

# **GRAND GULF NUCLEAR STATION**

## **OFFSITE DOSE CALCULATION MANUAL**

**DOCKET NO. 50-416**

### **INTRODUCTION**

The Offsite Dose Calculation Manual (ODCM) describes the methodology and parameters used in the calculation of offsite doses resulting from radioactive liquid and gaseous effluents, in the calculation of liquid and gaseous effluent monitoring Alarm/Trip Setpoints, and in the conduct of the Radiological Environmental Monitoring Program. The ODCM also contains (1) the Radioactive Effluent Controls and Radiological Environmental Monitoring Programs required by Technical Specification (TS) 5.5.4, and Technical Requirements Manual (TRM) 7.6.3.2, (2) descriptions of the information that is included in the Annual Radiological Environmental Operating and Annual Radioactive Effluent Release Reports required by TS 5.6.2 and 5.6.3, (3) a list and graphical description of the specific sample locations for the Radiological Environmental Monitoring Program, and (4) diagrams of the liquid and gaseous radwaste treatment systems.

The ODCM will be maintained at the station for use as a reference guide and training document of accepted methodologies and calculations. Changes in the calculational methods or parameters will be incorporated into the ODCM in order to assure that the ODCM represents the present methodology in all applicable areas. Computer software to perform the described calculations will be maintained current with the ODCM.

Changes to the ODCM shall be accomplished as specified in TS 5.5.1. Records of reviews performed for changes made to the ODCM shall be retained for the duration of the Unit Operating License.

**ODCM  
REVISION TABLE**

The following ODCM Revision Table represents changes to the ODCM listed in the order of the most recent change:

| Description of Change(s)  | Revision Number | Month/Year of Change | Affected Page Number(s)  |
|---|-----------------|----------------------|--|
| <ul style="list-style-type: none"> <li>Revise Table 6.3.10-1 Section 3B to include note h. Note h is to acknowledge ≤4 Turbine Building roof hatches may be open in Modes 4 and 5. LDCR 2012-017</li> </ul>   | 39              | 03/2012              | i, vii, viia, viib, 2.0-35, A-26, A-28, A-39, A-41   |
| <ul style="list-style-type: none"> <li>Revise 6.3.9 to add condition E. Condition E is to acknowledge that as long as flow is monitored and measured, there is no need to suspend dilution flow activities LBDCR 12-012</li> </ul>  | 38              | 03/2012              | i, ia, vii, viib, A-14   |
| <ul style="list-style-type: none"> <li>Revise Tables 2.2-3, 2.2-3a and 2.2-3b to replace X/Q and D/Q values with 2001-2005 annual averages, change to Reference 19, say 2008 Land Use Census utilized, and specify method of calculating parameters for unavailable location.</li> <li>Added second onsite vegetation sample location to Tables 2.2-3b and 3.0-2 and to Figure 3.0-1.</li> <li>Renumbered pages 2.0-24a and 2.0-25.</li> <li>Deleted Pages 3.0-6a, 6b, 6c, and 6d</li> <li>Deleted Section 2.4, "Definitions of Gaseous Effluents Parameters" since included throughout Section 2.0. Reference: LBDCR 2008-034</li> </ul> | 37              | 02/2009              | i, ii, iii, vii, viia, 2.0-23<br>2.0-23a<br>2.0-23b<br><br>2.0-25 thru 2.0-30<br><br>3.0-3a<br>3.0-7 |
| <ul style="list-style-type: none"> <li>Adds Table 2.2-1.b, "Pathway Dose Factors for LCO 6.11.4 and Section 2.2.1.b, (Pi)", for age group "Child".</li> <li>Changes note for Section 2.2.1.b to use Child Inhalation Pi values from Table 2.2-1b. Reference: LBDCR 2008-014</li> </ul>  | 36              | 11/2008              | i, ii, iia, v, vii<br>2.0-8<br>2.0-13<br>2.0-14  |

**ODCM**  
**REVISION TABLE**  
(cont.)

The following ODCM Revision Table represents changes to the ODCM listed in the order of the most recent change:

| Description of Change(s)  | Revision Number | Month/Year of Change | Affected Page Number(s)   |
|---|-----------------|----------------------|---|
| <ul style="list-style-type: none"> <li>Adds Reference 19 for 2001-2005 Meteorological Data review to the list of References.</li> <li>Updates Table 2.2-3 with most recent Land Use Census data.</li> <li>Changes referene from "garden" to "vegetation sample locations" on Table 2.2-3 and Table 2.2-3b.</li> <li>Minor editorial/format changes on Pages 2.0-23a, 2.0-36, 3.0-1 and 3.0-3.</li> <li>Changes Recreational Vehicle Laydown Area and Energy Services Center to areas with unrestricted areas within the site boundary on Table 2.2-3b.</li> <li>Updates Section 2.6.1, Table 3.0-3 and Figure 3.0-1 to show changes in TLD locations.</li> <li>Relocates one TLD due to safety / access concerns on Table 3.0-3.</li> <li>Removes administrative [non-REMP] sample location from Figure 3.0-2.</li> <li>Adds five supplemental TLD locations into the REMP to Table 6.12.1-1.</li> <li>Adds "commercially important" preference for fish sample to Table 6.12.1-1.</li> </ul> Reference: LBDCR 2007-035 | 35              | 9/2007               | i, ii, iia, vi, vii, viia, viib, 2.0-23, 2.0-23a, 2.0-23b, 2.0-36, 2.0-37, 3.0-1, 3.0-3, 3.0-4, 3.0-5, 3.0-7, 3.0-8, A-50, A-52, A-53 |
| <ul style="list-style-type: none"> <li>Deletes the requirement to functionally test the Radwaste Bldg., Containment, FHA and Turbine Bldg ventilation Flow Monitors every 92 days. Reference: LDC 2007-024</li> </ul>   | 34              | 8/2007               | i, vii, viib, A-24, A-25, A-26  |

ODCM  
REVISION TABLE  
(cont.)

The following ODCM Revision Table represents changes to the ODCM listed in the order of the most recent change:

| Description of Change(s)   | Revision Number | Month/Year of Change | Affected Page Number (s)  |
|--|-----------------|----------------------|---|
| <ul style="list-style-type: none"> <li>Add an occasional turbine building release point. Updated Figure 2.5-1 to note the release point and included the release point in Tables 6.3.10-1 and 6.11.4-1. Reference: LDC 2007-017</li> </ul>   | 33              | 3/2007               | i, ii, vii, viia, viib, 2.0-35, 2.0-35a, A-25, A-28, A-39                                 |
| <ul style="list-style-type: none"> <li>Changed wording in Section 1.2.1 so that the current dose calculation methodology may be used for storm drain release dose calculations. Reference: LDC 2005-074</li> <li>Added outfall 007 collection site to Table 3.0-2 and Figure 3.0-1. Reference: LDC 2005-074</li> <li>Adds Storm Drain sampling frequency to Table 6.12.1-1. Reference: LDC 2005-074</li> <li>Deletes Discharge Canal Flow as a required channel per Table 6.3.9-1 and allows use for flow estimation per Required Action 6.3.9 C.1. Reference: LDC 2004-095</li> </ul> | 32              | 12/2005              | i, ii, vi, vii, viia, viib, 1.0-7, 1.0-8, 3.0-3, 3.0-7, A-14, A-17, A-51                  |
| <ul style="list-style-type: none"> <li>Updates Introduction and Removes reference to UFSAR. Action to implement LDC 2005-022 - Removal of duplicate pages from Operating Licensing Manual</li> <li>Revises description of reverse osmosis equipment to allow operational flexibility. Removes Figure 1.3-2 - LDC 05047</li> </ul>  | 31              | 12/2005              | Cover page i, ii, v, vii, 1.0-15, 1.0-16, 1.0-17  |
| <ul style="list-style-type: none"> <li>Adds Distillate Sample Tank To Figure 1.3-1</li> </ul>  | 30              | 08/2005              | i, vii, 1.0-16  |
| <ul style="list-style-type: none"> <li>Updates and re-draws Figures 3.0-1 and 3.0-2. Figures were previously illegible.</li> </ul>   | 29              | 01/2005              | i, ii, v, vii, viia, 3.0-1, 3.0-3, 3.0-3a, 3.0-4, 3.0-7, 3.0-8                            |
| <ul style="list-style-type: none"> <li>Updates Figure 1.3-2 showing liquid radwaste treatment system to improve legibility and to show addition of reverse osmosis equipment. Reference: LDC2003-044.</li> <li>Adds reporting requirements for solid waste which is relocated from the PCP(Process Control Program) deletion in LDC2001-151 to Section 5.6.3 of the ODCM. This information was already being reported and this change is considered administrative in nature. Reference: LDC2001-051.</li> </ul>   | 28              | 10/2004              | Cover Page, i, ii, iia (deleted), iiii (deleted), iiib (deleted), iiic (deleted) iii, iv, |

ODCM  
REVISION TABLE  
(cont.)

The following ODCM Revision Table represents changes to the ODCM listed in the order of the most recent change:

| Description of Change(s)  | Revision Number | Month/Year of Change | Affected Page Number(s)                     |
|---|-----------------|----------------------|---|
| <ul style="list-style-type: none"> <li>Section 5.6.3.b is revised to change the use of "PSRC" to "OSRC." PSRC is no longer used. Reference: LDC2001-051.</li> <li>The signature sign-off page in the front of the ODCM is being deleted. This page is no longer needed since review and approvals will be documented in the LI-113 procedure form. Reference: LDC2004-077.</li> </ul>   | 28              | 10/2004              | v, vi, vii, viia, viic, 1.0-17, A-11, A-11a |
| <ul style="list-style-type: none"> <li>A Revision Table is being added to allow a convenient place for readers and the NRC to determine a chronological listing of all of the changes including pages number and a description of the changes. This will allow easy tracking of ODCM changes to ensure all changes that occur in a year are properly reported to the NRC. This is considered an enhancement over existing practice which is to only show the latest revision information. Reference: LDC2004-077.</li> <li>The Table of Contents was reformatted to be consistent with the Operating License Manual(OLM) and Updated Final Safety Analysis Report(UFSAR). Reference: LDC2004-077.</li> <li>Other editorial changes are being made such as page consolidations and reformatting to align the look of the ODCM with other License Basis Documents (LBD) such as the OLM and UFSAR. Reference: LDC2004-077.</li> </ul> | 28              | 10/2004              |   |
| <ul style="list-style-type: none"> <li>Removes shutdown statement if offgas pre-treatment radiation monitor is inoperable from LCO 6.3.10 and adds new actions to take to ensure appropriate monitoring.</li> <li>Adds a new LCO Section 6.0.1 which specifies actions to be taken in the event LCO associated actions are not met. This change was needed based on removal of the shutdown statement from 6.3.10 and to ensure the ODCM is consistent with LCO 6.0.1 currently contained in UFSAR Appendix 16A-0 and 16B-0 and the TRM. Reference: LDC2004-025.</li> </ul>   | 27              | 05/2004              | i, ii, vii, viib, A-12a, A-20, A-21         |
| <ul style="list-style-type: none"> <li>Added methodology to calculate a liquid monitor setpoint for waste tanks with very low gamma activity. Reference: LDC2004-011</li> </ul>   | 26              | 02/2004              | i, ii, vi, vii, 1.0-5, 1.0-5a               |

ODCM  
TABLE OF CONTENTS

| <u>Section</u>    | <u>Title</u>   | <u>Page</u> |
|-------------------|--|-------------|
|                   | INTRODUCTION   |             |
|                   | TABLE OF CONTENTS  |             |
|                   | LIST OF FIGURES  |             |
|                   | LIST OF TABLES   |             |
|                   | LIST OF REFERENCES   |             |
|                   | LIST OF EFFECTIVE PAGES  |             |
| <b>1.0</b>        | <b>LIQUID EFFLUENTS</b>  |             |
| <b>1.1</b>        | <b>LIQUID EFFLUENT MONITOR SETPOINTS</b>   |             |
| 1.1.1             | Liquid Radwaste Effluent Line Monitors   | 1.0-1       |
| <b>1.2</b>        | <b>DOSE CALCULATIONS FOR LIQUID EFFLUENTS</b>  |             |
| 1.2.1             | Maximum Exposed Individual Model   | 1.0-7       |
| 1.2.2             | Dose Projection  | 1.0-8       |
| <b>1.3</b>        | <b>LIQUID RADWASTE TREATMENT SYSTEM</b>  | 1.0-15      |
| <b>2.0</b>        | <b>GASEOUS EFFLUENTS</b>   |             |
| <b>2.1</b>        | <b>GASEOUS EFFLUENT MONITOR SETPOINTS</b>  |             |
| 2.1.1             | Continuous Ventilation Monitors  | 2.0-1       |
| 2.1.2             | Text Deleted   | 2.0-3       |
| <b>2.2</b>        | <b>GASEOUS EFFLUENT DOSE CALCULATIONS</b>  |             |
| 2.2.1             | Unrestricted Area Boundary Dose Rate   | 2.0-7       |
| 2.2.2             | Unrestricted Area Dose to Individual   | 2.0-9       |
| 2.2.3             | Dose Projection  | 2.0-10b     |
| <b>2.3</b>        | <b>METEOROLOGICAL MODEL</b>  |             |
| 2.3.1             | Atmospheric Dispersion (Annual Average)  | 2.0-24      |
| 2.3.2             | Atmospheric Dispersion (Hourly Average)  | 2.0-25      |
| 2.3.3             | Deposition (Hourly Average)  | 2.0-26      |
| <b>2.4</b>        | <b>DELETED</b>   | 2.0-27      |
| <b>2.5</b>        | <b>GASEOUS RADWASTE TREATMENT SYSTEM</b>   | 2.0-35      |
| <b>2.6</b>        | <b>ANNUAL DOSE COMMITMENT</b>  | 2.0-36      |
| 2.6.1             | Direct Radiation Dose Measurement  | 2.0-36      |
| <b>3.0</b>        | <b>RADIOLOGICAL ENVIRONMENTAL MONITORING</b>   |             |
| <b>3.1</b>        | <b>SAMPLING LOCATIONS</b>  | 3.0-1       |
| <b>APPENDIX A</b> | <b>RADIOLOGICAL EFFLUENT CONTROLS AND RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAMS</b> | A-0         |
| <b>1.0</b>        | <b>DEFINITIONS</b>   | A-2         |
| <b>Table 1.1</b>  | <b>SURVEILLANCE FREQUENCY NOTATION (DELETED)</b>   | A-4         |
| <b>Table 1.2</b>  | <b>MODES OF OPERATION (DELETED)</b>  | A-5         |
| <b>3.0</b>        | <b>APPLICABILITY (DELETED)</b>   | A-6         |

**ODCM**  
**TABLE OF CONTENTS**

| <b><u>Section</u></b> | <b><u>Title</u></b>  | <b><u>Page</u></b> |
|-----------------------|--|--------------------|
| <b>5.0</b>            | <b>ADMINISTRATIVE CONTROLS</b>   | A-8                |
| 5.6.2                 | Annual Radiological Environmental Operating Report   | A-9                |
| 5.6.3                 | Annual Radioactive Effluent Release Report   | A-10               |
| <b>6.0</b>            | <b>LIMITING CONDITIONS FOR OPERATION AND SURVEILLANCE REQUIREMENTS</b>                         | A-12               |
| <b>6.3</b>            | <b>INSTRUMENTATION</b>   |                    |
| 6.3.9                 | Radioactive Liquid Effluent Monitoring Instrumentation   | A-13               |
| 6.3.10                | Radioactive Gaseous Effluent Monitoring Instrumentation  | A-18               |
| <b>6.11</b>           | <b>RADIOACTIVE EFFLUENTS</b>   |                    |
| 6.11.1                | Liquid Effluents Concentration   | A-29               |
| 6.11.2                | Liquid Effluent Dose   | A-34               |
| 6.11.3                | Liquid Effluent Waste Treatment  | A-36               |
| 6.11.4                | Gaseous Effluents Dose Rate  | A-37               |
| 6.11.5                | Gaseous Effluent Dose - Noble Gases  | A-42               |
| 6.11.6                | Gaseous Effluent Dose - Iodine-131, Iodine-133, Tritium, and Radionuclides in Particulate Form | A-44               |
| 6.11.7                | Gaseous Radwaste Treatment   | A-46               |
| 6.11.8                | Ventilation Exhaust Treatment System   | A-47               |
| <b>6.12</b>           | <b>RADIOLOGICAL ENVIRONMENTAL MONITORING</b>   |                    |
| 6.12.1                | Monitoring Program   | A-48               |
| 6.12.2                | Land Use Census  | A-59               |
| <b>BASES</b>          |  |                    |
| <b>6.3</b>            | <b>INSTRUMENTATION</b>   | A-62               |
| 6.3.9                 | Radioactive Liquid Effluent Monitoring Instrumentation   | A-62               |
| 6.3.10                | Radioactive Gaseous Effluent Monitoring Instrumentation  | A-62               |
| <b>6.11</b>           | <b>RADIOACTIVE EFFLUENTS</b>   |                    |
|                       | <b>LIQUID EFFLUENTS</b>  |                    |
| 6.11.1                | Concentration  | A-63               |
| 6.11.2                | Dose   | A-63               |
| 6.11.3                | Liquid Waste Treatment   | A-66               |
|                       | <b>GASEOUS EFFLUENTS</b>   |                    |
| 6.11.4                | Dose Rate  | A-66               |
| 6.11.5                | Dose - Noble Gases   | A-67               |
| 6.11.6                | Dose - Iodine-131, Iodine-133, Tritium and Radionuclides in Particulate Form                   | A-69               |
| 6.11.7/6.11.8         | Gaseous Radwaste Treatment and Ventilation Exhaust Treatment                                   | A-71               |
| <b>6.12</b>           | <b>RADIOLOGICAL ENVIRONMENTAL MONITORING</b>   |                    |
| 6.12.1                | Monitoring Program   | A-72               |
| 6.12.2                | Land Use Census  | A-73               |

ODCM  
LIST OF FIGURES

| <u>Figure</u> | <u>Title</u>  | <u>Page</u> |
|---------------|---|-------------|
| 1.0-1         | Example Calibration Curve for Liquid Effluent Monitor           | 1.0-6       |
| 1.3-1         | Liquid Radwaste Treatment System                                | 1.0-16      |
| 2.3-1         | Plume Depletion Effect for Ground-Level Releases                | 2.0-31      |
| 2.3-2         | Vertical Standard Deviation of Material in a Plume              | 2.0-32      |
| 2.3-3         | Relative Deposition for Ground-Level Releases                   | 2.0-33      |
| 2.3-4         | Deleted   | 2.0-34      |
| 2.5-1         | Gaseous Radwaste Treatment System                               | 2.0-35a     |
| 3.0-1         | Collection Site Locations, 0-4 Mile Area Map                    | 3.0-7       |
| 3.0-2         | Collection Site Locations, General Area Map, 4-10 Mile Area Map | 3.0-8       |

LIST OF TABLES

| <u>Table</u> | <u>Title</u>  | <u>Page</u> |
|--------------|---|-------------|
| 1.2-1        | Bioaccumulation Factors   | 1.0-9       |
| 1.2-2        | Ingestion Dose Conversion Factors For Adults  | 1.0-10      |
| 1.2-3        | Site Related Ingestion Dose Commitment Factor   | 1.0-13      |
| 2.1-1        | Dose Factors for Exposure to a Semi-infinite Cloud of Noble Gases   | 2.0-6       |
| 2.2-1a       | Pathway Dose Factors for LCO 6.11.4 and Section 2.2.1.b   | 2.0-11      |
| 2.2-1b       | Pathway Dose Factors for LCO 6.11.4 and Section 2.2.1.b   | 2.0-13      |
| 2.2-2a       | Pathway Dose Factors for LCO 6.11.6 and Section 2.2.2.b   | 2.0-15      |
| 2.2-2b       | Pathway Dose Factors for LCO 6.11.6 and Section 2.2.2.b.  | 2.0-17      |
| 2.2-2c       | Pathway Dose Factors for LCO 6.11.6 and Section 2.2.2.b   | 2.0-19      |
| 2.2-2d       | Pathway Dose Factors for LCO 6.11.6 and Section 2.2.2.b   | 2.0-21      |
| 2.2-3        | Controlling Receptors, Locations and Atmospheric Dispersion Parameters for LCOs 6.11.5, 6.11.6 and 6.11.8 | 2.0-23      |
| 2.2-3a       | Site Boundary Atmospheric Dispersion Parameters for LCO 6.11.4  | 2.0-23a     |
| 2.2-3b       | Additional Receptor Locations within the Site Boundary for LCO 6.11.4                                     | 2.0-23b     |
| 2.3-1        | Deleted   | 2.0-26      |
| 3.0-1        | Air Sampler Collection Sites  | 3.0-2       |
| 3.0-2        | Miscellaneous Collection Sites  | 3.0-3       |
| 3.0-3        | TLD Locations   | 3.0-4       |



