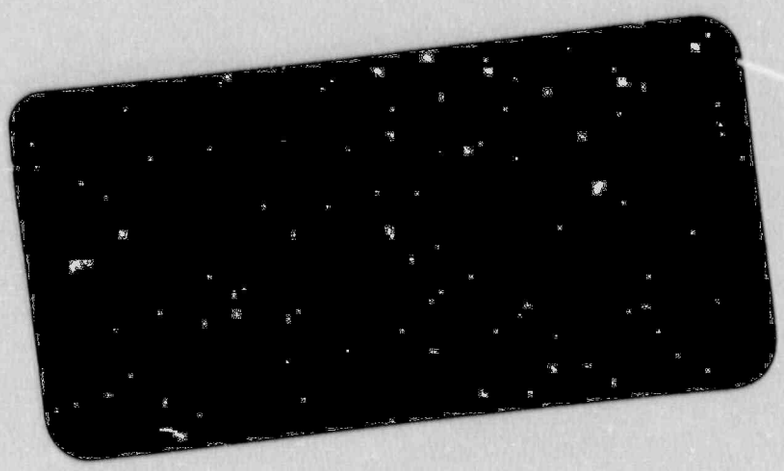
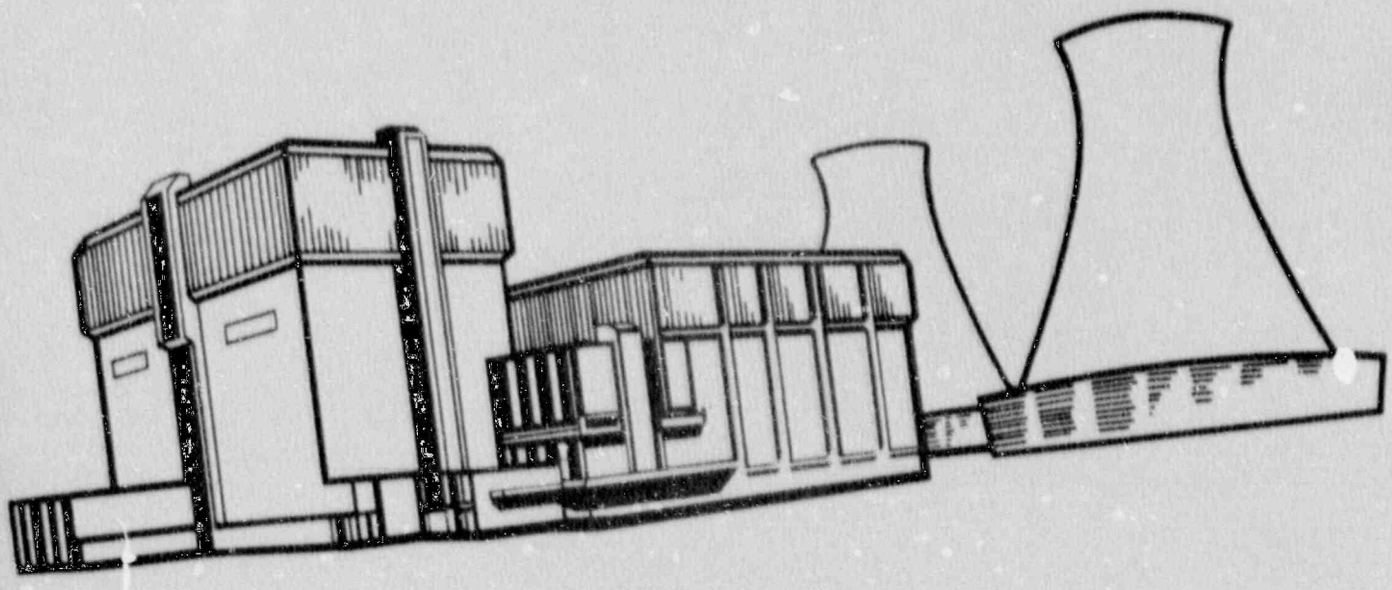
PHILADELPHIA ELECTRIC COMPANY
SERVICE
ELECTRIC GAS





LIMERICK GENERATING STATION

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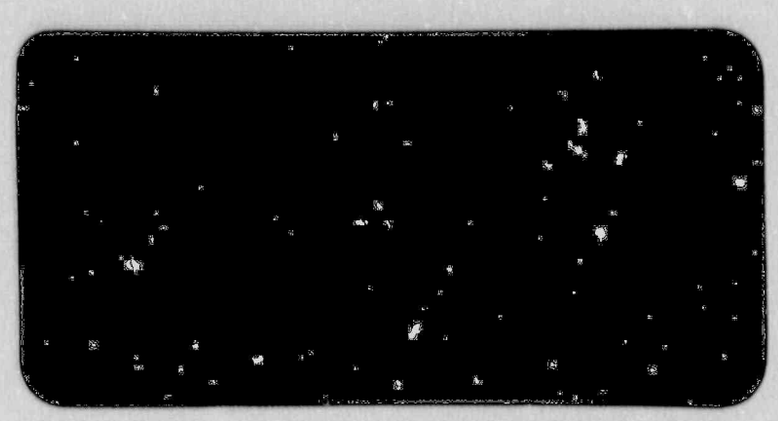

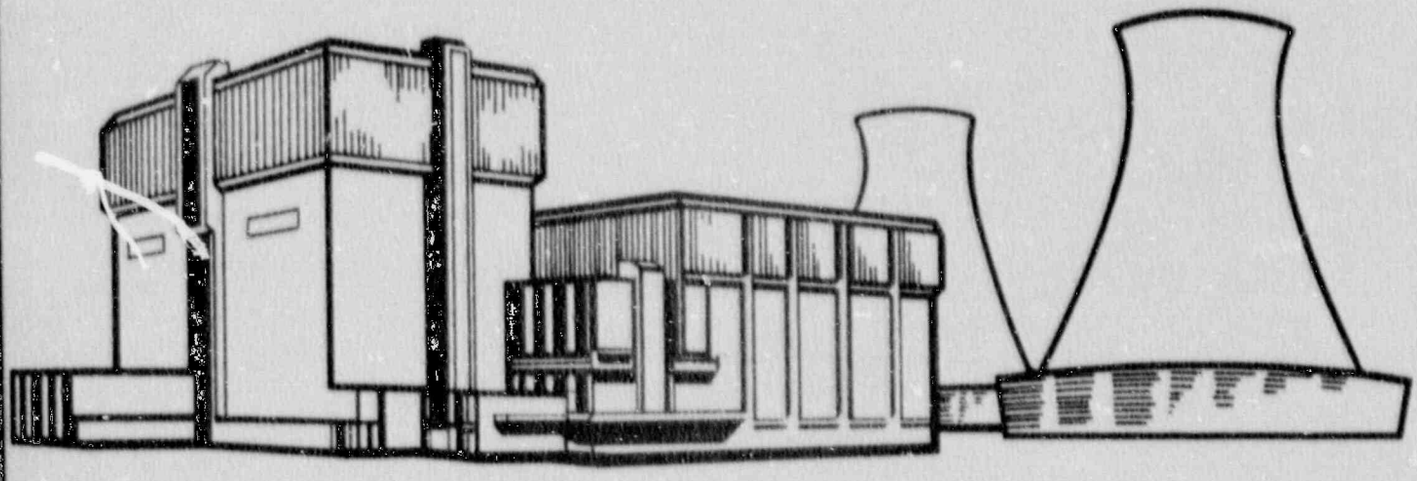

LIMERICK GENERATING STATION

PHILADELPHIA ELECTRIC COMPANY

LIMERICK GENERATING STATION
UNITS NO. 1 AND 2

DOCKET NO. 50-352 (Unit 1)
DOCKET NO. 50-353 (Unit 2)

SEMI-ANNUAL EFFLUENT RELEASE REPORT
NO. 12
JANUARY 1, 1990 THROUGH JUNE 30, 1990
Attachment D.
Offsite Dose Calculations Manual, Revision 8

OFFSITE DOSE CALCULATION MANUAL

REVISION 8

LIMERICK GENERATING STATION

UNITS 1 AND 2

PHILADELPHIA ELECTRIC COMPANY

DOCKET NOS. 50-352 and 50-353

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LIMERICK GENERATING STATION

OFFSITE DOSE CALCULATION MANUAL INDEX

PROCEDURE NAME	REV. NO.	TITLE	DATE SIGNED	DATE OF LAST PERIODIC REVIEW
ODCM	8	Offsite Dose Calculation Manual	04/03/90	08/13/86

s;odcm

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LIMERICK GENERATING STATION
OFFSITE DOSE CALCULATION MANUAL

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6.8.4.d.1	3.3.1	2-1 (or 2-9) 2-2 (or 2-9) 2-4 (or 2-10) 2-5 (or 2-10)
6.8.4.d.2,d.3	3.2.2	1-1 1-2 1-3 1-4
6.8.4.d.4	3.2.3	1-5 1-6 1-7
6.8.4.d.5,d.6	3.2.4	1-8 1-9
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TABLE A-1 (cont.)

Technical Specification	ODCM Section I Requirement	ODCM Equation Section II
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PART I

DEFINITIONS

The following terms are defined so that uniform interpretation of these controls may be achieved. The defined terms appear in capitalized type and shall be applicable throughout these controls.

1.1 ACTION

ACTION shall be that part of a control which prescribes remedial measures required under designated conditions.

1.2 CHANNEL CALIBRATION

A CHANNEL CALIBRATION shall be the adjustment, as necessary, of the channel output such that it responds with the necessary range and accuracy to known values of the parameter which the channel monitors. The CHANNEL CALIBRATION shall encompass the entire channel including the sensor and alarm and/or trip functions, and shall include the CHANNEL FUNCTIONAL TEST. The CHANNEL CALIBRATION may be performed by any series of sequential, overlapping or total channel steps such that the entire channel is calibrated.

1.3 CHANNEL CHECK

A CHANNEL CHECK shall be the qualitative assessment of channel behavior during operation by observation. This determination shall include, where possible, comparison of the channel indication and/or status with other indications and/or status derived from independent instrument channels measuring the same parameter.

1.4 CHANNEL FUNCTIONAL TEST

A CHANNEL FUNCTIONAL TEST shall be:

a. Analog channels - the injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY including alarm and/or trip functions and channel failure trips.

b. Bistable channels - the injection of a simulated signal into the sensor to verify OPERABILITY including alarm and/or trip functions.

The CHANNEL FUNCTIONAL TEST may be performed by any series of sequential, overlapping or total channel steps such that the entire channel is tested.

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Date 5/1/90
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1.5 DOSE EQUIVALENT I-131

DOSE EQUIVALENT I-131 shall be that concentration of I-131, microcuries per gram, which alone would produce the same thyroid dose as the quantity and isotopic mixture of I-131, I-132, I-133, I-134, and I-135 actually present. The thyroid dose conversion factors used for this calculation shall be those listed in Table III of TID-14844, "Calculation of Distance Factors for Power and Test Reactor Sites."

1.6 FREQUENCY NOTATION

The FREQUENCY NOTATION specified for the performance of Surveillance Requirements shall correspond to the intervals defined in Table 1.1.

1.7 MEMBER(S) OF THE PUBLIC

MEMBER(S) OF THE PUBLIC shall include all persons who are not occupationally associated with the plant. This category does not include employees of the utility, its contractors, or vendors. Also excluded from this category are persons who enter the site to service equipment or to make deliveries. This category does include persons who use portions of the site for recreational, occupational, or other purposes not associated with the plant.

1.8 OFFSITE DOSE CALCULATION MANUAL

The OFFSITE DOSE CALCULATION MANUAL (ODCM) shall contain the methodology and parameters used in the calculation of offsite doses resulting from radioactive gaseous and liquid effluents, in the calculation of gaseous and liquid effluent monitoring Alarm/Trip Setpoints, and in the conduct of the Environmental Radiological Monitoring Program. The ODCM shall also contain (1) the Radioactive Effluents Controls and Radiological Environmental Monitoring Programs required by Technical Specification 6.8.4 and (2) descriptions of the information that should be included in the Annual Radiological Environmental Operating and Semi-annual Radioactive Effluent Release Reports required by Technical Specifications 6.9.1.7 and 6.9.1.8. (3) description of meteorological monitoring controls.

Engr. JWB
H. P. LAS
Date 3/1/90
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1.9 OPERABLE - OPERABILITY

A system, subsystem, train, component or device shall be OPERABLE or have OPERABILITY when it is capable of performing its specified function(s) and when all necessary attendant instrumentation, controls, electrical power, cooling or seal water, lubrication or other auxiliary equipment that are required for the system, subsystem, train, component, or device to perform its function(s) are also capable of performing their related support function(s).

1.10 OPERATIONAL CONDITION - CONDITION

An OPERATIONAL CONDITION, i.e., CONDITION, shall be any one inclusive combination of mode switch position and average reactor coolant temperature as defined in the Technical Specifications.

1.11 PURGE - PURGING

PURGE or PURGING shall be the controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration or other operating condition, in such a manner that replacement air or gas is required to purify the confinement.

1.12 RATED THERMAL POWER

RATED THERMAL POWER shall be a total reactor core heat transfer rate to the reactor coolant of 3293 MWt.

1.13 REPORTABLE EVENT

A REPORTABLE EVENT shall be any of those conditions specified in Section 50.73 to 10 CFR Part 50.

1.14 SITE BOUNDARY

The SITE BOUNDARY shall be that line as defined in Figure I2.2-1a.

1.15 SOURCE CHECK

A SOURCE CHECK shall be the qualitative assessment of channel response when the channel sensor is exposed to a radioactive source.

1.16 THERMAL POWER

THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.

Engr. JWS
H. P. [illegible]
Date 3/28/90
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1.17 UNRESTRICTED AREA

An UNRESTRICTED AREA shall be any area at or beyond the SITE BOUNDARY access to which is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials, or any area within the SITE BOUNDARY used for residential quarters or for industrial, commercial, institutional, and/or recreational purposes.

1.18 VENTILATION EXHAUST TREATMENT SYSTEM

A VENTILATION EXHAUST TREATMENT SYSTEM shall be any system designed and installed to reduce gaseous radioiodine or radioactive material in particulate form in effluents by passing ventilation or vent exhaust gases through charcoal adsorbers and/or HEPA filters for the purpose of removing iodines or particulates from the gaseous exhaust stream prior to the release to the environment (such a system is not considered to have any effect on noble gas effluents). Engineered Safety Feature (ESF) atmospheric cleanup systems are not considered to be VENTILATION EXHAUST TREATMENT SYSTEM components.

1.19 VENTING

VENTING shall be the controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration or other operating condition, in such a manner that replacement air or gas is not provided or required during VENTING. Vent, used in system names, does not imply a VENTING process.

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Date 3/1/90
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TABLE 1.1

SURVEILLANCE FREQUENCY NOTATION

NOTATION	FREQUENCY
S	At least once per 12 hours.
D	At least once per 24 hours.
W	At least once per 7 days.
M	At least once per 31 days.
Q	At least once per 92 days.
SA	At least once per 184 days.
A	At least once per 366 days.
R	At least once per 18 months (550 days).
S/U	Prior to each reactor startup.
P	Prior to each radioactive release.
N.A.	Not applicable.

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2.1 METEOROLOGICAL MONITORING INSTRUMENTATION

The OPERABILITY of the meteorological monitoring instrumentation ensures that sufficient meteorological data is available for estimating potential radiation doses to the public as a result of routine or accidental release of radioactive materials to the atmosphere. This capability is required to evaluate the need for initiating protective measures to protect the health and safety of the public. This instrumentation is consistent with the recommendations of Regulatory Guide 1.23 "Onsite Meteorological Programs," February, 1972.

Site data compiled since January 1972 provide correlation between Elevation 1 (lower 1) and Elevation 1 (Tower 2), and between Elevation 2 (Tower 1) and Elevation 2 (Tower 2). This correlation serves as justification for the use of the appropriate Tower 2 instrument as a back-up to the Tower 1 instrument as shown in Table I 3.1-1.

MAPS DEFINING UNRESTRICTED AREAS AND SITE BOUNDARY FOR RADIOACTIVE GASEOUS AND LIQUID EFFLUENTS

2.2 Information regarding radioactive gaseous and liquid effluents, which will allow identification of structures and release points as well as definition of UNRESTRICTED AREAS within the SITE BOUNDARY that are accessible to MEMBER OF THE PUBLIC, shall be shown in Figures I2.2.-1a and I2.2.-1b.

The exclusion area and low population zone shall be as shown in Figures I2.2.-1c and I2.2-1d.

2.3 RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

The radioactive liquid effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in liquid effluents during actual or potential releases of liquid effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM part II to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

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FIGURE I2.2-1a

MAP DEFINING UNRESTRICTED AREAS AND SITE BOUNDARY
FOR RADIOACTIVE GASEOUS AND LIQUID EFFLUENTS

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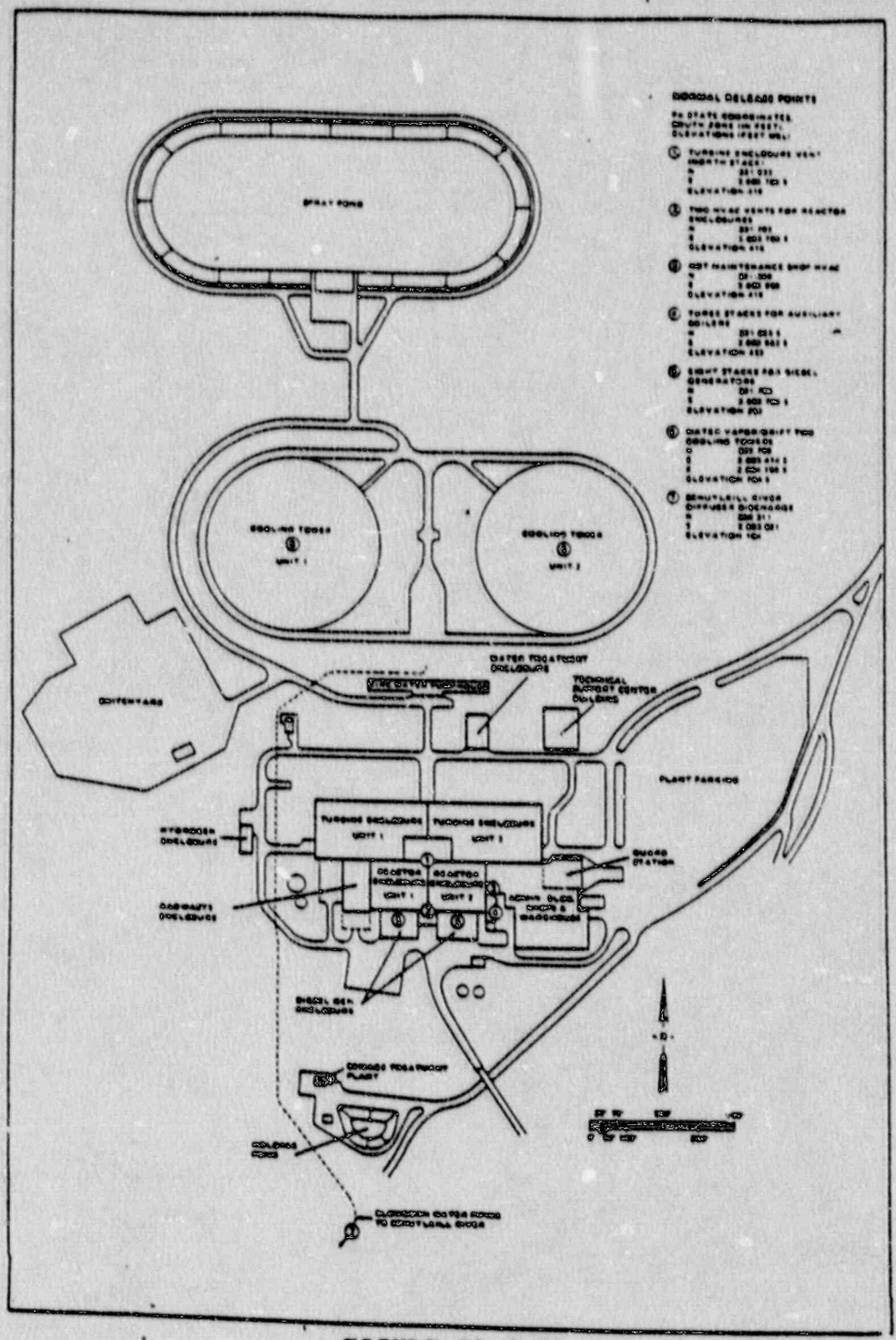

FIGURE I2.2-1b

MAP DEFINING UNRESTRICTED AREAS AND SITE BOUNDARY
FOR RADIOACTIVE GASEOUS AND LIQUID EFFLUENTS

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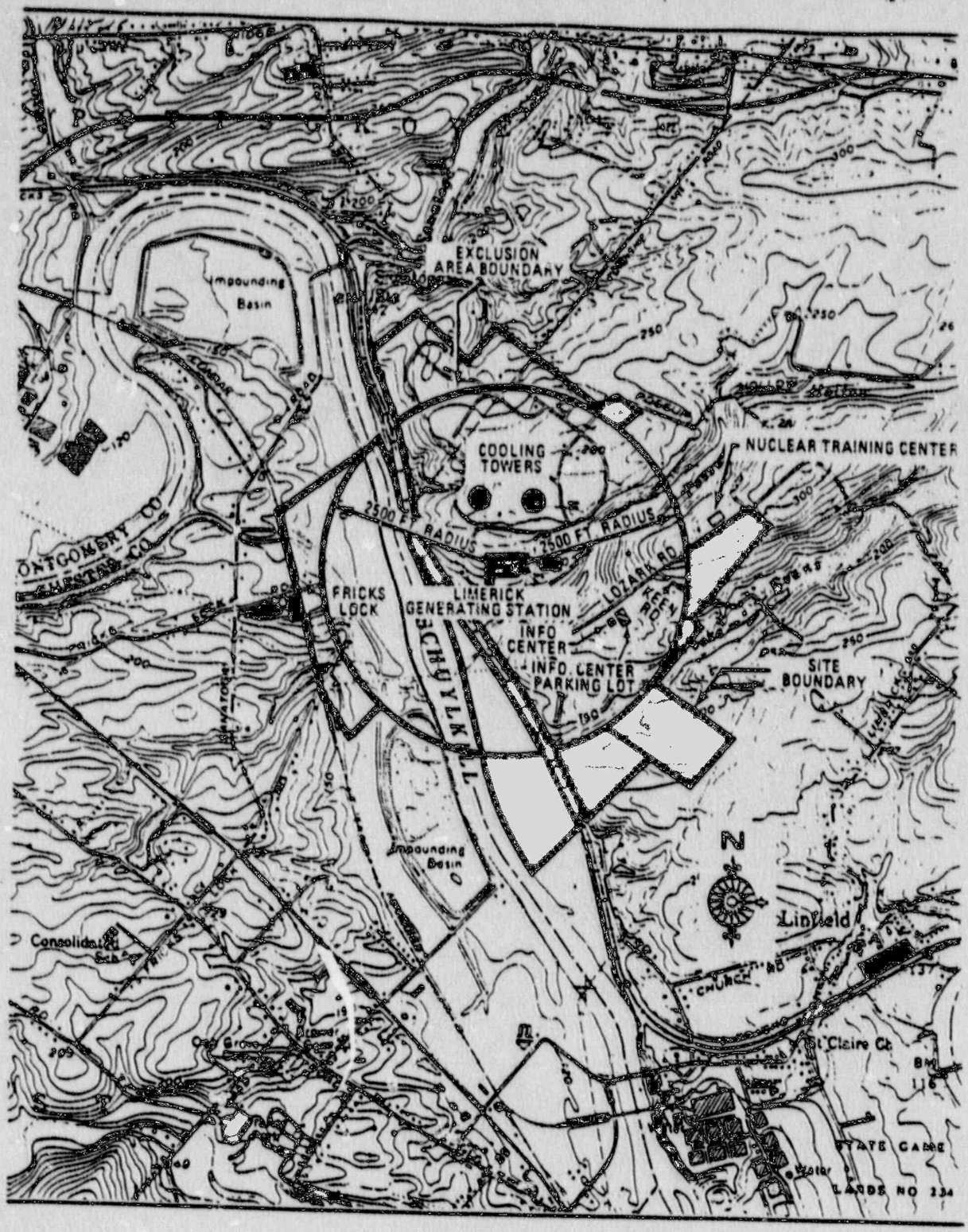

FIGURE I2.2-1c

EXCLUSION AREA

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FIGURE I2.2-1d

LOW POPULATION ZONE

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H. P. EWS
Date 3/1/90
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2.3.1 CONCENTRATION

This control is provided to ensure that the concentration of radioactive materials released in liquid waste effluents to UNRESTRICTED AREAS will be less than the concentration levels specified in 10 CFR Part 20, Appendix B, Table II, Column 2. This limitation provides additional assurance that the levels of radioactive materials in bodies of water in UNRESTRICTED AREAS will result in exposures within (1) the Section II.A design objectives of Appendix I, 10 CFR Part 50, to a MEMBER OF THE PUBLIC, and (2) the limits of 10 CFR 20.106(e) to the population. The concentration limits for dissolved or entrained noble gases are based upon the assumption that Xe-135 is the controlling radioisotope and its MPC in air was converted to an equivalent concentration in water using the methods described in the International Commission on Radiological Protection (ICRP) Publication 2.

The required detection capabilities for radioactive materials in liquid waste samples are tabulated in terms of the lower limits of detection (LLDs). Detailed discussion of the LLD, and other detection limits can be found in HASL Procedures Manual, HASL-300 (revised annually), Currie, L. A., "Limits for Qualitative Detection and Quantitative Determination - Application to Radiochemistry," Anal. Chem. 40, 586-93 (1968), and Hartwell, J. K., "Detection Limits for Radioanalytical Counting Techniques," Atlantic Richfield Hanford Company Report ARH-SA-215 (June, 1975).

2.3.2 DOSE

This Control is provided to implement the requirements of Sections II.A, III.A, and IV.A of Appendix I, 10 CFR Part 50. The Control implements the guides set forth in Section II.A of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in liquid effluents will be kept "as low as is reasonably achievable." Also, for fresh water sites with drinking water supplies which can be potentially affected by plant operations, there is reasonable assurance that the operation of the facility will not result in radionuclide concentrations in the finished drinking water that are in excess of the requirements of 40 CFR Part 141. The dose calculation methodology and parameters in the ODCM implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data, such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways is unlikely to be substantially underestimated. The equations specified in the ODCM for calculating the doses due to the actual release rates of radioactive materials in liquid effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October, 1977 and Regulatory Guide 1.113, "Estimating Aquatic Dispersion of Effluents from Accidental and Routine Reactor Releases for the Purpose of Implementing Appendix I," April, 1977.

This control applies to the release of radioactive materials in liquid effluents from the site.

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Date 3/1/90
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2.3.3 LIQUID RADWASTE TREATMENT SYSTEM

The requirement that the appropriate portions of this system be used when specified provides assurance that the releases of radioactive materials in liquid effluents will be kept "as low as is reasonably achievable". This specification implements the requirements of 10 CFR 50.35a, General Design Criterion 60 of Appendix A to 10 CFR Part 50 and the design objective given in Section II.D of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the liquid radwaste treatment system were specified as a suitable fraction of the dose design objectives set forth in Section II.A of Appendix I, 10 CFR Part 50, for liquid effluents.

2.4 RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

The radioactive gaseous effluent instrumentation is provided to monitor and control, as applicable, the releases of radioactive materials in gaseous effluents during actual or potential releases of gaseous effluents. The alarm/trip setpoints for these instruments shall be calculated in accordance with the procedures in the ODCM to ensure that the alarm/trip will occur prior to exceeding the limits of 10 CFR Part 20. The OPERABILITY and use of this instrumentation is consistent with the requirements of General Design Criteria 60, 63, and 64 of Appendix A to 10 CFR Part 50.

2.4.1 DOSE RATE

This control is provided to ensure that the dose at any time at and beyond the SITE BOUNDARY from gaseous effluents from the site will be within the annual dose limits of 10 CFR Part 20 to UNRESTRICTED AREAS. The annual dose limits are the dose associated with the concentrations of 10 CFR Part 20, Appendix B, Table II, Column I. These limits provide reasonable assurance that radioactive material discharged in gaseous effluents will not result in the exposure of a MEMBER OF THE PUBLIC in an UNRESTRICTED AREA, either within or outside the SITE BOUNDARY, to annual average concentrations exceeding the limits specified in Appendix B, Table II of 10 CFR Part 20 (10 CFR 20.106(b)(1)). For MEMBERS OF THE PUBLIC who may at times be within the SITE BOUNDARY, the occupancy factor for that MEMBER OF THE PUBLIC will usually be sufficiently low to compensate for any increase in the atmospheric diffusion factor for above that for the SITE BOUNDARY. Examples of calculations for such MEMBERS OF THE PUBLIC, with the appropriate occupancy factors, shall be given in the ODCM. The specified release rate limits restrict, at all times, the corresponding gamma and beta dose rates above background to a MEMBER OF THE PUBLIC at or beyond the SITE BOUNDARY to less than or equal to 500 mrems/year to the total body or to less than or equal to 3000 mrems/year to the skin. These release rate limits also restrict, at all times, the corresponding thyroid dose rate above background to a child via the inhalation pathway to less than or equal to 1500 mrems/year.

This specification applies to the release of radioactive materials in gaseous effluents from all reactors at the site.

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Date 3/4/80
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DOSE RATE (Continued)

The required detection capability for radioactive materials in gaseous waste samples are tabulated in terms of the lower limits of detection(LLDs). Detailed discussion of the LLD, and other detection limits can be found in HASL Procedures Manual, HASL-300 (revised annually), Currie, L. A., "Limits for Qualitative Detection and Quantitative Determination - Application to Radiochemistry," Anal. Chem. 40, 586-93 (1968), and Hartwell, J. K., "Detection Limits for Radioanalytical Counting Techniques." Atlantic Richfield Hanford Company Report (ARH-SA-215 (June 1975).

2.4.2 DOSE - NOBLE GASES

This control is provided to implement the requirements of Sections II.B, III.A, and IV.A of Appendix I, 10 CFR Part 50. The control implements the guides set forth in Section II.B of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive material in gaseous effluents will be kept "as low as is reasonably achievable". The Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on appropriate pathways is unlikely to be substantially underestimated. The dose calculation established in the ODCM for calculating the doses due to the actual release rates of radioactive noble gases in gaseous effluents are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision 1, October 1977 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routing Releases from Light-Water Cooled Reactors," Revision 1, July 1977 with site specific dispersion curves and deposition methodology. The ODCM equations provided for determining the air doses at and beyond the SITE BOUNDARY are based upon the historical average atmospheric conditions.

2.4.3 DOSE - IODINE-131, IODINE-133, TRITIUM, AND RADIONUCLIDES IN PARTICULATE FORM

This control is provided to implement the requirements of Sections II.C, III.A, and IV.A of Appendix I, 10 CFR Part 50. The controls are the guides set forth in Section II.C of Appendix I. The ACTION statements provide the required operating flexibility and at the same time implement the guides set forth in Section IV.A of Appendix I to assure that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonably achievable." The ODCM calculational methods specified in the Surveillance Requirements implement the requirements in Section III.A of Appendix I that conformance with the guides of Appendix I be shown by calculational procedures based on models and data, such that the actual exposure of a MEMBER OF THE PUBLIC through appropriate pathways

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Date 3/1/90
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DOSE-IODINE-131, IODINE-133, TRITIUM, AND RADIONUCLIDES IN PARTICULATE FORM (Continued)

is unlikely to be substantially underestimated. The ODCM calculational methods for calculating the doses due to the actual release rates of the subject materials are consistent with the methodology provided in Regulatory Guide 1.109, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10 CFR Part 50, Appendix I," Revision I, October 1977 and Regulatory Guide 1.111, "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water-Cooled Reactors," Revision 1, July 1977 with site specific dispersion curves and deposition methodology. These equations also provide for determining the actual doses based upon the historical average atmospheric conditions. The release rate specifications for iodine-131, iodine-133, tritium, and radionuclides in particulate form with half-lives greater than 8 days are dependent on the existing radionuclide pathways to man in areas at and beyond the SITE BOUNDARY. The pathways which were examined in the development of these calculations were: (1) individual inhalation of airborne radionuclides, (2) deposition of radionuclides onto green leafy vegetation with subsequent consumption by man, (3) deposition onto grassy areas where milk animals and meat-producing animals graze with consumption of the milk and meat by man, and (4) deposition on the ground with subsequent exposure of man.

2.4.4 VENTILATION EXHAUST TREATMENT SYSTEM

The requirement that the appropriate portions of this system be used, when specified, provides reasonable assurance that the releases of radioactive materials in gaseous effluents will be kept "as low as is reasonable achievable." This control implements the requirements of 10 CFR 50.36a, General Design Criterion 60 of Appendix A to 10 CFR Part 50, and the design objectives given in Section II.D of Appendix I to 10 CFR Part 50. The specified limits governing the use of appropriate portions of the systems were specified as a suitable fraction of the dose design objectives set forth in Section II.B and II.C of Appendix I, 10 CFR Part 50, for gaseous effluents.

2.4.5 VENTING OR PURGING

This control provides reasonable assurance that releases from drywell purging operations will not exceed the annual dose limits of 10 CFR Part 20 for UNRESTRICTED AREAS.

2.4.6 TOTAL DOSE

This control is provided to meet the dose limitations of 40 CFR Part 190 that have been incorporated into 10 CFR Part 20 by 46 CFR 18525. The control requires the the preparation and submittal of a Special Report whenever the calculated doses from plant radioactive effluents exceed twice the design objective doses of Appendix I. For sites containing up to four reactors, it is highly unlikely that the resultant dose to a MEMBER OF THE PUBLIC will exceed the dose limits of 40 CFR Part 190 if the individual reactors remain within the reporting requirement level.

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Date 8/1/90
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2.4.6 TOTAL DOSE (Continued)

The Special Report will describe a course of action that should result in the limitation of the annual dose to a member of the public to within the 40 CFR Part 190 limits. For the purposes of the Special Report, it may be assumed that the dose commitment to the MEMBER OF THE PUBLIC from other uranium fuel cycle sources is negligible, with the exception that dose contributions from other nuclear fuel cycle facilities at the same site or within a radius of 5 miles must be considered. If the dose to any MEMBER OF THE PUBLIC is estimated to exceed the requirements of 40 CFR Part 190, the Special Report with a request for a variance (provided the release conditions resulting in violation of 40 CFR Part 190 have not already been corrected), in accordance with the provisions of 40 CFR 190.11 and 10 CFR 20.405c, is considered to be a timely request and fulfills the requirements of 40 CFR Part 190 until NRC staff action is completed. An individual is not considered a MEMBER OF THE PUBLIC during any period in which he/she is engaged in carrying out any operation that is part of the nuclear fuel cycle.

2.5 RADIOLOGICAL ENVIROMENTAL MONITORING PROGRAM

The radiological environmental monitoring program required by this control provides representative measurements of radiation and of radioactive materials in those exposure pathways and for those radionuclides that lead to the highest potential radiation exposures of MEMBER OF THE PUBLIC resulting from the station operation. This monitoring program implements Section IV.B.2 of Appendix I to 10 CFR Part 50 and thereby supplements the radiological effluent monitoring program by verifying that the measurable concentrations of radioactive materials and levels of radiation are not higher than expected on the basis of the effluent measurements and modeling of the environmental exposure pathways. The initially specified monitoring program will be effective for at least the first 3 years of commercial operation. Following this period, program changes may be initiated based on operational experience.

The required detection capabilities for environmental sample analyses are tabulated in terms of the lower limits of detection (LLDs). The LLDs required by Table 4.12.1-1 are considered optimum for routine environmental measurements in industrial laboratories. It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not an a posteriori (after the fact) limit for a particular measurement.

Detailed discussion of the LLD, and other detection limits, can be found in HASL Procedures Manual, HASL-300 (revised annually); Currie L. A., "Limits for Qualitative Detection and Quantitative Determination - Application to Radiochemistry" Anal. Chem. 40, 586-93 (1968); and Hartwell, J. K., "Detection Limits for Radioanalytical Counting Techniques," Atlantic Richfield Hanford Company Report ARH-SA-215 (June 1975).

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Date 3/1/90
Rev. 9

2.5.1 LAND USE CENSUS

This control is provided to ensure that changes in the use of areas at and beyond the SITE BOUNDARY are identified and that modifications to the monitoring program are made if required by the results of this census. The best information from the door-to-door survey, aerial survey or consulting with local agricultural authorities or any combination of these methods shall be used. This census satisfies the requirements of Section IV.B.3 of Appendix I to 10 CFR Part 50. Restricting the census to gardens of greater than 500 square feet provides assurance that significant exposure pathways via leafy vegetables will be identified and monitored since a garden of this size is the minimum required to produce the quantity (26 kg/year) of leafy vegetables assumed in Regulatory Guide 1.109 for consumption by a child. To determine this minimum garden size, the following assumptions were used: (1) that 20% of the garden was used for growing broad leaf vegetation (i.e., similar to lettuce and cabbage), and (2) a vegetation yield of 2 kg/square meter.

2.5.2 INTERLABORATORY COMPARISON PROGRAM

The requirement for participation in an Interlaboratory Comparison Program is provided to ensure that independent checks on the precision and accuracy of the measurements of radioactive material in environmental sample matrices are performed as part of the quality assurance program for environmental monitoring in order to demonstrate that the results are reasonably valid for the purpose of Section IV.B.2 of Appendix I to 10 CFR Part 50.

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Date 3/1/90
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2.6 APPLICABILITY#

2.6.1 Compliance with the controls contained in the succeeding controls section is required during the OPERATIONAL CONDITIONS or other conditions specified therein; except that upon failure to meet the controls , the associated ACTION requirements shall be met.

2.6.2 Noncompliance with a control shall exist when the requirements of the control and associated ACTION requirements are not met within the specified time intervals. If the control is restored prior to expiration of the specified time intervals, completion of the ACTION requirements is not required.

2.6.3 There are no actions in the ODCM which would require an operational condition change.

2.6.4 There are no restrictions on changing operating conditions in any of the controls of the ODCM.

The associated bases from the LGS Technical Specifications applies to this section

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H. P. [illegible]
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2.6.5 Surveillance Requirements shall be met during the OPERATIONAL CONDITIONS or other conditions specified for individual controls unless otherwise stated in an individual Surveillance Requirement.

2.6.6 Each Surveillance Requirement shall be performed within the specified time interval with:

a. A maximum allowable extension not to exceed 25% of the surveillance interval, but

b. The combined time interval for any 3 consecutive surveillance intervals shall not exceed 3.25 times the specified surveillance interval.

2.6.7 Failure to perform a Surveillance Requirement within the allowed surveillance interval defined by control 2.6.6, shall constitute noncompliance with the OPERABILITY requirements for a control. The time limits of the ACTION requirements are applicable at the time it is identified that a Surveillance Requirement has not been performed. The ACTION requirements may be delayed for up to 24 hours to permit the completion of the surveillance when the allowable outage time limits of the ACTION requirements are less than 24 hours. Surveillance requirements do not have to be performed on inoperable equipment.

Engr. JWB
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Date 3/28/90
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METEOROLOGICAL MONITORING INSTRUMENTATION

CONTROLS

3.1 The meteorological monitoring instrumentation channels shown in Table I3.1-1 shall be OPERABLE.

APPLICABILITY: At all times.

ACTION:

a. With one or more meteorological monitoring instrumentation channels inoperable for more than 7 days, prepare and submit a Special Report to the Commission pursuant to LGS Technical Specification 6.9.2 within the next 10 days outlining the cause of the malfunction and the plans for restoring the instrumentation to OPERABLE status.

SURVEILLANCE REQUIREMENTS

3.1.1 Each of the above required meteorological monitoring instrumentation channels shall be demonstrated OPERABLE by the performance of the CHANNEL CHECK and CHANNEL CALIBRATION operations at the frequencies shown in Table I3.1-2.

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TABLE I3.1-1

METEOROLOGICAL MONITORING INSTRUMENTATION

INSTRUMENT	Tower 1 (Primary)	Tower 2 (Backup)	MINIMUM INSTRUMENTS OPERABLE
1. Wind Speed			
a. Elevation 1	30 feet	or 159 feet	1
b. Elevation 2	175 feet	or 304 feet	1
2. Wind Direction			
a. Elevation 1	30 feet	or 159 feet	1
b. Elevation 2	175 feet	or 304 feet	1
3. Air Temperature Difference			
a. Elevations	266 feet-26 feet	or 300 feet-26 feet	1

NOTE:

The meteorological towers shall be located as shown on Figure I3.1-1.