ODCM  
LIST OF REFERENCES

|     |  |
|-----|--|
| 1.  | Boegli, T. S., R. R. Bellamy, W. L. Britz, and R. L. Waterfield, "Preparation of Radiological Effluent Technical Specifications for Nuclear Power Plants," NUREG-0133 (October 1978).                    |
| 2.  | Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I, U.S. NRC Regulatory Guide 1.109 (March 1976).           |
| 3.  | Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I, U.S. NRC Regulatory Guide 1.109, Rev. 1 (October 1977). |
| 4.  | "Environmental Report," Mississippi Power and Light Company, Grand Gulf Nuclear Station, Units 1 and 2.  |
| 5.  | "Final Safety Analysis Report," Mississippi Power and Light Company, Grand Gulf Nuclear Station.   |
| 6.  | Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light - Water - Cooled Reactors, U.S. NRC Regulatory Guide 1.111 (March 1976).                 |
| 7.  | Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light - Water - Cooled Reactors, U.S. NRC Regulatory Guide 1.111, Rev. 1 (July 1977).          |
| 8.  | Age-Specific Radiation Dose Commitment Factors for a One-Year Chronic Intake, NUREG-0172, November 1977.   |
| 9.  | EER 93-6246 "X/Q and D/Q Atmospheric Dispersion and Deposition Factors".   |
| 10. | NPE Calculation #XC-Q1111-94002, Revision 2.   |
| 11. | GIN 97/01515 "Determination of Composite Dose Factor based on GGNS Historical Gaseous Releases".   |
| 12. | GIN 99/00152 "Liquid Monitor Trip Setpoint for Tanks with no Gamma Emitters"   |
| 13. | NUREG/CR-2919, "XOQDOQ: Computer Program for the meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations".  |
| 14. | NPE Calculation #XC-Q1111-01008, Revision 0  |
| 15. | GIN-2002/00314 "Evaluation of Updated Dispersion and Deposition Factors".  |
| 16. | GIN-2002/00718 "Historical ODCM Meteorological Model and Recirculation Factor Calculation Analysis".   |
| 17. | GIN-2001/01196 "Liquid Process and Liquid Effluent Radiation Monitor Calibration Basis".   |
| 18. | GIN-2005/00562 "Radiological Assessment of Storm Drain Tritium discharges at the Grand Gulf Nuclear Station.   |
| 19. | GIN-2007/00076 "Review of 2001-2005 Annual Average Relative Concentration and Relative Deposition".  |

ODCM

LIST OF EFFECTIVE PAGES

| <u>Page No.</u> | <u>Rev No.</u> |
|-----------------|----------------|
| Cover Page      | 31             |
| i               | 39             |
| ia              | 38             |
| ii              | 37             |
| iaa             | 36             |
| iii             | 37             |
| iv              | 28             |
| v               | 36             |
| vi              | 35             |
| vii             | 37             |
| viia            | 37             |
| viib            | 35             |
|                 |                |
| 1.0-1           | 17             |
| 1.0-2           | 17             |
| 1.0-3           | 17             |
| 1.0-4           | 15             |
| 1.0-5           | 26             |
| 1.0-5a          | 26             |
| 1.0-6           | 21             |
| 1.0-7           | 32             |
| 1.0-8           | 32             |
| 1.0-9           | 11             |
| 1.0-10          | 0              |
| 1.0-11          | 11             |
| 1.0-12          | 0              |
| 1.0-13          | 22             |
| 1.0-14          | 22             |
| 1.0-15          | 31             |
| 1.0-16          | 31             |
|                 |                |
| 2.0-1           | 17             |
| 2.0-2           | 25             |
| 2.0-3           | 2              |
| 2.0-4           | 23             |
| 2.0-5           | 24             |
| 2.0-6           | 22             |
| 2.0-7           | 17             |
| 2.0-8           | 36             |
| 2.0-9           | 25             |
| 2.0-10          | 25             |
| 2.0-10a         | 25             |
| 2.0-10b         | 17             |
| 2.0-11          | 22             |
| 2.0-12          | 22             |
| 2.0-13          | 36             |
| 2.0-14          | 36             |

| <u>Page No.</u> | <u>Rev No.</u> |
|-----------------|----------------|
| 2.0-15          | 25             |
| 2.0-16          | 25             |
| 2.0-16a         | 25             |
| 2.0-16b         | 25             |
| 2.0-16c         | 25             |
| 2.0-16d         | 25             |
| 2.0-16e         | 25             |
| 2.0-16f         | 25             |
| 2.0-17          | 25             |
| 2.0-18          | 25             |
| 2.0-18a         | 25             |
| 2.0-18b         | 25             |
| 2.0-18c         | 25             |
| 2.0-18d         | 25             |
| 2.0-18e         | 25             |
| 2.0-18f         | 25             |
| 2.0-18g         | 25             |
| 2.0-18h         | 25             |
| 2.0-19          | 25             |
| 2.0-20          | 25             |
| 2.0-20a         | 25             |
| 2.0-20b         | 25             |
| 2.0-20c         | 25             |
| 2.0-20d         | 25             |
| 2.0-20e         | 25             |
| 2.0-20f         | 25             |
| 2.0-20g         | 25             |
| 2.0-20h         | 25             |
| 2.0-21          | 25             |
| 2.0-22          | 25             |
| 2.0-22a         | 25             |
| 2.0-22b         | 25             |
| 2.0-22c         | 25             |
| 2.0-22d         | 25             |
| 2.0-22e         | 25             |
| 2.0-22f         | 25             |
| 2.0-22g         | 25             |
| 2.0-22h         | 25             |
| 2.0-23          | 37             |
| 2.0-23a         | 37             |
| 2.0-23b         | 37             |
| 2.0-24          | 25             |
| 2.0-25          | 37             |
| 2.0-26          | 37             |
| 2.0-27          | 37             |
| 2.0-28          | 37             |
| 2.0-29          | 37             |

ODCM  
LIST OF EFFECTIVE PAGES

Page No.                      Rev No.                      Page No.                      Rev No.

|         |    |
|---------|----|
| 2.0-30  | 37 |
| 2.0-31  | 15 |
| 2.0-32  | 25 |
| 2.0-33  | 15 |
| 2.0-34  | 25 |
| 2.0-35  | 39 |
| 2.0-35a | 33 |
| 2.0-36  | 35 |
| 2.0-37  | 35 |
|         |    |
| 3.0-1   | 35 |
| 3.0-2   | 20 |
| 3.0-3   | 35 |
| 3.0-3a  | 37 |
| 3.0-4   | 35 |
| 3.0-5   | 35 |
| 3.0-6   | 20 |
| 3.0-7   | 37 |
| 3.0-8   | 35 |

**ODCM**  
**LIST OF EFFECTIVE PAGES**

**Page No.**

**Rev No.**

| <b><u>APPENDIX A</u></b> |    |
|--------------------------|----|
| A-0                      | 17 |
| A-1                      | 17 |
| A-2                      | 17 |
| A-3                      | 17 |
| A-4                      | 17 |
| A-5                      | 17 |
| A-6                      | 17 |
| A-7                      | 17 |
| A-8                      | 17 |
| A-9                      | 22 |
| A-10                     | 17 |
| A-11                     | 28 |
| A-11a                    | 28 |
| A-12                     | 17 |
| A-12a                    | 27 |
| A-13                     | 18 |
| A-14                     | 38 |
| A-15                     | 17 |
| A-16                     | 17 |
| A-17                     | 32 |
| A-18                     | 17 |
| A-19                     | 23 |
| A-20                     | 27 |
| A-21                     | 27 |
| A-22                     | 17 |
| A-23                     | 17 |
| A-24                     | 34 |
| A-25                     | 34 |
| A-26                     | 39 |
| A-27                     | 33 |
| A-28                     | 39 |
| A-29                     | 17 |
| A-30                     | 17 |
| A-31                     | 17 |
| A-32                     | 17 |
| A-33                     | 17 |
| A-34                     | 25 |
| A-35                     | 17 |
| A-36                     | 17 |
| A-37                     | 17 |
| A-38                     | 17 |
| A-39                     | 39 |
| A-40                     | 17 |
| A-41                     | 39 |
| A-42                     | 17 |

**Page No.**

**Rev No.**

|      |    |
|------|----|
| A-43 | 17 |
| A-44 | 17 |
| A-45 | 17 |
| A-46 | 17 |
| A-47 | 17 |
| A-48 | 17 |
| A-49 | 17 |
| A-50 | 35 |
| A-51 | 32 |
| A-52 | 35 |
| A-53 | 35 |
| A-54 | 20 |
| A-55 | 17 |
| A-56 | 17 |
| A-57 | 17 |
| A-58 | 17 |
| A-59 | 20 |
| A-60 | 20 |
| A-61 | 17 |
| A-62 | 17 |
| A-63 | 17 |
| A-64 | 17 |
| A-65 | 17 |
| A-66 | 17 |
| A-67 | 22 |
| A-68 | 17 |
| A-69 | 17 |
| A-70 | 17 |
| A-71 | 17 |
| A-72 | 17 |
| A-73 | 17 |
| A-74 | 17 |

## 1.0 LIQUID EFFLUENTS

### 1.1 Liquid Effluent Monitor Setpoints

#### 1.1.1 Liquid Radwaste Effluent Line Monitors

Liquid Radwaste Effluent Line Monitors provide alarm and automatic termination of release prior to exceeding ten times the concentration limits specified in 10CFR20, Appendix B, Table 2, Column 2 at the release point to the unrestricted area. To meet this specification and for the purpose of implementation of LCO 6.3.9, the alarm/trip setpoints for liquid effluent monitors and flow measurement devices are set to assure that the following equation is satisfied:

$$\frac{cf}{F + f} \leq C \quad (1)$$

where:

- C = ten times the effluent concentration limit (LCO 6.11.1) implementing 10CFR20 for the site, in  $\mu\text{Ci/ml}$ .
- c = The setpoint, representative of a radioactivity concentration in  $\mu\text{Ci/ml}$ , of the radioactivity monitor measuring the radioactivity in the waste tank effluent line prior to dilution and subsequent release; the setpoint, which is inversely proportional to the volumetric flow of the effluent line and directly proportional to the volumetric flow of the dilution stream plus the waste tank effluent stream, represents a value which, if exceeded, would result in concentrations exceeding ten times the limits of 10CFR20 in the unrestricted area.

f = the waste tank effluent flow setpoint as measured at the radiation monitor location, in volume per unit time, but in the same units as F, below.

F = the dilution water flow setpoint as measured prior to the release point, in volume per unit time.

At Grand Gulf Unit 1, the available dilution water flow (F) should be constant for a given release, and the waste tank flow (f) and monitor setpoint (c) are set to meet the condition of equation 1 for a given effluent concentration, C. The method by which this is accomplished is as follows:

Step 1)

The isotopic concentration for a waste tank to be released is obtained from the sum of the measured concentrations as determined by the analysis required in ODCM Table 6.11.1-1:

$$\sum_i C_i = \sum_g C_g + C_a + \sum_s C_s + C_t + C_f \quad (2)$$

where:

$\sum_g C_g$  = the sum of concentrations  $C_g$  of each measured gamma emitter observed by gamma-ray spectroscopy of the waste sample.

$C_a$  = the concentration  $C_a$  of gross alpha emitters in liquid waste as measured in the monthly composite sample.

$\sum_s C_s$  = the measured concentrations of Sr-89 and Sr-90 in liquid waste as observed in the quarterly composite sample.

$C_t$  = the measured concentration of H-3 in liquid waste as determined from analysis of the monthly composite sample.

$C_f$  = the concentration of Fe-55 in liquid waste as measured in the quarterly composite sample.

The  $C_g$  term will be included in the analysis of each waste tank batch to be released; terms for alpha, strontiums, tritium and iron are included if analysis of liquid waste has shown the presence of these isotopes.

Step 2) The measured radionuclide concentrations are used to calculate a Dilution Factor, D.F., which is the ratio of total dilution flow rate to waste tank effluent flow rate required to assure that ten times the limiting concentration of 10CFR20, Appendix B, Table 2, Column 2 are met at the point of discharge.

$$D.F. = \left[ \sum_i \frac{C_i}{EC_i} \right] \times S.F.$$

$$= \left[ \sum_g \frac{C_g}{EC_g} + \frac{C_a}{EC_a} + \sum_s \frac{C_s}{EC_s} + \frac{C_t}{EC_t} + \frac{C_f}{EC_f} \right] \times S.F. \quad (3)$$

where:

$C_i = C_g, C_a, C_s, C_t$  and  $C_f$ ; measured concentrations as defined in Step 1. Terms  $C_a, C_s, C_t$  and  $C_f$  will be included in the calculation as appropriate.

$EC_i =$   $EC_g, EC_a, EC_s, EC_t$  and  $EC_f$  are ten times the limiting concentrations of the appropriate radionuclide from 10CFR20, Appendix B, Table 2, Column 2. For dissolved or entrained noble gases, the concentration shall be limited to  $2.0E-4$   $\mu\text{Ci/ml}$  total activity.

S.F. = an administrative safety factor normally applied at Grand Gulf which causes the calculated Dilution Factor to be two (2) times larger than the dilution factor required for compliance with ten times 10CFR20 limits.

Step 3) The maximum permissible waste tank effluent flow rate prior to dilution,  $f_d$ , is calculated based on a fixed fraction of the dilution flow rate,  $F_d$ :

$$f_d \leq \frac{F_d + f_d}{D.F.} \approx \frac{F_d}{D.F.} \quad \text{for } F_d \gg f_d \quad (4)$$

where:

$F_d = 0.9 \times$  minimum expected dilution flow rate

$f_d =$  maximum permissible waste tank effluent flow rate

D.F. = Dilution Factor from Step 2.

NOTE: Equation 4 is valid only for  $D.F. > 1$ ; for  $D.F. \leq 1$ , the waste tank effluent concentration meets the limits of ten times the limiting concentrations of 10CFR20 without dilution, and  $f_d$  may take on any desired value.

Step 4) The dilution flow rate setpoint for minimum dilution flow rate,  $F$ , and waste tank flow rate setpoint for maximum waste tank effluent flow rate,  $f$ , are calculated as follows:

$F = F_d = 0.9 \times$  minimum expected dilution flow rate (5)

$f = 0.9 \times f_d = 0.9 \times$  calculated maximum waste tank flow rate for the stated release conditions. (6)



Thus, if instrumentation indicates the dilution flow rate falls below the assumed flow rate of 90 percent of the actual dilution flow, or if the waste tank effluent flow rate exceeds 90 percent of the calculated maximum waste tank effluent flow rate, the release is terminated (manually or automatically).

- Step 5) The radioactivity monitor setpoint may now be specified based on the values of  $\sum_i C_i$ ,  $F$ , and  $f$  which were specified to provide compliance with ten times the limits of 10CFR20, Appendix B, Table 2, Column 2. The monitor response is primarily to gamma radiation; therefore, when determining the setpoint,  $S_p$  the summation of the gamma emitters in the tank is used and  $S_p$  is determined as follows:

$$S_p(\text{cpm}) = (f_d/f_a \times \sum C_g \times \text{MRF})$$

Where:

$f_d$  = maximum permissible waste tank effluent flow rate (gpm)

$f_a$  = actual or maximum expected waste tank effluent flow rate (gpm)

$\sum C_g$  = Summation of all detected gamma emitters (uCi/ml)

MRF = Monitor Response Factor (cpm/uCi/ml) (Figure 1.0-1)<sup>(17)</sup>

For waste tanks where the quantity of gamma emitters does not produce a significant response above background,  $S_p$ , may be determined as follows:

If  $S_p = 0$ , i.e. no gamma emitters present, then  $S_p = 2700$  cpm

Or

If  $S_p < (\text{Monitor Error} \times \text{Background})$ , then  $S_p = (\text{Monitor Error} \times \text{Background})$ . Provided that the error times the background is not greater than 2700 cpm.

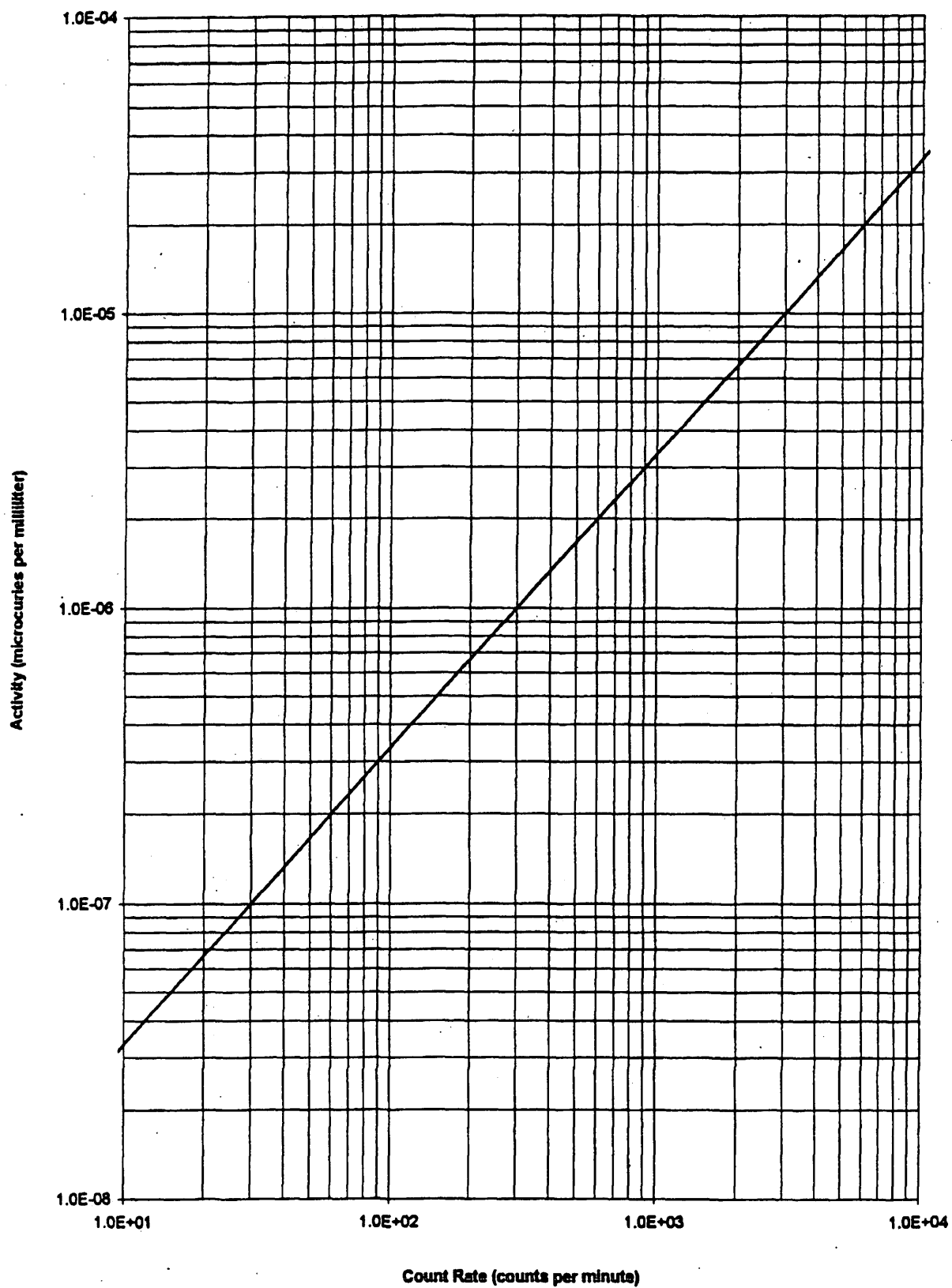
Note: 2700 cpm is based on Cesium-137 monitor response and the limits specified in LCO 6.11.1. <sup>(12)</sup>

The Monitor Error will normally be set at 25% (based on the calibration error) <sup>(17)</sup>.

The liquid monitor trip setpoint =  $S_p$  + Monitor Background

NOTE: Setpoint adjustments are not required if the existing setpoint corresponds to a lower count rate than the calculated value. The setpoint contains a factor of conservatism, even if the calculated maximum waste tank flow rate is attainable, since the calculated rate contains the safety factor margin, waste tank effluent flow rate margin, and the dilution flow rate margin. In practice, the actual waste tank effluent flow rate normally is many times less than the calculated tank flow rate, thus providing an additional conservatism during release.