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Date 3/1/90
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TABLE 13.1-2

METEOROLOGICAL MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	CHANNEL CALIBRATION
1. Wind Speed		
a. Elevation 1 (Tower 1 and Tower 2)	D	SA
b. Elevation 2 (Tower 1 and Tower 2)	D	SA
2. Wind Direction		
a. Elevation 1 (Tower 1 and Tower 2)	D	SA
b. Elevation 2 (Tower 1 and Tower 2)	D	SA
3. Air Temperature Difference		
a. Elevations 266 - 26 ft (Tower 1)	D	SA
b. Elevations 300 - 26 ft (Tower 2)	D	SA

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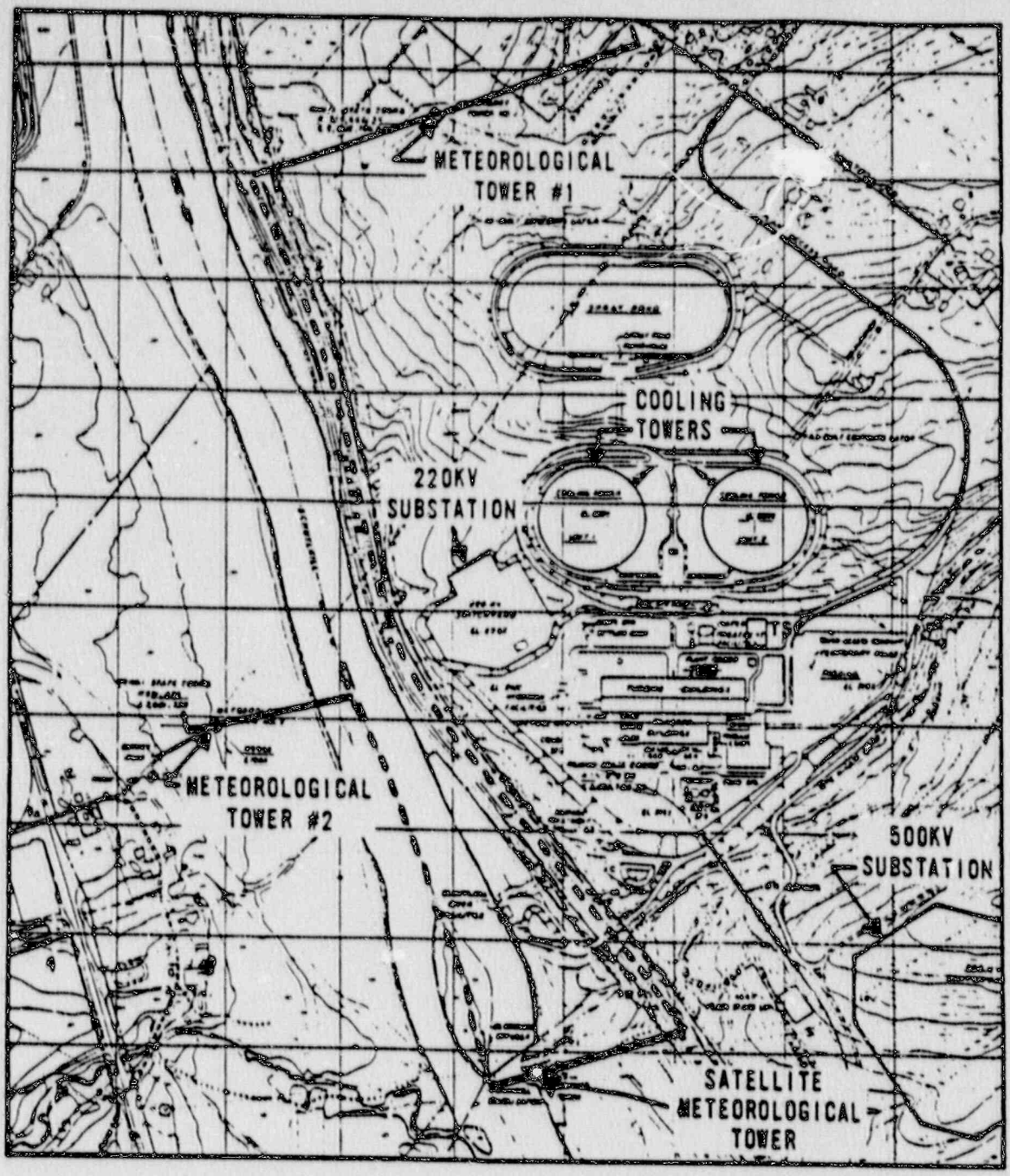

FIGURE I3.1-1

METEOROLOGICAL TOWER LOCATION

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Date 3/80
Rev. 5

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

CONTROLS

3.2.1 In accordance with LGS TS 6.8.4.d.1, the radioactive liquid effluent monitoring instrumentation channels shown in Table I3.2-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Control 3.2.2 are not exceeded. The alarm/trip setpoints* of these channels shall be determined and adjusted in accordance with the methodology and parameters in the OFFSITE DOSE CALCULATION MANUAL (ODCM).

APPLICABILITY: At all times.

ACTION:

a. With a radioactive liquid effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required by the above control, immediately suspend the release of radioactive liquid effluents monitored by the affected channel, or declare the channel inoperable.

b. With less than the minimum number of radioactive liquid effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table I3.2-1. Restore the inoperable instrumentation to OPERABLE status within the time specified in the ACTION or explain in the next Semiannual Radioactive Effluent Release Report why this inoperability was not corrected within the time specified.

SURVEILLANCE REQUIREMENTS

3.2.1.1 Each radioactive liquid effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table I3.2-2.

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* Excluding the flow rate measuring devices which are not determined and adjusted in accordance with the ODCM.

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Date 3/28/90
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TABLE I3.2-1

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION

	INSTRUMENT	MINIMUM CHANNELS OPERABLE	ACTION
1.	GROSS RADIOACTIVITY MONITORS PROVIDING AUTOMATIC TERMINATION OF RELEASE		
	a. Liquid Radwaste Effluent Line	1	100
	b. RHR Service Water System Effluent Line	1/loop	101
2.	GROSS RADIOACTIVITY MONITORS NOT PROVIDING AUTOMATIC TERMINATION OF RELEASE		
	a. Service Water System Effluent Line	1	101
3.	FLOW RATE MEASUREMENT DEVICES		
	a. Liquid Radwaste Effluent Line	1	102
	b. Discharge Line	1	102

ACTION STATEMENTS

ACTION 100 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases may continue for up to 14 days provided that prior to initiating a release:

a. At least two independent samples are analyzed in accordance with Table I3.2-3, and

b. At least two technically qualified members of the facility staff independently verify the release rate calculations and discharge line valving;

Otherwise, suspend release of radioactive effluents via this pathway.

ACTION 101 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided that, at least once per 8 hours, grab samples are collected and analyzed for gross radioactivity (beta or gamma). Beta is analyzed at a limit of detection of at least 1N7 microcurie/mL. Gamma is analyzed at a limit of detection of at least 5N7 microcurie/mL.

ACTION 102 - With the number of channels OPERABLE less [illegible]quired by the Minimum Channels OPERABLE requirement, e[illegible]eases via this pathway may continue for up to 30 days pr[illegible] flow rate is estimated at least once per 4 hours duri[illegible] releases. Pump curves generated in situ may be used to [illegible]flow.

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Date 3/1/90
Rev. 1

TABLE I3.2-2

RADIOACTIVE LIQUID EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST
1. GROSS RADIOACTIVITY MONITORS PROVIDING AUTOMATIC TERMINATION OF RELEASE				
a. Liquid Radwaste Effluent Line	P	P	R(3)	Q(1)
b. RHR Service Water System Effluent Line	D	M	R(3)	Q(1)
2. GROSS RADIOACTIVITY MONITORS NOT PROVIDING AUTOMATIC TERMINATION OF RELEASE				
a. Service Water System Effluent Line	D	M	R(3)	Q(2)
3. FLOW RATE MEASUREMENT DEVICES				
a. Liquid Radwaste Effluent Line	D(4)	N.A.	R	Q
b. Discharge Line	D(4)	N.A.	R	Q

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Date 3/11/80
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TABLE I3.2-2 (Continued)

TABLE NOTATIONS

(1) The CHANNEL FUNCTIONAL TEST shall also demonstrate that automatic isolation of this pathway and control room alarm annunciation occur if any of the following conditions exists:

1. Instrument indicates measured levels above the alarm/trip setpoint.
2. Circuit failure.
3. Instrument indicates a downscale failure.

(2) The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:

1. Instrument indicates measured levels above the alarm setpoint.
2. Circuit failure.
3. Instrument indicates a downscale failure.

(3) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Institute of Standards and Technology (NIST) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.

(4) CHANNEL CHECK shall consist of verifying indication of flow during periods of release. CHANNEL CHECK shall be made at least once per 24 hours on days on which continuous, periodic, or batch releases are made.

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Date 3/11/90
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CONCENTRATION

CONTROLS

3.2.2 In accordance with LGS TS 6.8.4.d.2 and 3, the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS (see Figure I2.2-1a,b) shall be limited to the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained nobles gases. For dissolved or entrained noble gases, the concentration shall be limited to 2×10^{-4} microcuries/ml total activity.

APPLICABILITY: At all times.

ACTION:

With the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS exceeding the above limits, immediately restore the concentration to within the above limits.

SURVEILLANCE REQUIREMENTS

3.2.2.1 Radioactive liquid wastes shall be sampled and analyzed according to the sampling and analysis program of Table I3.2-3.

3.2.2.2 The results of the radioactivity analyses shall be used in accordance with the methodology and parameters in the ODCM to assure that the concentrations at the point of release are maintained within the limits of Control 3.2.2.

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Date 3/1/90
Rev. 2

TABLE 13.2-3

RADIOACTIVE LIQUID WASTE SAMPLING AND ANALYSIS PROGRAM

LIQUID RELEASE TYPE	SAMPLING FREQUENCY	MINIMUM ANALYSIS FREQUENCY	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD)[a] (uCi/ML)
A. Batch Waste Release Tanks[b]	P Each Batch	P Each Batch	Principal Gamma Emitters[c]	$5x10^{-7}$
			I-131	$1x10^{-6}$
1. Floor Drain Sample Tank No. 2	P One Batch/M	M	Dissolved and Entrained Gases (Gamma Emitters)	$1x10^{-5}$
2. Laundry Drain Sample Tank	P Each Batch	M Composite[d]	H-3	$1x10^{-5}$
			Gross Alpha	$1x10^{-7}$
	P Each Batch	Q Composite[d]	Sr-89, Sr-90	$5x10^{-8}$
			Fe-55	$1x10^{-6}$
B. Continuous Release[e]	W Grab Sample	W	Principal Gamma Emitters[c]	$5x10^{-7}$
			I-131	$1x10^{-6}$
1. RHR Service Water System Effluent Line[f]	W Grab Sample	W	Dissolved and Entrained Gases (Gamma Emitters)	$1x10^{-5}$
2. Service Water System Effluent Line[f]	W Grab Sample	M Composite[d]	H-3	$1x10^{-5}$
			Gross Alpha	$1x10^{-7}$
	W Grab Sample	Q Composite[d]	Sr-89, Sr-90	$5x10^{-8}$
			Fe-55	$1x10^{-6}$

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H. P. [illegible]
Date 3/14/90
Rev. 9

TABLE 13.2-3 (Continued)

TABLE NOTATIONS

[a]The LLD is defined, for purposes of these controls, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, which may include radiochemical separation:

$$LLD = \frac{4.66 s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

Where:

LLD is the a priori lower limit of detection as defined above (as microcuries per unit mass or volume),

s_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute),

E is the counting efficiency, as counts per disintegration,

V is the sample size, in units of mass or volume,

2.22×10^6 is the number of disintegrations per minute per microcurie,

Y is the fractional radiochemical yield, when applicable,

λ is the radioactive decay constant for the particular radionuclide, and

Δt for the plant effluents is the elapsed time between the midpoint of sample collection and time of counting.

Typical values of E, V, Y, and Δt should be used in calculation.

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

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Date 3/4/80
Rev. 8

TABLE 13.2-3 (Continued)

TABLE NOTATIONS

[b] A batch release is the discharge of liquid wastes of a discrete volume. Prior to sampling for analyses, each batch shall be isolated, and then thoroughly mixed to assure representative sampling.

[c] The principal gamma emitters for which the LLD specification applies include the following radionuclides: Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, Cs-134, Cs-137, Ce-141, and Ce-144. This list does not mean that only these nuclides are to be considered. Other gamma peaks that are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Semiannual Radioactive Effluent Release Report pursuant to Control 3.6.

[d] A composite sample is one in which the quantity of liquid sampled is proportional to the quantity of liquid waste discharged and in which the method of sampling employed results in a specimen that is representative of the liquids released.

[e] A continuous release is the discharge of liquid wastes of a nondiscrete volume, e.g., from a volume of a system that has an input flow during the continuous release.

[f] Whenever effluent releases are in excess of the monitor's setpoint.

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Date 3/1/80
Rev. 8

DOSE

CONTROLS

3.2.3 In accordance with LGS TS 6.8.4.d.4 and 5, the dose or dose commitment to a MEMBER OF THE PUBLIC from radioactive materials in liquid effluents released from the site to UNRESTRICTED AREAS (See Figure I2.2-1a) shall be limited:

a. During any calendar quarter to less than or equal to 3 mrems to the total body and to less than or equal to 10 mrems to any organ, and

b. During any calendar year to less than or equal to 6 mrems to the total body and to less than or equal to 20 mrems to any organ.

APPLICABILITY: At all times.

ACTION:

a. With the calculated dose from the release of radioactive materials in liquid effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report which identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits. This Special Report shall also include the radiological impact on finished drinking water supplies at the nearest downstream drinking water source.

SURVEILLANCE REQUIREMENTS

3.2.3.1 Cumulative dose contributions from liquid effluents for the current calendar quarter and the current calendar year shall be determined in accordance with the methodology and parameters in the ODCM at least once per 31 days.

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Date 3/28/90
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LIQUID RADWASTE TREATMENT SYSTEM

CONTROLS

3.2.4 In accordance with LGS TS 6.8.4.d.6, the liquid radwaste treatment system shall be OPERABLE and appropriate portions of the system shall be used to reduce the radioactive materials in liquid waste prior to their discharge when the projected doses due to the liquid effluent, from the site, to UNRESTRICTED AREAS (see Figure I2.2-1a) would exceed 0.06 mrem to the total body or 0.2-mrem to any organ in a 31-day period.

APPLICABILITY: At all times.

ACTION:

a. With radioactive liquid waste being discharged without treatment and in excess of the above limits, prepare and submit to the Commission within 30 days pursuant to Technical Specification 6.9.2 a Special Report which includes the following information:

1. Explanation of what liquid radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems, and the reason for the inoperability,

2. Action(s) taken to restore the inoperable equipment to OPERABLE status, and

3. Summary description of action(s) taken to prevent a recurrence.

SURVEILLANCE REQUIREMENTS

3.2.4.1 Doses due to liquid releases from the site to UNRESTRICTED AREAS shall be projected at least once per 31 days in accordance with the methodology and parameters in the ODCM.

4.2.4.2 The liquid radwaste treatment system shall be demonstrated OPERABLE by meeting Controls 3.2.2 and 3.2.3.

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Date 3/15/90
Rev. 8

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

CONTROLS

3.3.1 In accordance with LGS TS 6.8.4.d.1, the radioactive gaseous effluent monitoring instrumentation channels shown in Table I3.3-1 shall be OPERABLE with their alarm/trip setpoints set to ensure that the limits of Control 3.3.2 are not exceeded. The alarm/trip setpoints of the applicable channels shall be determined in accordance with the methodology and parameters in the ODCM.

APPLICABILITY: As shown in Table I3.3-1

ACTION:

a. With a radioactive gaseous effluent monitoring instrumentation channel alarm/trip setpoint less conservative than required by the above Control, immediately suspend the release of radioactive gaseous effluents monitored by the affected channel or declare the channel inoperable.

b. With less than the minimum number of radioactive gaseous effluent monitoring instrumentation channels OPERABLE, take the ACTION shown in Table I3.3-1. Restore the inoperable instrumentation to OPERABLE status within the time specified in the ACTION or explain why this inoperability was not corrected in a timely manner in the next Semiannual Radioactive Effluent Release Report.

SURVEILLANCE REQUIREMENTS

3.3.1.1 Each radioactive gaseous effluent monitoring instrumentation channel shall be demonstrated OPERABLE by performance of the CHANNEL CHECK, SOURCE CHECK, CHANNEL CALIBRATION, and CHANNEL FUNCTIONAL TEST operations at the frequencies shown in Table I3.3-2.

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Date 3/29/90
Rev. 6

TABLE 13.3-1

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
1. SOUTH STACK EFFLUENT MONITORING SYSTEM			
a. Noble Gas Activity Monitor	1	*	111
b. Iodine Sampler	1	*	112
c. Particulate Sampler	1	*	112
d. Effluent System Flow Rate Monitor	1	*	113
e. Sampler Flow Rate Monitor	1	*	113
2. NORTH STACK EFFLUENT MONITORING SYSTEM			
a. Noble Gas Activity Monitor	1	*	114
b. Iodine Sampler	1	*	112
c. Particulate Sampler	1	*	112
d. Effluent System Flow Rate Monitor	1	*	113
e. Sampler Flow Rate Monitor	1	*	113

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Date 3/[illegible]/80
F [illegible]

TABLE 13.3-1 (continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION

INSTRUMENT	MINIMUM CHANNELS OPERABLE	APPLICABILITY	ACTION
3. HOT MAINTENANCE SHOP VENTILATION EXHAUST RADIATION MONITOR			
a. Iodine Sampler	1	**	112
b. Particulate Sampler	1	**	112
c. Effluent System Flow Rate Monitor	1	**	113
d. Sampler Flow Rate Monitor	1	**	113

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Date 3/1/90
Rev. B

TABLE 13.3-1 (Continued)

TABLE NOTATIONS

* At all times.

** During operation of the hot maintenance shop ventilation exhaust system.

ACTION STATEMENTS

ACTION 111 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided grab samples are taken at least once per 8 hours and these samples are analyzed for gross activity within 24 hours.

ACTION 112 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided samples are continuously collected with auxiliary sampling equipment as required in Table I3.3-3

ACTION 113 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided the flow rate is estimated at least once per 4 hours.

ACTION 114 - With the number of channels OPERABLE less than required by the Minimum Channels OPERABLE requirement, effluent releases via this pathway may continue for up to 30 days provided grab samples are taken at least once per 8 hours and these samples are analyzed for gross activity within 24 hours and provided the mechanical vacuum pumps are not operated.

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H. P.
Date 5/1/90
Rev. 8

TABLE I3.3-2

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE IS REQUIRED
1. SOUTH STACK EFFLUENT MONITORING SYSTEM					
a. Noble Gas Activity Monitor	D	M	R(2)	Q(1)	*
b. Iodine Sampler	W(3)	N.A.	N.A.	N.A.	*
c. Particulate Sampler	W(3)	N.A.	N.A.	N.A.	*
d. Effluent System Flow Rate Monitor	D	N.A.	R	Q	*
e. Sampler Flow Rate Monitor	D	N.A.	R	Q	*
2. NORTH STACK EFFLUENT MONITORING SYSTEM					
a. Noble Gas Activity Monitor	D	M	R(2)	Q(1)	*
b. Iodine Sampler	W(3)	N.A.	N.A.	N.A.	*
c. Particulate Sampler	W(3)	N.A.	N.A.	N.A.	*
d. Effluent System Flow Rate Monitor	D	N.A.	R	Q	*
e. Sampler Flow Rate Monitor	D	N.A.	R	Q	*

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H. P. EAE
Date 3/4/90
Rev. 0

TABLE 13.3-2 (Continued)

RADIOACTIVE GASEOUS EFFLUENT MONITORING INSTRUMENTATION SURVEILLANCE REQUIREMENTS

INSTRUMENT	CHANNEL CHECK	SOURCE CHECK	CHANNEL CALIBRATION	CHANNEL FUNCTIONAL TEST	MODES IN WHICH SURVEILLANCE IS REQUIRED
3. HOT MAINTENANCE SHOP VENTILATION EXHAUST RADIATION MONITOR					
a. Iodine Sampler	W(3)	N.A.	N.A.	N.A.	**
b. Particulate Sampler	W(3)	N.A.	N.A.	N.A.	**
c. Effluent System Flow Rate Monitor	D	N.A.	R	Q	**
d. Sampler Flow Rate Monitor	D	N.A.	R	Q	**

Engr. JHS
H. P. PLG
Date 3/1/80
Rev. 8

TABLE 13.3-2 (Continued)

TABLE NOTATIONS

* At all times.

** During operation of the hot maintenance shop ventilation exhaust system.

(1) The CHANNEL FUNCTIONAL TEST shall also demonstrate that control room alarm annunciation occurs if any of the following conditions exists:-

1. Instrument indicates measured levels above the alarm/trip setpoint.
2. Circuit failure.
3. Instrument indicates a downscale failure.
4. Instrument controls not set in operate mode.

(2) The initial CHANNEL CALIBRATION shall be performed using one or more of the reference standards certified by the National Institute of Standards and Testing (NIST) or using standards that have been obtained from suppliers that participate in measurement assurance activities with NIST. These standards shall permit calibrating the system over its intended range of energy and measurement range. For subsequent CHANNEL CALIBRATION, sources that have been related to the initial calibration shall be used.

(3) The iodine cartridges and particulate filters will be changed at least once per 7 days.

Engr. JWB
H. P. LWS
Date 3/7/90
Rev. X

GASEOUS EFFLUENTS

DOSE RATE

CONTROLS

3.3.2 In accordance with LGS TS 6.8.4.d.7 the dose rate due to radioactive materials released in gaseous effluents from the site to areas at or beyond the SITE BOUNDARY (see Figure I2.2-1a) shall be limited to the following:

a. For noble gases: Less than or equal to 500 mrems/yr to the total body and less than or equal to 3000 mrems/yr to the skin, and

b. For iodine-131, for iodine-133, for tritium, and for all radionuclides in particulate form with half-lives greater than 8 days; Less than or equal to 1500 mrems/yr to any organ. (Inhalation pathways only.)

APPLICABILITY: At all times.

ACTION:

a. With the dose rate(s) exceeding the above limits, immediately restore the release rate to within the above limits.

SURVEILLANCE REQUIREMENTS

3.3.2.1 The dose rate due to noble gases in gaseous effluents shall be determined to be within the above limits in accordance with the methodology and parameters of the ODCM.

3.3.2.2 The dose rate due to iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents shall be determined to be within the above limits in accordance with the methodology and parameters of the ODCM by obtaining representative samples and performing analyses in accordance with the sampling and analysis program specified in Table I3.3-3.

Engr. [signature]
H. P. [signature]
Date 3/28/80
Rev. 8

TABLE 13.3-3

RADIOACTIVE GASEOUS WASTE SAMPLING AND ANALYSIS PROGRAM

GASEOUS RELEASE TYPE	SAMPLING FREQUENCY	MINIMUM ANALYSIS FREQUENCY	TYPE OF ACTIVITY ANALYSIS	LOWER LIMIT OF DETECTION (LLD)[a] (mCi/mL)
A. Containment Purge (Pretreatment)	P Each Purge Grab Sample	P Each Purge	Principal Gamma Emitters[e,f]	1×10^{-4}
B. North Stack and South Stack	M[b] Grab Sample	M[b]	Principal Gamma Emitters[e]	1×10^{-4}
			H-3	1×10^{-6}
C. Hot Maintenance Shop Ventilation Exhaust[g] and All Release Types Listed in B above	Continuous[d]	W[c] Charcoal Sample	I-131 I-133	1×10^{-12} 1×10^{-10}
	Continuous[d]	W[c] Particulate Sample	Principal Gamma Emitters[e] (I-131, Others)	1×10^{-11}
	Continuous[d]	Q Composite Particulate Sample	Gross Alpha	1×10^{-11}
	Continuous[d]	Q Composite Particulate Sample	Sr-89, Sr-90	1×10^{-11}
D. All Release Types Listed in B above	Continuous[d]	Noble Gas Monitor	Noble Gases Gross Beta or Gamma	1×10^{-6} (Based on Xe-133)

Engr. JMB
H. P. FCB
Date 3/16/90
Rev. 4

TABLE 13.3-3 (Continued)

TABLE NOTATIONS

[a]The LLD is defined, for purposes of these Controls, as the smallest concentration of radioactive material in a sample that will yield a net count, above system background, that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system, (which may include radiochemical separation):

$$LLD = \frac{4.66 s_b}{E \cdot V \cdot 2.22 \times 10^6 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

Where:

LLD is the a priori lower limit of detection as defined above (as microcuries per unit mass or volume),

s_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute),

E is the counting efficiency (as counts per disintegration),

V is the sample size (in units of mass or volume),

2.22×10^6 is the number of disintegrations per minute per microcurie,

Y is the fractional radiochemical yield (when applicable),

λ is the radioactive decay constant for the particular radionuclide, and

Δt is the elapsed time between midpoint of sample collection and time of counting (for plant effluents, not environmental samples)

The value of s_b used in the calculation of the LLD for a detection system shall be based on the actual observed variance of the background counting rate or of the counting rate of the blank samples (as appropriate) rather than on an unverified theoretically predicted variance.

Typical values of E, V, Y, and Δt shall be used in the calculation.

It should be recognized that the LLD is defined an an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement.

Engr. JWB
H. P. EWS
Date 3/1/82
Rev. 6

TABLE NOTATIONS

b Sampling and analyses shall also be performed following shutdown, startup, or a THERMAL POWER change exceeding 15% of the RATED THERMAL POWER within a 1-hour period. This requirement does not apply if (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant has not increased more than a factor of 3; and (2) the main condenser offgas pre-treatment radioactivity monitor shows that effluent activity has not increased more than a factor of 3.

c Samples shall be changed at least once per 7 days and analyses shall be completed within 48 hours after changing, or after removal from sampler. Sampling shall also be performed at least once per 24 hours for at least 7 days following each shutdown, startup, or THERMAL POWER change exceeding 15% of RATED THERMAL POWER in 1 hour and analyses completed within 48 hours of changing. When samples collected for 24 hours are analyzed, the corresponding LLDs may be increased by a factor of 10. This requirement does not apply if (1) analysis shows that the DOSE EQUIVALENT I-131 concentration in the primary coolant has not increased more than a factor of 3; and (2) the noble gas monitor shows that effluent activity has not increased more than a factor of 3.

d The ratio of the sample flow rate to the sampled stream flow rate shall be known for the time period covered by each dose or dose rate calculation made in accordance with Controls 3.3.2, 3.3.3, and 3.3.4.

e The principal gamma emitters for which the LLD specification applies include the following radionuclides: Kr-87, Kr-88, Xe-133, Xe-133m, Xe-135, Xe-135m and Xe-138 for gaseous emissions and Mn-54, Fe-59, Co-58, Co-60, Zn-65, Mo-99, I-131, Cs-134, Cs-137, Ce-141 and Ce-144 for particulate emissions. This list does not mean that only these nuclides are to be considered. Other gamma peaks which are identifiable, together with those of the above nuclides, shall also be analyzed and reported in the Semiannual Radioactive Effluent Release Report, pursuant to Control 3.6

f Under the provisions of footnote e. above, only noble gases need to be considered.

g Required for the hot maintenance shop ventilation exhaust only during operation of the hot maintenance shop ventilation exhaust system.

Engr. JWB
H. P. [illegible]
Date 3/11/95
Rev. B

DOSE - NOBLE GASES

CONTROLS

3.3.3 In accordance with LGS TS 6.8.4.d.5 and 8, the air dose due to noble gases released in gaseous effluents, from the site to areas at and beyond the SITE BOUNDARY (see Figure I2.2-1a) shall be limited to the following:

a. During any calendar quarter: Less than or equal to 10 mrads for gamma radiation and less than or equal to 20 mrads for beta radiation, and

b. During any calendar year: Less than or equal to 20 mrads for gamma radiation and less than or equal to 40 mrads for beta radiation.

APPLICABILITY: At all times.

ACTION:

a. With the calculated air dose from radioactive noble gases in gaseous effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report which identifies the cause(s) for exceeding the limit(s) and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.

SURVEILLANCE REQUIREMENTS

3.3.3.1 Cumulative dose contributions for the current calendar quarter and current calendar year for noble gases shall be determined in accordance with the methodology and parameters in the ODCM at least once per 31 days.

Engr. JJB
H. P. RWG
Date 3/27/90
Rev. 8

DOSE - IODINE-133, TRITIUM, AND RADIONUCLIDES IN PARTICULATE FORM

CONTROLS

3.3.4 In accordance with LGS TS 6.8.4.d.9, the dose to a MEMBER OF THE PUBLIC from iodine-131, iodine-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents released, from the site to areas at and beyond the SITE BOUNDARY (see Figure I2.2-1a) shall be limited to the following:

a. During any calendar quarter: Less than or equal to 15 mrems to any organ and,

b. During any calendar year: Less than or equal to 30 mrems to any organ.

APPLICABILITY: At all times.

ACTION:

a. With the calculated dose from the release of iodine-131, iodine-133, tritium, and radionuclides in particulate form with half-lives greater than 8 days, in gaseous effluents exceeding any of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report which identifies the cause(s) for exceeding the limit and defines the corrective actions that have been taken to reduce the releases and the proposed corrective actions to be taken to assure that subsequent releases will be in compliance with the above limits.

SURVEILLANCE REQUIREMENTS

3.3.4.1 Cumulative dose contributions for the current calendar quarter and current calendar year for iodine-131, iodine-133, tritium, and radionuclides in particulate form with half-lives greater than 8 days shall be determined in accordance with the methodology and parameters in the ODCM at least once per 31 days.

Engr. JWB
H. P. RWG
Date 3/2/90
Rev. 8

VENTILATION EXHAUST TREATMENT SYSTEM

CONTROLS

3.3.5 In accordance with LGS TS 6.8.4.d.6, the VENTILATION EXHAUST TREATMENT SYSTEM shall be OPERABLE and appropriate portions of the system shall be used to reduce radioactive materials in gaseous waste prior to their discharge when the projected doses due to gaseous effluent releases, from the site to areas at and beyond the SITE BOUNDARY (see Figure I2.2-1) when averaged over 31 days would exceed 0.6 mrem to any organ in a 31-day period.

APPLICABILITY: At all times.

ACTION:

a. With gaseous waste being discharged without treatment, and in excess of the above limits, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report which includes the following information:

1. Explanation of why gaseous radwaste was being discharged without treatment, identification of any inoperable equipment or subsystems, and the reason for the inoperability.

2. Action(s) taken to restore the inoperable equipment to OPERABLE status, and

3. Summary description of action(s) taken to prevent a recurrence.

SURVEILLANCE REQUIREMENTS

3.3.5.1 Doses due to gaseous releases from the site to areas at and beyond the SITE boundary shall be projected at least once per 31 days in accordance with the methodology and parameters in the ODCM.

3.3.5.2 The VENTILATION EXHAUST TREATMENT SYSTEM shall be demonstrated OPERABLE by meeting Controls 3.3.2, 3.3.3 or 3.3.4.

Engr. JWB
H. P. [illegible]
Date 3/30/90
Rev. 8

CONTROLS

3.3.6 In accordance with LGS TS 6.8.4.d.10, VENTING or PURGING of the Mark II containment shall be through the standby gas treatment system.

APPLICABILITY: Whenever the containment is vented or purged.*

ACTION:

a. With the requirements of the above specification not satisfied, suspend all VENTING and PURGING of the containment.

SURVEILLANCE REQUIREMENTS

3.3.6.1 The containment shall be determined to be aligned for VENTING or PURGING through the standby gas treatment system within 4 hours prior to start of and at least once per 12 hours during VENTING or PURGING of the containment.

3.3.6.2 Prior to use of the purge system through the standby gas treatment system assure that:

a. Both standby gas treatment system trains are OPERABLE whenever the purge system is in use, and

b. Whenever the purge system is in use during OPERATIONAL CONDITION 1 or 2 or 3, only one of the standby gas treatment system trains may be used.

*Except for the one inch/two inch vent valves to the Reactor Enclosure Equipment Compartment Exhaust Filters when used for containment pressure control and nitrogen make-up operations.

Engr. JWB
H. P. [illegible]
Date 5/24/90
Rev. 18

RADIOACTIVE EFFLUENTS

TOTAL DOSE

CONTROLS

3.3.7 In accordance with LGS TS 6.8.4.d.11, the annual (calendar year) dose or dose commitment to any MEMBER OF THE PUBLIC, due to releases of radioactivity and radiation, from uranium fuel cycle sources shall be limited to less than or equal to 25 mrems to the total body or any organ, except the thyroid, which shall be limited to less than or equal to 75 mrems.

APPLICABILITY: At all times.

ACTION:

a. With the calculated doses from the release of radioactive materials in liquid or gaseous effluents exceeding twice the limits of Control 3.2.3.a, 3.2.3.b., 3.3.3.a., 3.3.3.b., 3.3.4.a., or 3.3.4.b., calculations shall be made including direct radiation contributions from the reactor units and from outside storage tanks to determine whether the above limits of Control 3.3.7 have been exceeded. If such is the case, prepare and submit to the Commission within 30 days, pursuant to Tech. Specification 6.9.2, a Special Report that defines the corrective action to be taken to reduce subsequent releases to prevent recurrence of exceeding the above limits and includes the schedule for achieving conformance with the above limits. This Special Report, as defined in 10 CFR 20.405c, shall include an analysis that estimates the radiation exposure (dose) to a MEMBER OF THE PUBLIC from the uranium fuel cycle sources, including all effluent pathways and direct radiation, for the calendar year that includes the release(s) covered by this report. It shall also describe levels of radiation and concentrations of radioactive material involved, and the cause of the exposure levels or concentrations. If the estimated dose(s) exceeds the above limits, and if the release condition resulting in violation 40 CFR Part 190 has not already been corrected, the Special Report shall include a request for a variance in accordance with the provisions of 40 CFR Part 190. Submittal of the report is considered a timely request, and a variance is granted until staff action on the request is complete.

SURVEILLANCE REQUIREMENTS

3.3.7.1 Cumulative dose contributions from liquid and gaseous effluents shall be determined in accordance with Controls 3.2.3.1, 3.3.3.1, and 3.3.4.1, and in accordance with the methodology and parameters in the ODCM.

3.3.7.2 If the cumulative dose contributions exceed the limits defined in 3.3.7a, Cumulative dose contributions from direct radiation from unit operation shall be determined in accordance with the methodology and parameters in the ODCM Part II.

Engr. JMB
H. P. [illegible]
Date 3/24/80
Rev. 8

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

CONTROLS

3.4.1 In accordance with LGS TS 6.8.4.f.1, the radiological environmental monitoring program shall be conducted as specified in Table I3.4-1.

APPLICABILITY: At all times.

ACTION

a. With the radiological enviornmental monitoring program not being conducted as specified in Table I3.4-1, prepare and submit to the Commission, in the Annual Radiological Environmental Operating Report per Control 3.5, a description of the reasons for not conducting the program as required and the plans for preventing a recurrence.

b. With the level of radioactivity as the result of plant effluents in an environmental sampling medium at a specified location exceeding the reporting levels of Table I3.4-2 when averaged over any calendar quarter, prepare and submit to the Commission within 30 days, pursuant to Technical Specification 6.9.2, a Special Report that identifies the cause(s) for exceeding the limit(s) and defines the corrective actions to be taken to reduce radioactive effluents so that the potential annual dose to a MEMBER OF THE PUBLIC is less than the calendar year limits of Controls 3.2.3, 3.3.3 and 3.3.4. When more than one of the radionuclides in Table I3.4-2 are detected in the sampling medium, this report shall be submitted if:

$$\frac{\text{concentration (1)}}{\text{reporting level (1)}} + \frac{\text{concentration(2)}}{\text{reporting level (2)}} + \ldots \geq 1.0$$

When radionuclides other than those in Table I3.4-2 are detected and are the result of plant effluents, this report shall be submitted if the potential annual dose to a MEMBER OF THE PUBLIC is equal to or greater than the calendar year limits of Controls 3.2.3, 3.3.3, and 3.3.4. This report is not required if the measured level of radioactivity was not the result of plant effluents; however, in such an event, the condition shall be reported and described in the Annual Radiological Environmental Operating Report.

Engr. JWB
H. P.
Date 2/4/80
Rev. 0

RADIOLOGICAL ENVIRONMENTAL MONITORING

CONTROLS

ACTION (Continued)

c. With milk or fresh leafy vegetable samples unavailable from one or more of the sample locations required by Table I3.4-1, identify locations for obtaining replacement samples and add them to the radiological environmental monitoring program within 30 days. The specific locations from which samples were unavailable may then be deleted from the monitoring program. Pursuant to Technical Specification 6.14, submit as a part of or concurrent with the Semiannual Radioactive Effluent Release Report, a complete, legible copy of the entire ODCM, including a revised figure(s) and table for the ODCM reflecting the new location(s).

SURVEILLANCE REQUIREMENTS

3.4.1.1 The radiological environmental monitoring samples shall be collected pursuant to Table I3.4-1 from the specific locations given in the table and figure(s) in the ODCM and shall be analyzed pursuant to the requirements of Table I3.4-1, the detection capabilities required by Table I3.4-3.

Engr. JWB
H. P. [illegible]
Date 3/24/90
Rev. 6

TABLE I3.4-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[a]	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
1. DIRECT RADIATION [b]	40 routine monitoring stations either with two or more dosimeters or with one instrument for measuring and recording dose rate continuously placed as follows: (1) An inner ring of stations, one in each meteorological sector, in the general area of the SITE BOUNDARY: (2) An outer ring of stations, one in each meteorological sector, in the 3-to-9-mile range from the site; (3) The balance of the stations placed in special interest areas such as population centers, nearby residences, schools, and in 1 or 2 areas to serve as control stations.	At least Quarterly.	Gamma dose at least quarterly.
2. AIRBORNE Radioiodine and Particulates	Samples from 5 locations: a. 3 samples from close to the 3 SITE BOUNDARY locations (in different sectors) of the highest calculated annual average groundlevel x/Q b. 1 sample from the vicinity community having one of the highest calculated annual highest groundlevel x/Q.	Continuous sampler operation with sample collection weekly, or more frequently if required by dust loading.[c]	Radioiodine Cannister: I-131 analysis weekly. Particulate Sampler: Gross beta radio activity analysis following filter change;[d] Gamma isotopic analysis[e] of composite (by location) at least quarterly.

Engr. JWB
H. P. [illegible]
Date 3/14/79
Rev. B

TABLE 13.4-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[a]	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
2. AIRBORNE (Continued)			
	1 sample from a control location, as for example 15-30 km distant and in the least prevalent wind direction.		
3. WATERBORNE			
a. Surface[f]	1 sample upstream 1 sample downstream	Composite sample over 1-month period.[g]	Gamma isotopic analysis[e] monthly. Composite for tritium analysis quarterly.
b. Ground	Samples from 1 or 2 sources only if likely to be affected.[h]	Quarterly.	Gamma isotopic[e] and tritium analysis quarterly.
c. Drinking	1 sample of each of 1 to 3 of the nearest water supplies that could be affected by its discharge.	Monthly. (Composite)	I-131 analysis on each composite when the dose calculated for the consumption of the water is greater than 1 mrem per year.[i] Composite for gross beta and gamma isotopic analyses monthly. Composite for tritium analysis quarterly.
	1 sample from a control location.		
d. Sediment from shoreline	1 sample from downstream area with existing or potential recreational value.	Semiannually.	Gamma isotopic analysis[e] semiannually.

Engr. JWS
H. P. CAS
Date 3/1/80
Rev. 8

TABLE 13.4-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[a]	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
4. INGESTION			
a. Milk	a. Samples from milking animals in 3 locations within 5 km distance having the highest dose potential. If there are none, then, 1 sample from milking animals in each of 3 areas between 5- to 8-km distance where doses are calculated to be greater than 1 mrem per yr.[i] 1 sample from milking animals at a control location (15-30 km km distant and in the least prevalent wind direction).	Semimonthly when animals are on pasture, monthly at other times.	Gamma isotopic[e] and I-131 analysis semimonthly when animals are on pasture; monthly at other times.
b. Fish and Invertebrates	a. 1 sample of two recreationally important species in vicinity of plant discharge area. 1 sample of same species in area not influenced by plant discharge.	Sample in season, or semiannually if they are not seasonal.	Gamma isotopic[e] analysis on edible portions.

Engr. RWB
H. P. CAC
Date 3/14/74
Rev. B

TABLE I3.4-1 (Continued)

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATIONS[a]	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
4. INGESTION (Continued)			
c. Food Products	Samples of 3 different kinds of broad leaf vegetation grown nearest each of two different offsite locations of highest predicted annual average ground level D/Q if milk sampling is not performed.	Monthly when available, if milk sampling is not performed.	Gamma isotopic[e] and I-131 analysis.
	1 sample of each of the similar broad leaf vegetation grown 15-30 km distant in the least prevalent wind direction if milk sampling is not performed.	Monthly when available, if milk sampling is not performed.	Gamma isotopic[e] and I-131 analysis.

Engr. JWB
H. P. RWS
Date 3/6/82
Rev. 8

TABLE I3.4-1 (Continued)

TABLE NOTATIONS

[a] Specific parameters of distance and direction sector from the centerline of the two reactors and additional description where pertinent, shall be provided for each and every sample location in Table I3.4-1 in a table and figure(s) in the ODCM. Deviations are permitted from the required sampling schedule if specimens are unobtainable due to hazardous conditions, seasonal unavailability, malfunction of automatic sampling equipment and other legitimate reasons. If specimens are unobtainable due to sampling equipment malfunction, every effort shall be made to complete corrective action prior to the end of the next sampling period. All deviations from the sampling schedule shall be documented in the Annual Radiological Environmental Operating Report pursuant to Control 3.5. It is recognized that, at times, it may not be possible or practicable to continue to obtain samples of the media of choice at the most desired location or time. In these instances suitable alternative media and locations may be chosen for the particular pathway in question and appropriate substitutions made within 30 days in the radiological environmental monitoring program. Pursuant to Technical Specification 6.14, submit as a part of or concurrent with the next Semiannual Radioactive Effluent Release Report a complete legible copy of the ODCM including a revised figure(s) and table for the ODCM reflecting the new location(s).

[b] One or more instruments, such as a pressurized ion chamber, for measuring and recording dose rate continuously may be used in place of, or in addition to, integrating dosimeters. For the purpose of this table, a thermoluminescent dosimeter (TLD) is considered to be one phosphor; two or more phosphors in a packet are considered as two or more dosimeters. Film badges shall not be used as dosimeters for measuring direct radiation.

[c] Methodology for recovery of radioiodine shall be described in the ODCM.

[d] Airborne particulate sample filters shall be analyzed for gross beta radioactivity 24 hours or more after sampling to allow for radon and thoron daughter decay. If gross beta activity in air particulate samples is greater than 10 times the yearly mean of control samples, gamma isotopic analysis shall be performed on the individual samples.

[e] Gamma isotopic analysis means the identification and quantification of gamma-emitting radionuclides that may be attributable to the effluents from the facility.

[f] The "upstream sample" shall be taken at a distance beyond significant influence of the discharge. The "downstream" samples shall be taken in an area beyond but near the mixing zone.

Engr. [signature]
H. P. [signature]
Date 7/1/80
Rev. 8

TABLE I3.4-1 (Continued)

TABLE NOTATIONS

[g] A composite sample is one in which the quantity (aliquot) of liquid sampled is proportional to the quantity of flowing liquid and in which the method of sampling employed results in a specimen that is representative of the liquid flow. In this program composite sample aliquots shall be collected at time intervals that are very short (e.g., hourly) relative to the compositing period (e.g., monthly) in order to assure obtaining a representative sample.

[h] Groundwater samples shall be taken when this source is tapped for drinking or irrigation purposes in areas where the hydraulic gradient or recharge properties are suitable for contamination.

[i] The dose shall be calculated for the maximum organ and age group, using the methodology and paremeters in the ODCM Part II.

Engr. SJVB
H. P. [illegible]
Date 3/1/90
Rev. 0

TABLE 13.4-2

REPORTING LEVELS FOR RADIOACTIVITY CONCENTRATIONS IN ENVIRONMENTAL SAMPLES

Reporting Levels

ANALYSIS	WATER (pCi/L)	AIRBORNE PARTICULATE or GASES (pCi/m^3)	FISH (pci/kg, wet)	MILK (pCi/L)	FOOD PRODUCTS (pCi/kg, wet)
H-3	20,000*				
Mn-54	1,000		30,000		
Fe-59	400		10,000		
Co-58	1,000		30,000		
Co-60	300		10,000		
Zn-65	300		20,000		
Zr-Nb-95	400**				
I-131	2	0.9		3	100
Cs-134	30	10	1,000	60	1,000
Cs-137	50	20	2,000	70	2,000
Ba-La-140	200**			300	

* For drinking water samples. This is 40 CFR Part 141 value. If no drinking water pathway exists, a value of 30,000 pCi/L may be used.

** Total for parent and daughter.

Engr. JWB
H. P. RWS
Date 3/17/80
Rev. 0

TABLE 13.4-3

DETECTION CAPABILITIES FOR ENVIRONMENTAL SAMPLE ANALYSIS[a]

LOWER LIMIT OF DETECTION (LLD)[b][c]

ANALYSIS	WATER (pCi/L)	AIRBORNE PARTICULATE or GASES (pCi/m^3)	FISH (pCi/kg, wet)	MILK (pCi/L)	FOOD PRODUCTS (pCi/kg, wet)	SEDIMENTS (pCi/kg, dry)
Gross Beta	4	0.01				
H-3	2000					
Mn-54	15		130			
Fe-59	30		260			
Co-58,60	15		130			
Zn-65	30		260			
Zr-95	30					
Nb-95	15					
I-131	1[d]	0.07		1	60	
Cs-134	15	0.05	130	15	60	150
Cs-137	18	0.06	150	18	80	180
Ba-140	60			60		
La-140	15			15		

Engr. JKB
H. P. RKG
Date 3/1/90
Rev. 8

TABLE I3.4-3 (Continued)

TABLE NOTATIONS

(a) This list does not mean that only these nuclides are to be considered. Other peaks that are identifiable at 95% confidence level, together with those of the above nuclides, shall also be analyzed and reported in the Annual Radiological Environmental Operating report pursuant to Control 3.5.

(b) Required detection capabilities for thermoluninescent dosimeters used for environmental measurements are given in Regulatory Guide 4.13.

(c) The LLD is defined, for purpose of these Controls, as the smallest concentration of radioactive material in a sample that will yield a net count (above system background) that will be detected with 95% probability with only 5% probability of falsely concluding that a blank observation represents a "real" signal.

For a particular measurement system (which may include radiochemical separation):

$$LLD = \frac{4.66\ s_b}{E \cdot V \cdot 2.22 \cdot Y \cdot \exp(-\lambda \Delta t)}$$

where

LLD is the "a priori" lower limit of detection as defined above (as picocuries per unit mass or volume),

s_b is the standard deviation of the background counting rate or of the counting rate of a blank sample as appropriate (as counts per minute),

E is the counting efficiency (as counts per disintegration),

V is the sample size (in units of mass or volume),

2.22 is the number of disintegrations per minute per picocurie,

Y is the fractional radiochemical yield (when applicable),

λ is the radioactive decay constant for the particular radionuclide, and

Δt is the environmental samples is the elapsed time between sample collection (or end of the sample collection period) and time of counting.

Typical values of E, V, Y and Δt should be used in the calculation.

Engr. JWB
H. P.
Date 3/1/79
Rev. 8

TABLE 13.4-3 (Continued)

TABLE NOTATIONS

It should be recognized that the LLD is defined as an a priori (before the fact) limit representing the capability of a measurement system and not as an a posteriori (after the fact) limit for a particular measurement. Analyses shall be performed in such a manner that the stated LLDs will be achieved under routine conditions. Occasionally background fluctuations, unavoidably small sample sizes, the presence of interfering nuclides, or other uncontrollable circumstances may render these LLDs unachievable. In such cases, the contributing factors shall be identified and described in the Annual Radiological Environmental Operating Report pursuant to Control 3.5.

(d) LLD for drinking water samples.

Engr. JNB
H. P. [illegible]
Date 5/1/90
Rev. B

LAND USE CENSUS

CONTROLS

3.4.2 In accordance with LGS TS 6.8.4.f.2, a land use census shall be conducted and shall identify within a distance of 8 km (5 miles) the location in each of the 16 meteorological sectors of the nearest milk animal, the nearest residence and the nearest garden* of greater than 50 m^2 (500 ft^2) producing broad leaf vegetation.

APPLICABILITY: At all times.

ACTION

a. With a land use census identifying a location(s) which yields a calculation dose or dose commitment greater than the values currently being calculated in Control 3.3.4.1, identify the new location(s) in the next Semiannual Radioactive Effluent Release Report, pursuant to Control 3.6.

b. With a land use census identifying a location(s) that yields a calculated dose or dose commitment (via the same exposure pathway) 20% greater than at a location from which samples are currently being obtained in accordance with Control 3.4.1, add the new location(s) to the radiological environmental monitoring program within 30 days. The sampling location(s), excluding the control station location, having the lowest calculated dose or dose commitment(s) (via the same exposure pathway) may be deleted from this monitoring program after October 31 of the year in which this land use census was conducted. Pursuant to Technical Specification 6.14, submit as a part of or concurrent with in the next Semiannual Radioactive Effluent Release Report a complete, legible copy of the entire ODCM including a revised figure(s) and table(s) for the ODCM reflecting the new location(s).

SURVEILLANCE REQUIREMENTS

3.4.2.1 The land use census shall be conducted during the growing season at least once per 12 months using that information that will provide the best results, such as by a door-to-door survey, aerial survey, or by consulting local agriculture authorities. The results of the land use census shall be included in the Annual Radiological Environmental Operating Report pursuant to Control 3.5.

* Broad leaf vegetation sampling of at least three different kinds of vegetation may be performed at the SITE BOUNDARY in each of two different direction sectors with the highest predicted D/Qs in lieu of the garden census. Controls for broad leaf vegetation sampling in Table I3.4-1 item 4.c. shall be followed, including analysis of control samples.

Engr. JWB
H. P. RWG
Date 3/24/90
Rev. 8

RADIOLOGICAL ENVIRONMENTAL MONITORING

INTERLABORATORY COMPARISON PROGRAM

CONTROLS

3.4.3 In accordance with LGS TS 6.8.4.f.3, analyses shall be performed on radioactive materials supplied as part of an Interlaboratory Comparison Program which has been approved by the Commission.

APPLICABILITY: At all times.

ACTION

a. With analyses not being performed as required above, report the corrective actions taken to prevent a recurrence to the Commission in the Annual Radiological Environmental Operating Report pursuant to Control 3.5.

SURVEILLANCE REQUIREMENTS

3.4.3.1 The interlaboratory Comparison Program shall be described in the ODCM. A summary of the results obtained as part of the above required Interlaboratory Comparison Program shall be included in the Annual Radiological Environmental Operating Report pursuant to Control 3.5.

Engr. JWB
H. P. KWB
Date 8/4/90
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ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT*

3.5 Routine Annual Radiological Environmental Operating Reports covering the operation of the unit during the previous calendar year shall be submitted prior to May 1 of each year. The initial report shall be submitted prior to May 1 of the year following initial criticality.

The Annual Radiological Environmental Operating Reports shall include summaries, interpretations, and an analysis of trends of the results of the radiological environmental surveillance activities for the report period, including a comparison (as appropriate), with preoperational studies, operational controls and previous environmental surveillance reports and an assessment of the observed impacts of the plant operation on the environment. The reports shall also include the results of land use censuses required by Control 3.4.2.

The Annual Radiological Environmental Operating Reports shall include the results of all radiological environmental samples and of all environmental radiation measurements taken during the report period pursuant to the locations specified in the tables and figures in the OFFSITE DOSE CALCULATION MANUAL, as well as summarized and tabulated results of these analyses and measurements in the format of the table in the Radiological Branch Technical Position, Revision 1, November 1979. In the event that some individual results are not available for inclusion with the report, the report shall be submitted noting and explaining the reasons for the missing results. The missing data shall be submitted as soon as possible in a supplementary report.

The reports shall also include the following: a summary description of the radiological environmental monitoring program; at least two legible maps.**

* A single submittal may be made for a multiple unit station.

**One map shall cover stations near the SITE BOUNDARY; a second shall include the more distant stations.

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3.5 ANNUAL RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT(continued)

covering all sampling locations keyed to a table giving distances and directions from the centerline of the reactor plant; the results of licensee participation in the Interlaboratory Comparison Program, required by Control 3.4.3 discussion of all deviations from the Sampling Schedule of Table I3.4-3; and discussion of all analyses in which the LLD required by Table I3.4-3 was not achievable.

3.6 SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT*

Routine Semiannual Radioactive Effluent Release Reports covering the operation of the unit during the previous 6 months of operation shall be submitted within 60 days after January 1 and July 1 of each year. The period of the first report shall begin with the date of initial criticality.

The Semiannual Radioactive Effluent Release Reports shall include a summary of the quantities of radioactive liquid and gaseous effluents and solid waste released from the facility as outlined in Regulatory Guide 1.21, "Measuring, Evaluating, and Reporting Radioactivity in Solid Wastes and Releases of Radioactive Materials in Liquid and Gaseous Effluents from Light-Water-Cooled Nuclear Power Plants," Revision 1, June 1974, with data summarized on a quarterly basis following the format of Appendix B thereof.

The Semiannual Radioactive Effluent Release Report to be submitted 60 days after January 1 of each year shall include an annual summary of hourly meteorologial data collected over the previous year. This annual summary may be either in the form of an hour-by-hour listing on magnetic tape of wind speed, wind direction and atmospheric stability, and precipitation (if measured), or in the form of joint frequency distributions of wind speed, wind direction, atmospheric stability.** This same report shall include an assessment of the radiation doses due to the radioactive liquid and gaseous effluents released from the unit or station during the previous calendar year. This same report shall also include an assessment of the radiation doses from radioactive liquid and gaseous effluents to MEMBERS OF THE PUBLIC due to their activities inside the SITE BOUNDARY (Figures I2.2-1a and I2.2-1b) during the report period. All assumptions used in making these assessments (i.e., specific activity, exposure time and location) shall be included in these reports. The assessment of radiation doses shall be performed in accordance with the methodology and parameters of the OFFSITE DOSE CALCULATION MANUAL (ODCM).

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*A single submittal may be made for a multiple unit station. The submittal should combine those sections that are common to all units at the station.

**In lieu of submission with the first half year Semiannual Radioactive Effluent Release Report, the licensee has the option of retaining this summary of required meteorological data on site in a file that shall be provided to the NRC upon request.

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3.6 SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (Continued)

The Semiannual Radioactive Effluent Release Report to be submitted 60 days after January 1 of each year shall also include an assessment of radiation doses to the likely most exposed MEMBER OF THE PUBLIC from reactor releases and other nearby uranium fuel cycle sources (including doses from primary effluent pathways and direct radiation) for the previous calendar year to show conformance with 40 CFR Part 160, Environmental Radiation Protection Standards for Nuclear Power Operation. Acceptable methods for calculating the dose contribution from liquid and gaseous effluents are given in Regulatory Guide 1.109, Rev. 1, October 1977.

The Semiannual Radioactive Effluent Release Reports shall include the following information for each type of solid waste (as defined in 10 CFR Part 61) shipped offsite during the report period:

a. Container volume,

b. Total curie quantity (specify whether determined by measurement or estimate),

c. Principal radionuclides (specify whether determined by measurement or estimate),

d. Source of waste and processing employed (e.g., dewatered spent resin, compacted dry waste, evaporator bottoms),

e. Type of container (e.g., LSA, Type A, Type B, Large Quantity), and

f. SOLIDIFICATION agent or absorbent (e.g., cement; urea formaldehyde).

The Semiannual Radioactive Effluent Release Reports shall include a list and description of unplanned releases from the site to UNRESTRICTED AREAS of radioactive materials in gaseous and liquid effluents made during the reporting period.

The Semiannual Radioactive Effluent Release Reports shall include any changes made during the reporting period to the PROCESS CONTROL PROGRAM (PCP) and to the ODCM, as well as a listing of new locations for dose calculations and/or environmental monitoring identified by the land use census pursuant to Control 3.4.2.

The Semiannual Radioactive Effluent Release Reports shall also include the following: an explanation as to why the inoperability of liquid or gaseous effluent monitoring instrumentation was not corrected within the time specified in Controls 3.2.1 or 3.3.1, respectively; and description of the events leading to liquid holdup tanks or gas storage tanks exceeding the Control limits.

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3.7 MAJOR CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS (Continued)

Licensee-initiated major changes to the radioactive waste systems (liquid, gaseous, and solid):

a. Shall be reported to the Commission in the Semiannual Radioactive Effluent Release Report for the period in which the change was made effective. The discussion of each change shall contain: -

1. A summary of the evaluation that led to the determination that the change could be made in accordance with 10 CFR 50.59;

2. Sufficient detailed information to totally support the reason for the change without benefit of additional or supplemental information;

3. A detailed description of the equipment, components, and processes involved and the interfaces with other plant systems;

4. An evaluation of the change which shows the predicted releases of radioactive materials in liquid and gaseous effluents and/or quantity of solid waste that differ from those previously predicted in the license application and amendments thereto;

5. An evaluation of the change which shows the expected maximum exposures to individual in the UNRESTRICTED AREA and to the general population that differ from those previously estimated in the license application and amendments thereto;

6. A comparison of the predicted releases of radioactive materials, in liquid and gaseous effluents and in solid waste, to the actual releases for the period prior to when the changes are to be made;

7. An estimate of the exposure to plant operating personnel as a result of the change; and

8. Documentation of the fact that the change was reviewed and found acceptable by the PORC.

b. Shall be reviewed and accepted by the PORC prior to implementation.

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PART II

1.0 Liquid Effluents

1.1 Radiation Monitoring Instrumentation and Controls

The liquid effluent monitoring instrumentation and controls at Limerick for controlling and monitoring normal radioactive material releases in accordance with the Limerick Technical Specifications are summarized as follows:

1) Liquid Radwaste System: The liquid radwaste discharge monitor (RISH63-0K604) provides an alarm and automatic termination of radioactive material releases from the liquid radwaste system as required by Technical Specification 6.8.4.d.1. Additional design features of the liquid radwaste system which prevent inadvertant releases to the environment include 1) redundant discharge valves, 2) single discharge line with loop seal and siphon breaker to eliminate probability of inadvertent discharges, 3) Low Cooling Tower Blowdown flow interlock which isolates the radwaste discharge line.

2) Service Water System: The Service Water discharge monitor (RISH10-1K605 and RISH10-2K605) provides an alarm upon indication of activity in the service water system as required by Technical Specification 6.8.4.d.1. While the service water system is not a normal release pathway, the monitor provides an indication of potential problems due to excessive leakage of the heat exchangers. In addition, the service water side of the fuel pool heat exchangers is kept at a higher pressure than the shell side to prevent potential radioactive contamination of the service water.

3) RHR Service Water System: The RHR Service Water Radiation (RHRSW) Monitors (RISH12-0K619A, RISH12-0K619B, RISH12-1K619C, RISH12-1K619D, RISH12-2K619C, and RISH12-2K619D) provide alarm and automatic termination of radioactive material release from the RHRSW system, as required by Technical Specification 6.8.4.d.1. While the RHRSW system is not a normal release pathway, the monitors provide indication of potential problems due to excessive leakage of the heat exchangers.

1.2 Liquid Effluent Monitor Setpoint Determination

Per the requirements of Technical Specification 6.8.4.d.1, alarm setpoints shall be established for the liquid effluent monitoring instrumentation to ensure that the release concentration limits of Specification 6.8.4.d.2 and 6.8.4.d.3

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are met (i.e., the concentration of radioactive material released in liquid effluents to UNRESTRICTED AREAS shall be limited to the concentrations specified in 10 CFR 20, Appendix B, Table II, Column 2, for radionuclides and 2 0E-04 μCi/ml for dissolved or entrained noble gases).

1.2.1 Radwaste Discharge Monitor and Discharge Flow Rate - RISH63-0K604

The setpoint for the liquid radwaste discharge monitor and flow rate at LGS are determined by the following equations. The radwaste discharge monitor high-high alarm/isolation setpoint is calculated at least monthly based on isotopes detected in the liquid radwaste sample tanks released during the previous month or on any specific sample tank being released ($\sum C_{igamma}$), the required minimum cooling tower blowdown flow at time of discharge (CTBD), and average liquid radwaste discharge flow (RR). The flow rate determination is calculated for each release and the MPC fraction calculated includes, in the concentration mix, the most recent results from 1) the quarterly composite for Sr-89, Sr-90, and Fe-55, and 2) the monthly composite for H-3, and 3) the sample(s) for dissolved and entrained noble gases.

If the calculated setpoint is less than the existing setpoint, the setpoint will be reduced to the new value. If the calculated setpoint is greater than the existing setpoint, the setpoint may remain at the lower value or increased to the calculated value.

If there were no sample tanks released or no activity detected during the previous month, then the calculation is performed using release data from the most recent month during which isotopes were detected. In addition, if there were no sample tanks released during the previous month, chemistry supervision may substitute more restrictive values (e.g., tritium) based on the plant sampling data.

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1.2.1.1 Setpoint Determination - RISH63-0K604

The setpoint for the liquid radwaste discharge monitor is determined by the following equation:

$$CPM_{(LRD)} \leq \left[1-\frac{(S)(RR)[\Sigma(C_{i\beta})/MPC_{i\beta})]}{(RR+CTBD)}\right]\left[\frac{(\Sigma C_{igamma})(RR+CTBD)}{(S)(E)(RR)\left[\Sigma(C_{igamma}/MPC_{igamma})\right]}\right]+BKG_{(LRD)} \quad (1\text{-}1)$$

where:

$CPM_{(LRD)}$ = Calculated liquid radwaste discharge monitor (RISH63-OK604) count rate attributable to the gamma emitting radionuclides, cpm,

ΣC_{igamma} = the sum of the concentration of the identified gamma emitting nuclides (μCi/ml),

CTBD = the required minimum cooling tower blowdown rate at time of discharge,

RR = average liquid radwaste discharge flow (gpm),

$BKG_{(LRD)}$ = background count rate of liquid radwaste discharge monitor (CPM),

E = the gross gamma detection efficiency of the liquid radwaste discharge monitor (μCi/ml/cpm), and

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S = 5; margin of safety factor to assure that the release is terminated prior to 10 CFR 20 limits being exceeded. Included in this factor are errors associated with monitor uncertainty, sampling uncertainty, flow rate uncertainty, and the contribution of other release paths (Service Water and RHRSW) which are not normally contaminated.

$\Sigma(C_{i\gamma}/MPC_{i\gamma})$ = the effective gamma MPC ratio for the mixture of radionuclides in the liquid radwaste discharge line (unitless)

where:

$C_{i\gamma}$ = the concentration of each identified gamma emitting radionuclide i in the liquid effluent (undiluted) (μCi/ml)

$MPC_{i\gamma}$ = the MPC value corresponding to radionuclide i from 10 CFR 20 Appendix B, Table II, Column 2 (dissolved and entrained noble gases MPC = 2.0×10^{-4} μCi/ml) (μCi/ml).

$\Sigma(Ci_{i\beta}/MPC_{i\beta})$ = the effective nongamma MPC ration for the mixture of radionuclides in the liquid radwaste discharge line (unitless)

where:

$C_{i\beta}$ = the concentration of each identified nongamma radionuclide i in the liquid effluent (undiluted) (μCi/ml).

$MPC_{i\beta}$ = the MPC value corresponding to radionuclide i from 10 CFR 20 Appendix B, Table II, Column 2 (dissolved and entrained noble gases MPC = 2.0×10^{-4} μCi/ml) (μCi/ml)

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•NOTE: The concentration mix must include the most recent sample data for H-3, Sr-89, Sr-90, Fe-55, and dissolved and entrained noble gases.

1.2.1.2 Flow Rate Determination

•NOTE: IF the effective MPC ratio for the mixture of radionuclides $[\Sigma(C_i/MPC_i)]$ is ≤1.0,
THEN a flow rate setpoint determination is not required, AND there is no limit on discharge flow rate.
IF a flow rate determination is required,
THEN the setpoint for the liquid radwaste flow rate is determined for each release by the following equation:

$$FLOW_{(LRD)} \leq \frac{CTBD}{(SF)[\Sigma(C_i/MPC_i) - 1]} \qquad (1\text{-}2)$$

where:

$FLOW_{(LRD)}$ = flow limit for radwaste discharge line (gpm)

CTBD = required minimum cooling tower blowdown flow for time of release

SF = 5; margin of safety factor to assure that the release does not exceed 10 CFR 20 limits

$\Sigma(C_i/MPC_i)$ = the effective MPC ratio for the mixture of radionuclides in the liquid radwaste discharge line (unitless)

where:

C_i = the concentration of each identified radionuclide i in the liquid effluent (undiluted) (μCi/ml).

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MPC_i = the MPC value corresponding to radionuclide i from 10 CFR 20 Appendix B, Table II, Col. 2, (dissolved and entrained noble gases (MPC = 2.0×10^{-4} μCi/ml) (μCi/ml)

*NOTE: The concentration mix must include the most recent sample data for H-3, Sr-89, Sr-90, Fe-55, and dissolved and entrained noble gases.

1.2.2 Service Water Radiation Monitor - RISH10-1K605,-2K605

The Service Water Monitor high-high setpoint is determined by the following equation. The monitor high-high alarm setpoint is calculated monthly based on the background count rate. If the calculated setpoint is less than the existing monitor setpoint, the setpoint will be reduced to the new value. If the calculated setpoint is greater than the existing setpoint, the setpoint may remain at the existing setpoint or increased to the new value. To assure that a high background count rate does not prevent adequate monitor sensitivity to meet the requirements of technical specifications 6.8.4.d.2 and 6.8.4.d.3, a maximum background count rate of 300 CPM shall be used for the alarm setpoint determination.

1.2.2.1 Setpoint Determination

The setpoint for the Service Water Monitor is determined by the following equation:

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$$CPM_{sw} \leq Z_{sw}(CRB_{sw})$$
(1-3)

where:

CPM_{sw} = Calculated Service Water Radiation Monitor (RISH10-1K605,-2K605) count rate, CPM

Z_{sw} = 3, multiplier to establish monitor setpoint count rate above background count rate (unitless)

CRB_{sw} = Service water monitor (RISH10-1K605, -2K605) count rate attributable to background radiation; CPM.

1.2.3 RHR Service Water Monitor - RISH12-0K619A,-0K619B, -1K619C,-1K619D, -2K619C,-2K619D

The RHR Service Water Monitor high-high setpoint is determined by the following equation. The monitor high-high alarm/isolation setpoint is calculated monthly based on the background count rate. If the calculated setpoint is less than the existing monitor setpoint, the setpoint will be reduced to the new value. If the calculated setpoint is greater than the existing setpoint, the setpoint may remain at the existing setpoint or increased to the new value. To assure that a high background count rate does not prevent adequate monitor sensitivity to meet the requirements of technical specifications 6.8.4.d.2 and 6.8.4.d.3, a maximum background count rate of 300 CPM shall be used for the alarm setpoint determination.

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1.2.3.1 Setpoint Determination

The setpoint for the RHR Service Water monitor is determined by the following equation:

$$CPM_{RHRSW} \leq Z_{RHRSW}(CRB_{RHRSW}) \quad (1\text{-}4)$$

where:

CPM_{RHRSW} = Calculated RHR Service Water Radiation Monitor (RISH12-0K619A,-0K619B, -1K619C,-1K619D,-2K619C, -2K619D) count rate, CPM

Z_{RHRSW} = 3, multiplier to establish monitor setpoint count rate above the background count rate (unitless)

CRB_{RHRSW} = RHR Service Water Radiation Monitor (RISH12-0K619A,-0K619B, -1K619C,-1K619D,-2K619C, -2K619D) count rate attributable to background radiation, CPM

1.3 Liquid Effluent Dose Calculation - 10 CFR 50

1.3.1 Members of the Public Dose

Technical Specification ODCM I3.2.3 limits the dose or dose commitment to MEMBERS OF THE PUBLIC from radioactive materials in liquid effluents from Limerick Generating Station to:

- during any calendar quarter:
  - ≤3 mrem to total body
  - ≤10 mrem to any organ
- during any calendar year:

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≤6 mrem to total body

≤20 mrem to total organ

Per Surveillance Requirement ODCM I3.2.3.1 the cumulative dose contribution from liquid effluents for the current calendar quarter and calendar year shall be determined at least once per 31 days in accordance with the following calculational methods. These equations are for the three aquatic environment exposure pathways (potable water, fish, shoreline exposure) in the Limerick aquatic environment. Only real pathways are addressed for each receptor. The receptors and associated pathways are listed below. Doses from each real pathway are summed to give dose at the receptor. The monthly results are accumulated to give the quarterly doses and the quarterly results are accumulated to give the annual doses.

Receptor	Dist.	Pathways		
Location	(mi)	Potable Water	Fish	Shoreline
LGS Outfall	0		x	x
Citizen's Utility	2.5	x	x	x
Phoenixville Water	9.0	x	x	x
Phil. Sub. Water	13.6	x		x
Crew Course	37.8			x

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1.3.1.1 Potable Water Pathway

$$R_{APJ} = 1100 \frac{U_{ap}}{M_p F} \sum_i Q_i D_{aipj} \exp(-\lambda_i(12)) \quad (1\text{-}5)$$

1.3.1.2 Fish (Aquatic Food) Pathway

$$R_{APJ} = 1100 \frac{U_{ap}}{M_p F} \sum_i Q_i B_{ip} D_{aipj} \exp(-\lambda_i(24)) \quad (1\text{-}6)$$

1.3.1.3 Shoreline Deposition Pathway

$$R_{APJ} = 110{,}000 \frac{U_{ap} W}{M_p F} \sum_i Q_i T_i D_{AIPJ} \exp(-\lambda_i t_p) \left[1-\exp(-\lambda_i(1.752E+5))\right] \quad (1\text{-}7)$$

where:

B_{ip} = equilibrium bioaccumulation factor for nuclide i in pathway p, expressed as the ratio of the concentration in biota, in pCi/kg, to the radionuclide concentration in water, in pCi/liter (liters/kg)

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ELEMENT	FISH	ELEMENT	FISH
H	9.0E-01	NB	3.0E 04
C	4.6E 03	MO	1.0E 01
NA	1.0E 02	TC	1.5E 01
P	3.0E 03	RU	1.0E 01
CR	2.0E 02	RH	1.0E 01
MN	4.0E 02	TE	4.0E 02
FE	1.0E 02	I	1.5E 01
CO	5.0E 01	CS	2.0E 03
NI	1.0E 02	BA	4.0E 00
CU	5.0E 01	LA	2.5E 01
ZN	2.0E 03	CE	1.0E 00
BR	4.2E 02	PR	2.5E 01
RB	2.0E 03	ND	2.5E 01
SR	3.0E 01	W	1.2E 03
Y	2.5E 01	P	1.0E 01
ZR	3.3E 00		

Ref: 1) Regulatory Guide 1.109, Rev. 1, Table A-1
2) Letter LTR 881209L001, from R. J. Clark, U.S.N.R.C., to G. A. Hunger, Philadelphia Electric Co., December 9, 1988, transmitting evaluation of Limerick ODCM.

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D_{aipj} = dose factor specific to a given age group a, radionuclide i, pathway p, and organ j which can be used to calculate radiation dose (1) from an intake of a radionuclide, in mrem/pCi, or (2) from exposure to a given concentration of a radionuclide in sediment, in mrem/hr per pCi/m^2. Values are listed by age group in Table 1-1.

F = waste dilution flow rate of liquid effluent dilution flow/number of batches (ft^3/sec).

M_p = dilution factor at point of exposure or at point of withdrawal of drinking water (dimensionless). Values are graphically listed by receptor location in Figures 1.3.1-1 to 1.3.1-5. Value will be based on average monthly river flow.

Q_i = total release of nuclide 'i' for time period (Ci).

R_{apj} = total dose for calculation time period to organ j of individuals of age group a from all nuclides i in pathway b (mrem)

T_i = radioactive half-life of nuclide i (days)

U_{ap} = usage factor specifying exposure time or intake rate for an individual of age group a associated with pathway p (hr/yr, liters/yr, or kg/yr)

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Pathway	Infant	Child	Teen	Adult
Fish	--	6.9[a]	16[a]	21[a]
Potable Water (l/yr)	330[a]	510[a]	510[a]	730[a]
Shoreline Recreation (hr/yr)	--	14[a]	67[a]	12[a]
Shoreline Recreation (hr/yr)	--	90[b]	600[b]	600[b]

Ref: [a]Regulatory Guide 1.109, Rev. 1, Table E-5
[b]EROL Table 5.2A-3

W = shoreline width factor (dimensionless) = 0.2. Ref: Regulatory Guide 1.109, Rev. 1

1.752E+5 = time period during which sediment is exposed to contaminated water (hrs) (midpoint of plant life = 20 yrs)

λ_i = radioactive decay constant of nuclide 'i' (hr^{-1})

12 = delay time for potable water pathway in hours to allow for nuclide decay during transport through the water purification plant and the water distribution system. Ref: Regulatory Guide 1.109, Rev. 1, App. A

24 = delay time in hours for fish pathway to allow for nuclide decay during transit through the food chain, as well as during food preparation. Ref: Regulatory Guide 1.109, Rev. 1, App. A

1100 = factor to convert from Ci/yr per ft^3/sec to pCi/liter

110,000 = factor to convert from Ci/yr per ft^3/sec to pCi/liter and to account for proportionately constant (100) used in sediment radioactivity model.

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1.4 Liquid Effluent Dose Projections

ODCM 13.2.4 requires that the liquid radwaste treatment system shall be operable and appropriate portions of the systems shall be used to reduce the radioactive materials in liquid waste prior to their discharge when the projected doses due to the liquid effluent to UNRESTRICTED AREAS would exceed:

- 0.06 mrem/31 days to the total body

or

- 0.2 mrem/31 days to any organ

The applicable liquid radwaste treatment processing equipment for maintaining radioactive material releases ALARA are delineated in Figure 1.4-6.

Dose projections are made at least once per 31-days by the following equations:

$$D_{tbp} = (D_{tb}/d) \cdot 31 \text{ days} \qquad (1\text{-}8)$$

$$D_{maxp} = (D_{max}/d) \cdot 31 \text{ days} \qquad (1\text{-}9)$$

where:

D_{tbp} = the total body dose projection for the current 31-day period (mrem)

D_{tb} = the total body dose to date for the current calendar quarter as determined by equation 1-5, 1-6, and 1-7 (mrem)

D_{maxp} = the maximum organ dose projection for the current 31-day period (mrem)

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D_{max} = the maximum organ dose to date for the current calendar quarter as determined by equations 1-5, 1-6, and 1-7 (mrem)

d = the number of days in the current calendar quarter at the end of the release (days). The minimum time elapsed is seven (7) days.

31 days = the number of days of concern

2.0 Gaseous Effluents

2.1 Radiation Monitoring Instrumentation and Controls

The gaseous effluent monitoring instrumentation and controls at Limerick for controlling and monitoring radioactive material releases in accordance with the Limerick Technical Specifications are summarized as follows:

1) North Vent (Common): The plant gaseous discharges via this vent are monitored by two Particulate, Iodine and Gas (PIG) monitors (RY26-075A and RY26-075B) in parallel and by the Wide Range Accident Monitor (WRAM) (RIX26-076). The PIGS have separate Particulate, Iodine, and gas sampling and monitoring channels but the Station Technical Specifications require only particulate and iodine sampling and noble gas monitoring. The WRAM has extended range (via three channels) noble gas monitoring and particulate and iodine sampling capability. In addition, the WRAM provides an isolation of the large Drywell Purge and Vent valves.

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2) South Vent (one per unit): The plant gaseous discharges via each South Vent are monitored by two redundant PIG monitors (RY26-185A,B and RY26-285A,B). As is the case of the North Vent, each PIG has separate particulate, iodine, and gas sampling and monitoring channels but the Station ODCM I requires only particulate and iodine sampling with noble gas monitoring.

3) Hot Maintenance Shop (Common): Due to the composition of the radioactive materials in the effluent stream (i.e., very low potential for noble gases), this release point is sampled by a Particulate and Iodine (P&I) Monitor (RY26-025). The P&I monitor has separate particulate and iodine sampling and monitoring channels but the Station ODCM I requires only particulate and iodine sampling.

2.2 Gaseous Effluent Monitor Setpoint Determination

ODCM I3.3.7.3 requires that alarm setpoint be established for the noble gas effluent monitoring channels (RY26-075A,B; RY26-185A,B; RY26-285A,B; and RIX26-076) to ensure that the release rate of radioactive materials does not exceed the limits of ODCM I3.3.2.a, which corresponds to a dose rate at the SITE BOUNDARY of 500 mrem/yr to the total body or 3000 mrem/yr to the skin. This specification also states that

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the dose rates from I-131, I-133, tritium, and all radionuclides in particulate form with half-lives greater than eight days, shall be limited to a maximum of 1500 mrem/yr to any organ (inhalation pathway only).

ODCM I limits are expressed in terms of dose rate, while the instruments which monitor effluents produce data in units of concentration of radioactivity (i.e., μCi/cc). It is therefore necessary to calculate the corresponding concentration of effluent release which will result in the dose rate limit being reached at the site boundary. This calculation is made more complex by the use of multiple release points at LGS.

Calculational Bases

The alarm setpoint calculation is performed monthly and is based on analytical results of grab samples from the appropriate release point. The relative concentration of each identified radionuclide in the grab samples is determined, and the data are used to perform a setpoint calculation for that nuclide mix and release point.

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The highest calculated annual average relative concentration (X/Q) for an area at or beyond the site boundary (1.1E-05 sec/M^3; NE sector) is conservatively used in the setpoint calculation.

Maximum flow rates through the North and South vents are used in alarm setpoint calculations. This is the most conservative situation and is necessary since flow can vary. By using maximum values, any flow less than the maximum will assure that the monitor will alarm before release rate limits are exceeded.

For each release point the following concentration is determined: a) the noble gas release concentration which would cause a SITE BOUNDARY total body dose rate of 500 mrem/yr and a skin dose rate of 3000 mrem/yr.

The fractional contribution of noble gas is calculated for each release point. The fractional contribution to the whole body and skin dose rates due to noble gases is calculated by taking the product of this fraction and the limiting concentration. A comparison of this concentration for whole body and skin dose rates due to noble gase releases is made to determine if the whole body or skin dose limit will be most restrictive. It is expected that the whole body

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limit will always be most restrictive, but the comparison is necessary to assure compliance with ODCM I. The sum of the contributions from each release point, independently calculated for iodines and noble gases, will equal the maximum instantaneous release rate allowed from the site.

The purpose of calculating the release rate which corresponds to the site boundary dose limit is not to determine an acceptable release rate, but to determine the maximum release rate which may not be exceeded. It is not intended that releases will be maintained at or near this limit, and in fact, requirements to maintain offsite doses As Low As Reasonably Achievable (ALARA) are specified in ODCM I3.3.3 and ODCM I3.3.4.

2.2.1 North Vent Noble Gas Effluent Monitors - RY26-075A-3, RY26-075B-3, and RIX26-076-2

The North Vent Noble Gas Effluent monitor high-high setpoint is calculated monthly based on the grab sample results performed in accordance with ODCM I3.3-3. Due to the incorporation of the ALARA philosophy in the design and operation of the Limerick effluent systems, release point grab samples may not identify any

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radionuclides. With this situation, plant staff may use the results of the last grab sample which identified radionuclides or use the default setpoint which is based on expected concentration ratios as reported in the FSAR. If any calculated alarm setpoint is less than the existing monitor setpoint, the setpoint will be reduced to the new value. If the calculated setpoint value is greater than the existing value, the setpoint may remain at the lower value or increased to the new value.

2.2.1.1 Setpoint Determination

The setpoint for the North Vent Noble Gas Effluent Monitor is set at or below the lesser of the $NVSP_{NGWB}$ or $NVSP_{NGSK}$ value. The Alert setpoint is not to exceed 1.1 E-04 μCi/cc, per LGS FSAR Table 11.5-2, using the two-unit maximum North Vent flow rate.

$$NVSP_{NGWB} \leq \frac{[VF_{NVNG}][500][\Sigma C_{iNV}]}{[3.4475\ E+09]\Sigma[(C_{iNV})(K_i)]} \qquad (2\text{-}1)$$

$$NVSP_{NGSK} \leq \frac{[VF_{NVNG}][3000][\Sigma C_{iNV}]}{[3.4475\ E+09]\Sigma[(C_{iNV})(L_i+1.1M_i)]} \qquad (2\text{-}2)$$

where:

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$NVSP_{NGWB}$ = North Vent Setpoint - Noble Gas Whole Body (μCi/cc)

$NVSP_{NGSK}$ = North Vent Setpoint - Noble Gas Skin (μCi/cc)

VF_{NVNG} = Fractional contribution to site boundary noble gas dose rate from the North Vent as calculated in equation 2-7. (unitless).

500 = Total body dose rate limit (mrem/yr)

3000 = Skin dose rate limit (mrem/yr)

ΣC_{INV} = Total noble gas activity from North Vent grab sample (μCi/cc)

3.4475 E+09 = Conversion factor $\left[\frac{(pCi)(cc)}{(m^3)(\mu Ci)}\right]$

$= (1.1E\text{-}05\ sec/m^3)(10^6\ pCi/\mu Ci)(664{,}000\ cfm)(\frac{1}{60}\ min/sec)(2.832E{+}04\ cc/ft^3)$ (2-3)

where:

1.1E-05 sec/m^3 = highest annual average relative concentration (NE Sector)

10^6 pCi/μCi = units conversion

664,000 cfm = maximum North Vent flow rate for two unit operation

$\frac{1}{60}$ min/sec = units conversion

2.832E+04 cc/ft^3 = units conversion

C_{INV} = concentration of noble gas nuclide i as determined by radioanalysis of North Vent grab sample (μCi/cc)

K_i = Total body dose conversion factor for noble gas nuclide i (mrem/yr per pCi/m^3, from Table 2-1)

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L_i = Beta skin dose conversion factor for noble gas nuclide i (mrem/yr per pCi/m^3, from Table 2-1).

M_i = Gamma air dose conversion factor for noble gas nuclide i (mrad/yr per pCi/m^3, per Table 2-1).

2.2.2 South Vent Noble Gas Effluent Monitors - RY26-185A-3, RY26-185B-3, RY26-285A-3, and RY26-285B-3

Each unit's South Vent Noble Gas Effluent monitor high-high setpoint is calculated monthly based on the grab sample results performed in accordance with ODCM 13.3-3. Due to the incorporation of the ALARA philosophy in the design and operation of the Limerick effluent systems, release point grab samples may not identify any radionuclides. With this situation, plant staff may use the results of the last grab sample which identified radionuclides or use the default setpoint which is based on expected concentration ratios as reported in the FSAR. If any calculated alarm setpoint is less than the existing monitor setpoint, the setpoint will be reduced to the new value. If the calculated setpoint value is greater than the existing value, the setpoint may remain at the lower value, or increased to the new value.

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2.2.2.1 Setpoint Determination

The setpoint for the South Vent Noble Gas Effluent Monitor is set at the lesser of the $SVSP_{NGWB}$ or $SVSP_{NGSK}$ value. $SVSP_{NGWB}$ and $SVSP_{NGSK}$ are calculated for each unit's South Vent. The Alert setpoint is not to exceed 3.4 E-06 μCi/cc, per LGS FSAR Table 11.5-2, for each unit's South Vent Noble Gas channel, using each unit's maximum South Vent flow rate.

When a containment purge occurs through one inch/two inch vent valves to the South Vent, a grab sample will be analyzed for noble gas activity, and the setpoint for the containment purge will be calculated per this section. This setpoint will be compared to the existing monitor setpoint. IF the calculated containment purge setpoint is less than the existing setpoint, THEN the setpoint will be reduced to the new value. IF the calculated containment purge setpoint is greater than the existing setpoint, THEN the existing setpoint will be maintained. At the completion of the containment purge, the setpoint will be

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restored to the monitor setpoint that existed immediately prior to the containment purge.

$$SVSP_{NGWB} \leq \frac{[VF_{SVNG}][500][\Sigma C_{isv}]}{[1.2149E+09]\Sigma[(C_{isv})(K_i)]} \qquad (2\text{-}4)$$

$$SVSP_{NGSK} \leq \frac{[VF_{SVNG}][3000][\Sigma C_{isv}]}{[1.2149E+09]\Sigma[(C_{isv})(L_i+1.1M_i)]} \qquad (2\text{-}5)$$

where:

$SVSP_{NGWB}$ = South Vent Setpoint - Noble Gas Whole Body (μCi/cc)

$SVSP_{NGSK}$ = South Vent Setpoint - Noble Gas Skin (μCi/cc)

VF_{SVNG} = Fractional contribution to site boundary noble gas dose rate from the Unit's South Vent as calculated in equation 2-8 or 2-8a (unitless)

500 = Total body dose rate limit (mrem/yr)

3000 = Skin dose rate limit (mrem/yr)

ΣC_{isv} = Total noble gas activity from each unit South Vent grab sample (μCi/cc)

1.2149E+09 = Conversion factor $\left[\frac{(pCi)(cc)}{(m^3)(\mu Ci)}\right]$

$$= (1.1E\text{-}05\ sec/m^3)(10^6 pCi/\mu Ci)(234{,}000\ cfm)(\tfrac{1}{60}\ min/sec)(2.832E+04\ cc/ft^3) \qquad (2\text{-}6)$$

where:

1.1E-05 sec/m^3 = highest annual average relative concentration (NE sector)

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10^6 pCi/μCi = units conversion

234,000 cfm = maximum South Vent flow rate

$\frac{1}{60}$ min/sec = units conversion

2.832E+04 cc/ft^3 = units conversion

C_{isv} = concentration of noble gas nuclide i, as determined by radioanalysis of South Vent grab sample (μCi/cc)

K_i = total body dose conversion factor for noble gas nuclide i (mrem/yr per pCi/m^3, from Table 2-1).