Figure 1.0-1  
Example Calibration Curve for Liquid Effluent Monitor



## 1.2 Dose Calculations for Liquid Effluents

### 1.2.1 Maximum Exposed Individual Model

The dose contribution to the maximum exposed individual from all radionuclides identified in liquid effluents released to unrestricted areas is calculated for the purpose of implementing LCO 6.11.2, 6.11.3, and TS 5.6.3 using the following expression:

$$D_{\text{Tau}} = \sum_i [A_{i\text{Tau}} \sum_{l=1}^m \Delta t_l C_{il} F_l] \quad \text{(millirem)} \quad (8)$$

where:

$A_{i\text{Tau}}$  = Site-related ingestion dose commitment factor for radionuclide  $i$ , in millirem/hr per  $\mu\text{Ci/ml}$ .

$$= K_o U_F B F_i D F_i$$

$\Delta t_l$  = length of the time period over which  $C_{il}$  and  $F_l$  are averaged for all liquid releases, in hours.

$C_{il}$  = average concentration of radionuclide  $i$  observed in the undiluted liquid effluent during time period  $\Delta t_l$  from any liquid release in  $\mu\text{Ci/ml}$ .

Concentrations are determined in accordance with the requirements of Table 6.11.1-1, 6.12-1-1 and 6.12.1-3. For composite samples, the last measured value from the most recent monthly and quarterly composite samples will be used in the dose calculation.

NOTE: LLD values are not used in dose calculations.

$F_1$  = Dilution factor for  $C_{il}$  during any liquid effluent release. For releases via the discharge basin,  $F_1$  is the dilution in the near field and is defined as the ratio of the average undiluted liquid waste flow during release to the product of the average flow from the site discharge structure to unrestricted receiving waters times the applicable factor of 2<sup>(5)</sup>

$$= \frac{\text{average undiluted liquid waste flow}}{\text{average flow from site discharge} \times 2}$$

For releases via the 007 outfall,  $F_1$  is defined as the 007 outfall runoff to the total runoff into Hamilton Lake. It is the environmental dilution derived from the lowest historical annual precipitation as recorded in the FSAR = 0.10<sup>(18)</sup>

$$K_o = \text{units conversion factor } 1.14 \times 10^5$$

$$= 10^6 \frac{\text{pCi}}{\mu\text{Ci}} \times 10^3 \frac{\text{ml}}{\text{kg}} \div 8766 \frac{\text{hr}}{\text{yr}}$$

$U_F$  = adult fish consumption (21 kg/yr) <sup>(3)</sup>.

$BF_i$  = Bioaccumulation factor for each nuclide,  $i$ , in fish, in pCi/kg per pCi/l from ODCM Table 1.2-1.

$DF_i$  = Dose conversion factor for each nuclide,  $i$ , for adults in preselected organ,  $\tau$ , in mrem/pCi, from ODCM Table 1.2-2.

Calculated values of  $A_{i\tau}$  for radionuclides which might be observed in liquid effluents are given in ODCM Table 1.2-3.

#### 1.2.2

##### Dose Projection

Doses from liquid effluents to UNRESTRICTED AREAS are projected at least every 31 days as required by LCO 6.11.3. These projections are made by averaging the doses ( $D_{\tau}$ ) from previous operating history (normally the previous six months) which is indicative of expected future operations.

TABLE 1.2-1  
BIOACCUMULATION FACTORS, (BF<sub>i</sub>)  
 (pCi/kg per pCi/liter)\*

| <u>ELEMENT</u> | <u>FRESHWATER<br/>FISH</u> | <u>INVERTEBRATE</u> |
|----------------|----------------------------|---------------------|
| H              | 9.0E-01                    | 9.0E-01             |
| C              | 4.6E+03                    | 9.1E+03             |
| NA             | 1.0E+02                    | 2.0E+02             |
| P              | 1.0E+05                    | 2.0E+04             |
| CR             | 2.0E+02                    | 2.0E+03             |
| MN             | 4.0E+02                    | 9.0E+04             |
| FE             | 1.0E+02                    | 3.2E+03             |
| CO             | 5.0E+01                    | 2.0E+02             |
| NI             | 1.0E+02                    | 1.0E+02             |
| CU             | 5.0E+01                    | 4.0E+02             |
| ZN             | 2.0E+03                    | 1.0E+04             |
| BR             | 4.2E+02                    | 3.3E+02             |
| RB             | 2.0E+03                    | 1.0E+03             |
| SR             | 3.0E+01                    | 1.0E+02             |
| Y              | 2.5E+01                    | 1.0E+03             |
| ZR             | 3.3E+00                    | 6.7E+00             |
| NB             | 3.0E+04                    | 1.0E+02             |
| MO             | 1.0E+01                    | 1.0E+01             |
| TC             | 1.5E+01                    | 5.0E+00             |
| RU             | 1.0E+01                    | 3.0E+02             |
| RH             | 1.0E+01                    | 3.0E+02             |
| SB             | 1.0E+00                    | 1.0E+01             |
| TE             | 4.0E+02                    | 6.1E+03             |
| I              | 1.5E+01                    | 5.0E+00             |
| CS             | 2.0E+03                    | 1.0E+03             |
| BA             | 4.0E+00                    | 2.0E+02             |
| LA             | 2.5E+01                    | 1.0E+03             |
| CE             | 1.0E+00                    | 1.0E+03             |
| PR             | 2.5E+01                    | 1.0E+03             |
| ND             | 2.5E+01                    | 1.0E+03             |
| W              | 1.2E+03                    | 1.0E+01             |
| NP             | 1.0E+01                    | 4.0E+02             |

\* Values in Table 1.2-1 are taken from Reference 3, Table A-1, except for SB which was taken from Reference 2, Table A-8.

TABLE 1.2-2

INGESTION DOSE CONVERSION FACTORS FOR ADULTS, (DF<sub>1</sub>)

(mrem per pCi ingested) \*

Page 1 of 3

| NUCLIDE |     | BONE     | LIVER    | T. BODY  | THYROID  | KIDNEY   | LUNG     | GI-LLI   |
|---------|-----|----------|----------|----------|----------|----------|----------|----------|
| H       | 3   | NO DATA  | 1.05E-07 | 1.05E-07 | 1.05E-07 | 1.05E-07 | 1.05E-07 | 1.05E-07 |
| C       | 14  | 2.84E-06 | 5.68E-07 | 5.68E-07 | 5.68E-07 | 5.68E-07 | 5.68E-07 | 5.68E-07 |
| NA      | 24  | 1.70E-06 | 1.70E-06 | 1.70E-06 | 1.70E-06 | 1.70E-06 | 1.70E-06 | 1.70E-06 |
| P       | 32  | 1.93E-04 | 1.20E-05 | 7.46E-06 | NO DATA  | NO DATA  | NO DATA  | 2.17E-05 |
| CR      | 51  | NO DATA  | NO DATA  | 2.66E-09 | 1.59E-09 | 5.86E-10 | 3.53E-09 | 6.69E-07 |
| MN      | 54  | NO DATA  | 4.57E-06 | 8.72E-07 | NO DATA  | 1.36E-06 | NO DATA  | 1.40E-05 |
| MN      | 56  | NO DATA  | 1.15E-07 | 2.04E-08 | NO DATA  | 1.46E-07 | NO DATA  | 3.67E-06 |
| FE      | 55  | 2.75E-06 | 1.90E-06 | 4.43E-07 | NO DATA  | NO DATA  | 1.06E-06 | 1.09E-06 |
| FE      | 59  | 4.34E-06 | 1.02E-05 | 3.91E-06 | NO DATA  | NO DATA  | 2.85E-06 | 3.40E-05 |
| CO      | 58  | NO DATA  | 7.45E-07 | 1.67E-06 | NO DATA  | NO DATA  | NO DATA  | 1.51E-05 |
| CO      | 60  | NO DATA  | 2.14E-06 | 4.72E-06 | NO DATA  | NO DATA  | NO DATA  | 4.02E-05 |
| NI      | 63  | 1.30E-04 | 9.01E-06 | 4.36E-06 | NO DATA  | NO DATA  | NO DATA  | 1.88E-06 |
| NI      | 65  | 5.28E-07 | 6.86E-08 | 3.13E-08 | NO DATA  | NO DATA  | NO DATA  | 1.74E-06 |
| CU      | 64  | NO DATA  | 8.33E-08 | 3.91E-08 | NO DATA  | 2.10E-07 | NO DATA  | 7.10E-06 |
| ZN      | 65  | 4.84E-06 | 1.54E-05 | 6.96E-06 | NO DATA  | 1.03E-05 | NO DATA  | 9.70E-06 |
| ZN      | 69  | 1.03E-08 | 1.97E-08 | 1.37E-09 | NO DATA  | 1.28E-08 | NO DATA  | 2.96E-09 |
| BR      | 83  | NO DATA  | NO DATA  | 4.02E-08 | NO DATA  | NO DATA  | NO DATA  | 5.79E-08 |
| BR      | 84  | NO DATA  | NO DATA  | 5.21E-08 | NO DATA  | NO DATA  | NO DATA  | 4.09E-13 |
| BR      | 85  | NO DATA  | NO DATA  | 2.14E-09 | NO DATA  | NO DATA  | NO DATA  | LT E-24  |
| RB      | 86  | NO DATA  | 2.11E-05 | 9.83E-06 | NO DATA  | NO DATA  | NO DATA  | 4.16E-06 |
| RB      | 88  | NO DATA  | 6.05E-08 | 3.21E-08 | NO DATA  | NO DATA  | NO DATA  | 8.36E-19 |
| RB      | 89  | NO DATA  | 4.01E-08 | 2.82E-08 | NO DATA  | NO DATA  | NO DATA  | 2.33E-21 |
| SR      | 89  | 3.08E-04 | NO DATA  | 8.84E-06 | NO DATA  | NO DATA  | NO DATA  | 4.94E-05 |
| SR      | 90  | 7.58E-03 | NO DATA  | 1.86E-03 | NO DATA  | NO DATA  | NO DATA  | 2.19E-04 |
| SR      | 91  | 5.67E-06 | NO DATA  | 2.29E-07 | NO DATA  | NO DATA  | NO DATA  | 2.70E-05 |
| SR      | 92  | 2.15E-06 | NO DATA  | 9.30E-08 | NO DATA  | NO DATA  | NO DATA  | 4.26E-05 |
| Y       | 90  | 9.62E-09 | NO DATA  | 2.58E-10 | NO DATA  | NO DATA  | NO DATA  | 1.02E-04 |
| Y       | 91M | 9.09E-11 | NO DATA  | 3.52E-12 | NO DATA  | NO DATA  | NO DATA  | 2.67E-10 |
| Y       | 91  | 1.41E-07 | NO DATA  | 3.77E-09 | NO DATA  | NO DATA  | NO DATA  | 7.76E-05 |
| Y       | 92  | 8.45E-10 | NO DATA  | 2.47E-11 | NO DATA  | NO DATA  | NO DATA  | 1.48E-05 |

\* Values taken from Reference 3, Table E-11.

TABLE 1.2-2 (Continued)  
INGESTION DOSE CONVERSION FACTORS FOR ADULTS, (DF<sub>i</sub>)  
(mrem per pCi ingested) \*

Page 2 of 3

| NUCLIDE | BONE     | LIVER    | T. BODY  | THYROID  | KIDNEY   | LUNG     | GI-LLI   |
|---------|----------|----------|----------|----------|----------|----------|----------|
| <hr/>   |          |          |          |          |          |          |          |
| Y 93    | 2.68E-09 | NO DATA  | 7.40E-11 | NO DATA  | NO DATA  | NO DATA  | 8.50E-05 |
| ZR 95   | 3.04E-08 | 9.75E-09 | 6.60E-09 | NO DATA  | 1.53E-08 | NO DATA  | 3.09E-05 |
| ZR 97   | 1.68E-09 | 3.39E-10 | 1.55E-10 | NO DATA  | 5.12E-10 | NO DATA  | 1.05E-04 |
| <hr/>   |          |          |          |          |          |          |          |
| NB 95   | 6.22E-09 | 3.46E-09 | 1.86E-09 | NO DATA  | 3.42E-09 | NO DATA  | 2.10E-05 |
| MO 99   | NO DATA  | 4.31E-06 | 8.20E-07 | NO DATA  | 9.76E-06 | NO DATA  | 9.99E-06 |
| TC 99M  | 2.47E-10 | 6.98E-10 | 8.89E-09 | NO DATA  | 1.06E-08 | 3.42E-10 | 4.13E-07 |
| <hr/>   |          |          |          |          |          |          |          |
| TC101   | 2.54E-10 | 3.66E-10 | 3.59E-09 | NO DATA  | 6.59E-09 | 1.87E-10 | 1.10E-21 |
| RU103   | 1.85E-07 | NO DATA  | 7.97E-08 | NO DATA  | 7.06E-07 | NO DATA  | 2.16E-05 |
| RU105   | 1.54E-08 | NO DATA  | 6.08E-09 | NO DATA  | 1.99E-07 | NO DATA  | 9.42E-06 |
| <hr/>   |          |          |          |          |          |          |          |
| RU106   | 2.75E-06 | NO DATA  | 3.48E-07 | NO DATA  | 5.31E-06 | NO DATA  | 1.78E-04 |
| AG110M  | 1.60E-07 | 1.48E-07 | 8.79E-08 | NO DATA  | 2.91E-07 | NO DATA  | 6.04E-05 |
| SB124   | 2.80E-06 | 5.29E-08 | 1.11E-06 | 6.79E-09 | 0.0      | 2.18E-06 | 7.95E-05 |
| SB125+D | 1.79E-06 | 2.00E-08 | 4.26E-07 | 1.82E-09 | 0.0      | 1.38E-06 | 1.97E-05 |
| SB126   | 1.15E-06 | 2.34E-08 | 4.15E-07 | 7.04E-09 | 0.0      | 7.05E-07 | 9.40E-05 |
| SB127   | 2.58E-07 | 5.65E-09 | 9.90E-08 | 3.10E-09 | 0.0      | 1.53E-07 | 5.90E-05 |
| TE125M  | 2.68E-06 | 9.71E-07 | 3.59E-07 | 8.06E-07 | 1.09E-05 | NO DATA  | 1.07E-05 |
| <hr/>   |          |          |          |          |          |          |          |
| TE127M  | 6.77E-06 | 2.42E-06 | 8.25E-07 | 1.73E-06 | 2.75E-05 | NO DATA  | 2.27E-05 |
| TE127   | 1.10E-07 | 3.95E-08 | 2.38E-08 | 8.15E-08 | 4.48E-07 | NO DATA  | 8.68E-06 |
| TE129M  | 1.15E-05 | 4.29E-06 | 1.82E-06 | 3.95E-06 | 4.80E-05 | NO DATA  | 5.79E-05 |
| <hr/>   |          |          |          |          |          |          |          |
| TE129   | 3.14E-08 | 1.18E-08 | 7.65E-09 | 2.41E-08 | 1.32E-07 | NO DATA  | 2.37E-08 |
| TE131M  | 1.73E-06 | 8.46E-07 | 7.05E-07 | 1.34E-06 | 8.57E-06 | NO DATA  | 8.40E-05 |
| TE131   | 1.97E-08 | 8.23E-09 | 6.22E-09 | 1.62E-08 | 8.63E-08 | NO DATA  | 2.79E-09 |
| <hr/>   |          |          |          |          |          |          |          |
| TE132   | 2.52E-06 | 1.63E-06 | 1.53E-06 | 1.80E-06 | 1.57E-05 | NO DATA  | 7.71E-05 |
| I 130   | 7.56E-07 | 2.23E-06 | 8.80E-07 | 1.89E-04 | 3.48E-06 | NO DATA  | 1.92E-06 |
| I 131   | 4.16E-06 | 5.95E-06 | 3.41E-06 | 1.95E-03 | 1.02E-05 | NO DATA  | 1.57E-06 |
| <hr/>   |          |          |          |          |          |          |          |
| I 132   | 2.03E-07 | 5.43E-07 | 1.90E-07 | 1.90E-05 | 8.65E-07 | NO DATA  | 1.02E-07 |
| I 133   | 1.42E-06 | 2.47E-06 | 7.53E-07 | 3.63E-04 | 4.31E-06 | NO DATA  | 2.22E-06 |
| I 134   | 1.06E-07 | 2.88E-07 | 1.03E-07 | 4.99E-06 | 4.58E-07 | NO DATA  | 2.51E-10 |
| <hr/>   |          |          |          |          |          |          |          |
| I 135   | 4.43E-07 | 1.16E-06 | 4.28E-07 | 7.65E-05 | 1.86E-06 | NO DATA  | 1.31E-06 |
| CS134   | 6.22E-05 | 1.48E-04 | 1.21E-04 | NO DATA  | 4.79E-05 | 1.59E-05 | 2.59E-06 |
| CS136   | 6.51E-06 | 2.57E-05 | 1.85E-05 | NO DATA  | 1.43E-05 | 1.96E-06 | 2.92E-06 |

\* Values taken from Reference 3, Table E-11, except for SB values which were taken from Reference 8, Table 4.



TABLE 1.2-2 (Continued)

INGESTION DOSE CONVERSION FACTORS FOR ADULTS, (DF<sub>1</sub>)

(mrem per pCi ingested) \*

Page 3 of 3

| NUCLIDE | BONE     | LIVER    | T. BODY  | THYROID | KIDNEY   | LUNG     | GI-LLI   |
|---------|----------|----------|----------|---------|----------|----------|----------|
| CS137   | 7.97E-05 | 1.09E-04 | 7.14E-05 | NO DATA | 3.70E-05 | 1.23E-05 | 2.11E-06 |
| CS138   | 5.52E-08 | 1.09E-07 | 5.40E-08 | NO DATA | 8.01E-08 | 7.91E-09 | 4.65E-13 |
| BA139   | 9.70E-08 | 6.91E-11 | 2.84E-09 | NO DATA | 6.46E-11 | 3.92E-11 | 1.72E-07 |
| BA140   | 2.03E-05 | 2.55E-08 | 1.33E-06 | NO DATA | 8.67E-09 | 1.46E-08 | 4.18E-05 |
| BA141   | 4.71E-08 | 3.56E-11 | 1.59E-09 | NO DATA | 3.31E-11 | 2.02E-11 | 2.22E-17 |
| BA142   | 2.13E-08 | 2.19E-11 | 1.34E-09 | NO DATA | 1.85E-11 | 1.24E-11 | 3.00E-26 |
| LA140   | 2.50E-09 | 1.26E-09 | 3.33E-10 | NO DATA | NO DATA  | NO DATA  | 9.25E-05 |
| LA142   | 1.28E-10 | 5.82E-11 | 1.45E-11 | NO DATA | NO DATA  | NO DATA  | 4.25E-07 |
| CE141   | 9.36E-09 | 6.33E-09 | 7.18E-10 | NO DATA | 2.94E-09 | NO DATA  | 2.42E-05 |
| CE143   | 1.65E-09 | 1.22E-06 | 1.35E-10 | NO DATA | 5.37E-10 | NO DATA  | 4.56E-05 |
| CE144   | 4.88E-07 | 2.04E-07 | 2.62E-08 | NO DATA | 1.21E-07 | NO DATA  | 1.65E-04 |
| PR143   | 9.20E-09 | 3.69E-09 | 4.56E-10 | NO DATA | 2.13E-09 | NO DATA  | 4.03E-05 |
| PR144   | 3.01E-11 | 1.25E-11 | 1.53E-12 | NO DATA | 7.05E-12 | NO DATA  | 4.33E-18 |
| ND147   | 6.29E-09 | 7.27E-09 | 4.35E-10 | NO DATA | 4.25E-09 | NO DATA  | 3.49E-05 |
| W 187   | 1.03E-07 | 8.61E-08 | 3.01E-08 | NO DATA | NO DATA  | NO DATA  | 2.82E-05 |
| NP239   | 1.19E-09 | 1.17E-10 | 6.45E-11 | NO DATA | 3.65E-10 | NO DATA  | 2.40E-05 |