L_i = Beta skin dose conversion factor for noble gas nuclide i (mrem/yr per pCi/m^3, from Table 2-1)

M_i = Gamma air dose conversion factor for noble gas nuclide i (mrad/yr per pCi/m^3, from Table 2-1)

2.2.3 Noble Gas Effluent Fractional Contribution

The noble gas effluent fractional contribution is calculated monthly using the results of the grab samples performed in accordance with ODCM 13.3-3. The results of this calculation are used in equations 2-1, 2-2, 2-4, and 2-5. This methodology assumes that the total body dose is the limiting factor for noble gas releases. If equations 2-1, 2-2, 2-4, and 2-5 show that the skin dose is limiting, fractional skin doses should be substituted for the whole body values used in equations 2-7, 2-8, and 2-8a.

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2.2.3.1 Calculation of VF_{NVNG}, VF_{1SVNG}, and VF_{2SVNG}

$$VF_{NVNG} = \frac{\Sigma[(C_{iNV})(K_i)]}{\Sigma[(C_{iNV})(K_i)]+\Sigma[(C_{i1SV})(K_i)]+\Sigma[(C_{i2SV})(K_i)]} \quad (2\text{-}7)$$

$$VF_{1SVNG} = \frac{\Sigma[(C_{i1SV})(K_i)]}{\Sigma[(C_{iNV})(K_i)]+\Sigma[(C_{i1SV})(K_i)]+\Sigma[(C_{i2SV})(K_i)]} \quad (2\text{-}8)$$

$$VF_{2SVNG} = \frac{\Sigma[(C_{i2SV})(K_i)]}{\Sigma[(C_{iNV})(K_i)]+\Sigma[(C_{i1SV})(K_i)]+\Sigma[(C_{i2SV})(K_i)]} \quad (2\text{-}8a)$$

where:

VF_{NWNG} = fractional contribution to site boundary noble gas total body dose rate from the North Vent (unitless)

VF_{1SVNG} = fractional contribution to site boundary noble gas total body dose rate from the Unit 1 South Vent (unitless)

VF_{2SVNG} = fractional contribution to site boundary noble gas total body dose rate from the Unit 2 South Vent (unitless)

C_{iNV} = concentration of noble gas nuclide i as determined by radioanalysis of North Vent grab sample (μCi/cc)

K_i = total body dose conversion factor for noble gas radionuclide i (mrem/yr per pCi/m^3)

C_{i1SV} = concentration of noble gas nuclide i as determined by radionanalysis of Unit 1 South Vent grab sample (μCi/cc)

C_{i2SV} = concentration of noble gas nuclide i as determined by radionanalysis of Unit 2 South Vent grab sample (μCi/cc)

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2.2.4 Noble Gas Effluent Default Setpoints

This methodology may be used when grab sample results from either the North Vent or the South Vent do not identify any radionuclides. This methodology is based on expected release concentration ratios as outlined in section 11.3 of the Limerick FSAR.

2.2.4.1 North Vent Noble Gas Monitors (RY26-075A-3 and RY26-075B-3)

The default setpoint for the North Vent noble gas effluent monitor is set at or below the $NVSP_{NGD}$ value.

$$NVSP_{NGD} \leq \frac{[8.90E-1][500][1.15E-6]}{[3.4475E+9][4.30E-9]} \qquad (2\text{-}9)$$

$$\leq 3.45E\text{-}5 \ \mu Ci/cc$$

where:

$NVSP_{NGD}$ = Default North Vent Setpoint - Noble Gas ($\mu Ci/cc$)

8.90E-1 = Default fractional contribution to site boundary noble gas total body dose rate from the North Vent (unitless)

$$= \frac{4.30E-9}{(4.30E-9)+(5.31E-10)}$$

where:

4.30E-9 = Summation of the North Vent concentration of noble gas nuclide i multiplied by the corresponding whole body dose factor

$$\left[\frac{(\mu Ci)(mrem)(m^3)}{(cc)(yr)(pCi)}\right]$$

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5.31E-10 = Summation of the South Vent (Unit 1 & 2) concentration of noble gas nuclide i multiplied by the corresponding whole body dose factor

$$\left[\frac{(\mu Ci)(mrem)(m^3)}{(cc)(yr)(pCi)}\right]$$

Ref: a) Based on expected annual release from FSAR Table 11.3-1
b) Based on maximum North Vent flow of 664,000 cfm and South Vent flow of 234,000 cfm for Unit 1 and Unit 2 vents
c) ODCM II Table 2-1

500 = Total body dose rate limit (mrem/yr)

1.15E-6 = Total noble gas concentration from North Vent (μCi/cc)

Ref: a) Based on FSAR Table 11.3-1
b) Based on maximum North Vent flow rate of 664,000 cfm.

3.4475E+9 = Conversion factor

$$\left[\frac{(pCi)(cc)}{(m^3)(\mu Ci)}\right]$$

Ref: a) ODCM II equation 2-3

4.30E-9 = Summation of the North Vent concentration of noble gas nuclide i multiplied by the corresponding whole body dose factor

$$\left[\frac{(\mu Ci)(mrem)(m^3)}{(cc)(yr)(pCi)}\right]$$

Ref: 1) Based on FSAR Table 11.3-1
2) Based on maximum North Vent flow of 664,000 cfm
3) ODCM II Table 2-1

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2.2.4.2 South Vent Noble Gas Monitors (RY26-185A-3, RY26-285A-3, RY26-185B-3 and RY26-285B-3)

The default setpoint for each Unit's South Vent noble gas effluent monitor is set at or below the $SVSP_{NGD}$ value.

$$SVSP_{NGD} \leq \frac{[5.49E-2][500][7.14E-8]}{[1.2149E+9][2.65E-10]} \qquad (2\text{-}10)$$

$$\leq 6.09E-6\ \mu Ci/cc$$

where:

$SVSP_{NGD}$ = Default South Vent Setpoint - Noble Gas ($\mu Ci/cc$)

5.49E-2 = Default fractional contribution to site boundary noble gas total body dose rate from the South Vent (unitless)

$$= \frac{2.65E-10}{(4.30E-9)+(5.31E-10)}$$

where:

2.65E-10 = summation of each Unit's South Vent concentration of noble gas nuclide i multiplied by the corresponding whole body dose factor

$$\left[\frac{(\mu Ci)(mrem)(m^3)}{(cc)(yr)(pCi)}\right]$$

4.30E-9 = summation of the North Vent concentration of noble gas nuclide i multiplied by the corresponding whole body dose factor

$$\left[\frac{(\mu Ci)(mrem)(m^3)}{(cc)(yr)(pCi)}\right]$$

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5.31E-10 = summation of the South Vent (Units 1 & 2) concentration of noble gas nuclide i multiplied by the corresponding whole body dose factor

$$\left[\frac{(\mu Ci)(mrem)(m^3)}{(cc)(yr)(pCi)}\right]$$

Ref: a) Based on expected annual releases from FSAR Table 11.3-1
b) Based on maximum North Vent flow of 664,000 cfm and South Vent flow of 234,000 cfm for Unit 1 and Unit 2 Vents
c) ODCM II Table 2-1

500 = total body dose rate limit (mrem/yr)

7.14E-8 = total noble gas concentration from South Vent (μCi/cc)

Ref: a) Based on FSAR Table 11.3-1
b) Based on maximum South Vent flow of 234,000 cfm)

1.2149E+9 = Conversion factor

$$\left[\frac{(pCi)(cc)}{(m^3)(\mu Ci)}\right]$$

Ref: ODCM II equation 2-6

2.65E-10 = Summation of each Unit's South Vent concentration of noble gas nuclide i multiplied by the corresponding whole body dose factor

$$\left[\frac{(\mu Ci)(mrem)(m^3)}{(cc)(yr)(pCi)}\right]$$

Ref: 1) Based on FSAR Table 11.3-1
2) Based on maximum South Vent flow of 234,000 cfm for Unit 1 and Unit 2 vents
3) ODCM II Table 2-1

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2.2.5 Wide Range Accident Monitor [illegible]le Gas Effluent Monitor (RIX26-076-4)

The Wide Range Accident Monitor (WRAM) noble gas total effluent channel monitors the noble gas effluent from the North Vent. This monitor has Main Control Room Annunciation as well as an isolation function on the primary containment purge and vent valves. The isolation setpoint value of ≤ 2.1 μCi/cc specified in Technical Specification Table 3.3.2-2 is based on the accident dose limits for containment purge during an accident (Ref: FSAR Section 1.13). For routine operations the total effluent alert and high setpoints are based upon the methodology of Sections 2.2.5.1 and 2.2.5.2. The setpoint units are in microcuries per second using the two unit maximum North Vent flow rate. The total effluent channel High setpoint is set at a value less than or equal to ten times the Alert setpoint (not to exceed the 2.1 μCi/cc equivalent using the two-unit maximum North Vent flow rate). For containment purge operations, the high setpoint is based on an isotopic analysis of the containment atmosphere (Ref. Section 2.2.5.3). These values are always more conservative than the Technical Specification Table 3.3.2-2 required value of ≤ 2.1 μCi/cc.

If the calculated setpoint value is less than the existing monitor setpoint, the setpoint will be reduced to

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the new value. If the calculated setpoint value is greater than the existing value, the setpoint may remain at the lower value, or increased to the new value.

2.2.5.1 Routine Operations Alert Setpoint Determination

For routine operations, the Alert setpoint for the WRAM Noble Gas total effluent channel is set at or below the lesser of the $NVSP_{NGWB}$ or $NVSP_{NGSK}$ value. The Alert setpoint is not to exceed 1.1 E-04 μCi/cc equivalent, using the two-unit maximum North Vent flow rate, per LGS FSAR Table 11.5-2.

$$NVSP_{NGWB} \leq \frac{[VF_{NVNG}][500][\Sigma C_{iNV}]}{[3.4475\ E+09]\Sigma[(C_{iNV})(K_i)]} \qquad (2\text{-}11)$$

$$NVSP_{NGSK} \leq \frac{[VF_{NVNG}][3000][\Sigma C_{iNV}]}{[3.4475\ E+09]\Sigma[(C_{iNV})(L_i+1.1M_i)]} \qquad (2\text{-}12)$$

where:

$NVSP_{NGWB}$ = North Vent Setpoint - Noble Gas Whole Body (μCi/cc)

$NVSP_{NGSK}$ = North Vent Setpoint - Noble Gas Skin (μCi/cc)

VF_{NVNG} = Fractional contribution to site boundary noble gas dose rate from the North Vent as calculated in equation 2-7. (unitless).

500 = Total body dose rate limit (mrem/yr)

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3000 = Skin dose rate limit (mrem/yr)

ΣC_{iNV} = Total noble gas activity from North Vent grab sample (μCi/cc)

3.4475 E+09 = Conversion factor $\left[\frac{(pCi)(cc)}{(m^3)(\mu Ci)}\right]$

$= (1.1E\text{-}05\ sec/m^3)(10^6\ pCi/\mu Ci)(664{,}000\ cfm)(\frac{1}{60}\ min/sec)(2.832E{+}04\ cc/ft^3)$ (2-13)

where:

1.1E-05 sec/m^3 = highest annual average relative concentration (NE Sector)

10^6 $pCi/\mu Ci$ = units conversion

664,000 cfm = maximum North Vent flow rate for two unit operation

$\frac{1}{60}$ min/sec = units conversion

2.832E+04 cc/ft^3 = units conversion

C_{iNV} = concentration of noble gas nuclide i as determined by radioanalysis of North Vent grab sample (μCi/cc)

K_i = Total body dose conversion factor for noble gas nuclide i (mrem/yr per pCi/m^3, from Table 2-1)

L_i = Beta skin dose conversion factor for noble gas nuclide i (mrem/yr per pCi/m^3, from Table 2-1).

M_i = Gamma air dose conversion factor for noble gas nuclide i (mrad/yr per pCi/m^3, per Table 2-1).

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The setpoint values are converted from μCi/cc to μCi/sec using the maximum two-unit North Vent flow rate:

$$NVSP_{TEWB} = [NVSP_{NGWB}] \; [3.134E+08] \qquad (2\text{-}14)$$

$$NVSP_{TESK} = [NVSP_{NGSK}] \; [3.134E+08] \qquad (2\text{-}15)$$

where:

$NVSP_{TEWB}$ = WRAM total effluent channel North Vent Setpoint - Noble Gas Whole Body (μCi/sec)

$NVSP_{TESK}$ = WRAM total effluent channel North Vent Setpoint - Noble Gas Skin (μCi/sec)

$NVSP_{NGWB}$ = North Vent Setpoint - Noble Gas Whole Body (μCi/cc)

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$NVSP_{NGSK}$ = North Vent Setpoint - Noble Gas Skin (μCi/cc)

3.134E+08 = Conversion factor (cc/sec)

$$= (664{,}000 \text{ scfm})\left(\tfrac{1}{60}\text{min/sec}\right)(2.832\text{E+04 cc/ft}^3) \qquad (2\text{-}16)$$

2.2.5.2 Routine Operations High Setpoint Determination

For routine operations, the high setpoint for the WRAM Noble Gas total effluent channel is set at or below ten times the lesser of the routine operations $NVSP_{TEWB}$ or $NVSP_{TESK}$ value.

$$NVHP_{TEWB} = [NVSP_{TEWB}]\,(10) \qquad (2\text{-}17)$$

$$NVHP_{TESK} = [NVSP_{TESK}]\,(10) \qquad (2\text{-}18)$$

where:

$NVHP_{TEWB}$ = WRAM total effluent channel North Vent High Setpoint Noble Gas Whole Body (μCi/sec)

$NVHP_{TESK}$ = WRAM total effluent channel North Vent High Setpoint Noble Gas Skin (μCi/sec)

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$NVSP_{TEWB}$ = WRAM total effluent channel North Vent Setpoint - Noble Gas Whole Body (μCi/sec)

$NVSP_{TESK}$ = WRAM total effluent channel North Vent setpoint - Noble Gas Skin (μCi/sec)

10 = multiplication factor to calculate High value (unitless)

2.2.5.3 High Setpoint Determination - Containment Purge Operations

During routine purge operations via North Stack, the setpoint will be determined prior to initiation of the purge based on the containment noble gas grab sample required by ODCM 13.3-3A. The WRAM high setpoint is set at or below the lesser of the $WRSP_{NGPWB}$ or $WRSP_{NGPSK}$ value. At no times will the setpoint be higher than 6.58 E+8 μCi/sec (Ref. Specification Table 3.3.2-2 limit of $\leq$ 2.1 μCi/cc converted to μCi/sec (2.1 μCi/cc is based on maximum 2 unit North Vent flow rate).

$$WRSP_{NGPWB} \leq \frac{[VF_{NVNG}][500][\Sigma C_{ic}] *}{[1.10E+1]\ \Sigma\ [(C_{ic})(K_i)]} \qquad (2\text{-}19)$$

$$WRSP_{NGPSK} \leq \frac{[VF_{NVNG}][3000][\Sigma C_{ic}]}{[1.10E+1]\ \Sigma\ [(C_{ic})(L_i+1.1M_i)]} \qquad (2\text{-}20)$$

where:

$WRSP_{NGPNB}$ = WRAM Purge Setpoint - Noble Gas Whole Body (μCi/sec)

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$WRSP_{NGPSK}$ = WRAM Purge Setpoint - Noble Gas skin (μCi/sec)

VF_{NVNG} = Fractional contribution to site boundary noble gas dose rate from North Vent as calculated in equation 2-7 (unitless)

500 = Total body dose rate limit (mrem/yr)

3000 = Skin dose rate limit (mrem/yr)

ΣC_{ic} = Total noble gas activity from containment grab sample (μCi/cc)

1.10E+1 = Conversion factor $\left[\frac{(pCi)(sec)}{(\mu Ci)(m^3)}\right]$

$$= \frac{(1.1E\text{-}5\ sec/m^3)(10^6 pCi/\mu Ci)(\frac{1}{60}\ min/sec)(2.832E+4\frac{cc}{ft^3})}{472\ \frac{min\text{-}cc}{sec\text{-}ft^3}} \quad (2\text{-}21)$$

where:

1.1E-5 = highest annual average relative concentration (sec/m^3) (NE sector)

10^6 = units conversion ($pCi/\mu Ci$)

$\frac{1}{60}$ = units conversion (min/sec)

2.832E+4 = units conversion (cc/ft^3)

472 = units conversion $\left(\frac{min\text{-}cc}{sec\text{-}ft^3}\right)$

C_{ic} = concentration of noble gas nuclide i as determined by radioanalysis of containment grab sample (μCi/cc)

K_i = Total body dose conversion factor for noble gas nuclide i (mrem/yr per pCi/m^3 from Table 2-1)

L_i = Beta skin dose conversion factor for noble gas nuclide i (mrem/yr per pCi/m^3 from Table 2-1)

M_i = Gamma air dose conversion factor for noble gas nuclide i (mrad/yr per pCi/m^3, from Table 2-1).

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2.3 Gaseous Effluent Dose Evaluation

The gaseous effluent dose evaluations are generally performed using the computer based RM-21A report processor. The following sections describe the computational models, assumptions and bases for the computer model. In the event that the computer model is unavailable for the required dose analysis, the dose analysis will be performed by manual calculation using the same methodology as the computer based report processor.

Monthly dose calculations are based on limiting sector average annual meteorological dispersion parameters. This calculation is performed using a senario of meteorological conditions which yield the limiting meteorological dispersion value required. For the noble gas monthly dose calculations, effluent release data are based on the latest grab sample analysis for radionuclide composition and the hourly average effluent monitor response for total release activity. For the iodine and particulate monthly dose calculations, the efffluent release radionuclide composition and release activity are based on the continuous composite samples for the time period of the dose calculation.

The quarterly dose calculations are a summation of the applicable monthly dose results.

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The annual dose calculations are based the meteorological conditions concurrent with the effluent releases. The meteorological conditions are based on the year's finalized meteorological data. Wind direction, temperature lapse rate, ambient temperature, ground level windspeed, and release elevation windspeed are provided for each hour of the year. The meteorological dispersion values (X/Q, depleted X/Q, and D/Q) are calculated for each hour and linked with the corresponding release data. The effluent release radionuclide composition and activity are based on the same parameters as the monthly dose analyses.

2.3.1 Site Boundary Dose Rate - Noble Gases

ODCM 13.3.2.a limits the dose rate at the SITE BOUNDARY due to noble gas releases to ≤ 500 mrem/yr total body and ≤ 3000 mrem/yr skin. Radiation monitor alarm setpoints are established to ensure that these release limits are not exceeded. In the event any gaseous releases from the station results in an alarm setpoint being exceeded, an evaluation of the SITE BOUNDARY dose rate resulting from the release will be performed using the following methodology.

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As appropriate, simultaneous releases from the North and South Vents will be considered in evaluating compliance with the release rate limits of ODCM 13.3.2.a following any releases exceeding the above prescribed alarm set-points. Monitor indications (readings) may be averaged over a time period not to exceed 15 minutes when determining noble gas release rate based on correlation of the monitor reading and monitor sensitivity. The 15-min averaging is needed to allow for reasonable monitor response to potentially changing radioactive material concentrations and to exclude potential electronic spikes in monitor readings that may be unrelated to radioactive material releases. As identified, any electronic spiking monitor responses may be excluded from the analysis.

NOTE: For administrative purposes, more conservative alarm setpoints than those required to meet 10 CFR 20 Dose Rate limits may be imposed. However, conditions exceeding these more limiting alarm setpoints do not necessarily indicate radioactive material release rates exceeding the dose limits of ODCM 13.3.2.a. Provided actual releases do not result in radiation monitor indications exceeding values based on the dose rate

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limits of ODCM 13.3.2.a, no further analyses are required for demonstrating compliance with the limits of ODCM 13.3.2.a.

The site boundary dose rate from noble gas effluent releases in the event of a noble gas effluent setpoint exceeding the value specified in ODCM II sections 2.2-1 (or 2.2.4.1), 2.2.2 (or 2.2.4.2), and 2.2.10 is calculated using the methodology stated below. This methodology is based on worst sector (NE) annual average meteorological dispersion but, if further refinement is required to meet the requirements of ODCM 13.3.2.a, actual meteorological data from the time period of concern may be used to calculate actual meteorological dispersion.

$$D_{\gamma PTB} = (53.882)(X/Q)\left[\sum_{i=3}^{17}\left[\left[(F_{NV})(Q_{iNV})+(F_{1SV})(Q_{i1SV})+(F_{2SV})(Q_{i2SV})\right]K_i\right]\right] \quad (2\text{-}22)$$

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$$D_{PSK} = (53.882)(X/Q)\left[\sum_{i=3}^{17}\left[\left[(F_{NV})(Q_{iNV})+(F_{1SV})(Q_{i1SV})+(F_{2SV})(Q_{i2SV})\right]L_i\right] + (SF)\sum_{i=3}^{17}\left[\left[(F_{NV})(Q_{iNV})+(F_{1SV})(Q_{i1SV})+(F_{2SV})(Q_{i2SV})\right]M_i(1.11)\right]\right]$$

(2-23)

where:

$D_{\gamma PTB}$ = Total Body Plume Dose Rate (rem/hr)

D_{PSK} = Skin Plume Dose Rate (rem/hr)

53.882 = Units conversion factor $\left(\frac{\text{rem-m}^3\text{-pCi-yr-min-cc}}{\mu\text{Ci-hr-mrem-m}^3\text{-sec-ft}^3}\right)$

X/Q = 1.1E-05 highest annual average relative concentration (NE Sector) (sec/m^3)

F_{NV} = North Vent Flow Rate (cfm)

Q_{iNV} = concentration of noble gas nuclide i during period of release from North Vent ($\mu Ci/cc$)

F_{1SV} = Unit 1 South Vent Flow Rate (cfm)

Q_{i1SV} = Concentration of noble gas nuclide i during period of release from Unit 1 South Vent ($\mu Ci/cc$)

F_{2SV} = Unit 2 South Vent Flow Rate (cfm)

Q_{i2SV} = Concentration of noble gas nuclide i during period of release from Unit 2 South Vent ($\mu Ci/cc$)

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K_i = Total body dose factor for noble gas nuclide i. Values listed in Table 2-1 $\left(\frac{\text{mrem-m}^3}{\text{pCi-yr}}\right)$

L_i = Skin dose factor for the beta contribution for noble gas nuclide i. Values are listed in Table 2-1 $\left(\frac{\text{mrem-m}^3}{\text{pCi-yr}}\right)$

1.11 = the average ratio of issue to air energy absorption coefficient. (mrem/mrad) (Ref: Reg. Guide 1.109 Section 2.2)

SF = 0.7 is the attenuation factor that accounts for the dose reduction due to shielding provided by residential structures (dimensionless) (Ref. Reg. Guide 1.109, Table E-15)

M_i = Gamma air dose factor for noble gas nuclide i. Values are listed in Table 2-1 $\left(\frac{\text{mrad-m}^3}{\text{pCi-yr}}\right)$

2.3.2 Site Boundary Dose Rate Radioiodine and Particulates

ODCM 13.3.2.d limits the dose rate to ≤ 1500 mrem/yr to any organ (inhalation pathways only) for I-131, I-133, tritium, and all radionuclides in particulate form with half-lives greater than 8 days in gaseous effluents. Compliance with ODCM 13.3.2.d will be determined monthly by performance of ODCM II section 2.3.4.

As appropriate, simultaneous releases from the North and South Vents will be considered in evaluating compliance with the release rate limits of ODCM 13.3.2.b. Release activity is based upon the results of the continuous

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composite sampler analyses performed in accordance with ODCM 13.3-3.

This methodology is based on the worst sector (NE) annual average meteorological dispersion but, if further refinement is required to meet the limits of ODCM 13.3.2.b, actual meteorological data from the time period of concern may be used to calculate actual meteorological dispersion.

2.3.3 Noble Gas Air Dose

ODCM 13.3.3 limits the air dose due to noble gases released in gaseous effluents (from both reactor units) to areas at or beyond the SITE BOUNDARY to:

≤ 10 mrad gamma for any quarter

≤ 20 mrad beta for any quarter

≤ 20 mrad gamma during any calendar year

≤ 40 mrad beta during any calendar year

As required by ODCM 13.3.3.1 Surveillance Requirement, these doses are calculated at least once per 31 days using the results of the most recent grab samples for isotopic composition performed in accordance with ODCM 13.3-3. Due to the incorporation of the ALARA philosophy in the design and operation of the Limerick

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effluent systems, release point grab samples may not identify any radionuclides. Total release acitvity is based upon the hourly average effluent monitor response. As identified, any electronic spiking monitor responses may be excluded from the release activity analyses. The monthly dose calculation is performed using the most limiting average annual meteorological dispersion values. The quarterly doses are based on the summation of the applicable monthly results. The annual dose calculations are based upon actual release meteorological conditions as described in Section 2.3.5. The monthly dose calculations are performed in accordance with the methodology and calculations below.

$$D_{\gamma AIR} = (0.114)(1.1E\text{-}5)(472) \sum_i [(F_{NV})(C_{iNV})+(F_{1SV})(C_{i1SV})+(F_{2SV})(C_{i2SV})] M_i \quad (2\text{-}24)$$

$$D_{\beta AIR} = (0.114)(1.1E\text{-}5)(472) \sum_i [(F_{NV})(C_{iNV})+(F_{1SV})(C_{i1SV})+(F_{2SV})(C_{i2SV})] N_i \quad (2\text{-}25)$$

where:

$D_{\gamma AIR}$ = Gamma air dose from noble gas releases (rad/hr)

$D_{\beta AIR}$ = Beta air dose from noble gas releases (rad/hr)

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0.114 = Units conversion $\left(\frac{\text{rad-pCi-yr}}{\mu\text{Ci-hr-mrad}}\right)$

1.1E-5 = Highest average annual relative concentration (NE sector) (sec/m^3)

472 = Units conversion $\left(\frac{\text{min-cc}}{\text{sec-ft}^3}\right)$

F_{NV} = Average North Vent flow rate for period of release (cfm)

C_{iNV} = Concentration of noble gas nuclide i from North Vent effluent (μCi/cc)

F_{1SV} = Average Unit 1 South Vent flow rate for period of release (cfm)

C_{i1SV} = Concentration of noble gas nuclide i from Unit 1 South Vent effluent (μCi/cc)

F_{2SV} = Average Unit 2 South Vent flow rate for period of release (cfm)

C_{i2SV} = Concentration of noble gas nuclide i from Unit 2 South Vent effluent (μCi/cc)

M_i = Gamma air dose factor for noble gas nuclide i. Values are listed in Table 2-1 $\left(\frac{\text{mrad-m}^3}{\text{pCi-yr}}\right)$

N_i = Beta air dose factor for noble gas nuclide i. Values are listed in Table 2-1 $\left(\frac{\text{mrad-m}^3}{\text{pCi-yr}}\right)$

2.3.4 Radioiodine and Particulate Dose Calculations

ODCM 13.3.4 limits the dose (from both reactor units) to a MEMBER OF THE PUBLIC from I-131, I-133, tritium, and all radionuclides in particulate form with half-lives

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greater than 8 days in gaseous effluents released to areas at or beyond the SITE BOUNDARY to:

≤ 15 mrem to any organ during any calendar quarter

≤ 30 mrem to any organ during any calendar year

As required by ODCM I3.3.4.1 Surveillance Requirement, these doses are calculated at least once per 31 days using the results of the continuous composite sample analysis performed in accordance with ODCM I3.3-3. Due to the incorporation of the ALARA philosophy in the design and operation of the Limerick effluent systems, these composite samples may not identify any radionuclides. Total release activity is based upon detectable concentration of the continuous composite samples and average appropriate vent flow during the sampling period. The monthly dose calculation is performed using the most limiting average annual meteorological dispersion values. The quarterly doses are based on the summation of the applicable monthly results. The annual dose calculations are based upon actual release meteorology as described in Section 2.3.5. The monthly dose calculations are performed in accordance with the methodology and calculations below. Total organ dose is obtained by the summation of the organ dose from each pathway for each receptor.

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2.3.4.1 Ground Pathway

$$D_{GPAR} = (3.6E\text{-}6)(472)(1.82E\text{-}9)\sum_t \left[\sum_{i=18}^{35} \left[(F_{NV})(Q_{iNV}) + (F_{1SV})(Q_{i1SV}) + (F_{2SV})(Q_{i2SV}) + (F_{HMS})(Q_{iHMS}) \right] (DF_{IKLN}) \right] (T_t) \quad (2\text{-}26)$$

2.3.4.2 Vegetation, Meat, Cow Milk, and Goat Milk Pathway

$$D_{VPAR} = (3.6E\text{-}6)(472)\sum_t \left[\left[\sum_{i=1}^{2} \left[(F_{NV})(Q_{iNV}) + (F_{1SV})(Q_{i1SV}) + (F_{2SV})(Q_{i2SV})(F_{HMS})(Q_{iHMS}) \right] (1.1E\text{-}5)(DF_{IKLN}) \right] + \left[\sum_{i=18}^{35} \left[(F_{NV})(Q_{iNV}) + (F_{1SV})(Q_{i1SV}) + (F_{2SV})(Q_{i2SV}) + (F_{HMS})(Q_{iHMS}) \right] (1.82E\text{-}9)(DF_{IKLN}) \right] \right] (T_t) \quad (2\text{-}27)$$

2.3.4.3 Inhalation Pathway

$$D_{IPAR} = (3.6E\text{-}6)(472)\sum_t \left[\left[\sum_{i=1}^{2} \left[(F_{NV})(Q_{iNV}) + (F_{1SV})(Q_{i1SV}) + (F_{2SV})(Q_{i2SV}) + (F_{HMS})(Q_{iHMS}) \right] (1.1E\text{-}5)(DF_{KLN}) \right] + \left[\sum_{i=18}^{35} \left[(F_{NV})(Q_{iNV}) + (F_{1SV})(Q_{i1SV}) + (F_{2SV})(Q_{i2SV}) + (F_{HMS})(Q_{iHMS}) \right] (1.0E\text{-}5)(DF_{KLN}) \right] \right] (T_t) \quad (2\text{-}28)$$

where:

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D_{GPAR} = dose from ground pathway due to release of particulates and iodines (rem)

D_{VPAR} = dose from vegetation, meat, cow milk, and goat milk pathways due to releases of particulates, iodines, and tritium (rem)

D_{IPAR} = dose from inhalation pathway due to release of particulates, iodines, and tritium (rem)

3.6E-6 = units conversion factor $\left(\frac{\text{rem-Ci-sec}}{\text{hr-mrem-}\mu\text{Ci}}\right)$

472 = units conversion factor $\left(\frac{\text{min-cc}}{\text{sec-ft}^3}\right)$

1.82E-9 = highest average annual deposition (ESE sector) $\left(\frac{1}{\text{m}^3}\right)$

$\sum_i$ = summation for each release time period (unitless)

F_{NV} = average North Vent flow rate during release (cfm)

Q_{iNV} = concentration of nuclide i from North Vent effluent (μCi/cc)

F_{1SV} = average Unit 1 South Vent flow rate during release (cfm)

Q_{i1SV} = concentration of nuclide i from Unit 1 South Vent effluent (μCi/cc)

F_{2SV} = average Unit 2 South Vent flow rate during release (cfm)

Q_{i2SV} = concentration of nuclide i from Unit 2 South Vent effluent (μCi/cc)

F_{HMS} = average Hot Maintenance Shop flow rate during release (cfm)

Q_{iHMS} = concentration of nuclide i from Hot Maintenance Shop effluent (μCi/cc)

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$DF_{i,k,l,n}$ = dose factor for organ type k, age group l, pathway number n; dose factors are based on results of a computer program that is based on and is similar to the NRC program GASPAR; results from this program provide input data in the form of a lookup table - values of $DF_{i,k,l,n}$ are provided in Table 2-2.

i = isotope number (1 through 35) (3 through 17 are noble gases)

k = organ type (1 through 8, where total body = 1, GI tract = 2, bone = 3, liver = 4, kidney = 5, thyroid = 6, lung = 7, skin = 8)

l = age group (1 through 4, where adult = 1, teen = 2, child = 3, infant = 4)

n = pathway number (1 through 7)

T_t = time duration of release (hrs)

1.1E-5 = highest average annual relative concentration (NE sector) (sec/m^3)

1.0E-5 = highest average annual relative depleted concentration (NE sector) (sec/m^3)

2.3.5 Annual Dose Evaluation

CDCM 13.6 requires an Annual Dose evaluation be performed and reported in accordance with Regulatory Guide 1.21 in the Semiannual Radioactive Effluent Release Report submitted 60 days after the first of each year. This dose evaluation is processed by the computer based RM-21A report processor. In the event that this computer model is unavailable, this analysis will be performed using the same methodology. The liquid portion of this annual dose calculation is described in Section

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1.3 of ODCM II. The annual gaseous dose calculation uses the same general methodology described in Section 2.3.1, 2.3.3, and 2.3.4 with the exception of meteorology, which is based upon sector average atmospheric dispersion values using the guidance of Regulatory Guide 1.111 (Section C.1c). Finalized hourly values of wind direction, ground level and release elevation wind speed, ambient temperature, and temperature lapse rate (for P-G stability class) are provided annually using the instrumentation specified in ODCM I3.1-1. These values are calculated for each hour and linked to the corresponding hourly averaged effluent release rate. Doses are then calculated for each hour at the various receptors of interest (depending upon release direction). Radioactive material release activity is calculated as described in Sections 2.3.3 and 2.3.4. Dose at each receptor is accumulated for the year and the maximum dose for plume, inhalation, and ingestion pathways are reported. The gaseous effluent dose receptors are listed in Table 2-4 and the dose is calculated using the methodology below.

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2.3.5.1 Plume Pathway

$$D_{PLNGA} = (3.6E\text{-}6)(472)\sum_t (X/Q)_t \sum_{i=3}^{17} [(F_{NV})(Q_{iNV}) + (F_{1SV})(Q_{i1SV}) + (F_{2SV})(Q_{i2SV})] \left[e^{(-\lambda i)(dr)/\mu_t}\right](DF_{ikln})(T_t) \quad (2\text{-}29)$$

2.3.5.2 Ground Pathway

$$D_{GPARA} = (3.6E\text{-}6)(472)\sum_t (D/Q)_t \sum_{i=18}^{35} \left[\begin{array}{l} (F_{NV})(Q_{iNV}) + (F_{1SV})(Q_{i1SV}) + \\ (F_{2SV})(Q_{i2SV}) + (F_{HMS})(Q_{iHMS}) \end{array} \right](DF_{ikln})(T_t) \quad (2\text{-}30)$$

2.3.5.3 Vegetation, Meat, Cow Milk, Goat Milk Pathway

$$D_{VPARA} = (3.6E\text{-}6)(472)\sum_t \left[\left[\sum_{i=1}^{2} [(F_{NV})(Q_{iNV}) + (F_{1SV})(Q_{i1SV}) + (F_{2SV})(Q_{i2SV}) + (F_{HMS})(Q_{iHMS})][X/Q_t](DF_{ikln}) \right] + \left[\sum_{i=18}^{35} [(F_{NV})(Q_{iNV}) + (F_{1SV})(Q_{i1SV}) + (F_{2SV})(Q_{i2SV}) + (F_{HMS})(Q_{iHMS})][D/Q]_t(DF_{ikln}) \right] \right](T_t) \quad (2\text{-}31)$$

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2.3.5.4 Inhalation Pathway

$$D_{IPARA} = (3.6E-6)(472)\sum_t \left[\left[\sum_{i=1}^{2} [(F_{NV})(Q_{iNV})+(F_{1SV})(Q_{i1SV})+(F_{2SV})(Q_{i2SV})+(F_{HMS})(Q_{iHMS})][X/Q]_t(DF_{ikln}) \right] + \left[\sum_{i=3}^{35} [(F_{NV})(Q_{iNV})+(F_{1SV})(Q_{i1SV})+(F_{2SV})(Q_{i2SV})+(F_{HMS})(Q_{iHMS})][X/Q_{depl}](DF_{ikln}) \right] \right] (T$$

(2-32)

where:

D_{PLNGA} = annual dose from plume pathway (rem)

D_{GPARA} = annual dose from ground pathway (rem)

D_{VPARA} = annual dose from vegetation, meat, cow milk, and goat milk pathways (rem)

D_{IPARA} = annual dose from inhalation pathway (rem)

3.6E-6 = units conversion factor $\left(\frac{\text{rem-Ci-sec}}{\text{hr-mrem-}\mu\text{Ci}}\right)$

472 = units conversion factor $\left(\frac{\text{min-cc}}{\text{sec-ft}^3}\right)$

$\sum_t$ = summation for each release time period (unitless)

$(X/Q)_t$ = relative concentration for time period "t" (sec/m^3)

F_{NV} = average North Vent flow rate during release (cfm)

Q_{iNV} = concentration of nuclide i from North Vent effluent ($\mu Ci/cc$)

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F_{1SV} = average Unit 1 South Vent flow rate during release (cfm)

Q_{i1SV} = concentration of nuclide i from Unit 1 South Vent effluent (μCi/cc)

F_{2SV} = average Unit 2 South Vent flow rate during release (cfm)

Q_{i2SV} = concentration of nuclide i from Unit 2 South Vent effluent (μCi/cc)

λ_i = decay constant of nuclide i (sec^{-1})

dr = distance to receptor "r" (m)

U_t = average windspeed for time period "t" (m/sec)

DF_{ikln} = dose factor for organ type k, age group l, pathway number n; dose factors are based on results of a computer program that is based on and is similar to the NRC program GASPAR; results from this program provide input data in the form of a lookup table - values of DF_{ikln} are provided in Table C-2.

i = isotope number (1 through 35) (3 through 17 are noble gases)

k = organ type (1 through 8, where total body = 1, GI tract = 2, bone = 3, liver = 4, kidney = 5, thyroid = 6, lung = 7, skin = 8)

l = age group (1 through 4, where adult = 1, teen = 2, child = 3, infant = 4)

n = pathway number (1 through 7)

T_t = time duration of release (hrs)

F_{HMS} = average Hot Maintenance Shop flow rate during release (cfm)

Q_{iHMS} = concentration of nuclide i from Hot Maintenance Shop effluent (μCi/cc)

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$(D/Q)_t$ = deposition concentration for time period "t" ($1/m^2$)

$(X/Q_{depl})_t$ = relative depleted concentration for time period "t" (sec/m^3)

2.4 Gaseous Effluent Dose Projection

ODCM 13.3.5 requires that the VENTILATION EXHAUST TREATMENT SYSTEM be used to reduce radioactive material levels prior to discharge when projected doses from both units to areas at and beyond the SITE BOUNDARY would exceed 0.6 mrem to any organ in a 31 day period.

The appplicable gaseous processing systems for maintaining radioactive material releases ALARA are the Gaseous Radwaste Treatment System and Exhaust Treatment System as delineated in Figures 2-1 and 2-2.

A dose projection is performed at least once per 31-days by the following equation:

$$Dmaxp = (Dmax/d) \cdot 31d \qquad (2\text{-}33)$$

where:

Dmaxp = maximum organ dose projection for current 31-day period (mrem)

Dmax = maximum organ dose to date for current calendar quarter as determined by equation (2-26) (2-27) or (2-28) (mrem)

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d = number of days in current calendar quarter at the end of the release. The minimum time elapsed is seven (7) days.

31d = the number of days of concern

3.0 Special Dose Analysis

3.1 Total Dose to MEMBERS OF THE PUBLIC

ODCM I3.3.7 requires that the annual dose or dose commitment to any MEMBER OF THE PUBLIC, due to releases of radioactivity and radiation, from the uranium fuel cycle shall be limited to:

≤ 25 mrem whole body or any organ except thyroid

≤ 75 mrem thyroid

ODCM I3.3.7.2 Surveillance Requirement requires that cumulative dose contributions from direct radiation from operations be evaluated when the calculated dose from the release of radioactive materials in liquid or gaseous effluents exceed twice the limits of ODCM I3.2.3.a, 3.2.3.b, 3.3.3.a, 3.3.3.b, 3.3.4.a, or 3.3.4.b. The direct radiation contribution shall be determined by the methodology described below. This methodology calculates the direct radiation contribution which then must be added to the dose or dose commitment determined in accordance with sections ODCM III.3.1, 2.3.3, and 2.3.4 to determine total dose from all pathways. This evaluation of direct radiation contribution is in accordance with ANSI/ANS 6.6.1-1979 Section 7. The error using this method is estimated to be approximately 8%. The

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following evaluation is performed for each receptor of concern.

$$D_{DRI} = D_{TTLD_1} - D_{\bar{X}\ BKG} - D_{IEFFL} \qquad (3\text{-}1)$$

where:

D_{DRI} = cumulative dose contribution from direct radiation at receptor i (mrem)

Note: Due to the statistics of radiation measurements and to the conservation of effluent calculations it is plausible that D_{DRI} may yield a negative value. In this situation the value for D_{DRI} shall be reported as zero (0).

D_{TTLDI} = total dose at receptor of interest (as evaluated by TLD measurement) (mrem)

Note: If there is not a TLD location at the actual receptor location, a more conservative location will be used to evaluate Total Dose.

$D_{\bar{X}BKG}$ = mean of the background dose as evaluated by TLDs at background sites (mrem)

D_{IEFFL} = effluent contribution to dose (as evaluated in sections 2.3.3 and 2.3.4.1).