\* Values taken from Reference 3, Table E-11

TABLE 1.2-3

## SITE RELATED INGESTION DOSE COMMITMENT FACTOR

Page 1 of 2

Release Type: 1 Liquid  
 Dose Factor: 0 AiTau ((mrem/hr)/(uCi/ml))\*  
 AgeGroup: 0 ADULT  
 Pathway: 2 Fresh Water Fish - Comm. (FFCM)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 2.26e-01 | 2.26e-01 | 2.26e-01 | 2.26e-01 | 2.26e-01 | 0.00e+00 | 2.26e-01 |
| C-14    | 3.13e+04 | 6.26e+03 | 6.26e+03 | 6.26e+03 | 6.26e+03 | 6.26e+03 | 0.00e+00 | 6.26e+03 |
| NA-24   | 4.07e+02 | 4.07e+02 | 4.07e+02 | 4.07e+02 | 4.07e+02 | 4.07e+02 | 0.00e+00 | 4.07e+02 |
| P-32    | 4.62e+07 | 2.87e+06 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.19e+06 | 0.00e+00 | 1.79e+06 |
| CR-51   | 0.00e+00 | 0.00e+00 | 7.61e-01 | 2.81e-01 | 1.69e+00 | 3.20e+02 | 0.00e+00 | 1.27e+00 |
| MN-54   | 0.00e+00 | 4.38e+03 | 0.00e+00 | 1.30e+03 | 0.00e+00 | 1.34e+04 | 0.00e+00 | 8.35e+02 |
| MN-56   | 0.00e+00 | 1.10e+02 | 0.00e+00 | 1.40e+02 | 0.00e+00 | 3.51e+03 | 0.00e+00 | 1.95e+01 |
| FE-55   | 6.58e+02 | 4.55e+02 | 0.00e+00 | 0.00e+00 | 2.54e+02 | 2.61e+02 | 0.00e+00 | 1.06e+02 |
| FE-59   | 1.04e+03 | 2.44e+03 | 0.00e+00 | 0.00e+00 | 6.82e+02 | 8.14e+03 | 0.00e+00 | 9.36e+02 |
| CO-58   | 0.00e+00 | 8.92e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.81e+03 | 0.00e+00 | 2.00e+02 |
| CO-60   | 0.00e+00 | 2.56e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.81e+03 | 0.00e+00 | 5.65e+02 |
| NI-63   | 3.11e+04 | 2.16e+03 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.50e+02 | 0.00e+00 | 1.04e+03 |
| NI-65   | 1.26e+02 | 1.64e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.17e+02 | 0.00e+00 | 7.49e+00 |
| CU-64   | 0.00e+00 | 9.97e+00 | 0.00e+00 | 2.51e+01 | 0.00e+00 | 8.50e+02 | 0.00e+00 | 4.68e+00 |
| ZN-65   | 2.32e+04 | 7.37e+04 | 0.00e+00 | 4.93e+04 | 0.00e+00 | 4.64e+04 | 0.00e+00 | 3.33e+04 |
| ZN-69   | 4.93e+01 | 9.43e+01 | 0.00e+00 | 6.13e+01 | 0.00e+00 | 1.42e+01 | 0.00e+00 | 6.56e+00 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.82e+01 | 0.00e+00 | 4.04e+01 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.11e-04 | 0.00e+00 | 5.24e+01 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.15e+00 |
| RB-86   | 0.00e+00 | 1.01e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.99e+04 | 0.00e+00 | 4.71e+04 |
| RB-88   | 0.00e+00 | 2.90e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.00e-09 | 0.00e+00 | 1.54e+02 |
| RB-89   | 0.00e+00 | 1.92e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.12e-11 | 0.00e+00 | 1.35e+02 |
| SR-89   | 2.21e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.55e+03 | 0.00e+00 | 6.35e+02 |
| SR-90   | 5.44e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.57e+04 | 0.00e+00 | 1.34e+05 |
| SR-91   | 4.07e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.94e+03 | 0.00e+00 | 1.64e+01 |
| SR-92   | 1.54e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.06e+03 | 0.00e+00 | 6.68e+00 |
| Y-90    | 5.76e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.10e+03 | 0.00e+00 | 1.54e-02 |
| Y-91    | 8.44e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.64e+03 | 0.00e+00 | 2.26e-01 |
| Y-91M   | 5.44e-03 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.60e-02 | 0.00e+00 | 2.11e-04 |
| Y-92    | 5.06e-02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.86e+02 | 0.00e+00 | 1.48e-03 |
| Y-93    | 1.60e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.09e+03 | 0.00e+00 | 4.43e-03 |
| ZR-95   | 2.40e-01 | 7.70e-02 | 0.00e+00 | 1.21e-01 | 0.00e+00 | 2.44e+02 | 0.00e+00 | 5.21e-02 |
| ZR-97   | 1.33e-02 | 2.68e-03 | 0.00e+00 | 4.04e-03 | 0.00e+00 | 8.30e+02 | 0.00e+00 | 1.22e-03 |
| NB-95   | 4.47e+02 | 2.48e+02 | 0.00e+00 | 2.46e+02 | 0.00e+00 | 1.51e+06 | 0.00e+00 | 1.34e+02 |
| MO-99   | 0.00e+00 | 1.03e+02 | 0.00e+00 | 2.34e+02 | 0.00e+00 | 2.39e+02 | 0.00e+00 | 1.96e+01 |
| TC-99M  | 8.87e-03 | 2.51e-02 | 0.00e+00 | 3.81e-01 | 1.23e-02 | 1.48e+01 | 0.00e+00 | 3.19e-01 |
| TC-101  | 9.12e-03 | 1.31e-02 | 0.00e+00 | 2.37e-01 | 6.72e-03 | 3.95e-14 | 0.00e+00 | 1.29e-01 |
| RU-103  | 4.43e+00 | 0.00e+00 | 0.00e+00 | 1.69e+01 | 0.00e+00 | 5.17e+02 | 0.00e+00 | 1.91e+00 |
| RU-105  | 3.69e-01 | 0.00e+00 | 0.00e+00 | 4.76e+00 | 0.00e+00 | 2.26e+02 | 0.00e+00 | 1.46e-01 |
| RU-106  | 6.58e+01 | 0.00e+00 | 0.00e+00 | 1.27e+02 | 0.00e+00 | 4.26e+03 | 0.00e+00 | 8.33e+00 |
| AG-110M | 8.81e-01 | 8.15e-01 | 0.00e+00 | 1.60e+00 | 0.00e+00 | 3.33e+02 | 0.00e+00 | 4.84e-01 |

\* Calculated from Equation 8.

TABLE 1.2-3 (Continued)

## SITE RELATED INGESTION DOSE COMMITMENT FACTOR

Page 2 of 2

Release Type: 1 Liquid  
 Dose Factor: 0 AiTau ((mrem/hr)/(uCi/ml))\*  
 AgeGroup: 0 ADULT  
 Pathway: 2 Fresh Water Fish - Comm. (FFCM)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| SB-124  | 6.70e+00 | 1.27e-01 | 1.63e-02 | 0.00e+00 | 5.22e+00 | 1.90e+02 | 0.00e+00 | 2.66e+00 |
| SB-125  | 4.29e+00 | 4.79e-02 | 4.36e-03 | 0.00e+00 | 3.30e+00 | 4.72e+01 | 0.00e+00 | 1.02e+00 |
| TE-125M | 2.57e+03 | 9.30e+02 | 7.72e+02 | 1.04e+04 | 0.00e+00 | 1.02e+04 | 0.00e+00 | 3.44e+02 |
| TE-127  | 1.05e+02 | 3.78e+01 | 7.80e+01 | 4.29e+02 | 0.00e+00 | 8.31e+03 | 0.00e+00 | 2.28e+01 |
| TE-127M | 6.48e+03 | 2.32e+03 | 1.66e+03 | 2.63e+04 | 0.00e+00 | 2.17e+04 | 0.00e+00 | 7.90e+02 |
| TE-129  | 3.01e+01 | 1.13e+01 | 2.31e+01 | 1.26e+02 | 0.00e+00 | 2.27e+01 | 0.00e+00 | 7.33e+00 |
| TE-129M | 1.10e+04 | 4.11e+03 | 3.78e+03 | 4.60e+04 | 0.00e+00 | 5.54e+04 | 0.00e+00 | 1.74e+03 |
| TE-131  | 1.89e+01 | 7.88e+00 | 1.55e+01 | 8.26e+01 | 0.00e+00 | 2.67e+00 | 0.00e+00 | 5.96e+00 |
| TE-131M | 1.66e+03 | 8.10e+02 | 1.28e+03 | 8.21e+03 | 0.00e+00 | 8.04e+04 | 0.00e+00 | 6.75e+02 |
| TE-132  | 2.41e+03 | 1.56e+03 | 1.72e+03 | 1.50e+04 | 0.00e+00 | 7.38e+04 | 0.00e+00 | 1.47e+03 |
| I-130   | 2.71e+01 | 8.01e+01 | 6.79e+03 | 1.25e+02 | 0.00e+00 | 6.89e+01 | 0.00e+00 | 3.16e+01 |
| I-131   | 1.49e+02 | 2.14e+02 | 7.00e+04 | 3.66e+02 | 0.00e+00 | 5.64e+01 | 0.00e+00 | 1.22e+02 |
| I-132   | 7.29e+00 | 1.95e+01 | 6.82e+02 | 3.11e+01 | 0.00e+00 | 3.66e+00 | 0.00e+00 | 6.82e+00 |
| I-133   | 5.10e+01 | 8.87e+01 | 1.30e+04 | 1.55e+02 | 0.00e+00 | 7.97e+01 | 0.00e+00 | 2.70e+01 |
| I-134   | 3.81e+00 | 1.03e+01 | 1.79e+02 | 1.64e+01 | 0.00e+00 | 9.01e-03 | 0.00e+00 | 3.70e+00 |
| I-135   | 1.59e+01 | 4.17e+01 | 2.75e+03 | 6.68e+01 | 0.00e+00 | 4.70e+01 | 0.00e+00 | 1.54e+01 |
| CS-134  | 2.98e+05 | 7.09e+05 | 0.00e+00 | 2.29e+05 | 7.61e+04 | 1.24e+04 | 0.00e+00 | 5.79e+05 |
| CS-136  | 3.12e+04 | 1.23e+05 | 0.00e+00 | 6.85e+04 | 9.38e+03 | 1.40e+04 | 0.00e+00 | 8.86e+04 |
| CS-137  | 3.82e+05 | 5.22e+05 | 0.00e+00 | 1.77e+05 | 5.89e+04 | 1.01e+04 | 0.00e+00 | 3.42e+05 |
| CS-138  | 2.64e+02 | 5.22e+02 | 0.00e+00 | 3.84e+02 | 3.79e+01 | 2.23e-03 | 0.00e+00 | 2.59e+02 |
| BA-139  | 9.29e-01 | 6.62e-04 | 0.00e+00 | 6.19e-04 | 3.75e-04 | 1.65e+00 | 0.00e+00 | 2.72e-02 |
| BA-140  | 1.94e+02 | 2.44e-01 | 0.00e+00 | 8.30e-02 | 1.40e-01 | 4.00e+02 | 0.00e+00 | 1.27e+01 |
| BA-141  | 4.51e-01 | 3.41e-04 | 0.00e+00 | 3.17e-04 | 1.93e-04 | 2.13e-10 | 0.00e+00 | 1.52e-02 |
| BA-142  | 2.04e-01 | 2.10e-04 | 0.00e+00 | 1.77e-04 | 1.19e-04 | 2.87e-19 | 0.00e+00 | 1.28e-02 |
| LA-140  | 1.50e-01 | 7.54e-02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.54e+03 | 0.00e+00 | 1.99e-02 |
| LA-142  | 7.66e-03 | 3.48e-03 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.54e+01 | 0.00e+00 | 8.68e-04 |
| CE-141  | 2.24e-02 | 1.52e-02 | 0.00e+00 | 7.04e-03 | 0.00e+00 | 5.79e+01 | 0.00e+00 | 1.72e-03 |
| CE-143  | 3.95e-03 | 2.92e+00 | 0.00e+00 | 1.29e-03 | 0.00e+00 | 1.09e+02 | 0.00e+00 | 3.23e-04 |
| CE-144  | 1.17e+00 | 4.88e-01 | 0.00e+00 | 2.90e-01 | 0.00e+00 | 3.95e+02 | 0.00e+00 | 6.27e-02 |
| PR-143  | 5.51e-01 | 2.21e-01 | 0.00e+00 | 1.27e-01 | 0.00e+00 | 2.41e+03 | 0.00e+00 | 2.73e-02 |
| PR-144  | 1.80e-03 | 7.48e-04 | 0.00e+00 | 4.22e-04 | 0.00e+00 | 2.59e-10 | 0.00e+00 | 9.16e-05 |
| ND-147  | 3.76e-01 | 4.35e-01 | 0.00e+00 | 2.54e-01 | 0.00e+00 | 2.09e+03 | 0.00e+00 | 2.60e-02 |
| W-187   | 2.96e+02 | 2.47e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.10e+04 | 0.00e+00 | 8.65e+01 |
| NP-239  | 2.85e-02 | 2.80e-03 | 0.00e+00 | 8.74e-03 | 0.00e+00 | 5.75e+02 | 0.00e+00 | 1.54e-03 |
| SB-126  | 2.75e+00 | 5.62e-02 | 1.69e-02 | 0.00e+00 | 1.69e+00 | 2.25e+02 | 0.00e+00 | 9.94e-01 |
| SB-127  | 6.18e-01 | 1.35e-02 | 7.42e-03 | 0.00e+00 | 3.66e-01 | 1.41e+02 | 0.00e+00 | 2.37e-01 |

\* Calculated from Equation 8.

### 1.3 Liquid Radwaste Treatment System

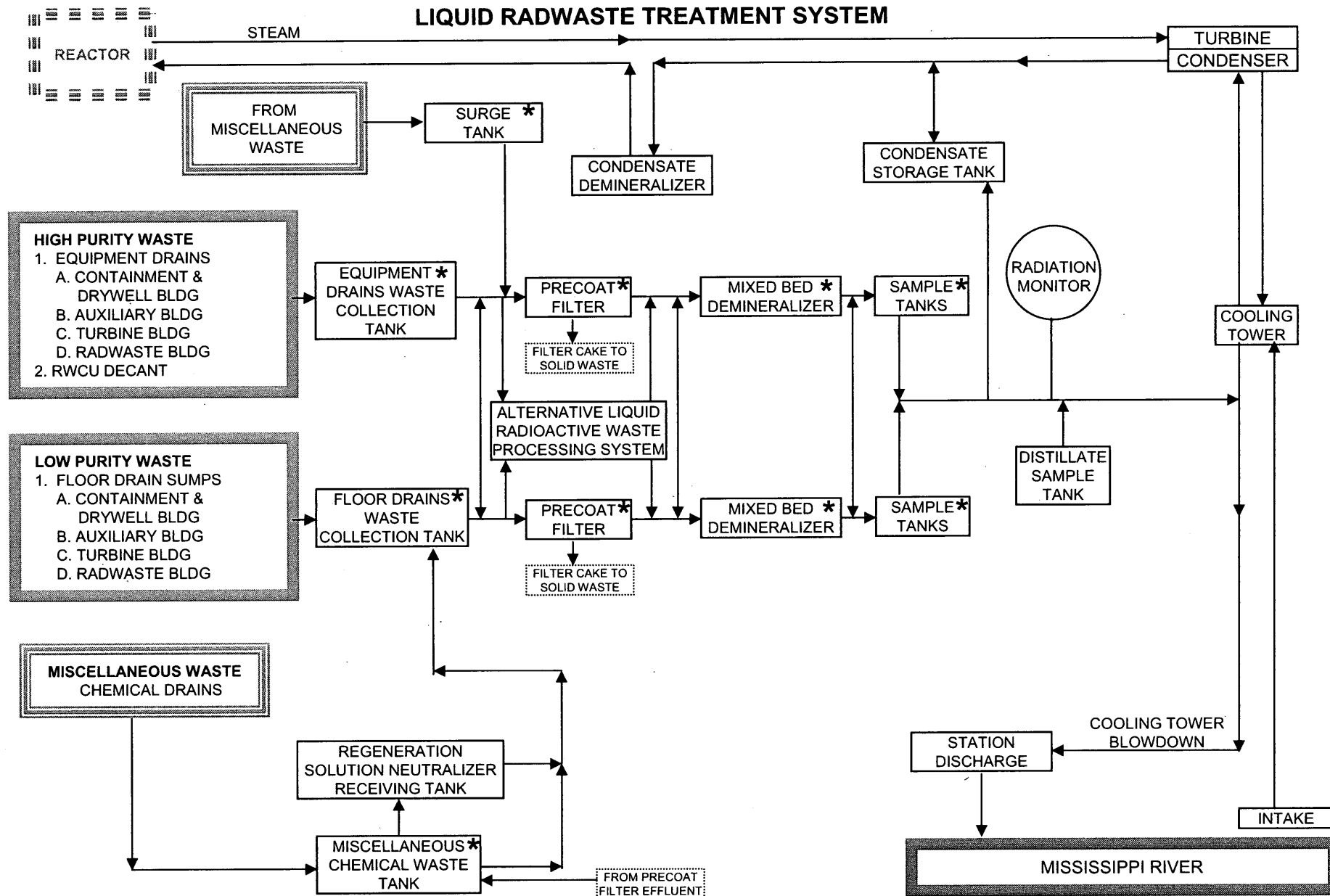
The essential components of the liquid radwaste treatment system are indicated by an asterisk (\*).

The radwaste system includes provisions for use of alternate liquid radioactive processing equipment. This system may be used in place of the precoat filters and may contain strainers, carbon bed filters, cartridge filters, a reverse osmosis unit or other components which process liquid radioactive wastes. Bypassing the precoat filter (an essential component) is acceptable provided that the effluent from the alternative system provides the same level of filtration required for the precoat filters.

#### NOTES for Figure ODCM 1.3-1

- (1) The essential components outlined on the following page are those necessary to collect, process and sample liquid radwaste prior to discharge to the environment.
- (2) Only one of the following is required in order to process liquid waste.
  - a. Equipment drain filter
  - b. Floor drain filter
  - c. Equipment drain demineralizer
  - d. Floor drain demineralizer
- (3) The Waste Surge Tanks may be used to replace the Waste Collection Tanks.

**FIGURE 1.3-1  
LIQUID RADWASTE TREATMENT SYSTEM**



## 2.0 GASEOUS EFFLUENTS

### 2.1 Gaseous Effluent Monitor Setpoints

#### 2.1.1 Continuous Ventilation Monitors

For the purpose of implementation of LCO 6.3.10, the alarm setpoint level for continuous ventilation noble gas monitors will be calculated as follows:

$S_V$  = count rate (cpm) above background of vent noble gas monitor at the alarm setpoint level

$$PF \times R_t \times D_{TB}$$

= the lesser of or

$$PF \times R_s \times D_{ss}$$

where:

PF = product of allocation factor (AF) and safety factor (SF), normally set at 0.1

AF = allocation factor allowing for a total of four normal effluent release points, normally set at 0.25

SF = safety factor allowing for cumulative uncertainties of measurements, normally set at 0.4

$D_{TB}$  = dose rate limit to the total body of an individual at the SITE BOUNDARY or at UNRESTRICTED AREAS inside the SITE BOUNDARY required to limit dose to 500 mrem in one year  
= 500 mrem/yr

$D_{ss}$  = dose rate limit to the skin of the body of an individual at the SITE BOUNDARY or at UNRESTRICTED AREAS inside the SITE BOUNDARY required to limit dose to 3000 mrem in one year  
= 3000 mrem/yr

$R_t$  = count rate (cpm) per mrem/yr to the total body

$$= C + \left[ \overline{X/Q} \sum_i K_i Q'_i \right]$$

where:

$C$  = count rate (cpm) above background of the vent monitor  
corresponding to grab sample radionuclide  
concentrations

$\overline{X/Q}$  = highest historical annual average atmospheric  
dispersion at the SITE BOUNDARY or at UNRESTRICTED  
AREAS inside the SITE BOUNDARY from Table 2.2-3a or  
Table 2.2-3b

$K_i$  = total body dose factor due to gamma emissions from  
each noble gas radionuclide  $i$  (mrem/yr per  $\mu\text{Ci}/\text{m}^3$ )  
from ODCM Table 2.1-1

$Q'_i$  = rate of release of noble gas radionuclide  $i$  ( $\mu\text{Ci}/\text{sec}$ )  
from the release point

$R_s$  = count rate (cpm) per mrem/yr to the skin

$$= C + \overline{X/Q} \left[ \sum_i (L_i + 1.1 M_i) Q'_i \right]$$

$L_i$  = skin dose factor due to beta emissions from isotope  $i$   
(mrem/yr per  $\mu\text{Ci}/\text{m}^3$ ) from ODCM Table 2.1-1

1.1 = mrem skin dose per mrad air dose

$M_i$  = air dose factor due to gamma emissions from isotope  $i$   
(mrad/yr per  $\mu\text{Ci}/\text{m}^3$ ) from ODCM Table 2.1-1

2.1.2

TEXT DELETED



NOTES For Section 2.1.1

1) The calculated setpoint values will determine the allowable bounds for the actual setpoint adjustments. That is, setpoint adjustments are not required to be performed if the existing setpoint level corresponds to a count rate that is less than or equal to + 25% of the calculated value. If radionuclides are not detected in the grab sample, then the previously calculated setpoint may remain as the valid setpoint.

2) A conservative setpoint may be calculated using a composite total body dose factor. This method may be used when there are no valid isotopics available. The conservative setpoint will be calculated as follows:

$$\begin{aligned} S_v &= \text{count rate (cpm) above background of vent noble gas monitor at the} \\ &\quad \text{alarm setpoint level*} \\ &= PF' \times D_{TB} \times R_t'' \end{aligned}$$

where:

$PF'$  = product of allocation factor (AF) and safety factor (SF'), normally set at 0.1

AF = allocation factor allowing for a total of four normal effluent release points, normally set at 0.25

SF' = safety factor allowing for cumulative uncertainties of measurements, normally set at 0.4.

$R_t''$  = conservative count rate per mrem/yr to the total body (Xe-133 detection, composite dose factor)  
 $= \frac{(3.53E-5) (60)}{\overline{X/Q} (X) (V) (K)}$

\* The setpoint calculation based on a skin dose is not required because the setpoint based on the total body dose is more conservative.

where:

X = Xe-133 volume efficiency factor of the detector system in  
μCi/cc/cpm as determined by the primary calibration\*

V = maximum designed ventilation flow rate in cubic feet per minute  
(cfm)

3.53E-5 = conversion factor, ft<sup>3</sup> per cc

60 = conversion factor, seconds per minute

K = total body dose factor for historical mixture\*\*,

= 1.51E + 03 mrem/yr per μCi/m<sup>3</sup>

Other variables as defined in Section 2.1.1

\* The instrument calibration procedures will include checks to ensure that  
the detector efficiency meets acceptance criteria.

\*\* ODCM Reference 11

TABLE 2.1-1  
DOSE FACTORS FOR EXPOSURE TO A SEMI-INFINITE CLOUD OF NOBLE GASES

| Nuclide | Y-Body** $K_i$ | B-Skin** $L_i$ | Y-Air* $M_i$ | B-Air* $N_i$ |
|---------|----------------|----------------|--------------|--------------|
| AR-41   | 8.84E+03***    | 2.69E+03       | 9.30E+03     | 3.28E+03     |
| KR-83M  | 7.56E-02       | 0.00E+00       | 1.93E+01     | 2.88E+02     |
| KR-85   | 1.61E+01       | 1.34E+03       | 1.72E+01     | 1.95E+03     |
| KR-85M  | 1.17E+03       | 1.46E+03       | 1.23E+03     | 1.97E+03     |
| KR-87   | 5.92E+03       | 9.73E+03       | 6.17E+03     | 1.03E+04     |
| KR-88   | 1.47E+04       | 2.37E+03       | 1.52E+04     | 2.93E+03     |
| KR-89   | 1.66E+04       | 1.01E+04       | 1.73E+04     | 1.06E+04     |
| KR-90   | 1.56E+04       | 7.29E+03       | 1.63E+04     | 7.83E+03     |
| XE-131M | 9.15E+01       | 4.76E+02       | 1.56E+02     | 1.11E+03     |
| XE-133  | 2.94E+02       | 3.06E+02       | 3.53E+02     | 1.05E+03     |
| XE-133M | 2.51E+02       | 9.94E+02       | 3.27E+02     | 1.48E+03     |
| XE-135  | 1.81E+03       | 1.86E+03       | 1.92E+03     | 2.46E+03     |
| XE-135M | 3.12E+03       | 7.11E+02       | 3.36E+03     | 7.39E+02     |
| XE-137  | 1.42E+03       | 1.22E+04       | 1.51E+03     | 1.27E+04     |
| XE-138  | 8.83E+03       | 4.13E+03       | 9.21E+03     | 4.75E+03     |

Values taken from Reference 3, Table B-1

\*  $\frac{\text{mrad} - \text{m}^3}{\mu\text{Ci} - \text{yr}}$

\*\*  $\frac{\text{mrem} - \text{m}^3}{\mu\text{Ci} - \text{yr}}$

\*\*\*  $8.84\text{E}+03 = 8.84 \times 10^3$

## 2.2 Gaseous Effluent Dose Calculations

### 2.2.1 Unrestricted Area Boundary Dose Rate

- a. For the purpose of implementation of LCO 6.11.4.a, the dose rate at the SITE BOUNDARY or at UNRESTRICTED AREAS within the SITE BOUNDARY due to noble gases shall be calculated as follows:

$$D_{tb} = \text{average total body dose rate in current year} \\ (\text{mrem/yr})$$

$$= \overline{X/Q} \sum K_i Q'_i$$

$$D_s = \text{average skin dose rate in current year}$$

$$(\text{mrem/yr})$$

$$= \overline{X/Q} \sum (L_i + 1.1M_i) Q'_i$$

- b. Organ dose rate due to tritium, I-131, I-133 and all radioactive materials in particulate form, with half-lives greater than eight days will be calculated for the purpose of implementation of LCO 6.11.4.b as follows:

$$D_o = \text{average organ dose rate in current year}$$

$$(\text{mrem/yr})$$

$$= \sum_i W P_i \overline{Q'_i}$$

where:

W = highest historical annual average atmospheric dispersion at the SITE BOUNDARY or UNRESTRICTED AREAS inside the SITE BOUNDARY for the appropriate pathway from Table 2.2-3a or 2.2-3b.

Use  $\bar{X}/\bar{Q}$  for inhalation and all tritium pathways

or

Use  $\bar{D}/\bar{Q}$  for food and ground plane pathways

$P_i$  = the total dose parameter for radionuclide i,

(mrem/yr per  $\mu\text{Ci}/\text{m}^3$ ) for inhalation and all tritium pathways and ( $\text{m}^2 \cdot \text{mrem}/\text{yr}$  per  $\mu\text{Ci}/\text{sec}$ ) for food and ground plane pathways, from ODCM Table 2.2-1b\*

$Q'_i$  = rate of release of noble gas radionuclide i ( $\mu\text{Ci}/\text{sec}$ ) from the release point

$\bar{Q}'_i$  = average release rate of isotope i of tritium, I-131, I-133 or other radionuclide in particulate form, with half-lives greater than eight (8) days in the current year ( $\mu\text{Ci}/\text{sec}$ )

\* Use child/inhalation pathway from Table 2.2-1b unless land use census identifies an infant/grass/cow/milk pathway. Then Table 2.2-1a may apply.

2.2.2 Unrestricted Area Dose to Individual

- a. For the purpose of implementation of LCO 6.11.5, the air dose at the SITE BOUNDARY or at UNRESTRICTED AREAS within the SITE BOUNDARY shall be determined as follows:

$D_{\gamma}$  = air dose due to gamma emissions from noble gas radionuclide  $i$  (mrad)

$$= 3.17 \times 10^{-8} \sum_i M_i \overline{X/Q} Q_i$$

where:

$\overline{X/Q}$  = highest historical annual average atmospheric for the SITE BOUNDARY or at UNRESTRICTED AREAS within the SITE BOUNDARY from Table 2.2-3a or 2.2-3b.

$M_i$  = air dose factor due to gamma emissions from noble gas radionuclide  $i$  (mrad/yr per  $\mu\text{Ci}/\text{m}^3$ ) from ODCM Table 2.1-1

$Q_i$  = cumulative release of radionuclide i of noble gas, tritium, I-131, I-133, or material in particulate form over the period of interest ( $\mu\text{Ci}$ )

Note:  $3.17 \times 10^{-8}$  is the inverse of the number of seconds per year, and

$D_\beta$  = air dose due to beta emissions from noble gas radionuclide i (mrad)

$$= 3.17 \times 10^{-8} \sum_i N_i \overline{X/Q'} Q_i$$

where:

$N_i$  = air dose factor due to beta emissions from noble gas radionuclide i (mrad/yr per  $\mu\text{Ci}/\text{m}^3$ ) from ODCM Table 2.1-1

$\overline{X/Q'}$  = highest historical annual average atmospheric dispersion for the SITE BOUNDARY or at UNRESTRICTED AREAS within the SITE BOUNDARY, from Table 2.2-3a or 2.2-3b.

$Q_i$  = cumulative release of radionuclide i of noble gas, tritium, I-131, I-133, or material in particulate form over the period of interest ( $\mu\text{Ci}$ )

### 2.2.2 Unrestricted Area Dose to Individual

- b. Dose to an individual from tritium, I-131, I-133 and radioactive materials in particulate form, with half-lives greater than eight (8) days will be calculated for the purpose of implementation of LCO 6.11.6 as follows:

$$D_p = \text{dose to an individual from tritium, I-131, I-133 and radionuclides in particulate form, with half-life greater than eight days (mrem)}$$

$$= 3.17 \times 10^{-8} \sum_i R_i W' Q_i$$

where:

$W'$  = historical annual average  $X/Q$  and  $D/Q$  at a controlling location for an individual from Table 2.2-3\*

$\overline{X/Q}$  = for inhalation and all tritium pathways

or

$\overline{D/Q}$  = for food and ground plane pathways

$R_i$  = the total dose factor for radionuclide  $i$ ,

(mrem/yr per  $\mu\text{Ci}/\text{m}^3$ ) for inhalation and all tritium pathways and ( $\text{m}^2 \cdot \text{mrem}/\text{yr}$  per  $\mu\text{Ci}/\text{sec}$ ) for food and ground plane pathways from Tables 2.2-2a - d

- \* Dose for each controlling receptor in Table 2.2-3 is calculated and the highest dose is selected for implementation of LCO 6.11.6. The most limiting age group, child, is assumed. In accordance with ODCM Reference 1, historical annual average atmospheric dispersion conditions are used. However, "real time" annual average dispersion conditions are coupled with the annual release and summarized in the Annual Radioactive Effluent Release Report.



2.2.2 Unrestricted Area Dose to Individual

$Q_i$  = cumulative release of radionuclide  $i$  of noble gas, tritium, I-131, I-133, or material in particulate form over the period of interest ( $\mu\text{Ci}$ )

- c. For the purpose of implementing TS 5.6.3, dose calculations will be performed using the above equations or with the substitution of average meteorological parameters (most limiting parameters will be used) which prevailed for the period of the report.

2.2.3 Dose Projection

Doses from gaseous effluents to UNRESTRICTED AREAS are projected at least every 31 days as required by LCO 6.11.8. These projections are made by averaging the doses ( $D_\gamma$ ,  $D_\beta$ ,  $D_p$ ) from previous operating history (normally the previous six months) which is indicative of future expected operations.

TABLE 2.2-1a

PATHWAY DOSE FACTORS FOR LCO 6.11.4 and  
SECTION 2.2.1.b, (P<sub>i</sub>)

Page 1 of 2

| AGE GROUP | (INFANT)   | ( N.A. )     | (INFANT) |
|-----------|------------|--------------|----------|
| ISOTOPE   | INHALATION | GROUND PLANE | FOOD     |
| H-3       | 6.47E+02   | 0.00E+00     | 2.38E+03 |
| C-14      | 2.65E+04   | 0.00E+00     | 2.34E+09 |
| NA-24     | 1.06E+04   | 1.99E+07     | 1.56E+07 |
| P-32      | 2.03E+06   | 0.00E+00     | 1.60E+11 |
| CR-51     | 1.28E+04   | 7.85E+06     | 4.70E+06 |
| MN-54     | 1.00E+06   | 1.29E+09     | 3.90E+07 |
| MN-56     | 7.17E+04   | 1.52E+06     | 2.84E+00 |
| FE-55     | 8.69E+04   | 0.00E+00     | 1.35E+08 |
| FE-59     | 1.02E+06   | 4.56E+08     | 3.92E+08 |
| CO-58     | 7.77E+05   | 6.18E+08     | 6.05E+07 |
| CO-60     | 4.51E+06   | 5.17E+09     | 2.10E+08 |
| NI-63     | 3.39E+05   | 0.00E+00     | 3.49E+10 |
| NI-65     | 5.01E+04   | 4.93E+05     | 3.02E+01 |
| CU-64     | 1.50E+04   | 9.80E+05     | 3.77E+06 |
| ZN-65     | 6.47E+05   | 7.90E+08     | 1.90E+10 |
| ZN-69     | 1.32E+04   | 0.00E+00     | 2.85E-09 |
| BR-83     | 3.81E+02   | 1.01E+04     | 9.27E-01 |
| BR-84     | 4.00E+02   | 3.38E+05     | 1.32E-22 |
| BR-85     | 2.04E+01   | 0.00E+00     | 0.00E+00 |
| RB-86     | 1.90E+05   | 1.47E+07     | 2.23E+10 |
| RB-88     | 5.57E+02   | 5.40E+04     | 1.88E-44 |
| RB-89     | 3.21E+02   | 2.11E+05     | 3.41E-52 |
| SR-89     | 2.03E+06   | 3.56E+04     | 1.26E+10 |
| SR-90     | 4.09E+07   | 0.00E+00     | 1.22E+11 |
| SR-91     | 7.34E+04   | 3.58E+06     | 3.19E+05 |
| SR-92     | 1.40E+05   | 1.23E+06     | 4.96E+01 |
| Y-90      | 2.69E+05   | 7.59E+03     | 9.42E+05 |
| Y-91      | 2.45E+06   | 1.70E+06     | 5.25E+06 |
| Y-91M     | 2.79E+03   | 1.66E+05     | 2.03E-15 |
| Y-92      | 1.27E+05   | 3.06E+05     | 1.02E+01 |
| Y-93      | 1.67E+05   | 3.58E+05     | 1.69E+04 |
| ZR-95     | 1.75E+06   | 3.99E+08     | 8.26E+05 |
| ZR-97     | 1.40E+05   | 4.92E+06     | 4.44E+04 |
| NB-95     | 4.79E+05   | 2.29E+08     | 2.06E+08 |
| MO-99     | 1.35E+05   | 6.60E+06     | 3.10E+08 |
| TC-99M    | 2.03E+03   | 3.01E+05     | 1.64E+04 |
| TC-101    | 8.44E+02   | 3.23E+04     | 4.88E-57 |
| RU-103    | 5.52E+05   | 1.80E+08     | 1.05E+05 |
| RU-105    | 4.84E+04   | 1.03E+06     | 3.18E+00 |
| RU-106    | 1.16E+07   | 3.59E+08     | 1.45E+06 |
| AG-110M   | 3.67E+06   | 3.65E+09     | 1.46E+10 |

TABLE 2.2-1a (Continued)  
 PATHWAY DOSE FACTORS FOR LCO 6.11.4 and  
 SECTION 2.2.1.b, (P<sub>i</sub>)

Page 2 of 2

| AGE GROUP | (INFANT)   | ( N.A. )     | (INFANT) |
|-----------|------------|--------------|----------|
| ISOTOPE   | INHALATION | GROUND PLANE | FOOD     |
| TE-125M   | 4.47E+05   | 3.01E+06     | 1.51E+08 |
| TE-127    | 2.44E+04   | 4.70E+03     | 1.35E+05 |
| TE-127M   | 1.31E+06   | 1.40E+05     | 1.04E+09 |
| TE-129    | 2.63E+04   | 4.41E+04     | 1.81E-07 |
| TE-129M   | 1.68E+06   | 3.30E+07     | 1.39E+09 |
| TE-131    | 8.22E+03   | 4.93E+07     | 1.41E-30 |
| TE-131M   | 1.99E+05   | 1.35E+07     | 2.29E+07 |
| TE-132    | 3.40E+05   | 7.09E+06     | 6.51E+07 |
| I-130     | 1.60E+06   | 9.55E+06     | 8.71E+08 |
| I-131     | 1.48E+07   | 2.98E+07     | 1.05E+12 |
| I-132     | 1.69E+05   | 2.09E+06     | 1.36E+02 |
| I-133     | 3.56E+06   | 4.26E+06     | 9.59E+09 |
| I-134     | 4.45E+04   | 7.57E+05     | 7.87E-10 |
| I-135     | 6.96E+05   | 4.21E+06     | 2.01E+07 |
| CS-134    | 7.03E+05   | 3.28E+09     | 6.80E+10 |
| CS-136    | 1.35E+05   | 2.44E+08     | 5.81E+09 |
| CS-137    | 6.12E+05   | 1.34E+09     | 6.02E+10 |
| CS-138    | 8.76E+02   | 5.86E+05     | 2.09E-22 |
| BA-139    | 5.10E+04   | 1.70E+05     | 2.71E-05 |
| BA-140    | 1.60E+06   | 3.35E+07     | 2.41E+08 |
| BA-141    | 4.75E+03   | 6.79E+04     | 5.08E-44 |
| BA-142    | 1.55E+03   | 7.23E+04     | 1.67E-79 |
| LA-140    | 1.68E+05   | 3.12E+07     | 1.88E+05 |
| LA-142    | 5.95E+04   | 1.30E+06     | 1.08E-05 |
| CE-141    | 5.17E+05   | 2.20E+07     | 1.37E+07 |
| CE-143    | 1.16E+05   | 3.75E+06     | 1.53E+06 |
| CE-144    | 9.84E+06   | 6.77E+07     | 1.33E+08 |
| PR-143    | 4.33E+05   | 0.00E+00     | 7.84E+05 |
| PR-144    | 4.28E+03   | 3.02E+03     | 1.13E-48 |
| ND-147    | 3.22E+05   | 1.44E+07     | 5.73E+05 |
| W-187     | 3.96E+04   | 3.90E+06     | 2.48E+06 |
| NP-239    | 5.95E+04   | 2.83E+06     | 9.42E+04 |

Units: Inhalation<sub>2</sub> and all tritium pathways - mrem/yr per  $\mu\text{Ci}/\text{m}^3$   
 Others - m<sup>2</sup> · mrem/yr per  $\mu\text{Ci}/\text{sec}$

Values based on standard NUREG-0133, Section 5.2.1 assumptions unless otherwise indicated.

TABLE 2.2-1b  
PATHWAY DOSE FACTORS FOR LCO 6.11.4 AND  
SECTION 2.2.1.b, (Pi)

Page 1 of 2

| AGE GROUP | ( CHILD )  | ( N.A. )     | ( CHILD )*   |
|-----------|------------|--------------|--------------|
| ISOTOPE   | INHALATION | GROUND PLANE | GRS/ANL/MEAT |
| H-3       | 1.13E+03   | 0.00E+00     | 1.83E+02     |
| C-14      | 3.59E+04   | 0.00E+00     | 2.99E+08     |
| NA-24     | 1.61E+04   | 1.98E+07     | 1.35E-03     |
| P-32      | 2.61E+06   | 0.00E+00     | 5.78E+09     |
| CR-51     | 1.70E+04   | 7.85E+06     | 3.64E+05     |
| MN-54     | 1.58E+06   | 1.29E+09     | 6.25E+06     |
| MN-56     | 1.23E+05   | 1.52E+06     | 1.90E-51     |
| FE-55     | 1.11E+05   | 0.00E+00     | 3.57E+08     |
| FE-59     | 1.27E+06   | 4.56E+08     | 4.94E+08     |
| CO-58     | 1.11E+06   | 6.18E+08     | 7.49E+07     |
| CO-60     | 7.07E+06   | 5.17E+09     | 2.99E+08     |
| NI-63     | 8.21E+05   | 0.00E+00     | 2.27E+10     |
| NI-65     | 8.40E+04   | 4.93E+05     | 3.17E-51     |
| CU-64     | 3.67E+04   | 9.80E+05     | 1.09E-05     |
| ZN-65     | 9.95E+05   | 7.90E+08     | 7.80E+08     |
| ZN-69     | 1.02E+04   | 0.00E+00     | 0.00E+00     |
| BR-83     | 4.74E+02   | 1.01E+04     | 7.43E-57     |
| BR-84     | 5.48E+02   | 3.38E+05     | 0.00E+00     |
| BR-85     | 2.53E+01   | 0.00E+00     | 0.00E+00     |
| RB-86     | 1.98E+05   | 1.47E+07     | 4.54E+08     |
| RB-88     | 5.62E+02   | 5.40E+04     | 0.00E+00     |
| RB-89     | 3.45E+02   | 2.11E+05     | 0.00E+00     |
| SR-89     | 2.16E+06   | 3.56E+04     | 3.76E+08     |
| SR-90     | 1.01E+08   | 0.00E+00     | 8.11E+09     |
| SR-91     | 1.74E+05   | 3.58E+06     | 4.13E-10     |
| SR-92     | 2.42E+05   | 1.23E+06     | 2.72E-48     |
| Y-90      | 2.68E+05   | 7.59E+03     | 3.81E+02     |
| Y-91M     | 2.81E+03   | 1.66E+05     | 0.00E+00     |
| Y-91      | 2.63E+06   | 1.70E+06     | 1.87E+08     |
| Y-92      | 2.39E+05   | 3.06E+05     | 5.43E-35     |
| Y-93      | 3.89E+05   | 3.58E+05     | 1.21E-07     |
| ZR-95     | 2.23E+06   | 3.99E+08     | 4.76E+08     |
| ZR-97     | 3.51E+05   | 4.92E+06     | 5.47E-01     |
| NB-95     | 6.14E+05   | 2.29E+08     | 1.74E+09     |
| MO-99     | 1.35E+05   | 6.60E+06     | 1.92E+05     |
| TC-99M    | 4.81E+03   | 3.01E+05     | 5.39E-18     |
| TC-101    | 5.85E+02   | 3.23E+04     | 0.00E+00     |
| RU-103    | 6.62E+05   | 1.80E+08     | 3.13E+09     |
| RU-105    | 9.95E+04   | 1.03E+06     | 4.59E-25     |
| RU-106    | 1.43E+07   | 3.59E+08     | 5.38E+10     |
| AG-110M   | 5.48E+06   | 3.65E+09     | 5.26E+08     |