3.2 Doses Due to Activities Inside The SITE BOUNDARY

In accordance with ODCM I3.6, the Semiannual Radioactive Effluent Release Report submitted within 60 days after January 1 of each year shall include an assessment of radiation dose from radioactive liquid and gaseous effluents to MEMBERS OF THE PUBLIC due to their activities inside the SITE BOUNDARY.

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There are three locations within the SITE BOUNDARY that are accessible to MEMBERS OF THE PUBLIC for activities unrelated to the operation of Limerick station. These locations are: 1) the railroad tracks which run along the river within the SITE BOUNDARY; 2) the Limerick Atomic Information Center, on Longview Road next to the 500 kV substation; and 3) Fricks Lock environmental laboratory, operated by RMC Environmental Services, Inc. Of these three locations, the railroad tracks are the closest to the plant confines. The highest annual dose for the three locations should be demonstrated by the railroad track location.

The following methodology is used to evaluate dose at the railroad tracks, Information Center, and Fricks Lock locations. This dose assessment is based on the results of the annual dose evaluation as outlined in ODCM Section 2.3.5. The maximum dose calculated will be reported.

$$D_{PSBX} = D_{SBX} \cdot \frac{X/Q_{RIP}}{X/Q_{SBX}} \cdot 0.25 \quad . \qquad (3\text{-}2)$$

where:

D_{PSBX} = Dose to MEMBERS OF THE PUBLIC within the SITE BOUNDARY in Sector "X" (mrem)

D_{SBX} = Dose at SITE BOUNDARY in Sector "X" (mrem)

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X/Q_{SBX} = Relative average annual atmospheric dispersion for year of interest at SITE BOUNDARY in Sector "X" (sec/m^3)

X/Q_{RIF} = Relative average annual atmospheric dispersion for year of interest at railroad, Information Center or Fricks Lock for distances listed below in Sector "X" (sec/m^3)

Sector	Distance to Location (m)
Railroad Tracks:	
S	300
SSW	225
SW	225
WSW	225
W	225
WNW	345
NW	450
Information Center:	
ESE	884
Fricks Lock:	
WSW	450

0.25 = maximum occupancy factor for railroad tracks, Limerick Atomic Information Center or Fricks Lock Environmental Laboratory (unitless).

4.0 Radiological Environmental Monitoring Program

4.1 Sampling Program

The operational phase of the Radiological Environmental Monitoring Program (REMP) is conducted in accordance with the requirements of ODCM I3.4-3. The objectives of the program are:

- To provide data on measureable levels of radiation and radioactive materials in the site environs

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- To evaluate the relationship between quantities of radioactive materials released from LGS and resultant radiation doses to individuals from principal pathways of exposure.

The sampling requirements (type of samples, collection frequency, and analysis) and sample locations are presented in Appendix B.

4.2 Interlaboratory Comparison Program

Technical Specification 6.8.4.e.3 requires analyses be performed on radioactive material supplied as part of an Interlaboratory Comparison.

Participation in an approved Interlaboratory Comparison Program provides a check on the preciseness of measurements of radioactive materials in environmental samples. A summary of the Interlaboratory Comparison Program results will be provided in the Annual Radiological Environmental Operating Report pursuant to ODCM 13.5.

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TABLES

TABLE 1-1

INGESTION INDIVIDUAL DOSE FACTORS (D_{aipj})
FOR LIQUID EFFLUENTS

UNITS FOR ALL INGESTION PATHWAYS ARE:

mrem/pCi

LIQUID DOSE FACTORS

DATA FROM TABLE 3-12 OF REG. GUIDE 1.109

INGESTION DOSE FACTORS FOR ADULT:

	BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
H3	0.000E+00	1.050E-07	1.050E-07	1.050E-07	1.050E-07	1.050E-07	1.050E-07
C14	2.84xE-06	5.680E-07	5.680E-07	5.680E-07	5.680E-07	5.680E-07	5.680E-07
MN54	1.700E-06	1.700E-06	1.700E-06	1.700E-06	1.700E-06	1.700E-06	1.700E-06
FE55	1.830E-06	1.220E-06	7.460E-07	0.000E+00	0.000E+00	0.000E+00	2.170E-06
CO57	0.000E+00	0.000E+00	2.66xE-06	1.290E-09	5.880E-10	3.530E-07	6.690E-07
MN56	0.000E+00	4.570E-08	8.720E-07	0.000E+00	1.760E-06	0.000E+00	1.400E-05
MN56	0.000E+00	1.100E-07	4.040E-06	0.000E+00	1.480E-07	0.000E+00	3.670E-06
FE59	2.730E-06	1.690E-06	4.690E-07	0.000E+00	0.000E+00	1.050E-06	1.090E-06
FE59	4.140E-06	1.010E-05	3.910E-06	0.000E+00	0.000E+00	2.850E-06	5.400E-05
CO58	0.000E+00	7.490E-07	1.870E-06	0.000E+00	0.000E+00	0.000E+00	1.510E-05
CO60	0.000E+00	2.140E-06	4.720E-06	0.000E+00	0.000E+00	0.000E+00	4.020E-05
NI63	1.300E-04	9.010E-06	4.360E-04	0.000E+00	0.000E+00	0.000E+00	1.580E-06
NI65	5.230E-07	6.480E-08	2.120E-08	0.000E+00	0.000E+00	0.000E+00	1.740E-06
CU64	0.000E+00	8.220E-04	3.910E-06	0.000E+00	1.100E-07	0.000E+00	7.100E-06
ZN65	4.240E-06	1.530E-05	8.910E-06	0.000E+00	1.010E-05	0.000E+00	9.720E-06
ZN69	1.230E-06	1.070E-06	1.370E-09	0.000E+00	1.260E-06	0.000E+00	2.980E-09
BR83	0.000E+00	0.000E+00	4.020E-08	0.000E+00	0.000E+00	0.000E+00	5.790E-08
BR84	0.000E+00	0.000E+00	5.210E-06	0.000E+00	0.000E+00	0.000E+00	4.090E-13
BR85	0.000E+00	0.000E+00	2.140E-09	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RB86	0.000E+00	2.110E-05	9.690E-06	0.000E+00	0.000E+00	0.000E+00	4.160E-06
RB88	0.000E+00	8.050E-08	3.210E-02	0.000E+00	0.000E+00	0.000E+00	8.260E-19
RB89	0.000E+00	4.010E-12	2.510E-05	0.000E+00	0.000E+00	0.000E+00	2.330E-21
SR89	3.090E-04	0.000E+00	8.840E-06	0.000E+00	0.000E+00	0.000E+00	4.940E-05
SR90	7.580E-03	0.000E+00	1.850E-03	0.000E+00	0.000E+00	0.000E+00	2.190E-04
SR91	5.870E-06	0.000E+00	2.290E-07	0.000E+00	0.000E+00	0.000E+00	2.700E-05
SR92	2.130E-06	0.000E+00	9.200E-08	0.000E+00	0.000E+00	0.000E+00	4.260E-05
Y90	3.620E-09	0.000E+00	2.580E-10	0.000E+00	0.000E+00	0.000E+00	1.020E-04
Y91M	9.040E-11	0.000E+00	3.820E-12	0.000E+00	0.000E+00	0.000E+00	2.670E-10
Y91	1.410E-07	0.000E+00	3.770E-09	0.000E+00	0.000E+00	0.000E+00	7.670E-05
Y92	3.630E-10	0.000E+00	2.470E-11	0.000E+00	0.000E+00	0.000E+00	1.480E-05
Y93	1.680E-09	0.000E+00	7.400E-11	0.000E+00	0.000E+00	0.000E+00	8.500E-05
ZR93	3.040E-08	9.730E-09	6.600E-09	0.000E+00	1.530E-08	0.000E+00	3.090E-05
ZR97	1.680E-09	3.190E-10	1.550E-10	0.000E+00	5.120E-10	0.000E+00	1.050E-04
NB95	6.220E-05	3.460E-05	1.660E-05	0.000E+00	1.420E-05	0.000E+00	2.100E-05
MO99	0.000E+00	4.110E-06	8.200E-07	0.000E+00	9.740E-06	0.000E+00	9.990E-06
TC99M	2.470E-10	6.980E-10	8.590E-09	0.000E+00	1.040E-08	3.420E-10	4.230E-07
TC101	2.540E-10	3.660E-10	3.590E-09	0.000E+00	6.590E-09	1.870E-10	1.100E-21
RU103	1.490E-07	0.000E+00	7.970E-08	0.000E+00	7.040E-07	0.000E+00	2.160E-05
RU105	2.540E-08	0.000E+00	1.020E-08	0.000E+00	1.790E-07	0.000E+00	9.420E-06
RU106	2.750E-06	0.000E+00	2.480E-07	0.000E+00	3.310E-06	0.000E+00	1.730E-04
AG110M	1.600E-07	1.480E-07	8.790E-08	0.000E+00	2.910E-07	0.000E+00	6.040E-05
TE123M	2.660E-06	9.170E-07	3.590E-07	3.060E-07	1.090E-05	0.000E+00	1.070E-05
TE125M	8.770E-06	2.440E-06	8.250E-07	1.730E-06	2.750E-05	0.000E+00	2.270E-05
TE127	1.100E-07	3.350E-08	2.380E-08	8.150E-08	4.480E-07	0.000E+00	8.680E-06
TE127M	1.150E-05	4.290E-06	1.220E-06	3.930E-06	4.800E-05	0.000E+00	5.790E-05
TE129	3.140E-08	1.130E-08	7.650E-09	2.410E-08	2.320E-07	0.000E+00	2.370E-06
TE129M	1.730E-06	8.460E-07	7.050E-07	1.340E-06	2.570E-06	0.000E+00	8.400E-05
TE131	1.970E-08	8.230E-09	8.220E-09	1.620E-08	2.630E-08	0.000E+00	2.790E-09
TE132	2.540E-06	1.420E-06	1.530E-06	2.230E-06	1.370E-05	0.000E+00	7.710E-05

I130	7.960E-07	2.230E-06	6.800E-07	1.370E-06	3.630E-06	0.000E+00	1.920E-06
I131	4.360E-06	5.910E-06	3.410E-06	1.910E-03	1.020E-05	0.000E+00	1.570E-06
I132	2.030E-07	5.430E-07	1.930E-07	1.900E-05	8.650E-07	0.000E+00	1.020E-07
I133	1.620E-06	2.670E-06	7.530E-07	3.630E-04	4.310E-06	0.000E+00	2.220E-06
I134	1.060E-07	2.870E-07	1.030E-07	4.990E-06	4.580E-07	0.000E+00	2.510E-10
I135	4.430E-07	1.160E-06	4.280E-07	7.650E-05	1.860E-06	0.000E+00	1.310E-06
CS134	6.220E-05	1.480E-04	1.210E-04	0.000E+00	4.790E-05	1.590E-05	2.590E-06
CS136	6.510E-06	2.570E-05	1.850E-05	0.000E+00	1.430E-05	1.960E-06	2.920E-06
CS137	7.970E-05	1.090E-04	7.140E-05	0.000E+00	3.700E-05	1.230E-05	2.110E-06
CS138	5.520E-08	1.090E-07	5.400E-08	0.000E+00	7.010E-08	7.910E-09	4.650E-13
BA139	9.700E-08	6.910E-11	2.840E-09	0.000E+00	6.460E-11	3.920E-11	1.720E-07
BA140	2.030E-05	2.550E-08	1.330E-06	0.000E+00	6.670E-09	1.460E-08	4.180E-05
BA141	4.710E-08	3.560E-11	1.590E-09	0.000E+00	3.310E-11	2.020E-11	2.220E-17
BA142	2.130E-08	2.190E-11	1.340E-09	0.000E+00	1.850E-11	1.240E-11	3.000E-26
LA140	2.500E-09	1.260E-09	3.330E-10	0.000E+00	0.000E+00	0.000E+00	9.250E-05
LA142	1.280E-10	5.820E-11	1.450E-11	0.000E+00	0.000E+00	0.000E+00	4.250E-07
CE141	9.360E-09	6.330E-09	7.180E-10	0.000E+00	2.940E-09	0.000E+00	2.620E-05
CE143	1.650E-09	1.220E-06	1.350E-10	0.000E+00	5.370E-10	0.000E+00	4.560E-05
CE144	4.880E-07	2.040E-07	2.620E-08	0.000E+00	1.210E-07	0.000E+00	1.650E-04
PR143	9.200E-09	3.690E-09	4.560E-10	0.000E+00	2.130E-09	0.000E+00	4.030E-05
PR144	3.010E-11	1.250E-11	1.530E-12	0.000E+00	7.030E-12	0.000E+00	4.330E-18
ND147	6.290E-09	7.270E-09	4.350E-10	0.000E+00	4.250E-09	0.000E+00	3.490E-05
W187	1.030E-07	8.610E-08	3.010E-08	0.000E+00	0.000E+00	0.000E+00	2.820E-05
NP239	1.190E-09	1.170E-10	6.630E-11	0.000E+00	3.650E-10	0.000E+00	2.400E-05
NONE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NONE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

LIQUID DOSE FACTORS

DATA FROM TABLE E-12 OF REG. GUIDE 1.109

INGESTION DOSE FACTORS FOR TEEN:

	BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
H3	0.0000E+00	1.0000E-07	1.0000E-07	1.0000E-07	1.0000E-07	1.0000E-07	1.0000E-07
C14	4.0000E-06	1.2000E-07	1.2000E-07	1.2000E-07	1.2000E-07	1.2000E-07	1.2000E-07
NA24	2.3000E-06	2.3000E-06	2.3000E-06	2.3000E-06	2.3000E-06	2.3000E-06	2.3000E-06
P32	2.7600E-04	1.7100E-05	1.0700E-05	0.0000E+00	0.0000E+00	0.0000E+00	2.3200E-05
CR51	0.0000E+00	0.0000E+00	3.6000E-07	2.0000E-09	7.6900E-10	5.1000E-09	6.0500E-07
MN54	0.0000E+00	9.5000E-06	1.1700E-06	0.0000E+00	1.7600E-06	0.0000E+00	1.2100E-05
MN56	0.0000E+00	1.8100E-07	2.8100E-08	0.0000E+00	2.0000E-07	0.0000E+00	1.0600E-05
FE55	3.7300E-06	2.8200E-06	6.2500E-07	0.0000E+00	0.0000E+00	1.7000E-06	1.1900E-06
FE59	5.5700E-06	1.2700E-05	9.2900E-06	0.0000E+00	0.0000E+00	4.3200E-06	3.2400E-05
CO58	0.0000E+00	9.7200E-07	2.2400E-06	0.0000E+00	0.0000E+00	0.0000E+00	1.3000E-05
CO60	0.0000E+00	2.6100E-06	6.1300E-06	0.0000E+00	0.0000E+00	0.0000E+00	3.6800E-05
NI63	1.7700E-04	1.2100E-05	6.0000E-06	0.0000E+00	0.0000E+00	0.0000E+00	1.9900E-06
NI65	7.4900E-07	9.5700E-08	6.2300E-08	0.0000E+00	0.0000E+00	0.0000E+00	1.1900E-06
CU64	0.0000E+00	1.1900E-07	5.4100E-08	0.0000E+00	2.9100E-07	0.0000E+00	8.9200E-06
ZN65	1.7900E-06	2.0000E-05	9.2300E-06	0.0000E+00	1.2900E-05	0.0000E+00	8.6700E-06
ZN69	1.4700E-05	2.8000E-06	1.9000E-05	0.0000E+00	1.8300E-08	0.0000E+00	5.1600E-08
BR83	0.0000E+00	0.0000E+00	5.7000E-05	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
BR84	0.0000E+00	0.0000E+00	7.2200E-05	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
BR85	0.0000E+00	0.0000E+00	3.0300E-07	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
RB86	0.0000E+00	2.9800E-05	1.4000E-05	0.0000E+00	0.0000E+00	0.0000E+00	6.4100E-06
RB88	0.0000E+00	8.8200E-08	6.5400E-08	0.0000E+00	0.0000E+00	0.0000E+00	2.3800E-15
RB89	0.0000E+00	5.5000E-08	3.8700E-08	0.0000E+00	0.0000E+00	0.0000E+00	8.4300E-17
SR89	6.4000E-04	0.0000E+00	1.2600E-05	0.0000E+00	0.0000E+00	0.0000E+00	5.2000E-05
SR90	2.1000E-02	0.0000E+00	2.0500E-03	0.0000E+00	0.0000E+00	0.0000E+00	2.3300E-04
SR91	8.0700E-06	0.0000E+00	3.2100E-07	0.0000E+00	0.0000E+00	0.0000E+00	3.6600E-05
SR92	3.0500E-06	0.0000E+00	1.3000E-07	0.0000E+00	0.0000E+00	0.0000E+00	7.7700E-05
Y90	1.3700E-03	0.0000E+00	3.6900E-10	0.0000E+00	0.0000E+00	0.0000E+00	1.1300E-04
Y91M	1.2900E-10	0.0000E+00	6.9300E-12	0.0000E+00	0.0000E+00	0.0000E+00	6.0900E-09
Y91	2.0100E-07	0.0000E+00	5.3700E-09	0.0000E+00	0.0000E+00	0.0000E+00	8.2400E-05
Y92	1.2100E-09	0.0000E+00	2.3000E-11	0.0000E+00	0.0000E+00	0.0000E+00	3.1200E-05
Y93	2.8300E-09	0.0000E+00	1.0500E-10	0.0000E+00	0.0000E+00	0.0000E+00	1.1700E-06
ZR95	4.1200E-08	1.3000E-08	8.9400E-09	0.0000E+00	1.9100E-08	0.0000E+00	3.0000E-05
ZR97	2.3700E-09	4.6900E-10	2.1600E-10	0.0000E+00	7.1100E-10	0.0000E+00	1.2700E-06
NB95	8.2200E-06	4.5600E-09	2.5100E-09	0.0000E+00	6.6200E-09	0.0000E+00	1.9500E-05
MO99	0.0000E+00	6.0300E-06	1.1500E-06	0.0000E+00	1.3300E-05	0.0000E+00	1.0300E-05
TC99M	1.2200E-10	9.2600E-10	1.2000E-08	0.0000E+00	1.3800E-08	5.1600E-10	6.0800E-07
TC101	3.6000E-10	5.1200E-10	5.0300E-09	0.0000E+00	9.2600E-09	3.1200E-10	8.7500E-17
RU103	2.5500E-07	0.0000E+00	1.0900E-07	0.0000E+00	8.9900E-07	0.0000E+00	2.1300E-05
RU105	2.1400E-08	0.0000E+00	8.6800E-09	0.0000E+00	2.7500E-07	0.0000E+00	1.7600E-05
RU106	1.9200E-06	0.0000E+00	4.9400E-07	0.0000E+00	7.5600E-06	0.0000E+00	1.3800E-04
AG110M	2.0300E-07	1.9600E-07	1.1800E-07	0.0000E+00	3.7000E-07	0.0000E+00	5.4500E-05
TE125M	3.8200E-06	1.3800E-06	5.1200E-07	1.8700E-06	8.0000E+00	0.0000E+00	1.1300E-05
TE127M	9.6700E-06	3.6300E-06	1.1500E-06	2.3000E-06	3.9200E-05	0.0000E+00	2.6100E-05
TE127	1.5300E-07	5.6000E-08	2.6000E-08	1.0900E-07	6.6000E-07	0.0000E+00	1.2200E-05
TE129M	1.0300E-05	3.8500E-06	2.5300E-06	3.2600E-06	6.8200E-05	0.0000E+00	6.1200E-05
TE129	6.6800E-08	1.6700E-08	1.0900E-08	3.2000E-08	1.8300E-07	0.0000E+00	2.4500E-07
TE131M	2.4400E-06	1.1700E-06	9.7600E-07	1.7600E-06	1.2200E-05	0.0000E+00	9.3900E-05
TE131	2.7900E-08	1.1300E-08	8.7200E-09	2.1300E-08	1.2200E-07	0.0000E+00	2.2900E-09
TE132	1.4900E-06	2.2100E-06	2.0300E-06	2.3300E-06	2.1300E-05	0.0000E+00	7.0000E-05

I130	1.030E-04	2.310E-06	1.190E-06	2.430E-04	4.590E-06	0.000E+00	2.290E-06
I131	3.250E-04	4.170E-06	4.400E-06	2.350E-03	1.610E-05	0.000E+00	1.620E-06
I132	2.790E-07	7.200E-07	2.620E-07	2.450E-03	1.150E-06	0.000E+00	3.130E-07
I133	2.010E-06	3.410E-06	1.040E-06	4.700E-04	3.920E-06	0.000E+00	2.580E-06
I134	1.400E-07	2.670E-07	1.390E-07	8.450E-04	6.100E-07	0.000E+00	5.150E-09
I135	8.100E-07	1.570E-06	8.620E-07	1.010E-04	2.400E-06	0.000E+00	1.740E-06
CS13-	8.370E-05	1.500E-04	9.140E-05	0.000E+00	8.260E-05	2.390E-05	2.450E-06
CS13E	8.590E-06	2.810E-05	2.270E-05	0.000E+00	1.500E-05	2.900E-06	2.720E-06
CS137	1.120E-04	2.490E-04	5.150E-05	0.000E+00	3.070E-05	1.970E-05	2.120E-06
CS138	7.760E-08	2.140E-07	7.450E-08	0.000E+00	1.190E-07	1.280E-08	6.780E-11
BA13-	1.890E-07	9.780E-11	4.050E-09	0.000E+00	9.220E-11	9.740E-11	1.240E-06
BA140	2.400E-05	3.420E-05	1.830E-06	0.000E+00	1.190E-08	2.360E-08	4.230E-05
BA141	8.710E-08	5.010E-11	2.240E-09	0.000E+00	4.670E-11	3.630E-11	1.430E-13
BA142	2.790E-08	2.590E-11	1.840E-09	0.000E+00	2.330E-11	1.990E-11	9.180E-20
LA140	3.630E-09	1.720E-09	6.350E-10	0.000E+00	0.000E+00	0.000E+00	9.120E-05
LA142	1.790E-10	7.550E-11	1.980E-11	0.000E+00	0.000E+00	0.000E+00	2.620E-06
CE141	1.230E-06	8.660E-09	1.020E-05	0.000E+00	6.150E-07	0.000E+00	2.540E-05
CE143	2.350E-09	1.710E-06	1.910E-10	0.000E+00	7.670E-10	0.000E+00	3.140E-05
CE144	6.960E-07	2.690E-07	3.760E-08	0.000E+00	1.720E-07	0.000E+00	1.750E-06
PR143	1.210E-08	5.230E-09	6.320E-10	0.000E+00	3.040E-09	0.000E+00	4.210E-05
PR144	4.200E-11	1.700E-11	2.130E-12	0.000E+00	1.010E-11	0.000E+00	4.740E-14
ND147	3.330E-09	1.020E-08	6.110E-10	0.000E+00	5.990E-09	0.000E+00	3.680E-05
W187	1.460E-07	1.190E-07	4.170E-08	0.000E+00	0.000E+00	0.000E+00	3.220E-05
NP239	1.760E-07	1.690E-10	5.220E-11	0.000E+00	5.210E-10	0.000E+00	2.670E-05
NONE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NONE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

LIQUID DOSE FACTORS

DATA FROM TABLE E-13 OF REG. GUIDE 1.109

INGESTION DOSE FACTORS FOR CHILD:

	BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
H3	0.000E+00	2.030E-07	2.030E-07	2.030E-07	2.030E-07	2.030E-07	2.030E-07
C14	1.220E-05	2.420E-06	2.420E-06	2.420E-06	2.420E-06	2.420E-06	2.420E-06
NA24	5.800E-06	5.800E-06	5.800E-06	5.800E-06	5.800E-06	5.800E-06	5.800E-06
P32	2.250E-04	3.290E-05	3.180E-05	0.000E+00	0.000E+00	0.000E+00	2.280E-05
CR51	0.000E+00	0.000E+00	8.900E-09	4.940E-09	1.350E-09	9.020E-09	6.720E-07
MN54	0.000E+00	1.070E-05	2.850E-06	0.000E+00	3.000E-06	0.000E+00	8.980E-06
MN56	0.000E+00	3.240E-07	7.540E-08	0.000E+00	4.040E-07	0.000E+00	6.860E-05
FE55	1.150E-05	6.100E-06	1.890E-06	0.000E+00	0.000E+00	3.450E-06	1.130E-06
FE59	1.650E-05	2.670E-05	1.330E-05	0.000E+00	0.000E+00	7.760E-06	2.780E-05
CO58	0.000E+00	1.800E-06	5.510E-06	0.000E+00	0.000E+00	0.000E+00	1.050E-05
CO60	0.000E+00	5.290E-06	1.560E-05	0.000E+00	0.000E+00	0.000E+00	2.910E-05
NI63	5.390E-04	2.890E-05	1.830E-05	0.000E+00	0.000E+00	0.000E+00	1.960E-06
NI65	2.220E-06	2.090E-07	1.220E-07	0.000E+00	0.000E+00	0.000E+00	2.560E-05
CU64	0.000E+00	2.450E-07	1.480E-07	0.000E+00	5.920E-07	0.000E+00	1.150E-05
ZN65	1.370E-05	3.650E-05	2.270E-05	0.000E+00	2.300E-05	0.000E+00	6.410E-06
ZN69	4.330E-08	6.330E-08	5.850E-09	0.000E+00	2.840E-08	0.000E+00	3.990E-06
BR83	0.000E+00	0.000E+00	1.710E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BR84	0.000E+00	0.000E+00	1.980E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BR85	0.000E+00	0.000E+00	9.120E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RB86	0.000E+00	6.700E-05	6.120E-05	0.000E+00	0.000E+00	0.000E+00	6.310E-06
RB88	0.000E+00	1.900E-07	1.320E-07	0.000E+00	0.000E+00	0.000E+00	9.320E-09
RB89	0.000E+00	1.170E-07	1.040E-07	0.000E+00	0.000E+00	0.000E+00	1.020E-09
SR89	1.320E-03	0.000E+00	3.770E-05	0.000E+00	0.000E+00	0.000E+00	5.110E-05
SR90	1.700E-02	0.000E+00	4.310E-01	0.000E+00	0.000E+00	0.000E+00	2.290E-04
SR91	2.400E-05	0.000E+00	9.060E-07	0.000E+00	0.000E+00	0.000E+00	5.300E-05
SR92	9.030E-06	0.000E+00	3.620E-07	0.000E+00	0.000E+00	0.000E+00	1.710E-06
Y90	4.110E-08	0.000E+00	1.100E-09	0.000E+00	0.000E+00	0.000E+00	1.170E-06
Y91M	3.820E-10	0.000E+00	1.390E-11	0.000E+00	0.000E+00	0.000E+00	7.480E-07
Y91	6.020E-07	0.000E+00	1.610E-08	0.000E+00	0.000E+00	0.000E+00	8.020E-05
Y92	3.600E-09	0.000E+00	1.030E-10	0.000E+00	0.000E+00	0.000E+00	1.040E-04
Y93	1.140E-08	0.000E+00	3.130E-10	0.000E+00	0.000E+00	0.000E+00	1.700E-06
ZR93	1.160E-07	2.550E-08	2.270E-08	0.000E+00	3.650E-08	0.000E+00	2.660E-05
ZR97	6.990E-09	1.010E-09	5.960E-10	0.000E+00	1.450E-09	0.000E+00	1.530E-06
NB95	2.250E-08	8.760E-09	6.260E-09	0.000E+00	8.230E-09	0.000E+00	1.620E-05
MO99	0.000E+00	1.330E-05	2.290E-06	0.000E+00	2.840E-05	0.000E+00	1.100E-05
TC99M	9.230E-10	1.810E-09	3.000E-08	0.000E+00	2.630E-08	9.190E-10	1.030E-06
TC101	1.070E-09	1.120E-09	1.620E-08	0.000E+00	1.910E-08	5.920E-10	3.560E-09
RU103	7.310E-07	0.000E+00	2.810E-07	0.000E+00	1.840E-06	0.000E+00	1.890E-05
RU105	6.450E-08	0.000E+00	2.340E-08	0.000E+00	5.670E-07	0.000E+00	6.210E-05
RU106	1.170E-05	0.000E+00	1.660E-06	0.000E+00	1.580E-05	0.000E+00	1.820E-04
AG110M	5.390E-07	3.640E-07	2.910E-07	0.000E+00	6.780E-07	0.000E+00	4.330E-05
TE125M	1.140E-05	3.090E-06	1.520E-06	3.230E-06	0.000E+00	0.000E+00	1.100E-05
TE127M	2.290E-05	7.780E-06	3.430E-06	6.910E-06	8.240E-05	0.000E+00	2.340E-05
TE127	4.710E-07	1.270E-07	1.010E-07	3.260E-07	1.360E-06	0.000E+00	1.860E-05
TE129M	4.870E-05	1.360E-05	7.560E-06	1.570E-05	1.430E-04	0.000E+00	5.940E-05
TE129	1.340E-07	3.760E-08	3.180E-08	9.360E-08	3.920E-07	0.000E+00	9.360E-06
TE131M	7.230E-06	2.690E-06	2.650E-06	5.120E-06	2.610E-05	0.000E+00	1.810E-04
TE131	8.300E-08	2.530E-08	2.670E-08	6.350E-08	2.510E-07	0.000E+00	6.360E-07
TE132	1.010E-05	4.470E-06	5.600E-06	8.310E-06	4.190E-05	0.000E+00	6.500E-05

30	2.920E-06	5.900E-06	2.040E-06	6.500E-04	8.820E-06	0.000E+00	2.760E-06
I131	1.720E-05	1.730E-05	9.830E-06	5.720E-03	2.840E-05	0.000E+00	1.540E-06
I132	8.000E-07	1.470E-06	6.760E-07	6.820E-05	2.250E-06	0.000E+00	1.730E-06
I133	5.920E-06	7.320E-06	2.770E-06	1.360E-03	1.220E-05	0.000E+00	2.950E-06
I134	4.150E-07	7.730E-07	3.520E-07	1.790E-05	1.170E-06	0.000E+00	5.160E-07
I135	1.750E-06	3.150E-06	1.490E-06	2.750E-04	4.830E-06	0.000E+00	2.400E-06
CS134	2.340E-04	3.840E-04	8.100E-05	0.000E+00	1.190E-04	4.270E-05	2.070E-06
CS136	2.350E-05	6.460E-05	4.180E-05	0.000E+00	3.440E-05	5.130E-06	2.270E-06
CS137	3.270E-04	3.130E-04	4.620E-05	0.000E+00	1.020E-04	3.670E-05	1.960E-06
CS138	2.280E-07	3.170E-07	2.010E-07	0.000E+00	2.230E-07	2.400E-08	1.460E-07
BA139	4.140E-07	2.210E-10	1.200E-08	0.000E+00	1.930E-10	1.300E-10	2.390E-05
BA140	8.310E-05	7.280E-08	4.850E-06	0.000E+00	2.370E-09	4.340E-08	4.210E-05
BA141	2.000E-07	1.120E-10	6.510E-09	0.000E+00	9.690E-11	6.580E-10	1.140E-07
BA142	8.740E-08	6.290E-11	4.890E-09	0.000E+00	5.090E-11	3.700E-11	1.140E-09
LA140	1.010E-08	3.530E-09	1.190E-09	0.000E+00	0.000E+00	0.000E+00	9.840E-05
LA142	5.240E-10	1.670E-10	5.230E-11	0.000E+00	0.000E+00	0.000E+00	3.310E-05
CE141	3.970E-08	1.980E-08	2.960E-09	0.000E+00	8.660E-09	0.000E+00	2.470E-05
CE143	6.990E-09	3.790E-06	5.490E-10	0.000E+00	1.590E-09	0.000E+00	5.550E-06
CE144	2.080E-06	6.520E-07	1.110E-07	0.000E+00	3.610E-07	0.000E+00	1.700E-04
PR143	3.930E-08	1.180E-08	1.950E-09	0.000E+00	6.390E-09	0.000E+00	4.240E-05
PR144	1.290E-10	3.970E-11	6.490E-12	0.000E+00	2.110E-11	0.000E+00	8.590E-08
ND147	2.790E-08	2.260E-08	1.750E-09	0.000E+00	1.240E-08	0.000E+00	3.580E-05
W187	4.290E-07	2.540E-07	1.140E-07	0.000E+00	0.000E+00	0.000E+00	3.570E-05
NP239	5.230E-09	3.770E-10	2.650E-10	0.000E+00	1.090E-09	0.000E+00	2.790E-05
NONE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NONE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

LIQUID DOSE FACTORS

DATA FROM TABLE E-14 OF REG. GUIDE 1.109

INGESTION DOSE FACTORS FOR INFANT:

	BONE	LIVER	T. BODY	THYROID	KIDNEY	LUNG	GI-LLI
H3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
C14	2.270E-05	5.040E-06	5.040E-06	5.040E-06	5.040E-06	5.040E-06	5.040E-06
NA24	1.010E-05	1.010E-05	1.010E-05	1.010E-05	1.010E-05	1.010E-05	1.010E-05
P32	1.700E-02	1.000E-04	6.390E-05	0.000E+00	0.000E+00	0.000E+00	2.300E-05
CR51	0.000E+00	0.000E+00	1.410E-06	8.200E-09	2.010E-09	1.790E-08	4.110E-07
MN54	0.000E+00	1.770E-05	4.510E-06	0.000E+00	4.410E-06	0.000E+00	7.210E-06
MN56	0.000E+00	3.180E-07	1.610E-07	0.000E+00	7.030E-07	0.000E+00	7.430E-05
FE55	1.290E-05	8.490E-06	2.490E-06	0.000E+00	0.000E+00	4.390E-06	1.140E-06
FE59	1.060E-05	5.280E-05	2.120E-05	0.000E+00	0.000E+00	1.590E-05	2.370E-05
CO58	0.000E+00	3.600E-06	8.790E-06	0.000E+00	0.000E+00	0.000E+00	8.970E-06
CO60	0.000E+00	1.020E-05	2.550E-06	0.000E+00	0.000E+00	0.000E+00	2.570E-05
NI63	6.340E-04	3.910E-05	2.200E-05	0.000E+00	0.000E+00	0.000E+00	1.950E-06
NI65	4.720E-06	5.320E-07	2.420E-07	0.000E+00	0.000E+00	0.000E+00	1.250E-05
CU64	0.000E+00	6.090E-07	2.920E-07	0.000E+00	1.030E-06	0.000E+00	5.330E-05
ZN65	1.240E-05	6.310E-05	2.910E-05	0.000E+00	3.060E-05	0.000E+00	1.170E-05
ZN69	9.320E-08	1.680E-07	1.230E-02	0.000E+00	6.920E-08	0.000E+00	0.000E+00
BR83	0.000E+00	0.000E+00	3.620E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BR84	0.000E+00	0.000E+00	3.620E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00
BR85	0.000E+00	0.000E+00	1.940E-08	0.000E+00	0.000E+00	0.000E+00	0.000E+00
RB86	0.000E+00	1.700E-04	8.420E-05	0.000E+00	0.000E+00	0.000E+00	4.350E-06
RB88	0.000E+00	4.980E-07	2.730E-07	0.000E+00	0.000E+00	0.000E+00	4.850E-07
RB89	0.000E+00	2.880E-07	1.970E-07	0.000E+00	0.000E+00	0.000E+00	9.740E-08
SR89	2.310E-02	0.000E+00	7.200E-05	0.000E+00	0.000E+00	0.000E+00	5.160E-05
SR90	1.850E-02	0.000E+00	4.710E-02	0.000E+00	0.000E+00	0.000E+00	2.310E-04
SR91	5.000E-05	0.000E+00	1.810E-06	0.000E+00	0.000E+00	0.000E+00	3.920E-05
SR92	1.920E-05	0.000E+00	7.130E-07	0.000E+00	0.000E+00	0.000E+00	2.070E-04
Y90	2.690E-08	0.000E+00	2.330E-09	0.000E+00	0.000E+00	0.000E+00	2.700E-06
Y91M	3.100E-10	0.000E+00	2.780E-11	0.000E+00	0.000E+00	0.000E+00	3.100E-05
Y91	1.230E-06	0.000E+00	3.020E-08	0.000E+00	0.000E+00	0.000E+00	1.480E-04
Y92	7.650E-09	0.000E+00	2.130E-10	0.000E+00	0.000E+00	0.000E+00	1.910E-04
Y93	2.430E-08	0.000E+00	6.620E-10	0.000E+00	0.000E+00	0.000E+00	2.500E-05
ZR95	2.060E-07	5.020E-08	3.580E-08	0.000E+00	5.410E-08	0.000E+00	2.500E-05
ZR97	1.480E-08	2.540E-09	1.180E-09	0.000E+00	2.560E-09	0.000E+00	1.620E-04
NB95	4.200E-08	1.720E-08	1.000E-08	0.000E+00	1.240E-08	0.000E+00	1.460E-05
MO99	0.000E+00	3.400E-05	6.630E-06	0.000E+00	5.030E-05	0.000E+00	1.120E-05
TC99M	1.920E-09	3.960E-09	5.100E-08	0.000E+00	6.260E-08	2.070E-09	1.150E-06
TC101	2.270E-09	2.860E-09	2.630E-08	0.000E+00	3.400E-08	1.560E-09	4.860E-07
RU103	1.490E-06	0.000E+00	4.950E-07	0.000E+00	1.090E-06	0.000E+00	1.800E-05
RU105	1.360E-07	0.000E+00	4.560E-08	0.000E+00	1.000E-06	0.000E+00	5.610E-05
RU106	2.410E-05	0.000E+00	3.010E-06	0.000E+00	2.850E-05	0.000E+00	1.830E-04
AG110M	9.980E-07	7.270E-07	4.810E-07	0.000E+00	1.060E-06	0.000E+00	3.770E-05
TE125M	2.230E-05	7.790E-06	3.150E-06	7.240E-06	0.000E+00	0.000E+00	1.110E-05
TE127M	1.850E-05	1.940E-05	7.080E-06	1.670E-05	1.440E-04	0.000E+00	2.360E-05
TE127	1.000E-06	3.350E-07	2.150E-07	8.140E-07	2.440E-06	0.000E+00	2.100E-05
TE129M	1.000E-04	3.420E-05	1.340E-05	3.240E-05	2.300E-04	0.000E+00	5.970E-05
TE129	2.840E-07	9.790E-08	4.630E-08	2.280E-07	7.070E-07	0.000E+00	2.270E-05
TE131M	2.520E-05	6.120E-06	3.050E-06	1.240E-05	4.210E-05	0.000E+00	1.030E-04
TE131	1.710E-07	6.500E-08	4.540E-08	1.370E-07	4.300E-07	0.000E+00	7.110E-06
TE132	2.040E-05	1.020E-05	9.610E-06	1.520E-05	5.440E-05	0.000E+00	3.810E-05

I130	4.000E-06	1.3[illegible]E-05	3.333E-06	1.450E-02	1.450E-05	0.000E+00	2.830E-06
I131	2.393E-03	4.6[illegible]E-05	1.650E-03	1.[illegible]E-02	4.540E-05	0.000E+00	1.510E-06
I132	1.550E-06	3.370E-06	1.200E-03	1.330E-04	3.750E-06	0.000E+00	2.730E-06
I133	1.250E-04	1.622E-05	3.310E-04	2.110E-03	2.140E-05	0.000E+00	3.030E-06
I134	1.610E-07	1.710E-06	6.0[illegible]E-07	4.130E-05	1.930E-06	0.000E+00	1.540E-06
I135	2.640E-0[illegible]	7.[illegible]E-06	1.240E-03	6.490E-04	2.270E-08	0.000E+00	2.620E-06
CS134	2.772E-04	7.0[illegible]E-04	7.100E-05	0.000E+00	1.810E-04	7.420E-05	1.910E-06
CS136	4.190E-07	1.[illegible]E-04	3.3[illegible]E-05	0.000E+00	3.380E-03	1.100E-05	2.030E-06
CS137	3.120E-04	6.110E-04	4.230E-05	0.000E+00	1.640E-04	6.440E-05	1.910E-06
CS138	4.810E-07	7.1[illegible]E-07	2.700E-07	0.000E+00	2.700E-07	6.070E-08	1.250E-06
BA139	2.110E-07	3.4[illegible]E-10	1.[illegible]E-08	0.000E+00	3.510E-10	5.540E-10	5.580E-05
BA140	1.710E-04	1.710E-07	2.510E-06	0.000E+00	4.030E-08	1.050E-07	4.200E-05
BA141	4.290E-07	2.[illegible]E-10	1.340E-02	0.000E+00	1.750E-10	1.770E-10	5.190E-06
BA142	1.940E-07	1.32[illegible]E-10	7.060E-09	0.000E+00	3.210E-11	9.260E-11	7.390E-07
LA140	[illegible].210E-08	3.320[illegible]E-09	2.140E-09	0.000E+00	0.000E+00	0.000E+00	9.770E-05
LA141	1.130E-05	4.0[illegible]E-10	3.670E-11	0.000E+00	0.000E+00	0.000E+00	6.860E-05
CE141	7.270E-08	4.300E-08	5.530E-09	0.000E+00	1.430E-08	0.000E+00	2.430E-05
CE143	1.480E-08	9.210E-06	1.120E-05	0.000E+00	2.860E-05	0.000E+00	5.730E-05
CE144	2.950E-06	1.222E-06	1.870E-07	0.000E+00	4.930E-07	0.000E+00	1.710E-04
PR143	2.130E-08	3.640E-08	4.030E-09	0.000E+00	1.130E-08	0.000E+00	4.290E-05
PR144	2.740E-10	1.000E-10	1.280E-11	0.000E+00	2.240E-11	0.000E+00	4.930E-06
ND147	3.8[illegible]E-05	3.6[illegible]E-08	1.430E-09	0.000E+00	2.190E-03	0.000E+00	3.600E-05
W187	9.022E-07	4.420E-07	1.170E-07	0.000E+00	0.000E+00	0.000E+00	3.690E-05
NP239	1.110E-08	9.910E-10	3.810E-10	0.000E+00	1.930E-09	0.000E+00	2.370E-05
NONE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
NONE	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Table 1-2

Assumptions used in Limerick Liquid
Effluent Dose Evaluation

Index	Description	Value
1-	Fraction of produce from local garden	7.600E-01
2-	Fraction of leafy veg from local garden	1.000E+00
3-	Soil density in plow layer (kg/m**2)	2.400E+02
4-	Fraction of activity retained on sprayed vegetation	2.500E-01
5-	Shielding factor for residential structures	7.000E-01
6-	Period of buildup of activity in soil (hr)	1.752E+05
7-	Period of pasture grass exposure to activity (hr)	7.200E+02
8-	Period of crop exposure to activity (hr)	1.440E+03
9-	Holding time in animal drinking water pond (hr)	0.000E+00
10-	Delay time for ingestion of grass by animals (hr)	0.000E+00
11-	Delay time for ingestion of stored feed by animals (hr)	2.160E+03
12-	Delay time for ingestion of leaf veg by man (hr)	2.400E+01
13-	Delay time for ingestion of other veg by man (hr)	1.440E+03
14-	Transport time milk-man (hr)	4.800E+01
15-	Time between slaughter and consumption of meat animal (hr)	4.800E+02
16-	Grass yield, wet wt (kg/m**2)	7.000E-01
17-	Other vegetation yield, wet wt (kg/m**2)	2.000E+00
18-	Weathering rate constant for activity on vegetation (1/hr)	2.100E-03
19-	Milk cow feed consumption rate (kg/day wet)	5.000E+01
20-	Goat feed consumption rate (kg/day wet)	6.000E+00
21-	Beef cattle feed consumption rate (kg/day wet)	5.000E+01
22-	Milk cow water consumption rate (l/day)	6.000E+01
23-	Goat water consumption rate (l/day)	8.000E+00
24-	Beef cattle water consumption rate (l/day)	5.000E+01
25-	Envil transit time for water ingestion (hr)	1.200E+01
26-	Envil transit time for fish ingestion (hr)	2.400E+01
27-	Envil transit time for invertebrate ingestion (hr)	2.400E+01
28-	Envil transit time for shore exposure (hr)	0.000E+00
29-	Water ingestion (l/yr) adult	7.300E+02
30-	Water ingestion (l/yr) teen	5.100E+02
31-	Water ingestion (l/yr) child	5.100E+02

TABLE 1-2 (cont.)