TABLE 2.2-1b (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.4 AND  
SECTION 2.2.1.b, (Pi)

Page 2 of 2

| AGE GROUP | ( CHILD )  | ( N.A. )     | ( CHILD ) *  |
|-----------|------------|--------------|--------------|
| ISOTOPE   | INHALATION | GROUND PLANE | GRS/ANL/MEAT |
| TE-125M   | 4.77E+05   | 3.01E+06     | 4.44E+08     |
| TE-127M   | 1.48E+06   | 1.39E+05     | 3.95E+09     |
| TE-127    | 5.62E+04   | 4.70E+03     | 1.25E-08     |
| TE-129M   | 1.76E+06   | 3.30E+07     | 4.09E+09     |
| TE-129    | 2.55E+04   | 4.41E+04     | 0.00E+00     |
| TE-131M   | 3.08E+05   | 1.35E+10     | 7.66E+03     |
| TE-131    | 2.05E+03   | 4.93E+07     | 0.00E+00     |
| TE-132    | 3.77E+05   | 7.09E+06     | 7.27E+06     |
| I-130     | 1.85E+06   | 9.55E+06     | 5.27E-04     |
| I-131     | 1.62E+07   | 2.98E+07     | 4.29E+09     |
| I-132     | 1.94E+05   | 2.09E+06     | 1.90E-57     |
| I-133     | 3.85E+06   | 4.26E+06     | 1.02E+05     |
| I-134     | 5.07E+04   | 7.57E+05     | 0.00E+00     |
| I-135     | 7.92E+05   | 4.21E+06     | 8.10E-15     |
| CS-134    | 1.01E+06   | 3.28E+09     | 1.18E+09     |
| CS-136    | 1.71E+05   | 2.44E+08     | 3.45E+07     |
| CS-137    | 9.07E+05   | 1.34E+09     | 1.04E+09     |
| CS-138    | 8.40E+02   | 5.86E+05     | 0.00E+00     |
| BA-139    | 5.77E+04   | 1.70E+05     | 0.00E+00     |
| BA-140    | 1.74E+06   | 3.35E+07     | 3.42E+07     |
| BA-141    | 2.92E+03   | 6.79E+04     | 0.00E+00     |
| BA-142    | 1.64E+03   | 7.23E+04     | 0.00E+00     |
| LA-140    | 2.26E+05   | 3.12E+07     | 4.28E+02     |
| LA-142    | 7.59E+04   | 1.30E+06     | 0.00E+00     |
| CE-141    | 5.44E+05   | 2.20E+07     | 1.08E+07     |
| CE-143    | 1.27E+05   | 3.75E+06     | 1.96E+02     |
| CE-144    | 1.20E+07   | 6.77E+07     | 1.48E+08     |
| PR-143    | 4.33E+05   | 0.00E+00     | 2.82E+07     |
| PR-144    | 1.57E+03   | 3.02E+03     | 0.00E+00     |
| ND-147    | 3.28E+05   | 1.44E+07     | 1.17E+07     |
| W-187     | 9.10E+04   | 3.90E+06     | 2.18E+00     |
| NP-239    | 6.40E+04   | 2.83E+06     | 1.74E+03     |

Units: Inhalation and all tritium pathways - mrem/yr per  $\mu\text{Ci}/\text{m}^3$ Others -  $\text{m}^2$  . mrem/yr per  $\mu\text{Ci}/\text{sec}$ 

Values based on standard NUREG-0133, Section 5.2.1 assumptions unless otherwise indicated.

\*Meat consumption assumed 75 percent beef and 25 percent mutton.

TABLE 2.2-2a

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 1 of 8

Release Type: 2 Gaseous  
 Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>)) |  
 AgeGroup: 3 INFANT  
 Pathway: 0 Ground Plane Deposition (GPD)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| C-14    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| NA-24   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.39e+07 | 1.20e+07 |
| P-32    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| CR-51   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.50e+06 | 4.65e+06 |
| MN-54   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.62e+09 | 1.38e+09 |
| MN-56   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.07e+06 | 9.03e+05 |
| FE-55   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| FE-59   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.20e+08 | 2.73e+08 |
| CO-58   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.45e+08 | 3.80e+08 |
| CO-60   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.53e+10 | 2.15e+10 |
| NI-63   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| NI-65   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.45e+05 | 2.97e+05 |
| CU-64   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.86e+05 | 6.05e+05 |
| ZN-65   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.57e+08 | 7.46e+08 |
| ZN-69   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.08e+03 | 4.87e+03 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.37e+05 | 2.03e+05 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.03e+07 | 8.98e+06 |
| RB-88   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.78e+04 | 3.31e+04 |
| RB-89   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.48e+05 | 1.23e+05 |
| SR-89   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.51e+04 | 2.16e+04 |
| SR-90   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| SR-91   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.51e+06 | 2.15e+06 |
| SR-92   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.62e+05 | 7.76e+05 |
| Y-90    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.31e+03 | 4.50e+03 |
| Y-91    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.21e+06 | 1.07e+06 |
| Y-91M   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.16e+05 | 1.00e+05 |
| Y-92    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.14e+05 | 1.80e+05 |
| Y-93    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.50e+05 | 1.83e+05 |
| ZR-95   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.85e+08 | 2.45e+08 |
| ZR-97   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.44e+06 | 2.96e+06 |
| NB-95   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.61e+08 | 1.37e+08 |
| MO-99   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.62e+06 | 3.99e+06 |
| TC-99M  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.11e+05 | 1.84e+05 |
| TC-101  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.26e+04 | 2.03e+04 |
| RU-103  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.26e+08 | 1.08e+08 |
| RU-105  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.21e+05 | 6.36e+05 |
| RU-106  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.04e+08 | 4.20e+08 |
| AG-110M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.02e+09 | 3.45e+09 |
| TE-125M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.13e+06 | 1.56e+06 |
| TE-127  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.29e+03 | 2.99e+03 |
| TE-127M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.08e+05 | 9.17e+04 |
| TE-129  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.08e+04 | 2.61e+04 |
| TE-129M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.31e+07 | 1.98e+07 |
| TE-131  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.45e+07 | 2.92e+04 |
| TE-131M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.46e+06 | 8.02e+06 |

TABLE 2.2-2a (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 2 of 8

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 3 INFANT

Pathway: 0 Ground Plane Deposition (GPD)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.97e+06 | 4.22e+06 |
| I-130   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.68e+06 | 5.50e+06 |
| I-131   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.09e+07 | 1.72e+07 |
| I-132   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.47e+06 | 1.25e+06 |
| I-133   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.98e+06 | 2.45e+06 |
| I-134   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.30e+05 | 4.46e+05 |
| I-135   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.95e+06 | 2.53e+06 |
| CS-134  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.05e+09 | 6.90e+09 |
| CS-136  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.71e+08 | 1.51e+08 |
| CS-137  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.20e+10 | 1.03e+10 |
| CS-138  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.10e+05 | 3.59e+05 |
| BA-139  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.19e+05 | 1.06e+05 |
| BA-140  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.35e+07 | 2.05e+07 |
| BA-141  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.75e+04 | 4.17e+04 |
| BA-142  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.06e+04 | 4.44e+04 |
| LA-140  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.18e+07 | 1.92e+07 |
| LA-142  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.12e+05 | 7.60e+05 |
| CE-141  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.54e+07 | 1.37e+07 |
| CE-143  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.63e+06 | 2.31e+06 |
| CE-144  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.05e+07 | 6.96e+07 |
| PR-143  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| PR-144  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.11e+03 | 1.84e+03 |
| ND-147  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.01e+07 | 8.39e+06 |
| W-187   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.73e+06 | 2.35e+06 |
| NP-239  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.98e+06 | 1.71e+06 |

TABLE 2.2-2a (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 3 of 8

Release Type: 2 Gaseous

Dose Factor: 2 R<sub>i</sub> (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 3 INFANT

Pathway: 1 Inhalation (INHL)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 6.47e+02 | 6.47e+02 | 6.47e+02 | 6.47e+02 | 6.47e+02 | 0.00e+00 | 6.47e+02 |
| C-14    | 2.65e+04 | 5.31e+03 | 5.31e+03 | 5.31e+03 | 5.31e+03 | 5.31e+03 | 0.00e+00 | 5.31e+03 |
| NA-24   | 1.06e+04 | 1.06e+04 | 1.06e+04 | 1.06e+04 | 1.06e+04 | 1.06e+04 | 0.00e+00 | 1.06e+04 |
| P-32    | 2.03e+06 | 1.12e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.61e+04 | 0.00e+00 | 7.74e+04 |
| CR-51   | 0.00e+00 | 0.00e+00 | 5.75e+01 | 1.32e+01 | 1.28e+04 | 3.57e+02 | 0.00e+00 | 8.95e+01 |
| MN-54   | 0.00e+00 | 2.53e+04 | 0.00e+00 | 4.98e+03 | 1.00e+06 | 7.06e+03 | 0.00e+00 | 4.98e+03 |
| MN-56   | 0.00e+00 | 1.54e+00 | 0.00e+00 | 1.10e+00 | 1.25e+04 | 7.17e+04 | 0.00e+00 | 2.21e-01 |
| FE-55   | 1.97e+04 | 1.18e+04 | 0.00e+00 | 0.00e+00 | 8.69e+04 | 1.10e+03 | 0.00e+00 | 3.33e+03 |
| FE-59   | 1.36e+04 | 2.35e+04 | 0.00e+00 | 0.00e+00 | 1.02e+06 | 2.48e+04 | 0.00e+00 | 9.48e+03 |
| CO-58   | 0.00e+00 | 1.22e+03 | 0.00e+00 | 0.00e+00 | 7.77e+05 | 1.11e+04 | 0.00e+00 | 1.82e+03 |
| CO-60   | 0.00e+00 | 8.02e+03 | 0.00e+00 | 0.00e+00 | 4.51e+06 | 3.19e+04 | 0.00e+00 | 1.18e+04 |
| NI-63   | 3.39e+05 | 2.04e+04 | 0.00e+00 | 0.00e+00 | 2.09e+05 | 2.42e+03 | 0.00e+00 | 1.16e+04 |
| NI-65   | 2.39e+00 | 2.84e-01 | 0.00e+00 | 0.00e+00 | 8.12e+03 | 5.01e+04 | 0.00e+00 | 1.23e-01 |
| CU-64   | 0.00e+00 | 1.88e+00 | 0.00e+00 | 3.98e+00 | 9.30e+03 | 1.50e+04 | 0.00e+00 | 7.74e-01 |
| ZN-65   | 1.93e+04 | 6.26e+04 | 0.00e+00 | 3.25e+04 | 6.47e+05 | 5.14e+04 | 0.00e+00 | 3.11e+04 |
| ZN-69   | 5.39e-02 | 9.67e-02 | 0.00e+00 | 4.02e-02 | 1.47e+03 | 1.32e+04 | 0.00e+00 | 7.18e-03 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.81e+02 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.00e+02 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.04e+01 |
| RB-86   | 0.00e+00 | 1.90e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.04e+03 | 0.00e+00 | 8.82e+04 |
| RB-88   | 0.00e+00 | 5.57e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.39e+02 | 0.00e+00 | 2.87e+02 |
| RB-89   | 0.00e+00 | 3.21e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.82e+01 | 0.00e+00 | 2.06e+02 |
| SR-89   | 3.98e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.03e+06 | 6.40e+04 | 0.00e+00 | 1.14e+04 |
| SR-90   | 4.09e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.12e+07 | 1.31e+05 | 0.00e+00 | 2.59e+06 |
| SR-91   | 9.56e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.26e+04 | 7.34e+04 | 0.00e+00 | 3.46e+00 |
| SR-92   | 1.05e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.38e+04 | 1.40e+05 | 0.00e+00 | 3.91e-01 |
| Y-90    | 3.29e+03 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.69e+05 | 1.04e+05 | 0.00e+00 | 8.82e+01 |
| Y-91    | 5.88e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.45e+06 | 7.03e+04 | 0.00e+00 | 1.57e+04 |
| Y-91M   | 4.07e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.79e+03 | 2.35e+03 | 0.00e+00 | 1.39e-02 |
| Y-92    | 1.64e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.45e+04 | 1.27e+05 | 0.00e+00 | 4.61e-01 |
| Y-93    | 1.50e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.64e+04 | 1.67e+05 | 0.00e+00 | 4.07e+00 |
| ZR-95   | 1.15e+05 | 2.79e+04 | 0.00e+00 | 3.11e+04 | 1.75e+06 | 2.17e+04 | 0.00e+00 | 2.03e+04 |
| ZR-97   | 1.50e+02 | 2.56e+01 | 0.00e+00 | 2.59e+01 | 1.10e+05 | 1.40e+05 | 0.00e+00 | 1.17e+01 |
| NB-95   | 1.57e+04 | 6.43e+03 | 0.00e+00 | 4.72e+03 | 4.79e+05 | 1.27e+04 | 0.00e+00 | 3.78e+03 |
| MO-99   | 0.00e+00 | 1.65e+02 | 0.00e+00 | 2.65e+02 | 1.35e+05 | 4.87e+04 | 0.00e+00 | 3.23e+01 |
| TC-99M  | 1.40e-03 | 2.88e-03 | 0.00e+00 | 3.11e-02 | 8.11e+02 | 2.03e+03 | 0.00e+00 | 3.72e-02 |
| TC-101  | 6.51e-05 | 8.23e-05 | 0.00e+00 | 9.79e-04 | 5.84e+02 | 8.44e+02 | 0.00e+00 | 8.12e-04 |
| RU-103  | 2.02e+03 | 0.00e+00 | 0.00e+00 | 4.24e+03 | 5.52e+05 | 1.61e+04 | 0.00e+00 | 6.79e+02 |
| RU-105  | 1.22e+00 | 0.00e+00 | 0.00e+00 | 8.99e-01 | 1.57e+04 | 4.84e+04 | 0.00e+00 | 4.10e-01 |
| RU-106  | 8.68e+04 | 0.00e+00 | 0.00e+00 | 1.07e+05 | 1.16e+07 | 1.64e+05 | 0.00e+00 | 1.09e+04 |
| AG-110M | 9.98e+03 | 7.22e+03 | 0.00e+00 | 1.09e+04 | 3.67e+06 | 3.30e+04 | 0.00e+00 | 5.00e+03 |
| TE-125M | 4.76e+03 | 1.99e+03 | 1.62e+03 | 0.00e+00 | 4.47e+05 | 1.29e+04 | 0.00e+00 | 6.58e+02 |
| TE-127  | 2.23e+00 | 9.53e-01 | 1.85e+00 | 4.86e+00 | 1.04e+04 | 2.44e+04 | 0.00e+00 | 4.89e-01 |
| TE-127M | 1.67e+04 | 6.90e+03 | 4.87e+03 | 3.75e+04 | 1.31e+06 | 2.73e+04 | 0.00e+00 | 2.07e+03 |
| TE-129  | 7.88e-02 | 3.47e-02 | 6.75e-02 | 1.75e-01 | 3.00e+03 | 2.63e+04 | 0.00e+00 | 1.88e-02 |
| TE-129M | 1.41e+04 | 6.09e+03 | 5.47e+03 | 3.18e+04 | 1.68e+06 | 6.90e+04 | 0.00e+00 | 2.23e+03 |
| TE-131  | 1.74e-02 | 8.22e-03 | 1.58e-02 | 3.99e-02 | 2.06e+03 | 8.22e+03 | 0.00e+00 | 5.00e-03 |
| TE-131M | 1.07e+02 | 5.50e+01 | 8.93e+01 | 2.65e+02 | 1.99e+05 | 1.19e+05 | 0.00e+00 | 3.63e+01 |



TABLE 2.2-2a (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 4 of 8

Release Type: 2 Gaseous  
 Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>)) |  
 AgeGroup: 3 INFANT  
 Pathway: 1 Inhalation (INHL)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 3.72e+02 | 2.37e+02 | 2.79e+02 | 1.04e+03 | 3.40e+05 | 4.41e+04 | 0.00e+00 | 1.76e+02 |
| I-130   | 6.36e+03 | 1.39e+04 | 1.60e+06 | 1.53e+04 | 0.00e+00 | 1.99e+03 | 0.00e+00 | 5.57e+03 |
| I-131   | 3.79e+04 | 4.44e+04 | 1.48e+07 | 5.18e+04 | 0.00e+00 | 1.06e+03 | 0.00e+00 | 1.96e+04 |
| I-132   | 1.69e+03 | 3.54e+03 | 1.69e+05 | 3.95e+03 | 0.00e+00 | 1.90e+03 | 0.00e+00 | 1.26e+03 |
| I-133   | 1.32e+04 | 1.92e+04 | 3.56e+06 | 2.24e+04 | 0.00e+00 | 2.16e+03 | 0.00e+00 | 5.60e+03 |
| I-134   | 9.21e+02 | 1.88e+03 | 4.45e+04 | 2.09e+03 | 0.00e+00 | 1.29e+03 | 0.00e+00 | 6.65e+02 |
| I-135   | 3.86e+03 | 7.60e+03 | 6.96e+05 | 8.47e+03 | 0.00e+00 | 1.83e+03 | 0.00e+00 | 2.77e+03 |
| CS-134  | 3.96e+05 | 7.03e+05 | 0.00e+00 | 1.90e+05 | 7.97e+04 | 1.33e+03 | 0.00e+00 | 7.45e+04 |
| CS-136  | 4.83e+04 | 1.35e+05 | 0.00e+00 | 5.64e+04 | 1.18e+04 | 1.43e+03 | 0.00e+00 | 5.29e+04 |
| CS-137  | 5.49e+05 | 6.12e+05 | 0.00e+00 | 1.72e+05 | 7.13e+04 | 1.33e+03 | 0.00e+00 | 4.55e+04 |
| CS-138  | 5.05e+02 | 7.81e+02 | 0.00e+00 | 4.10e+02 | 6.54e+01 | 8.76e+02 | 0.00e+00 | 3.98e+02 |
| BA-139  | 1.48e+00 | 9.84e-04 | 0.00e+00 | 5.92e-04 | 5.95e+03 | 5.10e+04 | 0.00e+00 | 4.30e-02 |
| BA-140  | 5.60e+04 | 5.60e+01 | 0.00e+00 | 1.34e+01 | 1.60e+06 | 3.84e+04 | 0.00e+00 | 2.90e+03 |
| BA-141  | 1.57e-01 | 1.08e-04 | 0.00e+00 | 6.50e-05 | 2.97e+03 | 4.75e+03 | 0.00e+00 | 4.97e-03 |
| BA-142  | 3.98e-02 | 3.30e-05 | 0.00e+00 | 1.90e-05 | 1.55e+03 | 6.93e+02 | 0.00e+00 | 1.96e-03 |
| LA-140  | 5.05e+02 | 2.00e+02 | 0.00e+00 | 0.00e+00 | 1.68e+05 | 8.48e+04 | 0.00e+00 | 5.15e+01 |
| LA-142  | 1.03e+00 | 3.77e-01 | 0.00e+00 | 0.00e+00 | 8.22e+03 | 5.95e+04 | 0.00e+00 | 9.04e-02 |
| CE-141  | 2.77e+04 | 1.67e+04 | 0.00e+00 | 5.25e+03 | 5.17e+05 | 2.16e+04 | 0.00e+00 | 1.99e+03 |
| CE-143  | 2.93e+02 | 1.93e+02 | 0.00e+00 | 5.64e+01 | 1.16e+05 | 4.97e+04 | 0.00e+00 | 2.21e+01 |
| CE-144  | 3.19e+06 | 1.21e+06 | 0.00e+00 | 5.38e+05 | 9.84e+06 | 1.48e+05 | 0.00e+00 | 1.76e+05 |
| PR-143  | 1.40e+04 | 5.24e+03 | 0.00e+00 | 1.97e+03 | 4.33e+05 | 3.72e+04 | 0.00e+00 | 6.99e+02 |
| PR-144  | 4.79e-02 | 1.85e-02 | 0.00e+00 | 6.72e-03 | 1.61e+03 | 4.28e+03 | 0.00e+00 | 2.41e-03 |
| ND-147  | 7.94e+03 | 8.13e+03 | 0.00e+00 | 3.15e+03 | 3.22e+05 | 3.12e+04 | 0.00e+00 | 5.00e+02 |
| W-187   | 1.30e+01 | 9.02e+00 | 0.00e+00 | 0.00e+00 | 3.96e+04 | 3.56e+04 | 0.00e+00 | 3.12e+00 |
| NP-239  | 3.71e+02 | 3.32e+01 | 0.00e+00 | 6.62e+01 | 5.95e+04 | 2.49e+04 | 0.00e+00 | 1.88e+01 |