Index	Description	Value
32-	Water ingestion (l/yr) infant	3.300E+02
33-	Shore exposure (hr/yr) adult	1.200E+01
34-	Shore exposure (hr/yr) teen	6.700E+01
35-	Shore exposure (hr/yr) child	1.400E+01
36-	Shore exposure (hr/yr) infant	0.000E+00
37-	Fresh water sport fish ingestion (kg/yr) adult	2.100E+01
38-	Fresh water sport fish ingestion (kg/yr) teen	1.600E+01
39-	Fresh water sport fish ingestion (kg/yr) child	6.900E+00
40-	Fresh water sport fish ingestion (kg/yr) infant	0.000E+00
41-	Fresh water commercial fish ingestion (kg/yr) adult	2.100E+01
42-	Fresh water commercial fish ingestion (kg/yr) teen	1.600E+01
43-	Fresh water commercial fish ingestion (kg/yr) child	6.900E+00
44-	Fresh water commercial fish ingestion (kg/yr) infant	0.000E+00
45-	Fresh water invertebrate ingestion (kg/yr) adult	5.000E+00
46-	Fresh water invertebrate ingestion (kg/yr) teen	3.800E+00
47-	Fresh water invertebrate ingestion (kg/yr) child	1.700E+00
48-	Fresh water invertebrate ingestion (kg/yr) infant	0.000E+00
49-	Salt water sport fish ingestion (kg/yr) adult	2.100E+01
50-	Salt water sport fish ingestion (kg/yr) teen	1.600E+01
51-	Salt water sport fish ingestion (kg/yr) child	6.900E+00
52-	Salt water sport fish ingestion (kg/yr) infant	0.000E+00
53-	Salt water commercial fish ingestion (kg/yr) adult	2.100E+01
54-	Salt water commercial fish ingestion (kg/yr) teen	1.600E+01
55-	Salt water commercial fish ingestion (kg/yr) child	6.900E+00
56-	Salt water commercial fish ingestion (kg/yr) infant	0.000E+00
57-	Salt water invertebrate ingestion (kg/yr) adult	5.000E+00
58-	Salt water invertebrate ingestion (kg/yr) teen	3.800E+00
59-	Salt water invertebrate ingestion (kg/yr) child	1.700E+00
60-	Salt water invertebrate ingestion (kg/yr) infant	0.000E+00
61-	Irrigated leafy vegetable ingestion (kg/yr) adult	6.400E+01
62-	Irrigated leafy vegetable ingestion (kg/yr) teen	4.200E+01
63-	Irrigated leafy vegetable ingestion (kg/yr) child	2.600E+01
64-	Irrigated leafy vegetable ingestion (kg/yr) infant	0.000E+00
65-	Irrigated other vegetable ingestion (kg/yr) adult	5.200E+02
66-	Irrigated other vegetable ingestion (kg/yr) teen	6.300E+02
67-	Irrigated other vegetable ingestion (kg/yr) child	5.200E+02
68-	Irrigated other vegetable ingestion (kg/yr) infant	0.000E+00

TABLE 1-2 (cont.)

Index	Description	Value
69-	Irrigated root vegetable ingestion (kg/yr) adult	5.200E+02
70-	Irrigated root vegetable ingestion (kg/yr) teen	6.300E+02
71-	Irrigated root vegetable ingestion (kg/yr) child	5.200E+02
72-	Irrigated root vegetable ingestion (kg/yr) infant	0.000E+00
73-	Irrigated cow milk ingestion (l/yr) adult	3.100E+02
74-	Irrigated cow milk ingestion (l/yr) teen	4.000E+02
75-	Irrigated cow milk ingestion (l/yr) child	3.300E+02
76-	Irrigated cow milk ingestion (l/yr) infant	3.300E+02
77-	Irrigated goat milk ingestion (l/yr) adult	3.100E+02
78-	Irrigated goat milk ingestion (l/yr) teen	4.000E+02
79-	Irrigated goat milk ingestion (l/yr) child	3.300E+02
80-	Irrigated goat milk ingestion (l/yr) infant	3.300E+02
81-	Irrigated beef ingestion (kg/yr) adult	1.100E+02
82-	Irrigated beef ingestion (kg/yr) teen	6.500E+01
83-	Irrigated beef ingestion (kg/yr) child	4.100E+01
84-	Irrigated beef ingestion (kg/yr) infant	0.000E+00

TABLE 2-1

DOSE FACTORS FOR NOBLE GASES

Index	Radionuclide	Total Body Dose Factor Ki (mrem/yr per pCi/m^3)	Beta Skin Dose Factor (mrem/yr per pCi/m^3)	Gamma Air Dose Factor Mi (mrad/yr per pCi/m^3)	Beta Air Dose Factor Ni (mrad/yr per pCi/m^3)
3	Ar-41	8.84E-03	2.69E-03	9.30E-03	3.28E-03
4	Kr-83m	7.56E-08	--------	1.93E-05	2.88E-04
5	Kr-85m	1.17E-03	1.46E-03	1.23E-03	1.97E-03
6	Kr-85	1.61E-05	1.34E-03	1.72E-05	1.95E-03
7	Kr-87	5.92E-03	9.73E-03	6.17E-03	1.03E-02
8	Kr-88	1.47E-02	2.37E-03	1.52E-02	2.93E-03
9	Kr-89	1.66E-02	1.01E-02	1.73E-02	1.06E-02
10	Kr-90	1.56E-02	7.29E-03	1.63E-02	7.83E-03
11	Xe-131m	9.15E-05	4.76E-04	1.56E-04	1.11E-03
12	Xe-133m	2.51E-04	9.94E-04	3.27E-04	1.48E-03
13	Xe-133	2.94E-04	3.06E-04	3.35E-04	1.05E-03
14	Xe-135m	3.12E-03	7.11E-04	3.36E-03	7.39E-04
15	Xe-135	1.81E-03	1.86E-03	1.92E-03	2.46E-03
16	Xe-137	1.42E-03	1.22E-02	1.51E-03	1.27E-02
17	Xe-138	8.83E-03	4.13E-03	9.21E-03	4.75E-03

TABLE 2-2

INDIVIDUAL DOSE FACTORS ($DF_{k,l,n}$)
FOR GASEOUS EFFLUENTS

UNITS FOR AIRBORNE PATHWAYS
(PATHWAY NUMBERS 1 AND 7) ARE:

$mrem\text{-}m^3/Ci\text{-}sec$

UNITS FOR DEPOSITION PATHWAYS
(PATHWAY NUMBERS 2-6) ARE:

$mrem\text{-}m^2/Ci$

Pathway No.	Pathway
1	Plume
2	Ground
3	Vegetable
4	Meat
5	Cow Milk
6	Goat Milk
7	Inhalation

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : H3

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.53E+01	6.53E+01	0.00E+00	6.53E+01	6.53E+01	6.53E+01	6.53E+01	0.00E+00
TEEN:	7.75E+01	7.75E+01	0.00E+00	7.75E+01	7.75E+01	7.75E+01	7.75E+01	0.00E+00
CHILD:	1.21E+02	1.21E+02	0.00E+00	1.21E+02	1.21E+02	1.21E+02	1.21E+02	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	7.98E+00	7.98E+00	0.00E+00	7.98E+00	7.98E+00	7.98E+00	7.98E+00	0.00E+00
TEEN:	4.76E+00	4.76E+00	0.00E+00	4.76E+00	4.76E+00	4.76E+00	4.76E+00	0.00E+00
CHILD:	5.75E+00	5.75E+00	0.00E+00	5.75E+00	5.75E+00	5.75E+00	5.75E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.88E+01	1.88E+01	0.00E+00	1.88E+01	1.88E+01	1.88E+01	1.88E+01	0.00E+00
TEEN:	2.49E+01	2.49E+01	0.00E+00	2.49E+01	2.49E+01	2.49E+01	2.49E+01	0.00E+00
CHILD:	3.87E+01	3.87E+01	0.00E+00	3.87E+01	3.87E+01	3.87E+01	3.87E+01	0.00E+00
INFANT:	5.87E+01	5.87E+01	0.00E+00	5.87E+01	5.87E+01	5.87E+01	5.87E+01	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.83E+01	3.83E+01	0.00E+00	3.83E+01	3.83E+01	3.83E+01	3.83E+01	0.00E+00
TEEN:	4.99E+01	4.99E+01	0.00E+00	4.99E+01	4.99E+01	4.99E+01	4.99E+01	0.00E+00
CHILD:	7.89E+01	7.89E+01	0.00E+00	7.89E+01	7.89E+01	7.89E+01	7.89E+01	0.00E+00
INFANT:	1.20E+02	1.20E+02	0.00E+00	1.20E+02	1.20E+02	1.20E+02	1.20E+02	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.01E+01	4.01E+01	0.00E+00	4.01E+01	4.01E+01	4.01E+01	4.01E+01	0.00E+00
TEEN:	4.03E+01	4.03E+01	0.00E+00	4.03E+01	4.03E+01	4.03E+01	4.03E+01	0.00E+00
CHILD:	3.57E+01	3.57E+01	0.00E+00	3.57E+01	3.57E+01	3.57E+01	3.57E+01	0.00E+00
INFANT:	2.05E+01	2.05E+01	0.00E+00	2.05E+01	2.05E+01	2.05E+01	2.05E+01	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : C14

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	5.22E+03	5.22E+03	2.61E+04	5.22E+03	5.22E+03	5.22E+03	5.22E+03	0.00E+00
TEEN:	8.71E+03	8.71E+03	4.35E+04	8.71E+03	8.71E+03	8.71E+03	8.71E+03	0.00E+00
CHILD:	2.11E+04	2.11E+04	1.05E+05	2.11E+04	2.11E+04	2.11E+04	2.11E+04	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.64E+04	1.64E+04	8.22E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	0.00E+00
TEEN:	2.74E+04	2.74E+04	1.37E+05	2.74E+04	2.74E+04	2.74E+04	2.74E+04	0.00E+00
CHILD:	6.64E+04	6.64E+04	3.32E+05	6.64E+04	6.64E+04	6.64E+04	6.64E+04	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.79E+03	1.79E+03	8.97E+03	1.79E+03	1.79E+03	1.79E+03	1.79E+03	0.00E+00
TEEN:	3.31E+03	3.31E+03	1.65E+04	3.31E+03	3.31E+03	3.31E+03	3.31E+03	0.00E+00
CHILD:	8.13E+03	8.13E+03	4.07E+04	8.13E+03	8.13E+03	8.13E+03	8.13E+03	0.00E+00
INFANT:	1.70E+04	1.70E+04	7.97E+04	1.70E+04	1.70E+04	1.70E+04	1.70E+04	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.79E+03	1.79E+03	8.97E+03	1.79E+03	1.79E+03	1.79E+03	1.79E+03	0.00E+00
TEEN:	3.31E+03	3.31E+03	1.65E+04	3.31E+03	3.31E+03	3.31E+03	3.31E+03	0.00E+00
CHILD:	8.13E+03	8.13E+03	4.07E+04	8.13E+03	8.13E+03	8.13E+03	8.13E+03	0.00E+00
INFANT:	1.70E+04	1.70E+04	7.97E+04	1.70E+04	1.70E+04	1.70E+04	1.70E+04	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.03E+02	1.03E+02	5.76E+02	1.08E+02	1.08E+02	1.08E+02	1.03E+02	0.00E+00
TEEN:	1.54E+02	1.54E+02	8.24E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	0.00E+00
CHILD:	2.13E+02	2.13E+02	1.13E+03	2.13E+02	2.13E+02	2.13E+02	2.13E+02	0.00E+00
INFANT:	1.68E+02	1.68E+02	8.39E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : AR41

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	3.14E+02
TEEN:	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	3.14E+02
CHILD:	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	3.14E+02
INFANT:	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	3.14E+02

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : KR83M

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	9.39E-02	4.75E-01
TEEN:	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	9.39E-02	4.75E-01
CHILD:	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	9.39E-02	4.75E-01
INFANT:	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	9.39E-02	4.75E-01

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : KR85

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.57E-01	3.57E-01	3.57E-01	3.57E-01	3.57E-01	3.57E-01	9.50E-01	4.29E+01
TEEN:	3.57E-01	3.57E-01	3.57E-01	3.57E-01	3.57E-01	3.57E-01	9.50E-01	4.29E+01
CHILD:	3.57E-01	3.57E-01	3.57E-01	3.57E-01	3.57E-01	3.57E-01	9.50E-01	4.29E+01
INFANT:	3.57E-01	3.57E-01	3.57E-01	3.57E-01	3.57E-01	3.57E-01	9.50E-01	4.29E+01

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : KR85M

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.66E+01	7.66E+01
TEEN:	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.66E+01	7.66E+01
CHILD:	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.66E+01	7.66E+01
INFANT:	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.60E+01	2.66E+01	7.66E+01

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : KR87

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.35E+02	4.50E+02
TEEN:	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.35E+02	4.50E+02
CHILD:	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.35E+02	4.50E+02
INFANT:	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.35E+02	4.50E+02

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : KR88

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	4.50E+02
TEEN:	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	4.50E+02
CHILD:	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	4.50E+02
INFANT:	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	3.27E+02	4.50E+02

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : KR89

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.68E+02	3.58E+02	3.68E+02	3.68E+02	3.68E+02	3.68E+02	3.72E+02	7.46E+02
TEEN:	3.68E+02	3.58E+02	3.68E+02	3.68E+02	3.68E+02	3.68E+02	3.72E+02	7.46E+02
CHILD:	3.68E+02	3.58E+02	3.68E+02	3.68E+02	3.68E+02	3.68E+02	3.72E+02	7.46E+02
INFANT:	3.68E+02	3.58E+02	3.68E+02	3.68E+02	3.68E+02	3.68E+02	3.72E+02	7.46E+02

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: C.W MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : KR90

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	6.33E+02
TEEN:	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	6.33E+02
CHILD:	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	6.33E+02
INFANT:	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	3.46E+02	6.33E+02

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : XE131M

OR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.38E+00	1.89E+01
TEEN:	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.38E+00	1.89E+01
CHILD:	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.38E+00	1.89E+01
INFANT:	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.03E+00	2.38E+00	1.89E+01

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : XE133M

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	5.57E+00	5.57E+00	5.57E+00	5.57E+00	5.57E+00	5.57E+00	6.03E+00	3.96E+01
TEEN:	5.57E+00	5.57E+00	5.57E+00	5.57E+00	5.57E+00	5.57E+00	6.03E+00	3.96E+01
CHILD:	5.57E+00	5.57E+00	5.57E+00	5.57E+00	5.57E+00	5.57E+00	6.03E+00	3.96E+01
INFANT:	5.57E+00	5.57E+00	5.57E+00	5.57E+00	5.57E+00	5.57E+00	6.03E+00	3.96E+01

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR BASELOUS RELEVANTS -- FOR ISOTOPE : XE133

FOR PATHWAY: PLUME

ADULT:	6.0000E+00	BODY 0.0000E+00	GI-TRACT 0.0000E+00	ACTOD 0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
ADOLESCENT:	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
TEEN:	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
CHILD:	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
INFANT:	6.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

FOR PATHWAY: VEGETABLE

ADULT:	0.0000E+00	BODY 0.0000E+00	GI-TRACT 0.0000E+00	ACTOD 0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
ADOLESCENT:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
TEEN:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
CHILD:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
INFANT:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

FOR PATHWAY: MEAT

ADULT:	0.0000E+00	BODY 0.0000E+00	GI-TRACT 0.0000E+00	ACTOD 0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
ADOLESCENT:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
TEEN:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
CHILD:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
INFANT:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

FOR PATHWAY: COW MILK

ADULT:	0.0000E+00	BODY 0.0000E+00	GI-TRACT 0.0000E+00	ACTOD 0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
ADOLESCENT:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
TEEN:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
CHILD:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
INFANT:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

FOR PATHWAY: GOAT MILK

ADULT:	0.0000E+00	BODY 0.0000E+00	GI-TRACT 0.0000E+00	ACTOD 0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
ADOLESCENT:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
TEEN:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
CHILD:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
INFANT:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

FOR PATHWAY: INHALATION

ADULT:	0.0000E+00	BODY 0.0000E+00	GI-TRACT 0.0000E+00	ACTOD 0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
ADOLESCENT:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
TEEN:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
CHILD:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
INFANT:	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : XE135M

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.95E+01	1.05E+02
TEEN:	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.95E+01	1.05E+02
CHILD:	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.95E+01	1.05E+02
INFANT:	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.92E+01	6.95E+01	1.05E+02

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : XE135

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.09E+01	1.06E+03
TEEN:	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.09E+01	1.06E+03
CHILD:	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.09E+01	1.06E+03
INFANT:	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.02E+01	4.09E+01	1.06E+03

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : XE137

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	4.24E+02
TEEN:	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	4.24E+02
CHILD:	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	4.24E+02
INFANT:	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	3.15E+01	4.24E+02

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : XE138

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.95E+02	1.96E+02	1.95E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	3.55E+02
TEEN:	1.95E+02	1.96E+02	1.95E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	3.55E+02
CHILD:	1.95E+02	1.96E+02	1.95E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	3.55E+02
INFANT:	1.95E+02	1.96E+02	1.95E+02	1.96E+02	1.96E+02	1.96E+02	1.96E+02	3.55E+02

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : CR51

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05
TEEN:	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05
CHILD:	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05
INFANT:	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05	1.43E+05

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.05E+03	2.66E+05	0.00E+00	0.00E+00	2.83E+02	6.31E+02	1.40E+03	0.00E+00
TEEN:	1.05E+03	2.66E+05	0.00E+00	0.00E+00	4.63E+02	8.21E+02	3.10E+03	0.00E+00
CHILD:	3.05E+03	1.55E+05	0.00E+00	0.00E+00	6.03E+02	1.70E+03	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.29E+02	3.33E+04	0.00E+00	0.00E+00	2.88E+01	7.88E+01	1.71E+02	0.00E+00
TEEN:	1.03E+02	1.77E+04	0.00E+00	0.00E+00	2.22E+01	6.71E+01	1.47E+02	0.00E+00
CHILD:	1.80E+02	8.30E+03	0.00E+00	0.00E+00	2.40E+01	8.90E+01	1.62E+02	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	5.20E+02	1.31E+05	0.00E+00	0.00E+00	1.13E+02	3.11E+02	6.91E+02	0.00E+00
TEEN:	9.09E+02	1.53E+05	0.00E+00	0.00E+00	1.99E+02	5.88E+02	1.30E+03	0.00E+00
CHILD:	1.85E+03	9.38E+04	0.00E+00	0.00E+00	2.81E+02	1.03E+03	1.88E+03	0.00E+00
INFANT:	2.94E+03	8.56E+04	0.00E+00	0.00E+00	4.19E+02	1.92E+03	3.73E+03	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.24E+01	1.57E+04	0.00E+00	0.00E+00	1.38E+01	3.73E+01	8.29E+01	0.00E+00
TEEN:	1.09E+02	1.83E+04	0.00E+00	0.00E+00	2.39E+01	7.06E+01	1.56E+02	0.00E+00
CHILD:	2.22E+02	1.13E+04	0.00E+00	0.00E+00	3.37E+01	1.23E+02	2.25E+02	0.00E+00
INFANT:	3.52E+02	1.03E+04	0.00E+00	0.00E+00	5.02E+01	2.30E+02	4.47E+02	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.17E+00	1.05E+02	0.00E+00	0.00E+00	7.23E-01	1.89E+00	4.56E+02	0.00E+00
TEEN:	4.29E+00	9.51E+01	0.00E+00	0.00E+00	9.74E-01	2.38E+00	6.66E+02	0.00E+00
CHILD:	4.89E+00	3.44E+01	0.00E+00	0.00E+00	7.71E-01	2.71E+00	5.38E+02	0.00E+00
INFANT:	2.84E+00	1.13E+01	0.00E+00	0.00E+00	4.19E-01	1.82E+00	4.07E+02	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : MN54

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.96E+07
TEEN:	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.96E+07
CHILD:	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.96E+07
INFANT:	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.23E+07	4.96E+07

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.61E+05	2.58E+07	0.00E+00	8.42E+06	2.51E+06	0.00E+00	0.00E+00	0.00E+00
TEEN:	2.55E+05	2.51E+07	0.00E+00	1.27E+07	3.80E+06	0.00E+00	0.00E+00	0.00E+00
CHILD:	5.03E+05	1.39E+07	0.00E+00	1.09E+07	3.00E+06	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.21E+04	5.16E+05	0.00E+00	1.68E+05	5.01E+04	0.00E+00	0.00E+00	0.00E+00
TEEN:	5.09E+04	4.63E+05	0.00E+00	2.28E+05	6.88E+04	0.00E+00	0.00E+00	0.00E+00
CHILD:	9.91E+04	2.63E+05	0.00E+00	1.97E+05	5.43E+04	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.94E+04	4.73E+05	0.00E+00	1.54E+05	4.59E+04	0.00E+00	0.00E+00	0.00E+00
TEEN:	4.66E+04	4.24E+05	0.00E+00	2.09E+05	6.30E+04	0.00E+00	0.00E+00	0.00E+00
CHILD:	9.07E+04	2.41E+05	0.00E+00	1.80E+05	4.97E+04	0.00E+00	0.00E+00	0.00E+00
INFANT:	1.62E+05	2.63E+05	0.00E+00	7.15E+05	1.05E+05	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.53E+03	5.67E+04	0.00E+00	1.85E+04	5.51E+03	0.00E+00	0.00E+00	0.00E+00
TEEN:	6.12E+03	6.33E+04	0.00E+00	3.09E+04	9.20E+03	0.00E+00	0.00E+00	0.00E+00
CHILD:	1.23E+04	3.37E+04	0.00E+00	2.69E+04	1.29E+04	0.00E+00	0.00E+00	0.00E+00
INFANT:	1.95E+04	3.15E+04	0.00E+00	8.58E+04	1.90E+04	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.00E+02	2.65E+03	0.00E+00	1.26E+03	3.12E+02	0.00E+00	4.44E+04	0.00E+00
TEEN:	3.66E+02	2.12E+03	0.00E+00	1.66E+03	4.03E+02	0.00E+00	6.29E+04	0.00E+00
CHILD:	3.01E+02	7.26E+02	0.00E+00	1.36E+03	3.18E+02	0.00E+00	5.00E+04	0.00E+00
INFANT:	1.53E+02	2.24E+02	0.00E+00	8.03E+02	1.58E+02	0.00E+00	3.17E+04	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : CO58

OR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.15E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.36E+07
TEEN:	1.15E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.36E+07
CHILD:	1.15E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.36E+07
INFANT:	1.15E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.16E+07	1.36E+07

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.76E+05	1.59E+07	0.00E+00	7.85E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	2.77E+05	1.63E+07	0.00E+00	1.18E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	5.43E+05	1.64E+07	0.00E+00	1.77E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.50E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	7.30E+05	6.50E+06	0.00E+00	3.26E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	5.79E+05	3.66E+06	0.00E+00	2.51E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	8.93E+05	1.71E+06	0.00E+00	2.91E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.89E+05	1.71E+06	0.00E+00	8.42E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	3.27E+05	1.93E+06	0.00E+00	1.42E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	6.03E+05	1.96E+06	0.00E+00	2.13E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	1.03E+05	1.08E+06	0.00E+00	4.33E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.25E+04	2.05E+05	0.00E+00	1.01E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	3.92E+04	2.32E+05	0.00E+00	1.70E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	7.95E+04	2.36E+05	0.00E+00	2.60E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	1.30E+05	1.30E+05	0.00E+00	5.20E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.57E+01	3.37E+03	0.00E+00	5.02E+01	0.00E+00	0.00E+00	2.94E+04	0.00E+00
TEEN:	8.80E+01	3.02E+03	0.00E+00	5.57E+01	0.00E+00	0.00E+00	4.26E+04	0.00E+00
CHILD:	1.00E+02	1.09E+03	0.00E+00	5.64E+01	0.00E+00	0.00E+00	3.51E+04	0.00E+00
INFANT:	5.77E+01	3.53E+02	0.00E+00	3.87E+01	0.00E+00	0.00E+00	2.46E+04	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : CO60

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	8.34E+08
TEEN:	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	8.34E+08
CHILD:	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	8.34E+08
INFANT:	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	7.09E+08	8.34E+08

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.02E+07	8.66E+07	0.00E+00	4.62E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.61E+07	9.59E+07	0.00E+00	7.11E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	3.20E+07	6.58E+07	0.00E+00	1.10E+07	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.11E+05	2.65E+07	0.00E+00	1.41E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	5.45E+05	1.66E+07	0.00E+00	1.09E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	9.83E+05	7.42E+06	0.00E+00	1.69E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.73E+05	5.77E+06	0.00E+00	3.07E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.17E+06	6.73E+06	0.00E+00	5.61E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	2.33E+06	4.68E+06	0.00E+00	8.59E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	3.90E+06	3.93E+06	0.00E+00	1.85E+07	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	8.13E+04	6.93E+05	0.00E+00	3.69E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.41E+05	8.14E+05	0.00E+00	6.75E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	2.85E+05	5.67E+05	0.00E+00	1.07E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	4.63E+05	4.71E+05	0.00E+00	2.23E+05	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.69E+02	9.03E+03	0.00E+00	3.65E+02	0.00E+00	0.00E+00	1.89E+05	0.00E+00
TEEN:	6.29E+02	8.25E+03	0.00E+00	4.79E+02	0.00E+00	0.00E+00	2.70E+05	0.00E+00
CHILD:	7.13E+02	3.05E+03	0.00E+00	6.16E+02	0.00E+00	0.00E+00	2.26E+05	0.00E+00
INFANT:	3.73E+02	1.01E+03	0.00E+00	2.54E+02	0.00E+00	0.00E+00	1.43E+05	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : ZN65

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.63E+07
TEEN:	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.63E+07
CHILD:	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.63E+07
INFANT:	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.29E+07	2.63E+07

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.53E+07	2.20E+07	1.10E+07	3.80E+07	2.34E+07	0.00E+00	0.00E+00	0.00E+00
TEEN:	2.48E+07	2.80E+07	1.53E+07	5.32E+07	3.40E+07	0.00E+00	0.00E+00	0.00E+00
CHILD:	4.95E+07	1.39E+07	2.98E+07	7.83E+07	5.00E+07	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.03E+07	1.60E+07	7.50E+06	2.39E+07	1.60E+07	0.00E+00	0.00E+00	0.00E+00
TEEN:	8.54E+06	7.75E+06	5.27E+06	1.83E+07	1.17E+07	0.00E+00	0.00E+00	0.00E+00
CHILD:	1.31E+07	3.70E+06	7.91E+06	2.11E+07	1.33E+07	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.15E+07	5.79E+07	2.89E+07	9.20E+07	6.15E+07	0.00E+00	0.00E+00	0.00E+00
TEEN:	7.12E+07	6.93E+07	4.44E+07	1.54E+08	9.85E+07	0.00E+00	0.00E+00	0.00E+00
CHILD:	1.34E+08	4.07E+07	8.71E+07	2.32E+08	1.46E+08	0.00E+00	0.00E+00	0.00E+00
INFANT:	1.85E+08	3.39E+08	1.17E+08	4.01E+08	1.95E+08	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.99E+06	6.95E+06	3.47E+06	1.10E+07	7.38E+06	0.00E+00	0.00E+00	0.00E+00
TEEN:	8.63E+06	7.83E+06	5.33E+06	1.85E+07	1.18E+07	0.00E+00	0.00E+00	0.00E+00
CHILD:	1.73E+07	4.89E+06	1.05E+07	2.78E+07	1.75E+07	0.00E+00	0.00E+00	0.00E+00
INFANT:	2.22E+07	4.07E+07	1.40E+07	4.81E+07	2.33E+07	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.48E+03	1.69E+03	1.03E+03	3.27E+03	2.19E+03	0.00E+00	2.74E+04	0.00E+00
TEEN:	1.98E+03	1.48E+03	1.22E+03	4.24E+03	2.74E+03	0.00E+00	3.93E+04	0.00E+00
CHILD:	2.23E+03	5.17E+02	1.35E+03	3.59E+03	2.26E+03	0.00E+00	3.16E+04	0.00E+00
INFANT:	9.85E+02	1.53E+03	6.12E+02	1.98E+03	1.03E+03	0.00E+00	2.05E+04	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : SR89

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	7.68E+02
TEEN:	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	7.68E+02
CHILD:	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	7.68E+02
INFANT:	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	6.62E+02	7.68E+02

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	7.42E+06	4.14E+07	2.58E+08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.20E+07	5.00E+07	4.20E+08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	2.91E+07	3.95E+07	1.02E+09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.68E+05	9.41E+05	5.86E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.42E+05	5.90E+05	4.95E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	2.68E+05	3.63E+05	9.37E+06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	8.09E+05	4.52E+06	2.82E+07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.49E+06	6.19E+06	5.20E+07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	3.67E+06	4.98E+06	1.29E+08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	7.02E+06	5.03E+06	2.45E+08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.71E+06	9.50E+06	5.92E+07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	3.13E+06	1.30E+07	1.09E+08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	7.72E+06	1.05E+07	2.70E+08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	1.47E+07	1.06E+07	5.14E+08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.75E+02	1.11E+04	9.64E+03	0.00E+00	0.00E+00	0.00E+00	4.44E+04	0.00E+00
TEEN:	3.95E+02	1.18E+04	1.38E+04	0.00E+00	0.00E+00	0.00E+00	7.65E+04	0.00E+00
CHILD:	5.47E+02	5.30E+03	1.90E+04	0.00E+00	0.00E+00	0.00E+00	6.84E+04	0.00E+00
INFANT:	3.62E+02	2.03E+03	1.26E+04	0.00E+00	0.00E+00	0.00E+00	6.44E+04	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : SR90

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.38E+10	1.83E+09	5.64E+10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.79E+10	2.04E+09	7.27E+10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	3.09E+10	1.64E+09	1.25E+11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.49E+08	5.94E+07	1.81E+09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	2.90E+08	3.34E+07	1.17E+09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	3.88E+08	2.06E+07	1.57E+09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.67E+09	1.97E+08	6.82E+09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	2.38E+09	2.70E+08	9.64E+09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	4.11E+09	2.18E+08	1.67E+10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	5.5[illegible]E+09	7.14E+08	1.43E+10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	5.00E+09	5.8[illegible]E+08	[illegible]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	8.67E+09	4.[illegible]E+08	[illegible]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	9.47E+09	4.[illegible]E+08	[illegible]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.[illegible]E+09	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TEEN:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
CHILD:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
INFANT:	8.21E+08	4.15E+08	1.30E+09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : FE59

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	9.30E+06
TEEN:	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	9.30E+06
CHILD:	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	9.30E+06
INFANT:	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	8.34E+06	9.30E+06

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.80E+06	2.43E+07	3.[illegible]E+06	7.30E+06	0.00E+00	0.00E+00	[illegible]E+06	0.00E+00
TEEN:	6.23E+06	2.65E+07	6.75E+06	1.[illegible]E+07	0.00E+00	0.00E+00	5.30E+06	0.00E+00
CHILD:	8.69E+06	1.82E+07	1.03E+07	1.75E+07	0.00E+00	0.00E+00	4.06E+06	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.29E+06	8.73E+07	4.76E+05	1.12E+07	0.00E+00	0.00E+00	[illegible]E+06	0.00E+00
TEEN:	3.43E+05	2.10E+07	3.80E+06	8.87E+06	0.00E+00	0.00E+00	2.[illegible]E+06	0.00E+00
CHILD:	5.63E+06	1.46E+07	6.74E+06	1.09E+07	0.00E+00	0.00E+00	2.16E+06	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.79E+05	4.17E+06	5.32E+05	1.[illegible]E+06	0.00E+00	0.00E+00	3.69E+05	0.00E+00
TEEN:	8.37E+05	5.[illegible]E+06	9.43E+05	2.17E+06	0.00E+00	0.00E+00	6.83E+05	0.00E+00
CHILD:	1.74E+06	3.53E+06	2.15E+06	3.48E+06	0.00E+00	0.00E+00	1.01E+06	0.00E+00
INFANT:	2.77E+05	3.35E+06	4.02E+06	7.0[illegible]E+06	0.00E+00	0.00E+00	2.07E+06	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.23E+03	5.42E+04	6.91E+03	1.63E+04	0.00E+00	0.00E+00	4.54E+03	0.00E+00
TEEN:	1.09E+06	6.[illegible]E+04	1.[illegible]E+04	2.[illegible]E+04	0.00E+00	0.00E+00	8.88E+03	0.00E+00
CHILD:	2.25E+04	4.71E+04	2.80E+04	4.53E+04	0.00E+00	0.00E+00	1.31E+04	0.00E+00
INFANT:	3.60E+04	4.36E+04	5.22E+04	9.[illegible]E+04	0.00E+00	0.00E+00	2.70E+04	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.35E+02	5.36E+03	3.73E+02	8.80E+02	0.00E+00	0.00E+00	3.22E+04	0.00E+00
TEEN:	4.55E+02	5.36E+03	5.05E+02	1.17E+03	0.00E+00	0.00E+00	4.84E+04	0.00E+00
CHILD:	5.29E+02	2.96E+03	6.56E+02	1.06E+03	0.00E+00	0.00E+00	4.02E+04	0.00E+00
INFANT:	3.00E+02	7.56E+02	6.30E+02	7.46E+02	0.00E+00	0.00E+00	3.22E+04	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : ZR95

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	7.48E+05	7.48E+06	7.48E+06	7.48E+06	7.48E+05	7.48E+06	7.48E+05	8.67E+06
TEEN:	7.48E+05	7.48E+06	7.48E+06	7.48E+06	7.48E+05	7.48E+06	7.48E+05	8.67E+06
CHILD:	7.48E+05	7.48E+06	7.48E+06	7.48E+06	7.48E+05	7.48E+06	7.48E+05	8.67E+06
INFANT:	7.48E+05	7.48E+06	7.48E+06	7.48E+06	7.48E+05	7.48E+06	7.48E+05	8.67E+06

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.46E+03	3.03E+07	2.98E+04	9.55E+03	1.50E+04	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.01E+04	3.37E+07	4.63E+04	1.46E+04	2.33E+04	0.00E+00	0.00E+00	0.00E+00
CHILD:	2.07E+04	6.43E+07	1.06E+05	2.33E+04	3.33E+04	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	7.25E+03	3.40E+07	3.34E+04	1.07E+04	1.68E+04	0.00E+00	0.00E+00	0.00E+00
TEEN:	5.81E+03	1.93E+07	2.66E+04	8.45E+03	1.34E+04	0.00E+00	0.00E+00	0.00E+00
CHILD:	9.30E+03	1.09E+07	4.75E+04	1.05E+04	1.50E+04	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.65E+00	1.72E+04	1.63E+01	5.40E+00	8.47E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	6.39E+00	2.14E+04	2.94E+01	9.29E+00	1.35E+01	0.00E+00	0.00E+00	0.00E+00
CHILD:	1.31E+01	1.37E+04	6.84E+01	1.50E+01	2.15E+01	0.00E+00	0.00E+00	0.00E+00
INFANT:	2.10E+01	1.47E+04	1.21E+02	2.96E+01	3.19E+01	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.39E-01	2.05E+03	2.02E+00	6.48E-01	1.02E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	7.66E-01	2.57E+03	3.53E+00	1.11E+00	1.64E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	1.61E+00	1.88E+03	8.20E+00	1.80E+00	2.58E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	2.52E+00	1.77E+03	1.46E+01	3.55E+00	3.83E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	7.38E+02	4.77E+03	3.40E+03	1.09E+03	1.72E+03	0.00E+00	5.60E+04	0.00E+00
TEEN:	9.99E+02	4.72E+03	4.62E+03	1.45E+03	2.14E+03	0.00E+00	8.52E+04	0.00E+00
CHILD:	1.17E+03	1.94E+03	6.02E+03	1.33E+03	1.89E+03	0.00E+00	7.07E+04	0.00E+00
INFANT:	6.44E+02	6.38E+02	3.66E+03	8.33E+02	9.85E+02	0.00E+00	5.55E+04	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : SB124

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : CS134

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.46E+08
TEEN:	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.46E+08
CHILD:	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.46E+08
INFANT:	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.11E+08	2.46E+08

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.50E+08	5.34E+06	1.28E+08	3.05E+08	9.88E+07	0.00E+00	3.23E+07	0.00E+00
TEEN:	2.00E+08	5.93E+06	2.03E+08	4.77E+08	1.55E+08	0.00E+00	5.79E+07	0.00E+00
CHILD:	1.60E+08	4.10E+06	4.66E+08	7.60E+08	2.68E+08	0.00E+00	8.46E+07	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.38E+07	2.80E+05	1.22E+07	2.31E+07	9.64E+06	0.00E+00	3.13E+06	0.00E+00
TEEN:	1.05E+07	2.35E+05	9.76E+06	2.29E+07	8.75E+06	0.00E+00	2.73E+06	0.00E+00
CHILD:	5.96E+06	1.22E+05	1.77E+07	3.32E+07	1.77E+07	0.00E+00	3.13E+06	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.03E+03	3.33E+06	1.05E+03	1.30E+08	8.11E+07	0.00E+00	2.69E+07	0.00E+00
TEEN:	4.00E+03	3.38E+06	1.83E+03	3.30E+08	1.57E+08	0.00E+00	5.22E+07	0.00E+00
CHILD:	1.46E+03	3.74E+06	4.22E+03	6.92E+08	3.14E+08	0.00E+00	7.69E+07	0.00E+00
INFANT:	1.23E+03	3.64E+06	6.79E+03	1.27E+09	5.25E+08	0.00E+00	1.34E+08	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.14E+03	1.32E+07	3.16E+08	7.81E+08	2.43E+08	0.00E+00	8.07E+07	0.00E+00
TEEN:	5.99E+03	1.31E+07	5.46E+08	1.39E+09	4.70E+08	0.00E+00	1.57E+08	0.00E+00
CHILD:	4.33E+03	1.12E+07	1.26E+09	2.08E+09	6.46E+08	0.00E+00	2.31E+08	0.00E+00
INFANT:	3.84E+03	1.03E+07	2.04E+09	3.80E+09	9.78E+08	0.00E+00	4.01E+08	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.31E+04	3.30E+02	1.13E+04	2.69E+04	9.10E+03	0.00E+00	3.09E+03	0.00E+00
TEEN:	1.74E+04	3.09E+02	1.59E+04	3.38E+04	1.13E+04	0.00E+00	4.64E+03	0.00E+00
CHILD:	7.12E+03	1.22E+02	2.06E+04	3.21E+04	1.05E+04	0.00E+00	3.86E+03	0.00E+00
INFANT:	2.35E+03	4.13E+01	1.26E+04	2.23E+04	6.04E+03	0.00E+00	2.53E+03	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : CS136

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	5.21E+06
TEEN:	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	5.21E+06
CHILD:	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	5.21E+06
INFANT:	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	4.60E+06	5.21E+06