TABLE 2.2-2a (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 5 of 8

Release Type: 2 Gaseous  
Dose Factor: 2  $R_i$  ( $m^2 \cdot (mrem/yr)/(uCi/sec)$  or  $(mrem/yr)/(uCi/m^3)$ ) |  
AgeGroup: 3 INFANT  
Pathway: 2 Vegetation (VEG)

| Nuclide | Bone | Liver | Thyroid | Kidney | Lung | GI-Lli | Skin | TB |
|---------|------|-------|---------|--------|------|--------|------|----|
|---------|------|-------|---------|--------|------|--------|------|----|

-----  
Not a pathway for this age group

TABLE 2.2-2a (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 6 of 8

Release Type: 2 Gaseous  
Dose Factor: 2 R<sub>i</sub> (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>)) |  
AgeGroup: 3 INFANT  
Pathway: 4 Grs/Cow/Meat (CMEAT)

| Nuclide | Bone | Liver | Thyroid | Kidney | Lung | GI-Lli | Skin | TB |
|---------|------|-------|---------|--------|------|--------|------|----|
|---------|------|-------|---------|--------|------|--------|------|----|

-----  
Not a pathway for this agegroup

TABLE 2.2-2a (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 7 of 8

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 3 INFANT

Pathway: 5 Grs/Cow/Milk (CMILK)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 2.38e+03 | 2.38e+03 | 2.38e+03 | 2.38e+03 | 2.38e+03 | 0.00e+00 | 2.38e+03 |
| C-14    | 2.34e+09 | 5.00e+08 | 5.00e+08 | 5.00e+08 | 5.00e+08 | 5.00e+08 | 0.00e+00 | 5.00e+08 |
| NA-24   | 1.56e+07 | 1.56e+07 | 1.56e+07 | 1.56e+07 | 1.56e+07 | 1.56e+07 | 0.00e+00 | 1.56e+07 |
| P-32    | 1.60e+11 | 9.42e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.17e+09 | 0.00e+00 | 6.21e+09 |
| CR-51   | 0.00e+00 | 0.00e+00 | 1.05e+05 | 2.30e+04 | 2.05e+05 | 4.70e+06 | 0.00e+00 | 1.61e+05 |
| MN-54   | 0.00e+00 | 3.90e+07 | 0.00e+00 | 8.64e+06 | 0.00e+00 | 1.43e+07 | 0.00e+00 | 8.84e+06 |
| MN-56   | 0.00e+00 | 3.13e-02 | 0.00e+00 | 2.69e-02 | 0.00e+00 | 2.84e+00 | 0.00e+00 | 5.39e-03 |
| FE-55   | 1.35e+08 | 8.73e+07 | 0.00e+00 | 0.00e+00 | 4.27e+07 | 1.11e+07 | 0.00e+00 | 2.33e+07 |
| FE-59   | 2.24e+08 | 3.92e+08 | 0.00e+00 | 0.00e+00 | 1.16e+08 | 1.87e+08 | 0.00e+00 | 1.54e+08 |
| CO-58   | 0.00e+00 | 2.43e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.05e+07 | 0.00e+00 | 6.05e+07 |
| CO-60   | 0.00e+00 | 8.82e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.10e+08 | 0.00e+00 | 2.08e+08 |
| NI-63   | 3.49e+10 | 2.16e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.07e+08 | 0.00e+00 | 1.21e+09 |
| NI-65   | 3.51e+00 | 3.97e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.02e+01 | 0.00e+00 | 1.81e-01 |
| CU-64   | 0.00e+00 | 1.84e+05 | 0.00e+00 | 3.11e+05 | 0.00e+00 | 3.77e+06 | 0.00e+00 | 8.51e+04 |
| ZN-65   | 5.55e+09 | 1.90e+10 | 0.00e+00 | 9.23e+09 | 0.00e+00 | 1.61e+10 | 0.00e+00 | 8.78e+09 |
| ZN-69   | 1.94e-11 | 3.49e-11 | 0.00e+00 | 1.45e-11 | 0.00e+00 | 2.85e-09 | 0.00e+00 | 2.60e-12 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.27e-01 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.32e-22 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 2.23e+10 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.69e+08 | 0.00e+00 | 1.10e+10 |
| RB-88   | 0.00e+00 | 1.88e-44 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.83e-44 | 0.00e+00 | 1.03e-44 |
| RB-89   | 0.00e+00 | 3.41e-52 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.16e-52 | 0.00e+00 | 2.35e-52 |
| SR-89   | 1.26e+10 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.59e+08 | 0.00e+00 | 3.61e+08 |
| SR-90   | 1.22e+11 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.52e+09 | 0.00e+00 | 3.10e+10 |
| SR-91   | 2.70e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.19e+05 | 0.00e+00 | 9.76e+03 |
| SR-92   | 4.60e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.96e+01 | 0.00e+00 | 1.71e-01 |
| Y-90    | 6.82e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.42e+05 | 0.00e+00 | 1.83e+01 |
| Y-91    | 7.33e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.25e+06 | 0.00e+00 | 1.95e+03 |
| Y-91M   | 6.09e-19 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.03e-15 | 0.00e+00 | 2.08e-20 |
| Y-92    | 5.37e-04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.02e+01 | 0.00e+00 | 1.51e-05 |
| Y-93    | 2.14e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.69e+04 | 0.00e+00 | 5.83e-02 |
| ZR-95   | 6.81e+03 | 1.66e+03 | 0.00e+00 | 1.79e+03 | 0.00e+00 | 8.26e+05 | 0.00e+00 | 1.18e+03 |
| ZR-97   | 4.05e+00 | 6.96e-01 | 0.00e+00 | 7.01e-01 | 0.00e+00 | 4.44e+04 | 0.00e+00 | 3.18e-01 |
| NB-95   | 5.93e+05 | 2.44e+05 | 0.00e+00 | 1.75e+05 | 0.00e+00 | 2.06e+08 | 0.00e+00 | 1.41e+05 |
| MO-99   | 0.00e+00 | 2.08e+08 | 0.00e+00 | 3.10e+08 | 0.00e+00 | 6.84e+07 | 0.00e+00 | 4.05e+07 |
| TC-99M  | 2.74e+01 | 5.65e+01 | 0.00e+00 | 6.08e+02 | 2.95e+01 | 1.64e+04 | 0.00e+00 | 7.28e+02 |
| TC-101  | 2.28e-59 | 2.87e-59 | 0.00e+00 | 3.42e-58 | 1.57e-59 | 4.88e-57 | 0.00e+00 | 2.84e-58 |
| RU-103  | 8.67e+03 | 0.00e+00 | 0.00e+00 | 1.80e+04 | 0.00e+00 | 1.05e+05 | 0.00e+00 | 2.90e+03 |
| RU-105  | 8.00e-03 | 0.00e+00 | 0.00e+00 | 5.88e-02 | 0.00e+00 | 3.18e+00 | 0.00e+00 | 2.69e-03 |
| RU-106  | 1.90e+05 | 0.00e+00 | 0.00e+00 | 2.25e+05 | 0.00e+00 | 1.45e+06 | 0.00e+00 | 2.38e+04 |
| AG-110M | 3.86e+08 | 2.82e+08 | 0.00e+00 | 4.03e+08 | 0.00e+00 | 1.46e+10 | 0.00e+00 | 1.86e+08 |
| TE-125M | 1.51e+08 | 5.04e+07 | 5.08e+07 | 0.00e+00 | 0.00e+00 | 7.19e+07 | 0.00e+00 | 2.04e+07 |
| TE-127  | 6.45e+03 | 2.16e+03 | 5.25e+03 | 1.57e+04 | 0.00e+00 | 1.35e+05 | 0.00e+00 | 1.39e+03 |
| TE-127M | 4.21e+08 | 1.40e+08 | 1.22e+08 | 1.04e+09 | 0.00e+00 | 1.70e+08 | 0.00e+00 | 5.10e+07 |
| TE-129  | 2.27e-09 | 7.81e-10 | 1.90e-09 | 5.64e-09 | 0.00e+00 | 1.81e-07 | 0.00e+00 | 5.29e-10 |
| TE-129M | 5.57e+08 | 1.91e+08 | 2.14e+08 | 1.39e+09 | 0.00e+00 | 3.33e+08 | 0.00e+00 | 8.58e+07 |
| TE-131  | 3.49e-32 | 1.29e-32 | 3.11e-32 | 8.91e-32 | 0.00e+00 | 1.41e-30 | 0.00e+00 | 9.79e-33 |
| TE-131M | 3.38e+06 | 1.36e+06 | 2.75e+06 | 9.35e+06 | 0.00e+00 | 2.29e+07 | 0.00e+00 | 1.12e+06 |

TABLE 2.2-2a (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 8 of 8

Release Type: 2 Gaseous

Dose Factor: 2 R<sub>i</sub> (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 3 INFANT

Pathway: 5 Grs/Cow/Milk (CMILK)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 2.10e+07 | 1.04e+07 | 1.54e+07 | 6.51e+07 | 0.00e+00 | 3.85e+07 | 0.00e+00 | 9.71e+06 |
| I-130   | 3.53e+06 | 7.77e+06 | 8.71e+08 | 8.53e+06 | 0.00e+00 | 1.67e+06 | 0.00e+00 | 3.12e+06 |
| I-131   | 2.72e+09 | 3.20e+09 | 1.05e+12 | 3.74e+09 | 0.00e+00 | 1.14e+08 | 0.00e+00 | 1.41e+09 |
| I-132   | 1.43e+00 | 2.91e+00 | 1.36e+02 | 3.25e+00 | 0.00e+00 | 2.36e+00 | 0.00e+00 | 1.04e+00 |
| I-133   | 3.62e+07 | 5.28e+07 | 9.59e+09 | 6.20e+07 | 0.00e+00 | 8.93e+06 | 0.00e+00 | 1.55e+07 |
| I-134   | 1.65e-11 | 3.37e-11 | 7.87e-10 | 3.77e-11 | 0.00e+00 | 3.49e-11 | 0.00e+00 | 1.20e-11 |
| I-135   | 1.13e+05 | 2.25e+05 | 2.01e+07 | 2.50e+05 | 0.00e+00 | 8.13e+04 | 0.00e+00 | 8.19e+04 |
| CS-134  | 3.65e+10 | 6.80e+10 | 0.00e+00 | 1.75e+10 | 7.18e+09 | 1.85e+08 | 0.00e+00 | 6.87e+09 |
| CS-136  | 1.98e+09 | 5.81e+09 | 0.00e+00 | 2.32e+09 | 4.73e+08 | 8.82e+07 | 0.00e+00 | 2.17e+09 |
| CS-137  | 5.15e+10 | 6.02e+10 | 0.00e+00 | 1.62e+10 | 6.55e+09 | 1.88e+08 | 0.00e+00 | 4.27e+09 |
| CS-138  | 8.06e-23 | 1.31e-22 | 0.00e+00 | 6.53e-23 | 1.02e-23 | 2.09e-22 | 0.00e+00 | 6.35e-23 |
| BA-139  | 4.29e-07 | 2.84e-10 | 0.00e+00 | 1.71e-10 | 1.72e-10 | 2.71e-05 | 0.00e+00 | 1.24e-08 |
| BA-140  | 2.41e+08 | 2.41e+05 | 0.00e+00 | 5.72e+04 | 1.48e+05 | 5.92e+07 | 0.00e+00 | 1.24e+07 |
| BA-141  | 4.16e-45 | 2.85e-48 | 0.00e+00 | 1.71e-48 | 1.73e-48 | 5.08e-44 | 0.00e+00 | 1.31e-46 |
| BA-142  | 4.05e-80 | 3.37e-83 | 0.00e+00 | 1.94e-83 | 2.04e-83 | 1.67e-79 | 0.00e+00 | 1.99e-81 |
| LA-140  | 4.06e+01 | 1.60e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.88e+05 | 0.00e+00 | 4.12e+00 |
| LA-142  | 1.73e-10 | 6.35e-11 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.08e-05 | 0.00e+00 | 1.52e-11 |
| CE-141  | 4.34e+04 | 2.64e+04 | 0.00e+00 | 8.15e+03 | 0.00e+00 | 1.37e+07 | 0.00e+00 | 3.11e+03 |
| CE-143  | 3.96e+02 | 2.63e+05 | 0.00e+00 | 7.65e+01 | 0.00e+00 | 1.53e+06 | 0.00e+00 | 3.00e+01 |
| CE-144  | 2.33e+06 | 9.52e+05 | 0.00e+00 | 3.85e+05 | 0.00e+00 | 1.33e+08 | 0.00e+00 | 1.30e+05 |
| PR-143  | 1.49e+03 | 5.56e+02 | 0.00e+00 | 2.07e+02 | 0.00e+00 | 7.84e+05 | 0.00e+00 | 7.37e+01 |
| PR-144  | 6.25e-53 | 2.42e-53 | 0.00e+00 | 8.76e-54 | 0.00e+00 | 1.13e-48 | 0.00e+00 | 3.15e-54 |
| ND-147  | 8.81e+02 | 9.05e+02 | 0.00e+00 | 3.49e+02 | 0.00e+00 | 5.73e+05 | 0.00e+00 | 5.54e+01 |
| W-187   | 6.08e+04 | 4.23e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.48e+06 | 0.00e+00 | 1.46e+04 |
| NP-239  | 3.64e+01 | 3.26e+00 | 0.00e+00 | 6.50e+00 | 0.00e+00 | 9.42e+04 | 0.00e+00 | 1.84e+00 |

Units: Inhalation<sub>2</sub> and all tritium pathways - mrem/yr per  $\mu\text{Ci}/\text{m}^3$   
 Others - m<sup>2</sup> \* mrem/yr per  $\mu\text{Ci}/\text{sec}$

Values based on standard NUREG-0133, Section 5.3.1 assumptions unless otherwise indicated.

TABLE 2.2-2b

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 1 of 10

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 2 CHILD

Pathway: 0 Ground Plane Deposition (GPD)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| C-14    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| NA-24   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.39e+07 | 1.20e+07 |
| P-32    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| CR-51   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.50e+06 | 4.65e+06 |
| MN-54   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.62e+09 | 1.38e+09 |
| MN-56   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.07e+06 | 9.03e+05 |
| FE-55   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| FE-59   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.20e+08 | 2.73e+08 |
| CO-58   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.45e+08 | 3.80e+08 |
| CO-60   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.53e+10 | 2.15e+10 |
| NI-63   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| NI-65   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.45e+05 | 2.97e+05 |
| CU-64   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.86e+05 | 6.05e+05 |
| ZN-65   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.57e+08 | 7.46e+08 |
| ZN-69   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.08e+03 | 4.87e+03 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.37e+05 | 2.03e+05 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.03e+07 | 8.98e+06 |
| RB-88   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.78e+04 | 3.31e+04 |
| RB-89   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.48e+05 | 1.23e+05 |
| SR-89   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.51e+04 | 2.16e+04 |
| SR-90   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| SR-91   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.51e+06 | 2.15e+06 |
| SR-92   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.62e+05 | 7.76e+05 |
| Y-90    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.31e+03 | 4.50e+03 |
| Y-91    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.21e+06 | 1.07e+06 |
| Y-91M   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.16e+05 | 1.00e+05 |
| Y-92    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.14e+05 | 1.80e+05 |
| Y-93    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.50e+05 | 1.83e+05 |
| ZR-95   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.85e+08 | 2.45e+08 |
| ZR-97   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.44e+06 | 2.96e+06 |
| NB-95   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.61e+08 | 1.37e+08 |
| MO-99   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.62e+06 | 3.99e+06 |
| TC-99M  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.11e+05 | 1.84e+05 |
| TC-101  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.26e+04 | 2.03e+04 |
| RU-103  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.26e+08 | 1.08e+08 |
| RU-105  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.21e+05 | 6.36e+05 |
| RU-106  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.04e+08 | 4.20e+08 |
| AG-110M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.02e+09 | 3.45e+09 |
| TE-125M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.13e+06 | 1.56e+06 |
| TE-127  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.29e+03 | 2.99e+03 |
| TE-127M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.08e+05 | 9.17e+04 |
| TE-129  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.08e+04 | 2.61e+04 |
| TE-129M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.31e+07 | 1.98e+07 |
| TE-131  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.45e+07 | 2.92e+04 |
| TE-131M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.46e+06 | 8.02e+06 |

TABLE 2.2-2b (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 2 of 10

Release Type: 2 Gaseous

Dose Factor: 2 R<sub>i</sub> (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 2 CHILD

Pathway: 0 Ground Plane Deposition (GPD)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.97e+06 | 4.22e+06 |
| I-130   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.68e+06 | 5.50e+06 |
| I-131   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.09e+07 | 1.72e+07 |
| I-132   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.47e+06 | 1.25e+06 |
| I-133   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.98e+06 | 2.45e+06 |
| I-134   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.30e+05 | 4.46e+05 |
| I-135   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.95e+06 | 2.53e+06 |
| CS-134  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.05e+09 | 6.90e+09 |
| CS-136  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.71e+08 | 1.51e+08 |
| CS-137  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.20e+10 | 1.03e+10 |
| CS-138  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.10e+05 | 3.59e+05 |
| BA-139  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.19e+05 | 1.06e+05 |
| BA-140  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.35e+07 | 2.05e+07 |
| BA-141  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.75e+04 | 4.17e+04 |
| BA-142  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.06e+04 | 4.44e+04 |
| LA-140  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.18e+07 | 1.92e+07 |
| LA-142  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.12e+05 | 7.60e+05 |
| CE-141  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.54e+07 | 1.37e+07 |
| CE-143  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.63e+06 | 2.31e+06 |
| CE-144  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.05e+07 | 6.96e+07 |
| PR-143  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| PR-144  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.11e+03 | 1.84e+03 |
| ND-147  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.01e+07 | 8.39e+06 |
| W-187   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.73e+06 | 2.35e+06 |
| NP-239  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.98e+06 | 1.71e+06 |