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.99E+05	3.15E+05	7.01E+05	2.77E+06	1.54E+06	0.00E+00	2.11E+05	0.00E+00
TEEN:	2.14E+05	2.37E+05	8.10E+05	3.19E+06	1.74E+05	0.00E+00	2.74E+05	0.00E+00
CHILD:	2.83E+05	1.37E+05	1.62E+06	4.46E+06	2.37E+05	0.00E+00	3.54E+05	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.53E+05	1.[illegible]E+05	2.30E+05	9.06E+05	5.05E+05	0.00E+00	6.92E+04	0.00E+00
TEEN:	4.74E+05	5.[illegible]E+04	1.79E+05	7.05E+05	3.84E+05	0.00E+00	6.05E+04	0.00E+00
CHILD:	5.50E+05	2.[illegible]E+04	3.09E+05	8.50E+05	4.53E+05	0.00E+00	6.75E+04	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ULT:	1.43E+07	2.16E+06	5.03E+05	1.99E+07	1.10E+07	0.00E+00	1.51E+05	0.00E+00
EEN:	2.25E+07	2.71E+06	8.56E+06	3.37E+07	1.83E+07	0.00E+00	2.89E+05	0.00E+00
CHILD:	3.44E+07	1.87E+06	1.93E+07	5.31E+07	2.83E+07	0.00E+00	4.22E+05	0.00E+00
INFANT:	4.14E+07	1.69E+06	3.77E+07	1.11E+08	4.42E+07	0.00E+00	9.05E+06	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.29E+07	6.77E+06	1.51E+07	5.96E+07	3.31E+07	0.00E+00	4.54E+06	0.00E+00
TEEN:	6.79E+07	8.13E+06	2.57E+07	1.01E+08	5.50E+07	0.00E+00	8.67E+06	0.00E+00
CHILD:	1.03E+08	5.50E+06	5.80E+07	1.59E+08	8.49E+07	0.00E+00	1.27E+07	0.00E+00
INFANT:	1.24E+08	5.06E+06	1.13E+08	3.33E+08	1.33E+08	0.00E+00	2.71E+07	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.50E+03	3.70E+02	1.24E+03	4.64E+03	2.71E+03	0.00E+00	3.80E+02	0.00E+00
TEEN:	4.34E+03	3.45E+02	1.63E+03	6.14E+03	3.50E+03	0.00E+00	5.63E+02	0.00E+00
CHILD:	3.68E+03	1.33E+02	2.06E+03	5.42E+03	3.03E+03	0.00E+00	4.61E+02	0.00E+00
INFANT:	1.63E+03	4.53E+01	1.53E+03	4.26E+03	1.79E+03	0.00E+00	3.73E+02	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : CS137

CR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.93E+03	3.93E+08	3.93E+03	3.93E+08	3.93E+03	3.93E+08	3.93E+03	4.64E+08
TEEN:	3.93E+03	3.93E+08	3.93E+03	3.93E+08	3.93E+03	3.93E+08	3.93E+03	4.64E+08
CHILD:	3.93E+03	3.93E+08	3.93E+03	3.93E+08	3.93E+03	3.93E+08	3.93E+03	4.64E+08
INFANT:	3.93E+03	3.93E+08	3.93E+03	3.93E+08	3.93E+03	3.93E+08	3.93E+03	4.64E+08

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	.88E+03	5.56E+06	2.10E+03	2.87E+08	9.77E+07	0.00E+00	3.24E+07	0.00E+00
TEEN:	.51E+03	3.57E+06	3.47E+03	4.62E+08	1.57E+08	0.00E+00	6.11E+07	0.00E+00
CHIL:	.17E+08	4.97E+06	8.29E+03	7.94E+08	2.59E+08	0.00E+00	9.31E+07	0.00E+00
INFA:	.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.63E+07	4.30E+05	1.11E+07	2.48E+07	8.63E+05	0.00E+00	2.80E+06	0.00E+00
TEEN:	6.93E+06	2.35E+05	4.51E+07	6.00E+07	6.87E+05	0.00E+00	2.65E+06	0.00E+00
CHILD:	3.92E+06	1.86E+05	2.77E+07	5.66E+07	8.66E+05	0.00E+00	5.11E+06	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
CULT:	1.38E+03	4.07E+06	1.54E+03	2.10E+08	7.13E+07	0.00E+00	2.37E+07	0.00E+00
EEN:	1.29E+03	5.27E+06	2.75E+03	3.70E+08	1.23E+08	0.00E+00	6.90E+07	0.00E+00
CHILD:	9.43E+07	4.02E+06	6.71E+03	5.42E+08	2.09E+08	0.00E+00	7.53E+07	0.00E+00
INFANT:	8.83E+07	3.92E+06	1.07E+09	1.25E+09	3.36E+08	0.00E+00	1.36E+03	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.13E+08	1.22E+07	4.61E+03	6.30E+08	2.14E+08	0.00E+00	7.11E+07	0.00E+00
TEEN:	3.87E+09	1.58E+07	8.35E+08	1.11E+09	3.70E+08	0.00E+00	1.67E+08	0.00E+00
CHILD:	2.84E+08	1.21E+07	2.01E+09	1.93E+09	6.28E+08	0.00E+00	2.26E+08	0.00E+00
INFANT:	2.65E+03	1.18E+07	3.21E+09	3.76E+09	1.01E+09	0.00E+00	4.09E+03	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.35E+06	2.56E+02	1.52E+04	1.97E+04	7.03E+03	0.00E+00	2.38E+03	0.00E+00
TEEN:	9.87E+03	2.59E+02	2.13E+04	2.69E+04	9.64E+03	0.00E+00	3.83E+03	0.00E+00
CHILD:	4.07E+03	1.15E+02	2.87E+04	2.52E+04	8.95E+03	0.00E+00	3.30E+03	0.00E+00
INFANT:	1.44E+03	4.23E+01	1.74E+04	1.96E+04	5.46E+03	0.00E+00	2.26E+03	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : BA140

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	7.16E+05
TEEN:	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	7.16E+05
CHILD:	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	7.16E+05
INFANT:	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	6.27E+05	7.16E+05

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.35E+05	4.29E+06	2.08E+06	2.62E+03	8.89E+02	0.00E+00	1.50E+03	0.00E+00
TEEN:	1.62E+05	3.88E+06	2.52E+06	3.09E+03	1.05E+03	0.00E+00	2.07E+03	0.00E+00
CHILD:	3.13E+05	2.72E+06	5.36E+06	4.59E+03	1.55E+03	0.00E+00	2.80E+03	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.61E+04	1.13E+06	5.50E+05	6.91E+02	2.35E+02	0.00E+00	3.96E+02	0.00E+00
TEEN:	2.93E+04	7.00E+05	4.55E+05	5.58E+02	1.89E+02	0.00E+00	3.75E+02	0.00E+00
CHILD:	4.90E+04	4.25E+05	8.40E+05	7.36E+02	2.60E+02	0.00E+00	4.39E+02	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.37E+04	1.06E+06	5.15E+05	6.47E+02	2.20E+02	0.00E+00	3.70E+02	0.00E+00
TEEN:	5.99E+04	1.43E+06	9.29E+05	1.14E+03	3.86E+02	0.00E+00	7.66E+02	0.00E+00
CHILD:	1.31E+05	1.14E+06	2.24E+06	1.97E+03	6.60E+02	0.00E+00	1.17E+03	0.00E+00
INFANT:	2.35E+05	1.13E+06	4.62E+06	4.32E+03	1.10E+03	0.00E+00	2.83E+03	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.05E+03	1.27E+05	6.13E+04	7.76E+01	2.64E+01	0.00E+00	4.44E+01	0.00E+00
TEEN:	7.13E+03	1.72E+05	1.12E+05	1.37E+02	4.63E+01	0.00E+00	9.19E+01	0.00E+00
CHILD:	1.57E+04	1.36E+05	2.69E+05	2.36E+02	7.92E+01	0.00E+00	1.41E+02	0.00E+00
INFANT:	2.85E+04	1.36E+05	5.54E+05	5.54E+02	1.32E+02	0.00E+00	3.40E+02	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	8.14E+01	6.92E+03	1.24E+03	1.55E+00	5.30E-01	0.00E+00	4.03E+04	0.00E+00
TEEN:	1.12E+02	7.25E+03	1.73E+03	2.13E+00	7.23E-01	0.00E+00	6.46E+04	0.00E+00
CHILD:	1.37E+02	3.23E+03	2.33E+03	2.05E+00	6.70E-01	0.00E+00	5.52E+04	0.00E+00
INFANT:	9.19E+01	1.22E+03	1.78E+03	1.78E+00	4.20E-01	0.00E+00	5.06E+04	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : CE141

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.70E+05
TEEN:	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.70E+05
CHILD:	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.70E+05
INFANT:	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.17E+05	4.70E+05

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.55E+02	1.20E+07	4.63E+03	3.13E+03	1.45E+03	0.00E+00	0.00E+00	0.00E+00
TEEN:	5.57E+02	1.39E+07	7.29E+03	4.85E+03	2.23E+03	0.00E+00	0.00E+00	0.00E+00
CHILD:	1.29E+03	1.08E+07	1.74E+04	8.57E+03	3.80E+03	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.95E+01	6.36E+05	2.54E+02	1.72E+02	7.97E+01	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.63E+01	4.07E+05	2.13E+02	1.42E+02	6.70E+01	0.00E+00	0.00E+00	0.00E+00
CHILD:	2.97E+01	2.30E+05	4.01E+02	2.00E+02	8.77E+01	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.71E+00	2.16E+05	8.75E+01	5.92E+01	2.75E+01	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.23E+01	3.06E+05	1.60E+02	1.07E+02	5.04E+01	0.00E+00	0.00E+00	0.00E+00
CHILD:	2.93E+01	2.26E+05	3.95E+02	1.97E+02	8.64E+01	0.00E+00	0.00E+00	0.00E+00
INFANT:	5.62E+01	2.47E+05	7.83E+02	4.73E+02	1.47E+02	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	8.05E-01	2.72E+04	1.05E+01	7.10E+00	3.30E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.48E+00	3.68E+04	1.93E+01	1.29E+01	6.05E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	3.51E+00	2.95E+04	4.74E+01	2.37E+01	1.04E+01	0.00E+00	0.00E+00	0.00E+00
INFANT:	6.73E+00	2.96E+04	9.40E+01	5.73E+01	1.77E+01	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.84E+01	3.30E+03	6.31E+02	4.29E+02	1.99E+02	0.00E+00	1.15E+04	0.00E+00
TEEN:	6.67E+01	4.01E+03	9.00E+02	6.01E+02	2.81E+02	0.00E+00	1.95E+04	0.00E+00
CHILD:	9.13E+01	1.79E+03	1.24E+03	6.19E+02	2.71E+02	0.00E+00	1.72E+04	0.00E+00
INFANT:	6.33E+01	6.83E+02	8.79E+02	5.28E+02	1.66E+02	0.00E+00	1.64E+04	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : CE144

JR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.65E+06
TEEN:	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.65E+06
CHILD:	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.65E+06
INFANT:	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.12E+06	2.65E+06

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.63E+04	2.91E+08	8.62E+05	3.60E+05	2.14E+05	0.00E+00	0.00E+00	0.00E+00
TEEN:	7.73E+04	3.62E+08	1.44E+06	5.95E+05	3.56E+05	0.00E+00	0.00E+00	0.00E+00
CHILD:	1.57E+05	2.57E+08	3.51E+06	1.10E+06	6.13E+05	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.41E+03	8.90E+06	2.63E+04	1.10E+04	6.53E+03	0.00E+00	0.00E+00	0.00E+00
TEEN:	1.47E+03	5.58E+06	2.72E+04	9.18E+03	5.48E+03	0.00E+00	0.00E+00	0.00E+00
CHILD:	2.23E+03	3.62E+06	4.18E+04	1.31E+04	7.26E+03	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.47E+02	2.13E+06	6.46E+03	2.70E+03	1.60E+03	0.00E+00	0.00E+00	0.00E+00
TEEN:	6.39E+02	2.99E+06	1.19E+04	4.92E+03	2.94E+03	0.00E+00	0.00E+00	0.00E+00
CHILD:	1.56E+03	2.60E+06	2.93E+04	9.19E+03	5.09E+03	0.00E+00	0.00E+00	0.00E+00
INFANT:	2.35E+03	2.41E+06	4.20E+04	1.72E+04	6.95E+03	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.16E+01	2.56E+05	7.75E+02	3.24E+02	1.92E+02	0.00E+00	0.00E+00	0.00E+00
TEEN:	7.67E+01	3.59E+05	1.43E+03	5.90E+02	3.53E+02	0.00E+00	0.00E+00	0.00E+00
CHILD:	1.88E+02	3.12E+05	3.52E+03	1.10E+03	6.11E+02	0.00E+00	0.00E+00	0.00E+00
INFANT:	2.82E+02	2.89E+05	5.04E+03	2.06E+03	8.34E+02	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	5.88E+03	2.59E+04	1.09E+05	6.54E+04	2.69E+04	0.00E+00	2.46E+05	0.00E+00
TEEN:	8.32E+03	2.74E+04	1.55E+05	6.62E+04	3.83E+04	0.00E+00	4.24E+05	0.00E+00
CHILD:	1.15E+04	1.23E+04	2.15E+05	6.71E+04	3.72E+04	0.00E+00	3.79E+05	0.00E+00
INFANT:	5.59E+03	4.70E+03	1.01E+05	3.84E+04	1.70E+04	0.00E+00	3.12E+05	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : I131

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	3.19E+05
TEEN:	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	3.19E+05
CHILD:	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	3.19E+05
INFANT:	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	2.63E+05	3.19E+05

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	4.62E+05	2.04E+05	5.41E+05	7.74E+05	1.33E+06	2.54E+08	0.00E+00	0.00E+00
TEEN:	4.02E+05	1.48E+05	5.35E+05	7.66E+05	1.29E+06	2.16E+08	0.00E+00	0.00E+00
CHILD:	5.83E+05	9.13E+04	1.02E+06	1.03E+06	1.68E+06	3.39E+08	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	8.70E+04	6.01E+04	1.06E+05	1.52E+05	2.60E+05	4.96E+07	0.00E+00	0.00E+00
TEEN:	6.66E+04	2.44E+04	8.82E+04	1.24E+05	2.13E+05	3.60E+07	0.00E+00	0.00E+00
CHILD:	9.35E+04	1.46E+04	1.66E+05	1.65E+05	2.70E+05	5.44E+07	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.39E+06	1.10E+06	2.92E+06	4.17E+06	7.16E+06	1.37E+09	0.00E+00	0.00E+00
TEEN:	3.95E+06	1.47E+06	5.30E+06	7.42E+06	1.28E+07	2.46E+09	0.00E+00	0.00E+00
CHILD:	7.36E+06	1.15E+06	1.28E+07	1.29E+07	2.12E+07	4.27E+09	0.00E+00	0.00E+00
INFANT:	1.39E+07	1.13E+06	2.63E+07	3.16E+07	3.69E+07	1.06E+10	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.87E+06	1.32E+06	3.50E+06	5.01E+06	8.59E+06	1.64E+09	0.00E+00	0.00E+00
TEEN:	4.73E+06	1.76E+06	6.36E+06	8.90E+06	1.53E+07	2.95E+09	0.00E+00	0.00E+00
CHILD:	8.81E+06	1.38E+06	1.54E+07	1.55E+07	2.55E+07	5.12E+09	0.00E+00	0.00E+00
INFANT:	1.67E+07	1.35E+06	3.22E+07	3.79E+07	4.43E+07	1.28E+10	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	6.49E+02	1.99E+02	7.99E+02	1.13E+03	1.96E+03	3.78E+05	0.00E+00	0.00E+00
TEEN:	6.37E+02	2.06E+02	1.12E+03	1.56E+03	2.66E+03	4.64E+05	0.00E+00	0.00E+00
CHILD:	8.66E+02	9.01E+01	1.52E+03	1.52E+03	2.50E+03	5.15E+05	0.00E+00	0.00E+00
INFANT:	6.21E+02	3.36E+01	1.20E+03	1.41E+03	1.64E+03	4.70E+05	0.00E+00	0.00E+00

INDIVIDUAL DOSE FACTORS FOR GASEOUS EFFLUENTS -- FOR ISOTOPE : I133

FOR PATHWAY: PLUME

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TEEN:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
CHILD:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+0	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: GROUND

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	4.35E+04
TEEN:	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	4.35E+04
CHILD:	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	4.35E+04
INFANT:	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	3.75E+04	4.35E+04

FOR PATHWAY: VEGETABLE

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	7.07E+03	2.08E+04	1.33E+04	2.32E+04	4.05E+04	3.61E+06	0.00E+00	0.00E+00
TEEN:	6.41E+03	1.89E+04	1.24E+04	2.10E+04	3.69E+04	2.93E+06	0.00E+00	0.00E+00
CHILD:	1.06E+04	1.19E+04	2.26E+04	2.79E+04	4.65E+04	5.19E+06	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: MEAT

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.01E-03	5.93E-03	3.79E-03	6.60E-03	1.15E-02	9.70E-01	0.00E+00	0.00E+00
TEEN:	1.64E-03	4.87E-03	3.17E-03	5.38E-03	9.46E-03	7.52E-01	0.00E+00	0.00E+00
CHILD:	2.76E-03	2.94E-03	5.90E-03	7.29E-03	1.22E-02	1.35E+00	0.00E+00	0.00E+00
INFANT:	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

FOR PATHWAY: COW MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.07E+04	6.12E+04	3.91E+04	6.81E+04	1.19E+05	1.00E+07	0.00E+00	0.00E+00
TEEN:	3.70E+04	9.17E+04	7.15E+04	1.21E+05	2.13E+05	1.69E+07	0.00E+00	0.00E+00
CHILD:	8.12E+04	8.85E+04	1.74E+05	2.15E+05	3.58E+05	3.99E+07	0.00E+00	0.00E+00
INFANT:	1.55E+05	9.03E+04	3.67E+05	5.34E+05	6.28E+05	9.71E+07	0.00E+00	0.00E+00

FOR PATHWAY: GOAT MILK

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	2.49E+04	7.34E+04	4.69E+04	8.17E+04	1.42E+05	1.20E+07	0.00E+00	0.00E+00
TEEN:	4.44E+04	1.10E+05	8.57E+04	1.45E+05	2.55E+05	2.03E+07	0.00E+00	0.00E+00
CHILD:	9.75E+04	1.06E+05	2.08E+05	2.58E+05	4.29E+05	4.79E+07	0.00E+00	0.00E+00
INFANT:	1.86E+05	1.08E+05	4.40E+05	6.41E+05	7.53E+05	1.16E+08	0.00E+00	0.00E+00

FOR PATHWAY: INHALATION

	T. BODY	GI-TRACT	BONE	LIVER	KIDNEY	THYROID	LUNG	SKIN
ADULT:	1.43E+02	2.81E+02	2.74E+02	4.69E+02	8.19E+02	6.52E+04	0.00E+00	0.00E+00
TEEN:	1.97E+02	3.27E+02	3.85E+02	6.49E+02	1.14E+03	9.26E+04	0.00E+00	0.00E+00
CHILD:	2.44E+02	1.74E+02	5.25E+02	6.44E+02	1.07E+03	1.22E+05	0.00E+00	0.00E+00
INFANT:	1.73E+02	6.33E+01	4.20E+02	5.08E+02	7.10E+02	1.13E+05	0.00E+00	0.00E+00

TABLE 2-3

ASSUMPTIONS USED IN LIMERICK GASEOUS
EFFLUENT DOSE EVALUATION

Index	Description	Value
1	Fraction of produce from local garden	0.76
2	Fraction of leafy veg from local garden	1.00
3	Soil density in plow layer (kg/m**2)	240.0
4	Fraction of deposited particulates retained on vegetation	0.20
5	Fraction of deposited iodines retained on vegetation	1.0
6	Shielding factor of residential structures	0.7
7	Period of buildup of activity in soil (hr)	175200.0
8	Period of pasture grass exposure to activity (hr)	720.0
9	Period of crop exposure to activity (hr)	1440.0
10	Transport time milkman (hr)	48.0
11	Delay time for ingestion of grass by animals (hr)	0.0
12	Delay time for ingestion of stored feed by animals (hr)	2160.0
13	Delay time for ingestion of leaf veg by man (hr)	24.0
14	Delay time for ingestion of other veg by man (hr)	1440.0
15	Time between slaughter and consumption of meat animal (hr)	480.0
16	Grass yield, wet wt (kg/m**2)	0.7
17	Other vegetation yield, wet wt (kg/m**2)	2.0
18	Weathering rate constant for activity on vegetation (1./hr)	0.0021
19	Milk cow feed consumption rate (kg/day wet)	50.0
20	Beef cattle feed consumption rate (kg/day wet)	50.0
21	Goat feed consumption rate (kg/day wet)	6.0
22	Plume exposure adult (hr/yr)	8760.0
23	Plume exposure teen (hr/yr)	8760.0
24	Plume exposure child (hr/yr)	8760.0
25	Plume exposure infant (hr/yr)	8760.0
26	Ground exposure adult (hr/yr)	8760.0
27	Ground exposure teen (hr/yr)	8760.0
28	Ground exposure child (hr/yr)	8760.0
29	Ground expsoure infant (hr/yr)	8760.0

TABLE 2-3 (cont.)

Index	Description	Value
30	Inhalation rate adult (m**3/yr)	8000.0
31	Inhalation rate teen (m**3/yr)	8000.0
32	Inhalation rate child (m**3/yr)	3700.0
33	Inhalation rate infant (m**3/yr)	1400.0
34	Leafy veg consumption rate adult (kg/yr)	64.0
35	Leafy veg consumption rate teen (kg/yr)	42.0
36	Leafy veg consumption rate child (kg/yr)	26.0
37	Leafy veg consumption rate infant (kg/yr)	0.0
38	Non-leafy veg consumption rate adult (kg/yr)	520.0
39	Non-leafy veg consumption rate teen (kg/yr)	630.0
40	Non-leafy veg consumption rate child (kg/yr)	520.0
41	Non-leafy veg consumption rate infant (kg/yr)	0.0
42	Root veg consumption rate adult (kg/yr)	0.0
43	Root veg consumption rate teen (kg/yr)	0.0
44	Root veg consumption rate child (kg/yr)	0.0
45	Root veg consumption rate infant (kg/yr)	0.0
46	Cow milk consumption rate adult (l/yr)	310.0
47	Cow milk consumption rate teen (l/yr)	400.0
48	Cow milk consumption rate child (l/yr)	330.0
49	Cow milk consumption rate infant (l/yr)	330.0
50	Goat milk consumption rate adult (l/yr)	310.0
51	Goat milk consumption rate teen (l/yr)	400.0
52	Goat milk consumption rate child (l/yr)	330.0
53	Goat milk consumption rate infant (l/yr)	330.0
54	Meat consumption rate adult (kg/yr)	110.0
55	Meat consumption rate teen (kg/yr)	65.0
56	Meat consumption rate child (kg/yr)	41.0
57	Meat consumption rate infant (kg/yr)	0.0
58	Fraction of year animals on pasture	0.75
59	Fraction of feed from pasture when on pasture	0.88
60	Fraction of year leafy veg grown	0.42
61	Atmosphere hydrogen concentration (gm/m**3)	8.0

TABLE 2-4

NEAREST GASEOUS EFFLUENT DOSE RECEPTOP DISTANCES (METERS)

Direction	Plume Ground Inhalation Pathways	Vegetation Pathway	Meat Pathway	Cow Pathway	Goat Pathway
N	805	2414	3414	7562	0
NNE	805	1609	1585	0	0
NE	965	3218	1097	4183	0
ENE	965	2414	3871	0	0
E	965	1770	1890	6758	0
ESE	965	805	4511	1770	1770
SE	1609	3862	7241	7241	0
SSE	1609	1609	7224	0	0
S	1287	1931	3018	3701	5654
SSW	1609	1931	1433	2896	0
SW	965	1287	2835	4827	0
WSW	1287	1287	2134	2255	0
W	965	2574	4084	0	0
WNW	1126	1440	0	0	0
NW	1126	2574	6660	0	0
NNW	1448	1931	6325	0	0

APPENDIX A

TABLE A-1

TECHNICAL SPECIFICATION/ODCM MATRIX

Technical Specification	ODCM Section I Requirement	ODCM Equation Section II
6.8.4.d.1	3.2.1	1-1 1-2 1-3 1-4
6.8.4.d.1	3.3.1	2-1 (or 2-9) 2-2 (or 2-9) 2-4 (or 2-10) 2-5 (or 2-10)
6.8.4.d.2,d.3	3.2.2	1-1 1-2 1-3 1-4
6.8.4.d.4	3.2.3	1-5 1-6 1-7
6.8.4.d.5,d.6	3.2.4	1-8 1-9
6.8.4.d.7	3.3.2	2-22 2-23
6.8.4.d.7	3.3.2	2-26 2-27 2-28
6.8.4.d.8	3.3.3	2-24 2-25
6.8.4.d.9	3.3.4	2-26 2-27 2-28
6.8.4.d.9	3.3.5	2-33
3.11.2.7		2-4 2-5

TABLE A-1 (cont.)

Technical Specification	ODCM Section I Requirement	ODCM Equation Section II
6.8.4.d.10	3.3.8	1-5 1-6 1-7 2-24 2-25 2-26 2-27 2-28
6.8.4.d.10	3.3.7	3-1
6.8.4.e.1	3.4.1	Section 4 App. B
6.8.4.e.3	3.5 3.4.3	1-5 1-6 1-7 2-29 2-30 2-31 2-32 3-2

APPENDIX B

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM - SAMPLE TYPE, LOCATION, AND ANALYSIS

TABLE B-1

ODCM - LIMERICK GENERATING STATION
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

Pathway	Station Code		Location	Collection Method	Analyses
1. Direct	36S2		0.6 miles N of site	1 set of four (4) TLDs from each location at least quarterly	Gamma dose quarterly
	2E1		5.1 miles NNE of site		
	3S1		0.6 miles NNE of site		
	4E1		4.6 miles NNE of site		
	5S1		0.4 miles NE of site		
	5H1	C	25.8 miles NE of site		
	6C1		2.1 miles ENE of site		
	7S1		0.5 miles ENE of site		
	7E1		4.2 miles ENE of site		
	9C1		2.2 miles E of site		
	10S3		0.5 miles E of site		
	10E1		3.9 miles E of site		
	10F3		5.5 miles ESE of site		
	11S1		0.5 miles ESE of site		
	13C1		2.9 miles SE of site		
	13E1		4.3 miles SE of site		
	14S1		0.6 miles SE of site		
	15D1		3.2 miles SE of site		
	16S2		0.6 miles SSE of site		
	17B1		1.6 miles S of site		
	18G1	C	12.9 miles S of site		
	18S1		0.3 miles S of site		
	19D1		3.6 miles S of site		
	20D1		3.1 miles SSW of site		
	20F1		5.2 miles SSW of site		
	21S1		0.5 miles SSW of site		
	23S2		0.5 miles WSW of site		

C = Control Stations

ENGR JWB
HP RWB
DATE 10/27/85
REV 8

TABLE B-1 (continued)

Pathway	Station Code		Location	Collection Method	Analyses
I. Direct (cont.)	24D1		3.9 miles SW of site	Collected quarterly	Gamma dose quarterly
	25S1		0.5 miles SW of site		
	25D1		4.0 miles WSW of site		
	26S3		0.4 miles W of site		
	28D2		3.8 miles W of site		
	29S1		0.5 miles WNW of site		
	29E1		4.9 miles WNW of site		
	31D1		3.0 miles NW of site		
	31D2		3.9 miles NW of site		
	32S1		0.5 miles NW of site		
	34S2		0.6 miles NNW of site		
	34E1		4.6 miles NNW of site		
	35F1		4.2 miles N of site		
II. Airborne					
Particulates	10S3		0.5 miles E of site	Approximately 1 cfm continuous flow through glass fiber filter which is collected weekly at filter change.	Gross beta analysis on each weekly sample. Gamma spectrometry shall be done when gross beta exceeds ten times the yearly mean of control station value.
	11S1		0.5 miles ESE of site		
	14S1		0.6 miles SE of site		
	13C1		2.9 miles SE of site		
	13H4	C	28.8 miles SE of site		

ENGR JWB
HP 1-23-85
DATE 8/1/85
REV 7

TABLE B-1 (continued)

Pathway	Station Code		Location	Collection Method	Analyses
II. Airborne (cont.)					
Particulates (cont.)					Gross beta analysis done >24 hr after sampling to allow for Radon and Thoron daughter decay. Gamma isotopic analysis on monthly composite.
Iodine	10S3 11S1 14S1 13C1 13H4	 C	0.5 miles E of site 0.5 miles ESE of site 0.6 miles SE of site 2.9 miles SE of site 28.8 miles SE of site	A TEDA impregnated flow-through cartridge is connected to air sampler and is collected weekly at filter change.	Iodine 131 analysis performed on each weekly sample.
III. Water					
Surface	24S1 16B2	C 	0.3 miles SSW of site 1.1 miles SSE of site	Sample collected from a continuous water sampler, monthly. In event sampler is inoperable, weekly grab samples will be collected until sampler returned to service.	Gamma isotopic analysis monthly; H-3 on quarterly composite.
Sediment	16C4		Vincent Dam, Downstream of discharge	A sediment sample is taken semi-annually.	Gamma isotopic analysis; semi-annually.

ENGR JWB
HP RLS
DATE 5/1/87
REV 1

Pathway	Station Code		Location	Collection Method	Analyses
IV. Ingestion					
Milk	22F1	C	9.8 miles SW of site	Sample of fresh milk is collected from each farm biweekly when cows are on pasture, monthly at other times	Gamma isotopic and I-131 analyses on each sample on collection
	10B1		1.1 miles ESE of site		
	25B1		1.3 miles WSW of site		
	21B1		1.8 miles SSW of site		
Drinking	15F7		5.2 miles SSE of site	Sample collected from a continuous water sampler monthly. In event sampler is inoperable, weekly grab samples will be collected until sampler returned to service	Gross beta and gamma isotopic monthly; H-3 on quarterly composite
	28F3	C	5.9 miles WNW of site		
	15F4		7.8 miles SE of site		
	16C2		2.4 miles SSE of site		
Fish	16C5		1.9 miles SSE of site	Two species of recreationally important fish (predator and bottom feeder) sampled in season or semiannually if not seasonal	Gamma isotopic analyses on edible portions
	29C1	C	3.2 miles WNW of site		
Food Products	11S1		0.5 miles ESE of site	Monthly when available if milk sampling is not performed	Gamma isotopic and I-131 analysis

ENGR JWB
HP PKC
DATE 8/11/2
REV 7

FIGURES

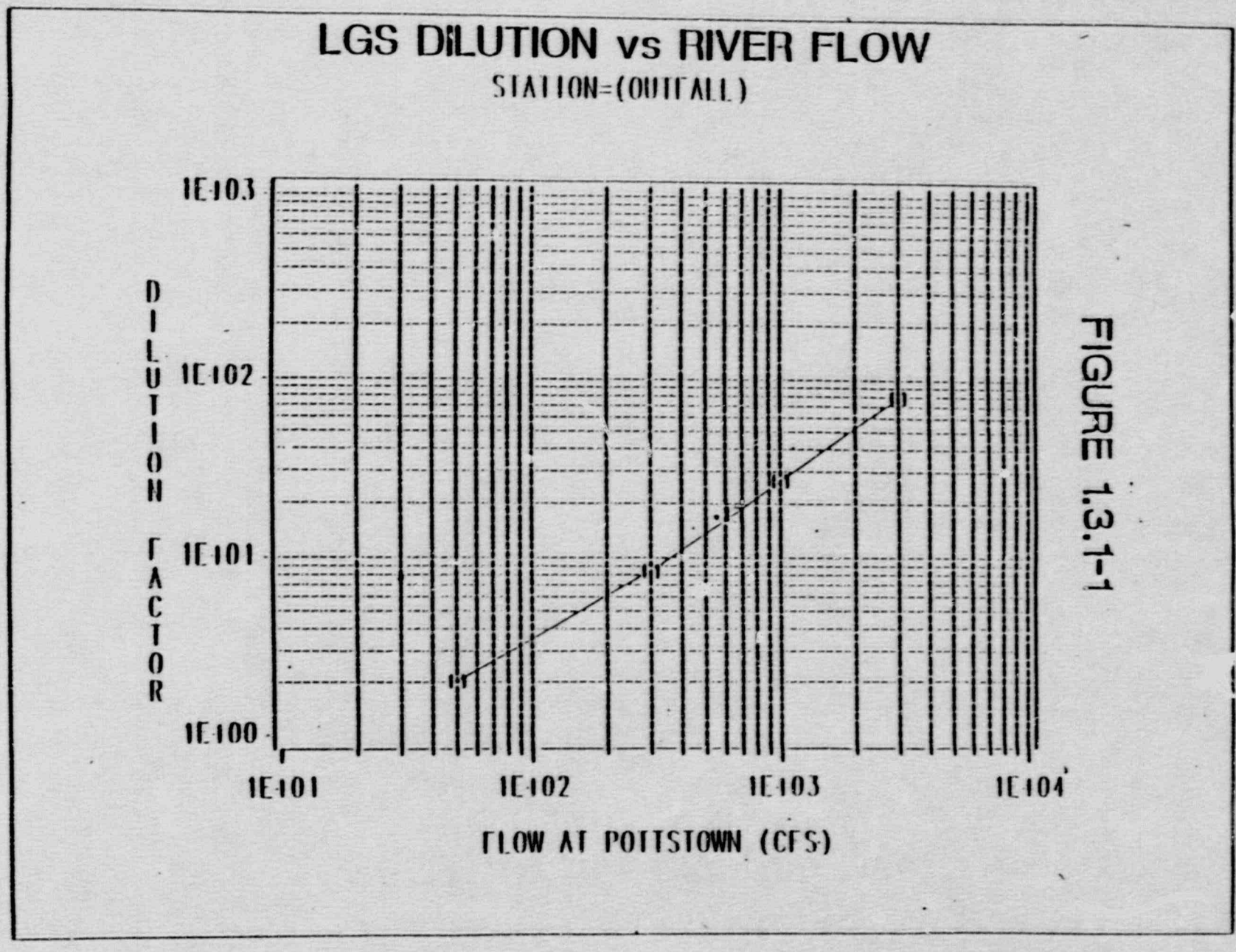
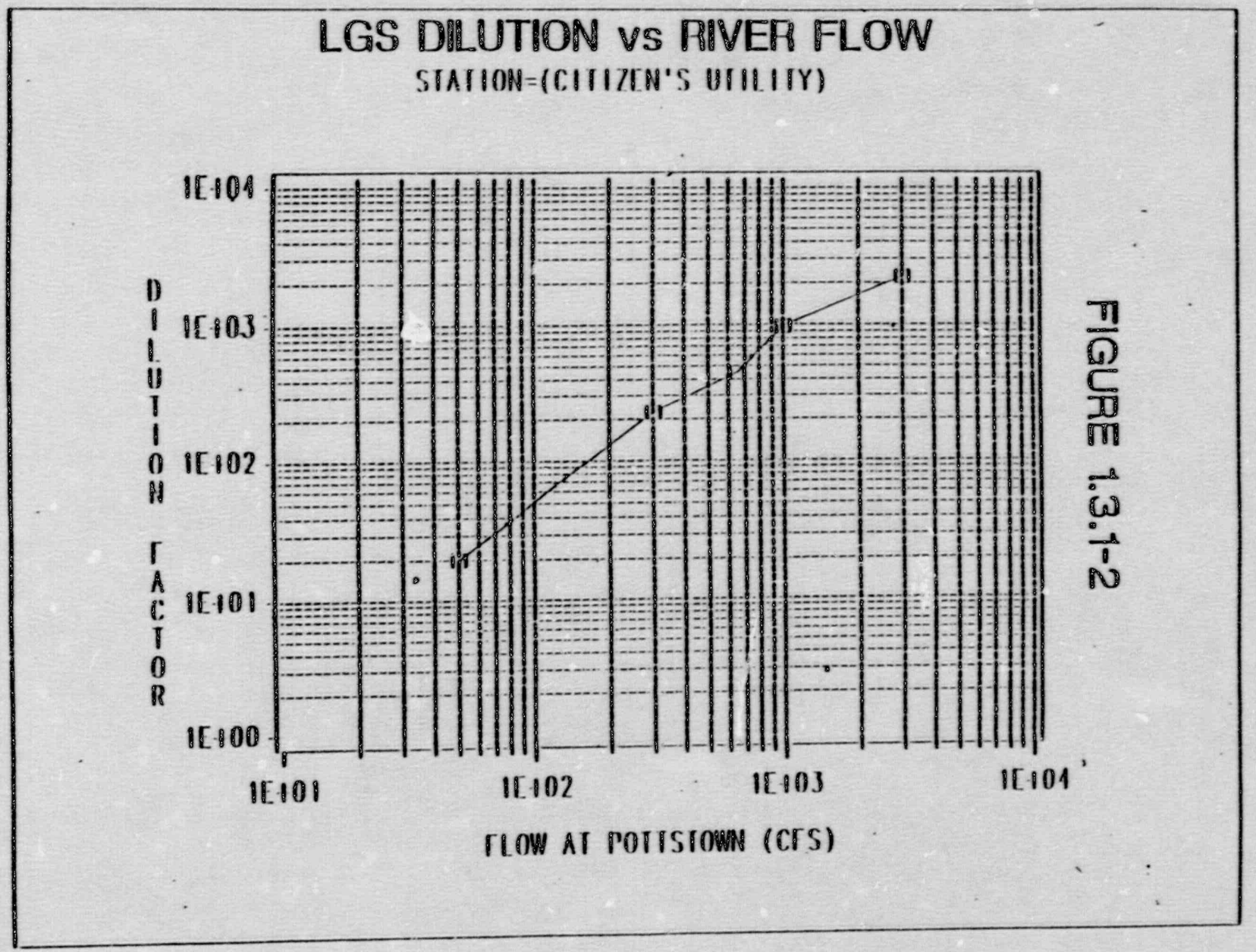

LGS DILUTION vs RIVER FLOW
STATION=(OUTFALL)
1E+03
1E+02
1E+01
1E+00
DILUTION FACTOR
1E+01
1E+02
1E+03
1E+04
FLOW AT POTTSTOWN (CFS)

FIGURE 1.3.1-1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DILUTION FACTOR
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1E+03
1E+02
1E+01
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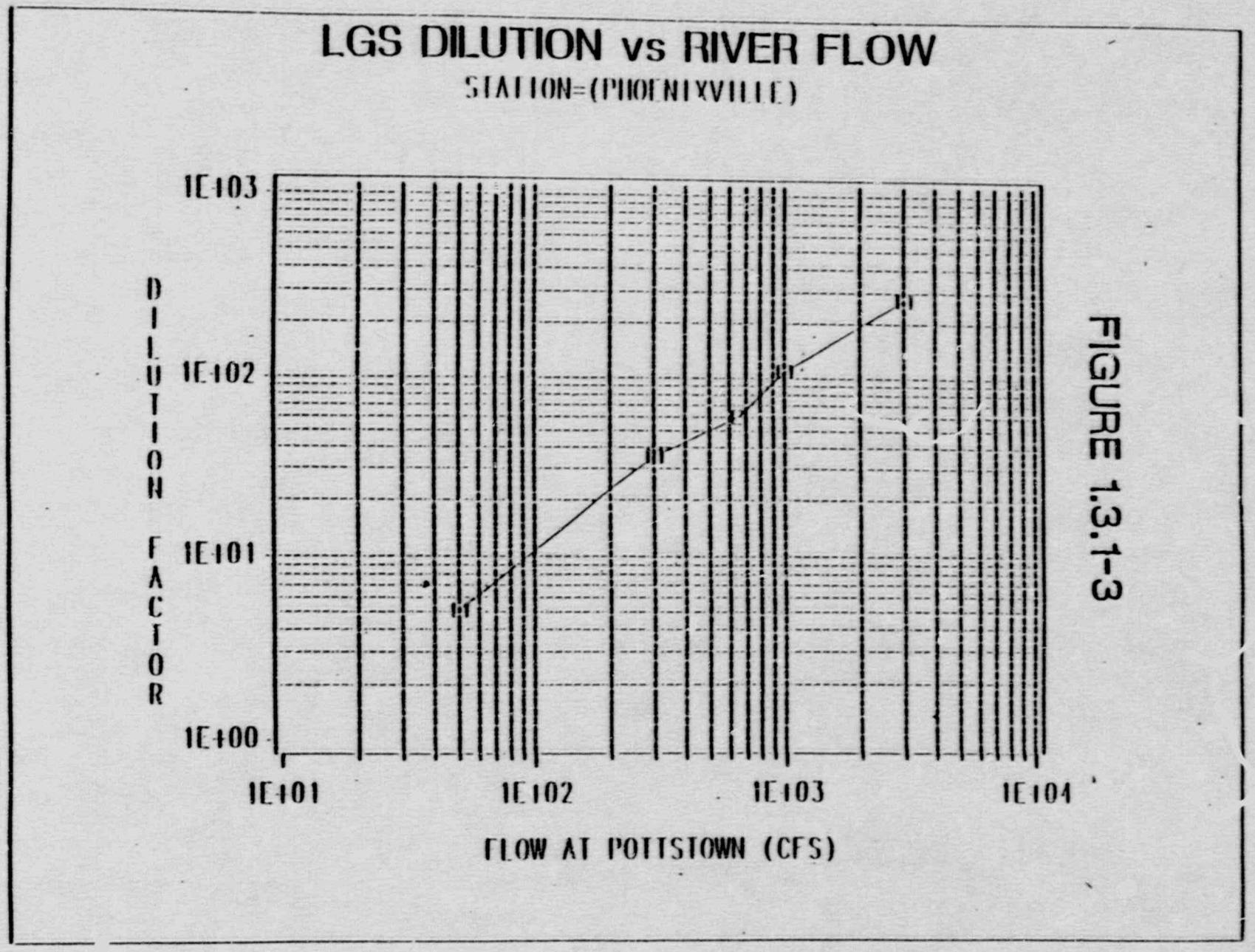
1E+02
1E+03
1E+04
FLOW AT POTTSTOWN (CFS)

FIGURE 1.3.1-2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STATION=(PHOENIXVILLE)
1E+03
1E+02
1E+01
1E+00
DILUTION FACTOR
1E+01
1E+02
1E+03
1E+04
FLOW AT POTTSTOWN (CFS)

FIGURE 1.3.1-3

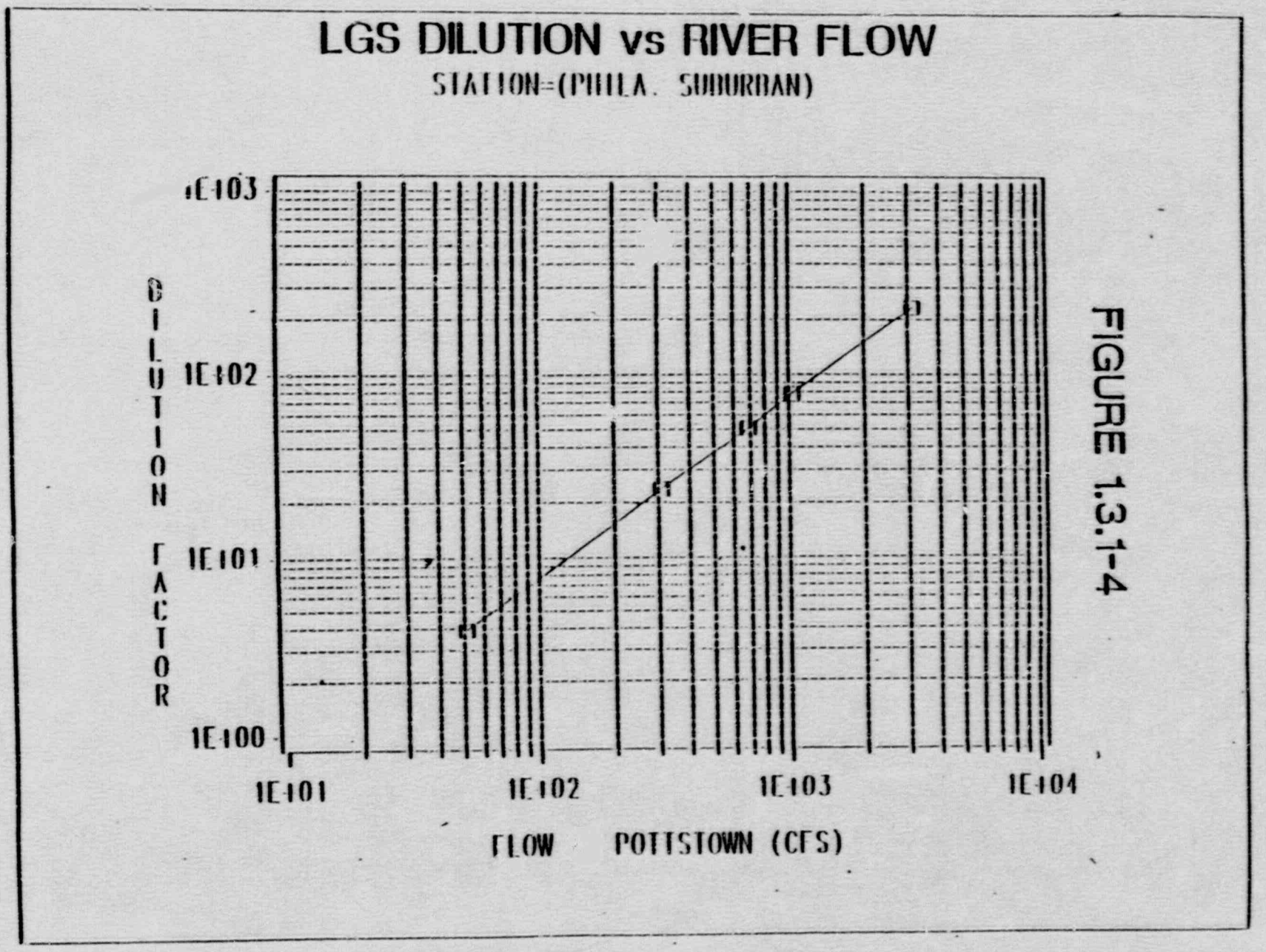

LGS DILUTION vs RIVER FLOW
STATION=(PHILA. SUBURBAN)
1E+03
1E+02
1E+01
1E+00
DILUTION FACTOR
1E+01
1E+02
1E+03
1E+04
FLOW POTTSTOWN (CFS)

FIGURE 1.3.1-4

LGS DILUTION vs RIVER FLOW

STATION=(CREW COURSE)

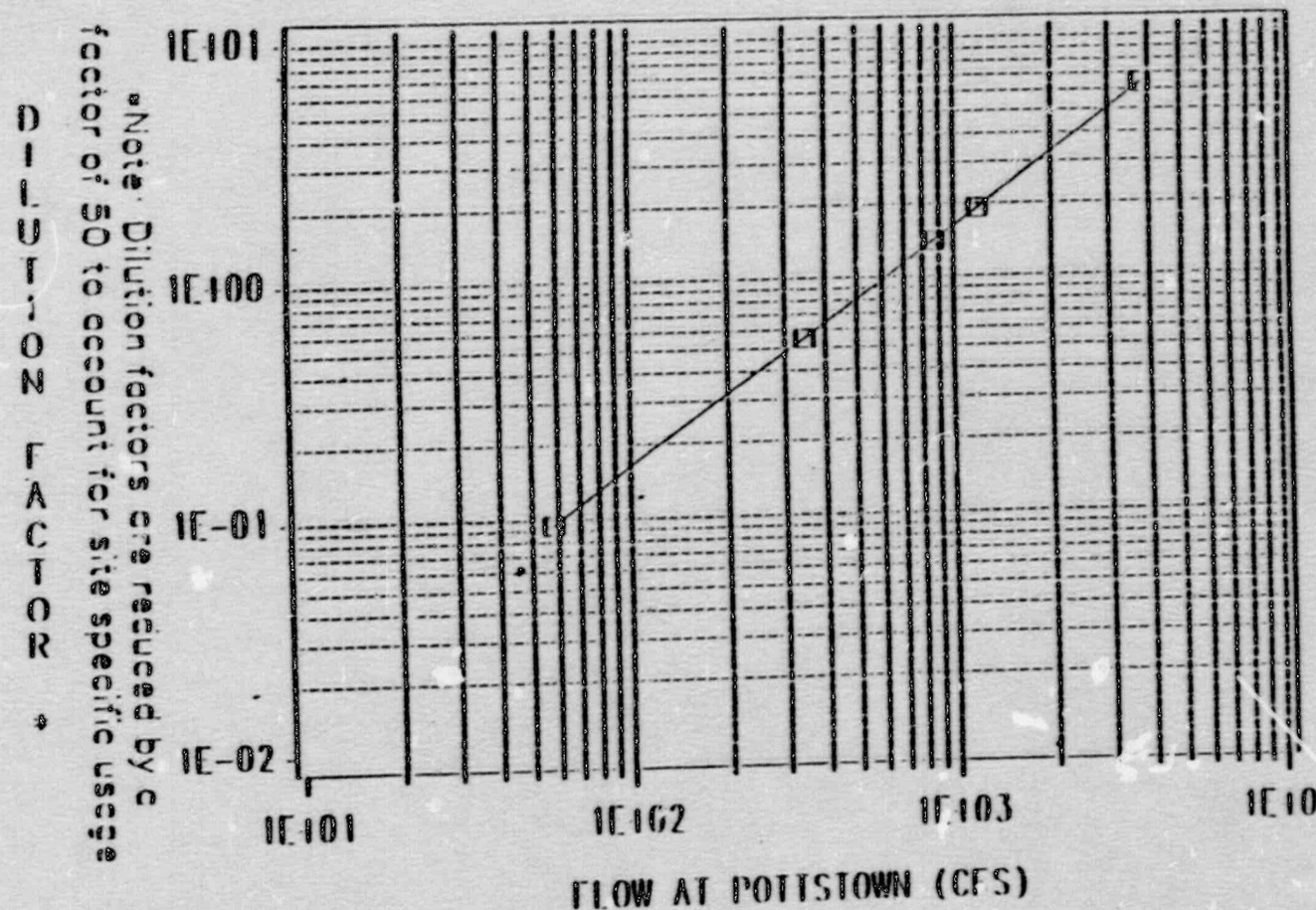
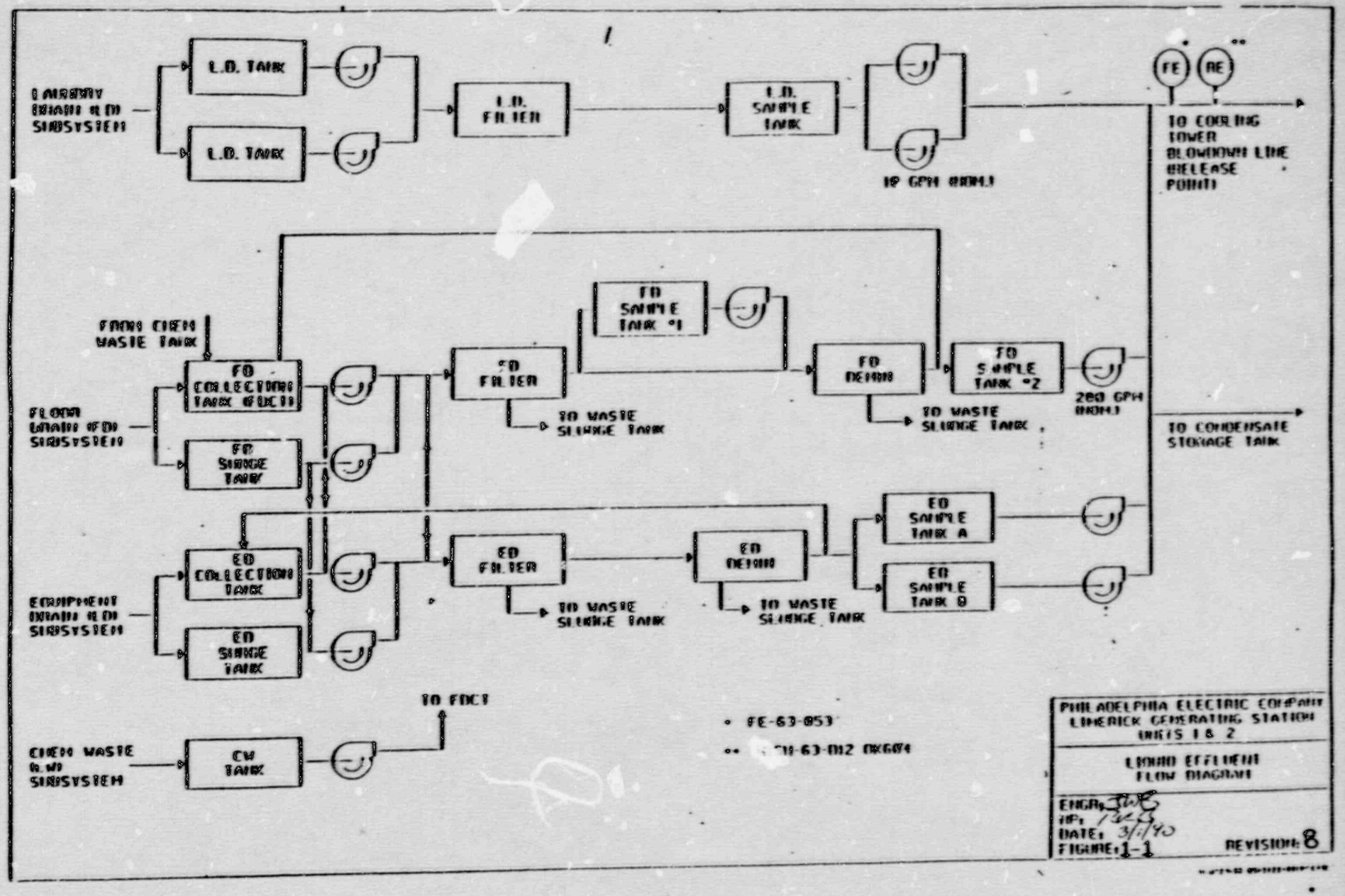
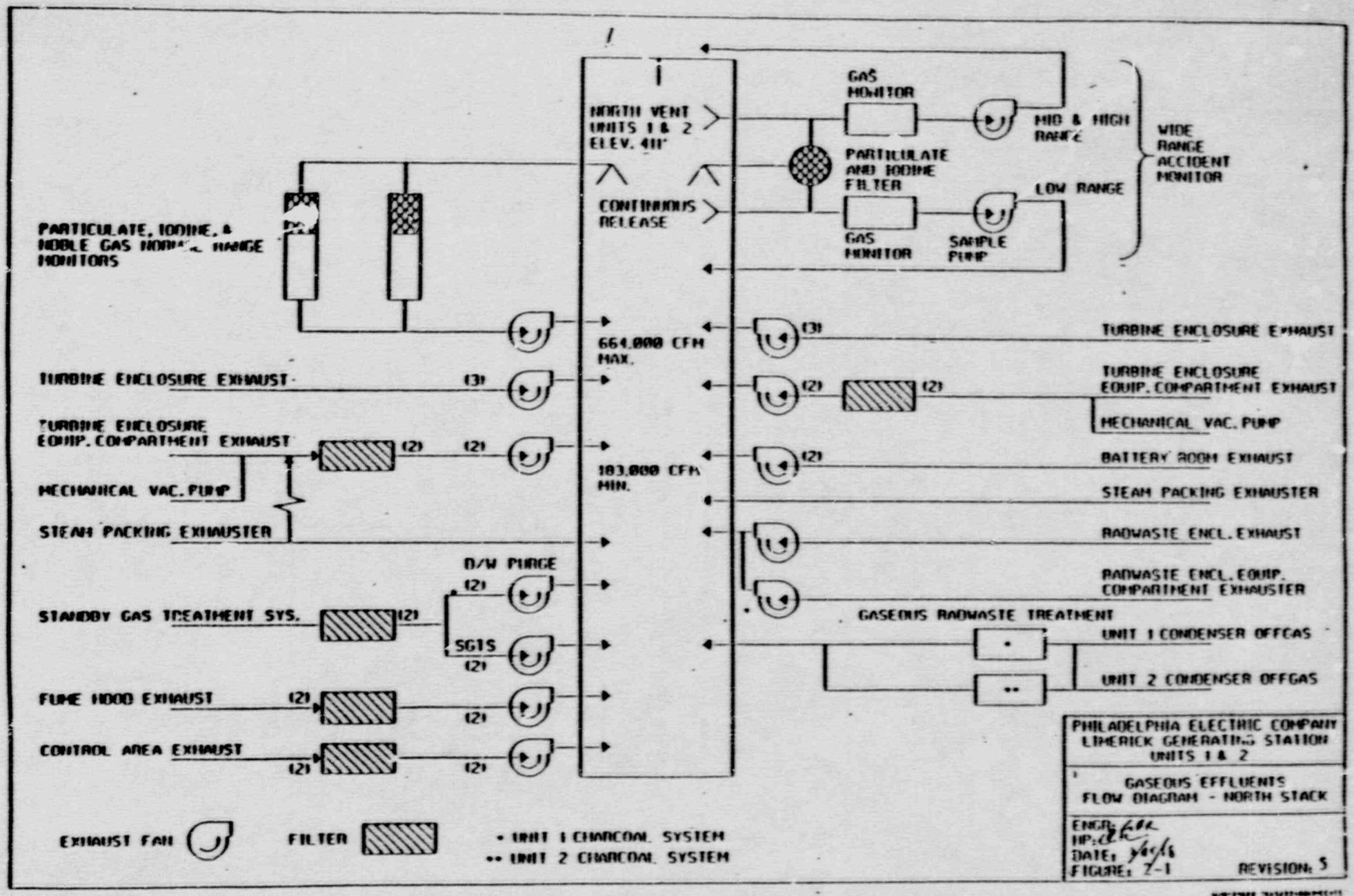
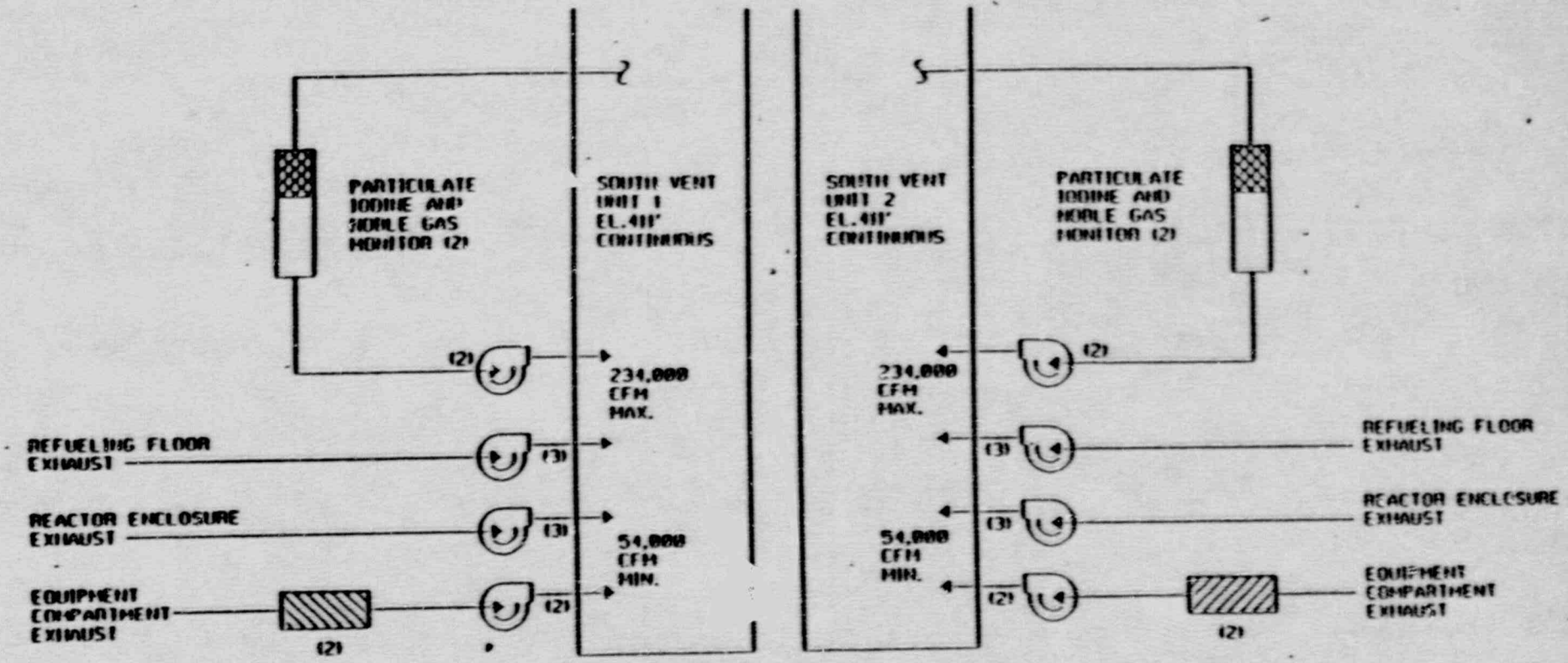


FIGURE 1.3.1-5


L.D. TANK
L.D. TANK
L.D. FILTER
L.D. SAMPLE TANK
10 GPM (MAX.)
FE
AE
TO COOLING TOWER BLOWDOWN LINE RELEASE POINT
FD SAMPLE TANK #1
FD FILTER
TO WASTE SLUDGE TANK
FD DEMIN
TO WASTE SLUDGE TANK
FD SAMPLE TANK #2
200 GPM (MAX.)
TO CONDENSATE STORAGE TANK
FD COLLECTION TANK (FDCT)
FD SLUDGE TANK
ED COLLECTION TANK
ED SLUDGE TANK
ED FILTER
TO WASTE SLUDGE TANK
ED DEMIN
TO WASTE SLUDGE TANK
ED SAMPLE TANK A
ED SAMPLE TANK B
CW TANK
TO FDCT
* FE-63-053
** 70-63-012 (MOD)
PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION
UNITS 1 & 2
LIQUID EFFLUENT
FLOW DIAGRAM
ENGR:
DATE: 3/1/90
FIGURE: 1-1
REVISION: 8


NORTH VENT
UNITS 1 & 2
ELEV. 411'
CONTINUOUS
RELEASE
GAS
MONITOR
MID & HIGH
RANGE
PARTICULATE
AND IODINE
FILTER
LOW RANGE
GAS
MONITOR
SAMPLE
PUMP
WIDE
RANGE
ACCIDENT
MONITOR
PARTICULATE, IODINE, &
NOBLE GAS NORMAL RANGE
MONITORS
664,000 CFM
MAX.
183,000 CFM
MIN.
TURBINE ENCLOSURE EXHAUST
(3)
TURBINE ENCLOSURE
EQUIP. COMPARTMENT EXHAUST
(2)
(2)
MECHANICAL VAC. PUMP
STEAM PACKING EXHAUSTER
D/W PURGE
(2)
STANDBY GAS TREATMENT SYS.
(2)
SGTS
(2)
FUME HOOD EXHAUST
(2)
(2)
CONTROL AREA EXHAUST
(2)
(2)
(3)
TURBINE ENCLOSURE EXHAUST
(2)
(2)
TURBINE ENCLOSURE
EQUIP. COMPARTMENT EXHAUST
MECHANICAL VAC. PUMP
(2)
BATTERY ROOM EXHAUST
STEAM PACKING EXHAUSTER
RADWASTE ENCL. EXHAUST
RADWASTE ENCL. EQUIP.
COMPARTMENT EXHAUSTER
GASEOUS RADWASTE TREATMENT
UNIT 1 CONDENSER OFFGAS
UNIT 2 CONDENSER OFFGAS
EXHAUST FAN
FILTER
• UNIT 1 CHARCOAL SYSTEM
•• UNIT 2 CHARCOAL SYSTEM
PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION
UNITS 1 & 2
GASEOUS EFFLUENTS
FLOW DIAGRAM - NORTH STACK
ENGR:
HP:
DATE:
FIGURE: 7-1
REVISION: 5

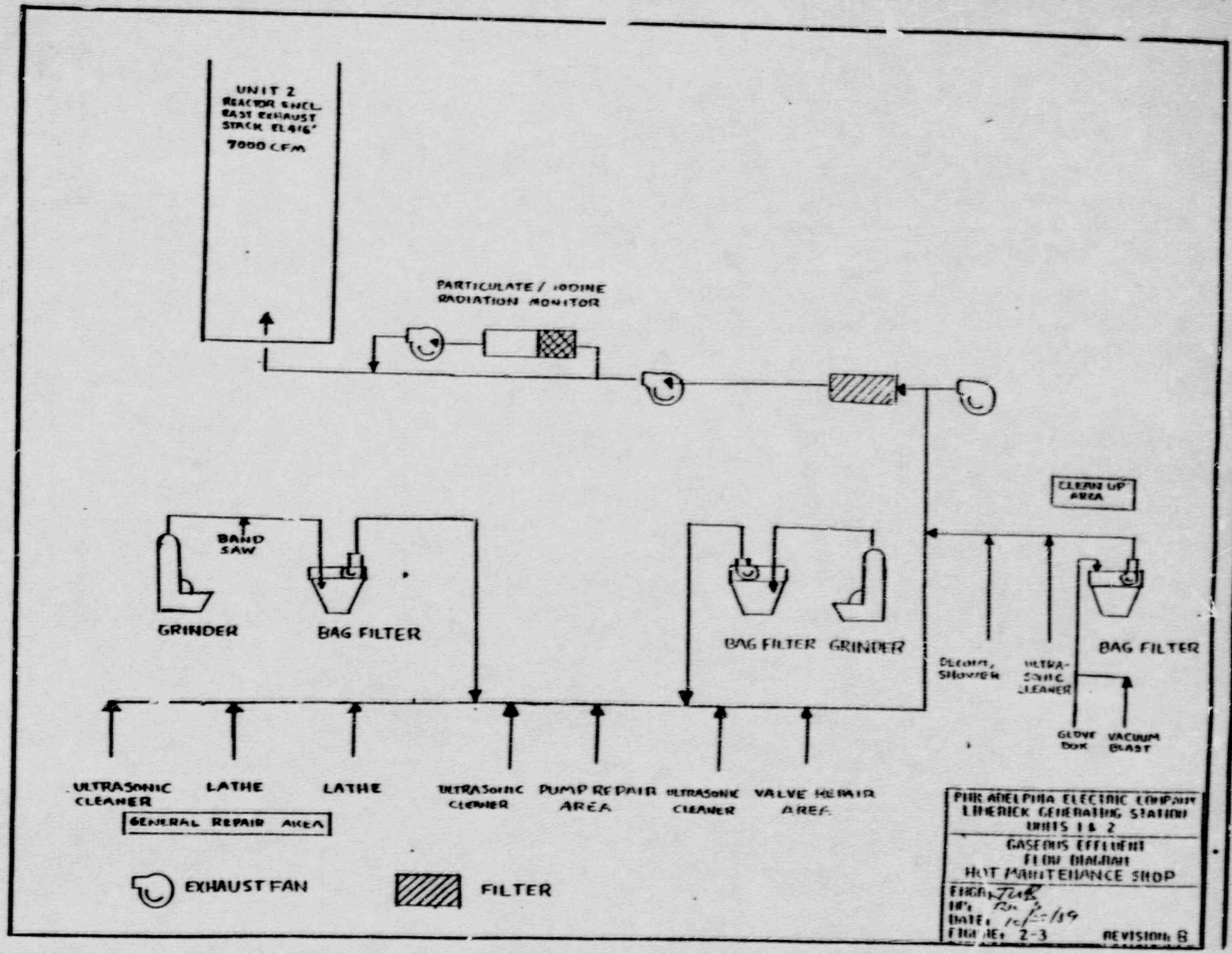


PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION
UNITS 1 & 2

GASEOUS EFFLUENT
FLOW DIAGRAM
SOUTH STACK

ENGR:
HP:
DATE:
FIGURE:

REVISION: 5


UNIT 2
REACTOR ENCL
EAST EXHAUST
STACK EL 416'
7000 CFM
PARTICULATE / IODINE
RADIATION MONITOR
CLEAN UP
AREA
BAND
SAW
GRINDER
BAG FILTER
BAG FILTER
GRINDER
DECON.
SHOWER
ULTRA-
SONIC
CLEANER
BAG FILTER
GLOVE
BOX
VACUUM
BLAST
ULTRASONIC
CLEANER
LATHE
LATHE
ULTRASONIC
CLEANER
PUMP REPAIR
AREA
ULTRASONIC
CLEANER
VALVE REPAIR
AREA
GENERAL REPAIR AREA
EXHAUST FAN
FILTER
PHILADELPHIA ELECTRIC COMPANY
LIMERICK GENERATING STATION
UNITS 1 & 2
GASEOUS EFFLUENT
FLOW DIAGRAM
HOT MAINTENANCE SHOP
FIGURE:
NO:
DATE:
FIGURE: 2-3
REVISION: 8

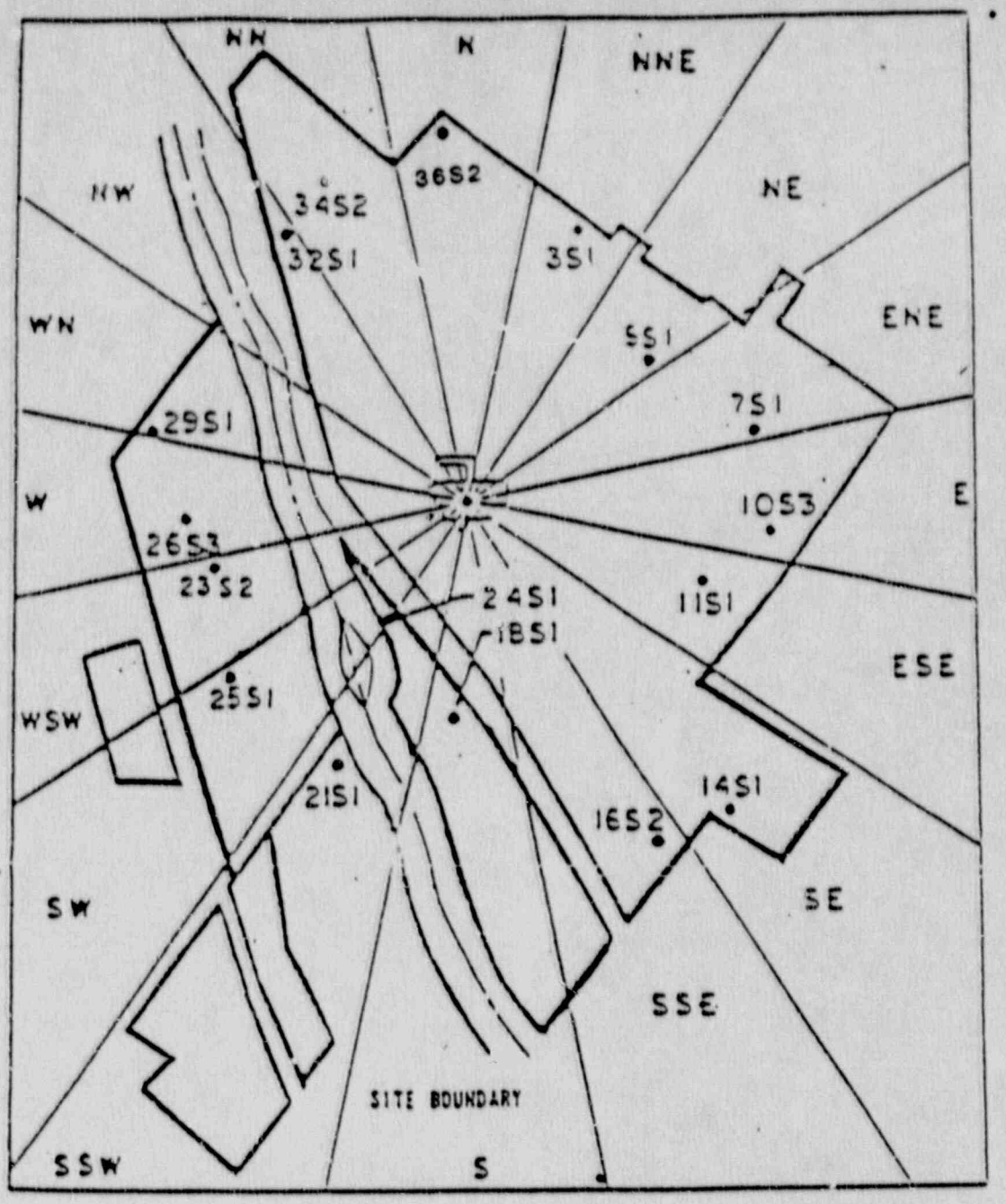


FIGURE B-1
ENVIRONMENTAL SAMPLING LOCATIONS
ON SITE OR NEAR THE
LIMERICK GENERATING STATION

ENGR	J.T.B
HP	LWS
DATE	10/29/87
REV	8

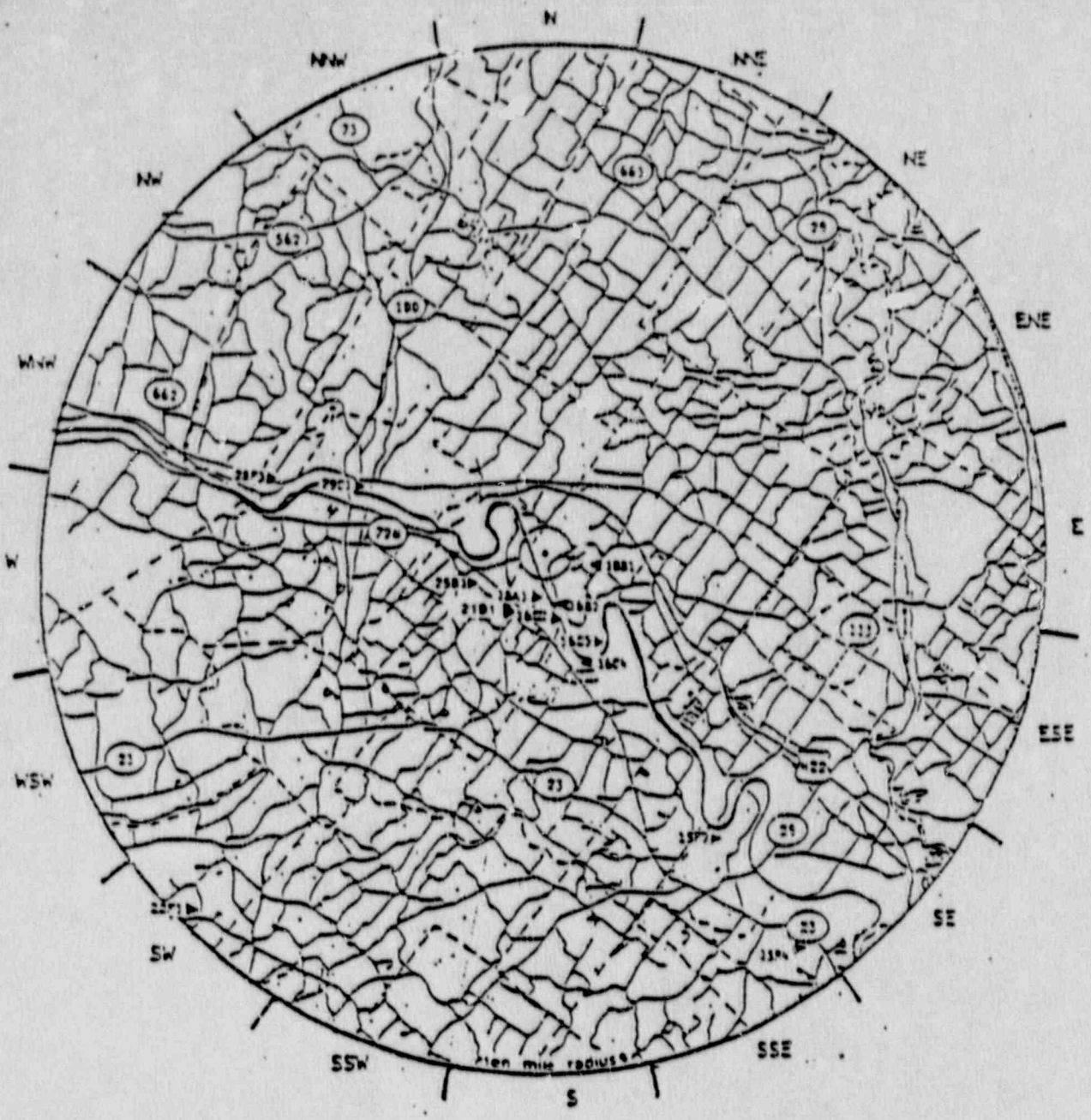


FIGURE B-2
AQUATIC AND TERRESTRIAL ENVIRONMENTAL
SAMPLING LOCATIONS AT INTERMEDIATE DISTANCES
FROM THE LIMERICK GENERATING STATION

ENGR	
HP	
DATE	
REV	

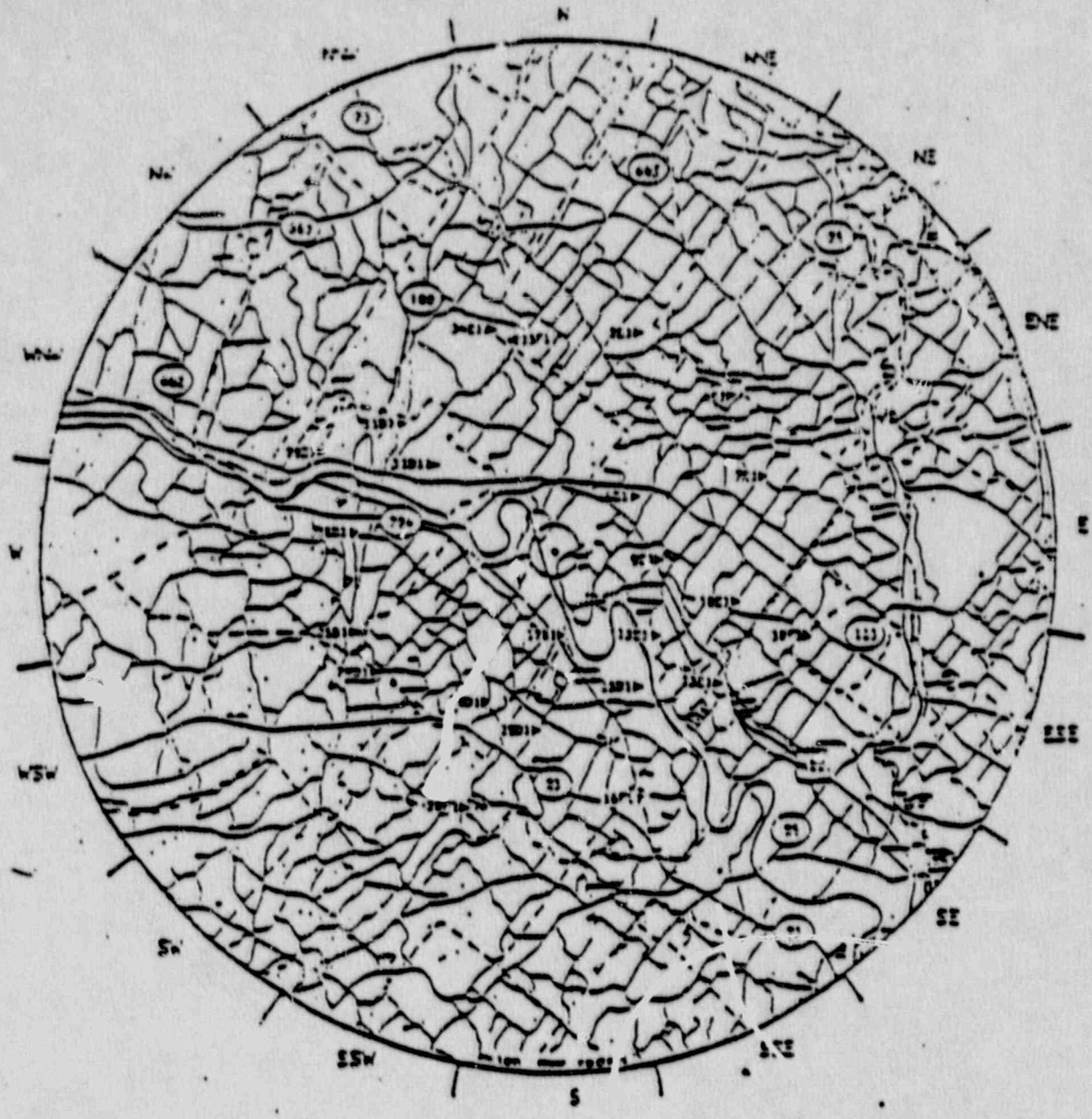


FIGURE B-3
AIRBORNE AND TLD ENVIRONMENTAL SAMPLING
LOCATIONS AT INTERMEDIATE DISTANCES FROM
THE LIMERICK GENERATING STATION

ENGR	GGC
HP	MJS
DATE	3/25/91
REV	1

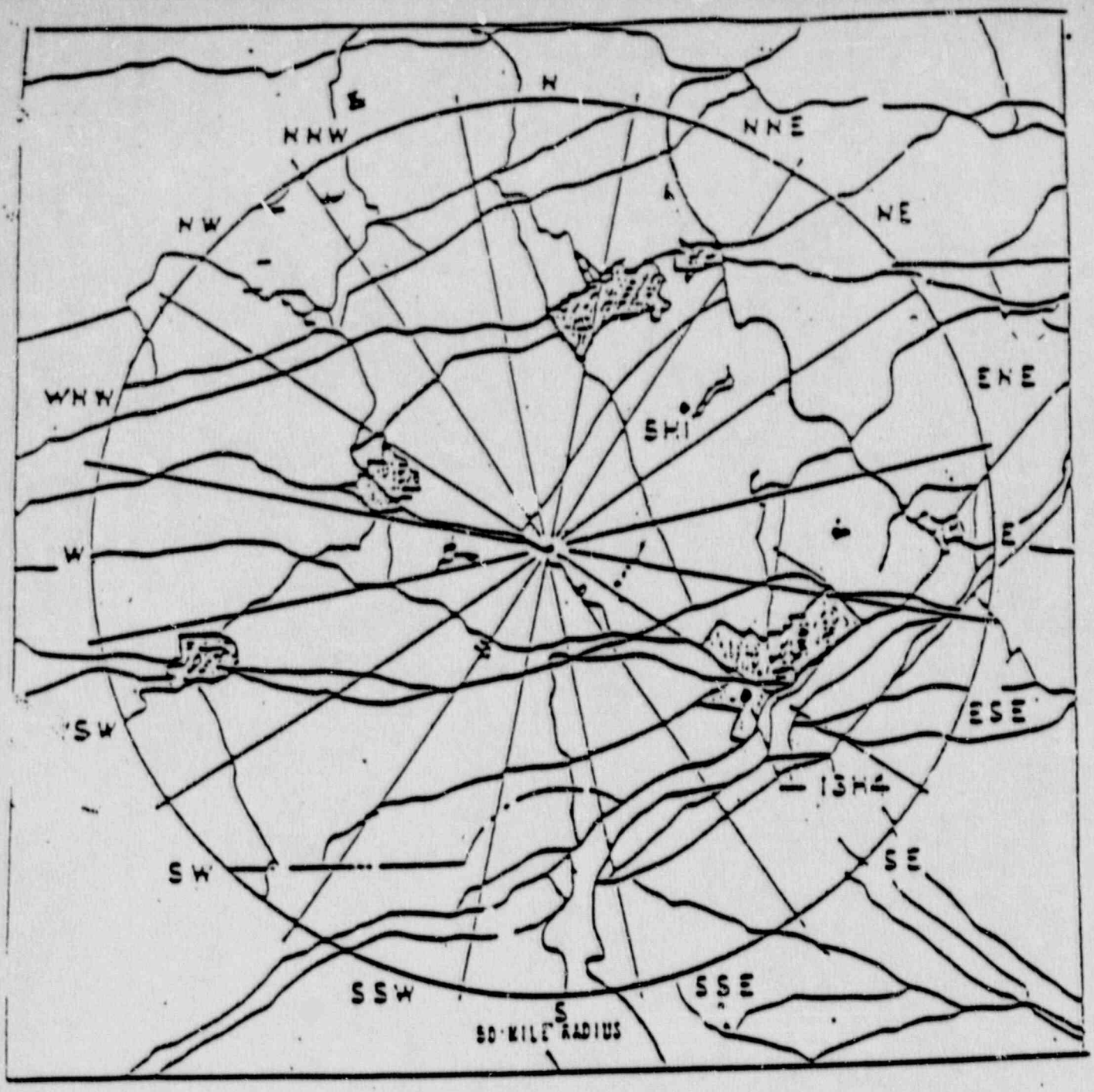


FIGURE B-4
ENVIRONMENTAL SAMPLING LOCATIONS
AT REMOTE DISTANCES FROM THE
LIMERICK GENERATING STATION

ENGR	
HP	
DATE	
REV	