TABLE 2.2-2b (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 3 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 2 CHILD  
Pathway: 1 Inhalation (INHL)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 1.13e+03 | 1.13e+03 | 1.13e+03 | 1.13e+03 | 1.13e+03 | 0.00e+00 | 1.13e+03 |
| C-14    | 3.59e+04 | 6.73e+03 | 6.73e+03 | 6.73e+03 | 6.73e+03 | 6.73e+03 | 0.00e+00 | 6.73e+03 |
| NA-24   | 1.61e+04 | 1.61e+04 | 1.61e+04 | 1.61e+04 | 1.61e+04 | 1.61e+04 | 0.00e+00 | 1.61e+04 |
| P-32    | 2.61e+06 | 1.14e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.22e+04 | 0.00e+00 | 9.88e+04 |
| CR-51   | 0.00e+00 | 0.00e+00 | 8.55e+01 | 2.43e+01 | 1.70e+04 | 1.08e+03 | 0.00e+00 | 1.54e+02 |
| MN-54   | 0.00e+00 | 4.29e+04 | 0.00e+00 | 1.00e+04 | 1.58e+06 | 2.29e+04 | 0.00e+00 | 9.51e+03 |
| MN-56   | 0.00e+00 | 1.66e+00 | 0.00e+00 | 1.67e+00 | 1.31e+04 | 1.23e+05 | 0.00e+00 | 3.12e-01 |
| FE-55   | 4.74e+04 | 2.52e+04 | 0.00e+00 | 0.00e+00 | 1.11e+05 | 2.87e+03 | 0.00e+00 | 7.77e+03 |
| FE-59   | 2.07e+04 | 3.35e+04 | 0.00e+00 | 0.00e+00 | 1.27e+06 | 7.07e+04 | 0.00e+00 | 1.67e+04 |
| CO-58   | 0.00e+00 | 1.77e+03 | 0.00e+00 | 0.00e+00 | 1.11e+06 | 3.44e+04 | 0.00e+00 | 3.16e+03 |
| CO-60   | 0.00e+00 | 1.31e+04 | 0.00e+00 | 0.00e+00 | 7.07e+06 | 9.62e+04 | 0.00e+00 | 2.26e+04 |
| NI-63   | 8.21e+05 | 4.63e+04 | 0.00e+00 | 0.00e+00 | 2.75e+05 | 6.33e+03 | 0.00e+00 | 2.80e+04 |
| NI-65   | 2.99e+00 | 2.96e-01 | 0.00e+00 | 0.00e+00 | 8.18e+03 | 8.40e+04 | 0.00e+00 | 1.64e-01 |
| CU-64   | 0.00e+00 | 1.99e+00 | 0.00e+00 | 6.03e+00 | 9.58e+03 | 3.67e+04 | 0.00e+00 | 1.07e+00 |
| ZN-65   | 4.26e+04 | 1.13e+05 | 0.00e+00 | 7.14e+04 | 9.95e+05 | 1.63e+04 | 0.00e+00 | 7.03e+04 |
| ZN-69   | 6.70e-02 | 9.66e-02 | 0.00e+00 | 5.85e-02 | 1.42e+03 | 1.02e+04 | 0.00e+00 | 8.92e-03 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.74e+02 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.48e+02 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.53e+01 |
| RB-86   | 0.00e+00 | 1.98e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.99e+03 | 0.00e+00 | 1.14e+05 |
| RB-88   | 0.00e+00 | 5.62e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.72e+01 | 0.00e+00 | 3.66e+02 |
| RB-89   | 0.00e+00 | 3.45e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.89e+00 | 0.00e+00 | 2.90e+02 |
| SR-89   | 5.99e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.16e+06 | 1.67e+05 | 0.00e+00 | 1.72e+04 |
| SR-90   | 1.01e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.48e+07 | 3.43e+05 | 0.00e+00 | 6.44e+06 |
| SR-91   | 1.21e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.33e+04 | 1.74e+05 | 0.00e+00 | 4.59e+00 |
| SR-92   | 1.31e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.40e+04 | 2.42e+05 | 0.00e+00 | 5.25e-01 |
| Y-90    | 4.11e+03 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.62e+05 | 2.68e+05 | 0.00e+00 | 1.11e+02 |
| Y-91    | 9.14e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.63e+06 | 1.84e+05 | 0.00e+00 | 2.44e+04 |
| Y-91M   | 5.07e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.81e+03 | 1.72e+03 | 0.00e+00 | 1.84e-02 |
| Y-92    | 2.04e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.39e+04 | 2.39e+05 | 0.00e+00 | 5.81e-01 |
| Y-93    | 1.87e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.44e+04 | 3.89e+05 | 0.00e+00 | 5.11e+00 |
| ZR-95   | 1.90e+05 | 4.18e+04 | 0.00e+00 | 5.96e+04 | 2.23e+06 | 6.11e+04 | 0.00e+00 | 3.70e+04 |
| ZR-97   | 1.88e+02 | 2.72e+01 | 0.00e+00 | 3.89e+01 | 1.13e+05 | 3.51e+05 | 0.00e+00 | 1.60e+01 |
| NB-95   | 2.35e+04 | 9.18e+03 | 0.00e+00 | 8.62e+03 | 6.14e+05 | 3.70e+04 | 0.00e+00 | 6.55e+03 |
| MO-99   | 0.00e+00 | 1.72e+02 | 0.00e+00 | 3.92e+02 | 1.35e+05 | 1.27e+05 | 0.00e+00 | 4.25e+01 |
| TC-99M  | 1.78e-03 | 3.48e-03 | 0.00e+00 | 5.07e-02 | 9.51e+02 | 4.81e+03 | 0.00e+00 | 5.77e-02 |
| TC-101  | 8.10e-05 | 8.51e-05 | 0.00e+00 | 1.45e-03 | 5.85e+02 | 1.63e+01 | 0.00e+00 | 1.08e-03 |
| RU-103  | 2.79e+03 | 0.00e+00 | 0.00e+00 | 7.03e+03 | 6.62e+05 | 4.48e+04 | 0.00e+00 | 1.07e+03 |
| RU-105  | 1.53e+00 | 0.00e+00 | 0.00e+00 | 1.34e+00 | 1.59e+04 | 9.95e+04 | 0.00e+00 | 5.55e-01 |
| RU-106  | 1.36e+05 | 0.00e+00 | 0.00e+00 | 1.84e+05 | 1.43e+07 | 4.29e+05 | 0.00e+00 | 1.69e+04 |
| AG-110M | 1.69e+04 | 1.14e+04 | 0.00e+00 | 2.12e+04 | 5.48e+06 | 1.00e+05 | 0.00e+00 | 9.14e+03 |
| TE-125M | 6.73e+03 | 2.33e+03 | 1.92e+03 | 0.00e+00 | 4.77e+05 | 3.38e+04 | 0.00e+00 | 9.14e+02 |
| TE-127  | 2.77e+00 | 9.51e-01 | 1.96e+00 | 7.07e+00 | 1.00e+04 | 5.62e+04 | 0.00e+00 | 6.11e-01 |
| TE-127M | 2.49e+04 | 8.55e+03 | 6.07e+03 | 6.36e+04 | 1.48e+06 | 7.14e+04 | 0.00e+00 | 3.02e+03 |
| TE-129  | 9.77e-02 | 3.50e-02 | 7.14e-02 | 2.57e-01 | 2.93e+03 | 2.55e+04 | 0.00e+00 | 2.38e-02 |
| TE-129M | 1.92e+04 | 6.85e+03 | 6.33e+03 | 5.03e+04 | 1.76e+06 | 1.82e+05 | 0.00e+00 | 3.04e+03 |
| TE-131  | 2.17e-02 | 8.44e-03 | 1.70e-02 | 5.88e-02 | 2.05e+03 | 1.33e+03 | 0.00e+00 | 6.59e-03 |
| TE-131M | 1.34e+02 | 5.92e+01 | 9.77e+01 | 4.00e+02 | 2.06e+05 | 3.08e+05 | 0.00e+00 | 5.07e+01 |



TABLE 2.2-2b (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 4 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 R<sub>i</sub> (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 2 CHILD  
Pathway: 1 Inhalation (INHL)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 4.81e+02 | 2.72e+02 | 3.18e+02 | 1.77e+03 | 3.77e+05 | 1.38e+05 | 0.00e+00 | 2.63e+02 |
| I-130   | 8.18e+03 | 1.64e+04 | 1.85e+06 | 2.45e+04 | 0.00e+00 | 5.11e+03 | 0.00e+00 | 8.44e+03 |
| I-131   | 4.81e+04 | 4.81e+04 | 1.62e+07 | 7.88e+04 | 0.00e+00 | 2.84e+03 | 0.00e+00 | 2.73e+04 |
| I-132   | 2.12e+03 | 4.07e+03 | 1.94e+05 | 6.25e+03 | 0.00e+00 | 3.20e+03 | 0.00e+00 | 1.88e+03 |
| I-133   | 1.66e+04 | 2.03e+04 | 3.85e+06 | 3.38e+04 | 0.00e+00 | 5.48e+03 | 0.00e+00 | 7.70e+03 |
| I-134   | 1.17e+03 | 2.16e+03 | 5.07e+04 | 3.30e+03 | 0.00e+00 | 9.55e+02 | 0.00e+00 | 9.95e+02 |
| I-135   | 4.92e+03 | 8.73e+03 | 7.92e+05 | 1.34e+04 | 0.00e+00 | 4.44e+03 | 0.00e+00 | 4.14e+03 |
| CS-134  | 6.51e+05 | 1.01e+06 | 0.00e+00 | 3.30e+05 | 1.21e+05 | 3.85e+03 | 0.00e+00 | 2.25e+05 |
| CS-136  | 6.51e+04 | 1.71e+05 | 0.00e+00 | 9.55e+04 | 1.45e+04 | 4.18e+03 | 0.00e+00 | 1.16e+05 |
| CS-137  | 9.07e+05 | 8.25e+05 | 0.00e+00 | 2.82e+05 | 1.04e+05 | 3.62e+03 | 0.00e+00 | 1.28e+05 |
| CS-138  | 6.33e+02 | 8.40e+02 | 0.00e+00 | 6.22e+02 | 6.81e+01 | 2.70e+02 | 0.00e+00 | 5.55e+02 |
| BA-139  | 1.84e+00 | 9.84e-04 | 0.00e+00 | 8.62e-04 | 5.77e+03 | 5.77e+04 | 0.00e+00 | 5.37e-02 |
| BA-140  | 7.40e+04 | 6.48e+01 | 0.00e+00 | 2.11e+01 | 1.74e+06 | 1.02e+05 | 0.00e+00 | 4.33e+03 |
| BA-141  | 1.96e-01 | 1.09e-04 | 0.00e+00 | 9.47e-05 | 2.92e+03 | 2.75e+02 | 0.00e+00 | 6.36e-03 |
| BA-142  | 5.00e-02 | 3.60e-05 | 0.00e+00 | 2.91e-05 | 1.64e+03 | 2.74e+00 | 0.00e+00 | 2.79e-03 |
| LA-140  | 6.44e+02 | 2.25e+02 | 0.00e+00 | 0.00e+00 | 1.83e+05 | 2.26e+05 | 0.00e+00 | 7.55e+01 |
| LA-142  | 1.29e+00 | 4.11e-01 | 0.00e+00 | 0.00e+00 | 8.70e+03 | 7.59e+04 | 0.00e+00 | 1.29e-01 |
| CE-141  | 3.92e+04 | 1.95e+04 | 0.00e+00 | 8.55e+03 | 5.44e+05 | 5.66e+04 | 0.00e+00 | 2.90e+03 |
| CE-143  | 3.66e+02 | 1.99e+02 | 0.00e+00 | 8.36e+01 | 1.15e+05 | 1.27e+05 | 0.00e+00 | 2.88e+01 |
| CE-144  | 6.77e+06 | 2.12e+06 | 0.00e+00 | 1.17e+06 | 1.20e+07 | 3.89e+05 | 0.00e+00 | 3.62e+05 |
| PR-143  | 1.85e+04 | 5.55e+03 | 0.00e+00 | 3.00e+03 | 4.33e+05 | 9.73e+04 | 0.00e+00 | 9.14e+02 |
| PR-144  | 5.96e-02 | 1.85e-02 | 0.00e+00 | 9.77e-03 | 1.57e+03 | 1.97e+02 | 0.00e+00 | 3.00e-03 |
| ND-147  | 1.08e+04 | 8.73e+03 | 0.00e+00 | 4.81e+03 | 3.28e+05 | 8.21e+04 | 0.00e+00 | 6.81e+02 |
| W-187   | 1.63e+01 | 9.66e+00 | 0.00e+00 | 0.00e+00 | 4.11e+04 | 9.10e+04 | 0.00e+00 | 4.33e+00 |
| NP-239  | 4.66e+02 | 3.35e+01 | 0.00e+00 | 9.73e+01 | 5.81e+04 | 6.40e+04 | 0.00e+00 | 2.35e+01 |

TABLE 2.2-2b (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 5 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>)) |  
AgeGroup: 2 CHILD  
Pathway: 2 Vegetation (VEG)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 4.01e+03 | 4.01e+03 | 4.01e+03 | 4.01e+03 | 4.01e+03 | 0.00e+00 | 4.01e+03 |
| C-14    | 8.89e+08 | 1.78e+08 | 1.78e+08 | 1.78e+08 | 1.78e+08 | 1.78e+08 | 0.00e+00 | 1.78e+08 |
| NA-24   | 3.75e+05 | 3.75e+05 | 3.75e+05 | 3.75e+05 | 3.75e+05 | 3.75e+05 | 0.00e+00 | 3.75e+05 |
| P-32    | 3.36e+09 | 1.57e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.30e+07 | 0.00e+00 | 1.30e+08 |
| CR-51   | 0.00e+00 | 0.00e+00 | 6.49e+04 | 1.77e+04 | 1.19e+05 | 6.20e+06 | 0.00e+00 | 1.17e+05 |
| MN-54   | 0.00e+00 | 6.65e+08 | 0.00e+00 | 1.86e+08 | 0.00e+00 | 5.58e+08 | 0.00e+00 | 1.77e+08 |
| MN-56   | 0.00e+00 | 1.87e+01 | 0.00e+00 | 2.26e+01 | 0.00e+00 | 2.71e+03 | 0.00e+00 | 4.22e+00 |
| FE-55   | 8.01e+08 | 4.25e+08 | 0.00e+00 | 0.00e+00 | 2.40e+08 | 7.87e+07 | 0.00e+00 | 1.32e+08 |
| FE-59   | 3.97e+08 | 6.42e+08 | 0.00e+00 | 0.00e+00 | 1.86e+08 | 6.69e+08 | 0.00e+00 | 3.20e+08 |
| CO-58   | 0.00e+00 | 6.45e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.76e+08 | 0.00e+00 | 1.98e+08 |
| CO-60   | 0.00e+00 | 3.78e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.10e+09 | 0.00e+00 | 1.12e+09 |
| NI-63   | 3.95e+10 | 2.11e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.42e+08 | 0.00e+00 | 1.34e+09 |
| NI-65   | 1.05e+02 | 9.89e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.21e+03 | 0.00e+00 | 5.77e+00 |
| CU-64   | 0.00e+00 | 1.09e+04 | 0.00e+00 | 2.64e+04 | 0.00e+00 | 5.13e+05 | 0.00e+00 | 6.60e+03 |
| ZN-65   | 8.12e+08 | 2.16e+09 | 0.00e+00 | 1.36e+09 | 0.00e+00 | 3.80e+08 | 0.00e+00 | 1.35e+09 |
| ZN-69   | 9.30e-06 | 1.34e-05 | 0.00e+00 | 8.15e-06 | 0.00e+00 | 8.47e-04 | 0.00e+00 | 1.24e-06 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.35e+00 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.92e-11 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 4.52e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.91e+07 | 0.00e+00 | 2.78e+08 |
| RB-88   | 0.00e+00 | 4.38e-22 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.15e-23 | 0.00e+00 | 3.04e-22 |
| RB-89   | 0.00e+00 | 4.69e-26 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.09e-28 | 0.00e+00 | 4.17e-26 |
| SR-89   | 3.59e+10 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.39e+09 | 0.00e+00 | 1.03e+09 |
| SR-90   | 1.24e+12 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.68e+10 | 0.00e+00 | 3.15e+11 |
| SR-91   | 5.22e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.15e+06 | 0.00e+00 | 1.97e+04 |
| SR-92   | 7.24e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.37e+04 | 0.00e+00 | 2.90e+01 |
| Y-90    | 2.31e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.58e+07 | 0.00e+00 | 6.18e+02 |
| Y-91    | 1.87e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.49e+09 | 0.00e+00 | 4.99e+05 |
| Y-91M   | 9.23e-09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.81e-05 | 0.00e+00 | 3.36e-10 |
| Y-92    | 1.58e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.57e+04 | 0.00e+00 | 4.53e-02 |
| Y-93    | 2.92e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.35e+06 | 0.00e+00 | 8.00e+00 |
| ZR-95   | 3.87e+06 | 8.50e+05 | 0.00e+00 | 1.22e+06 | 0.00e+00 | 8.86e+08 | 0.00e+00 | 7.56e+05 |
| ZR-97   | 5.70e+02 | 8.23e+01 | 0.00e+00 | 1.18e+02 | 0.00e+00 | 1.25e+07 | 0.00e+00 | 4.86e+01 |
| NB-95   | 4.10e+05 | 1.60e+05 | 0.00e+00 | 1.50e+05 | 0.00e+00 | 2.95e+08 | 0.00e+00 | 1.14e+05 |
| MO-99   | 0.00e+00 | 7.70e+06 | 0.00e+00 | 1.65e+07 | 0.00e+00 | 6.37e+06 | 0.00e+00 | 1.91e+06 |
| TC-99M  | 4.70e+00 | 9.22e+00 | 0.00e+00 | 1.34e+02 | 4.68e+00 | 5.25e+03 | 0.00e+00 | 1.53e+02 |
| TC-101  | 1.35e-30 | 1.42e-30 | 0.00e+00 | 2.41e-29 | 7.48e-31 | 4.50e-30 | 0.00e+00 | 1.80e-29 |
| RU-103  | 1.53e+07 | 0.00e+00 | 0.00e+00 | 3.86e+07 | 0.00e+00 | 3.96e+08 | 0.00e+00 | 5.89e+06 |
| RU-105  | 9.13e+01 | 0.00e+00 | 0.00e+00 | 8.02e+02 | 0.00e+00 | 5.96e+04 | 0.00e+00 | 3.31e+01 |
| RU-106  | 7.45e+08 | 0.00e+00 | 0.00e+00 | 1.01e+09 | 0.00e+00 | 1.16e+10 | 0.00e+00 | 9.30e+07 |
| AG-110M | 3.21e+07 | 2.17e+07 | 0.00e+00 | 4.04e+07 | 0.00e+00 | 2.58e+09 | 0.00e+00 | 1.74e+07 |
| TE-125M | 3.51e+08 | 9.52e+07 | 9.86e+07 | 0.00e+00 | 0.00e+00 | 3.39e+08 | 0.00e+00 | 4.68e+07 |
| TE-127  | 9.97e+03 | 2.69e+03 | 6.90e+03 | 2.84e+04 | 0.00e+00 | 3.89e+05 | 0.00e+00 | 2.14e+03 |
| TE-127M | 1.32e+09 | 3.56e+08 | 3.16e+08 | 3.77e+09 | 0.00e+00 | 1.07e+09 | 0.00e+00 | 1.57e+08 |
| TE-129  | 1.20e-03 | 3.36e-04 | 8.59e-04 | 3.52e-03 | 0.00e+00 | 7.49e-02 | 0.00e+00 | 2.86e-04 |
| TE-129M | 8.40e+08 | 2.35e+08 | 2.71e+08 | 2.47e+09 | 0.00e+00 | 1.03e+09 | 0.00e+00 | 1.30e+08 |
| TE-131  | 2.59e-15 | 7.90e-16 | 1.98e-15 | 7.84e-15 | 0.00e+00 | 1.36e-14 | 0.00e+00 | 7.71e-16 |
| TE-131M | 1.54e+06 | 5.33e+05 | 1.10e+06 | 5.16e+06 | 0.00e+00 | 2.16e+07 | 0.00e+00 | 5.67e+05 |

TABLE 2.2-2b (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 6 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 2 CHILD  
Pathway: 2 Vegetation (VEG)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 6.98e+06 | 3.09e+06 | 4.50e+06 | 2.87e+07 | 0.00e+00 | 3.11e+07 | 0.00e+00 | 3.73e+06 |
| I-130   | 6.14e+05 | 1.24e+06 | 1.37e+08 | 1.85e+06 | 0.00e+00 | 5.80e+05 | 0.00e+00 | 6.39e+05 |
| I-131   | 1.43e+08 | 1.44e+08 | 4.75e+10 | 2.36e+08 | 0.00e+00 | 1.28e+07 | 0.00e+00 | 8.17e+07 |
| I-132   | 9.23e+01 | 1.70e+02 | 7.87e+03 | 2.60e+02 | 0.00e+00 | 2.00e+02 | 0.00e+00 | 7.80e+01 |
| I-133   | 3.53e+06 | 4.36e+06 | 8.11e+08 | 7.27e+06 | 0.00e+00 | 1.76e+06 | 0.00e+00 | 1.65e+06 |
| I-134   | 1.50e-04 | 2.78e-04 | 6.40e-03 | 4.26e-04 | 0.00e+00 | 1.85e-04 | 0.00e+00 | 1.28e-04 |
| I-135   | 6.28e+04 | 1.13e+05 | 1.00e+07 | 1.73e+05 | 0.00e+00 | 8.61e+04 | 0.00e+00 | 5.34e+04 |
| CS-134  | 1.60e+10 | 2.63e+10 | 0.00e+00 | 8.16e+09 | 2.93e+09 | 1.42e+08 | 0.00e+00 | 5.55e+09 |
| CS-136  | 8.23e+07 | 2.26e+08 | 0.00e+00 | 1.21e+08 | 1.80e+07 | 7.95e+06 | 0.00e+00 | 1.46e+08 |
| CS-137  | 2.39e+10 | 2.29e+10 | 0.00e+00 | 7.46e+09 | 2.69e+09 | 1.43e+08 | 0.00e+00 | 3.38e+09 |
| CS-138  | 6.44e-11 | 8.95e-11 | 0.00e+00 | 6.30e-11 | 6.78e-12 | 4.12e-11 | 0.00e+00 | 5.67e-11 |
| BA-139  | 4.96e-02 | 2.65e-05 | 0.00e+00 | 2.31e-05 | 1.56e-05 | 2.86e+00 | 0.00e+00 | 1.44e-03 |
| BA-140  | 2.77e+08 | 2.43e+05 | 0.00e+00 | 7.90e+04 | 1.45e+05 | 1.40e+08 | 0.00e+00 | 1.62e+07 |
| BA-141  | 2.04e-21 | 1.14e-24 | 0.00e+00 | 9.90e-25 | 6.72e-24 | 1.16e-21 | 0.00e+00 | 6.65e-23 |
| BA-142  | 4.06e-39 | 2.92e-42 | 0.00e+00 | 2.36e-42 | 1.72e-42 | 5.29e-41 | 0.00e+00 | 2.26e-40 |
| LA-140  | 3.25e+03 | 1.14e+03 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.17e+07 | 0.00e+00 | 3.83e+02 |
| LA-142  | 3.39e-04 | 1.08e-04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.14e+01 | 0.00e+00 | 3.38e-05 |
| CE-141  | 6.56e+05 | 3.27e+05 | 0.00e+00 | 1.43e+05 | 0.00e+00 | 4.08e+08 | 0.00e+00 | 4.85e+04 |
| CE-143  | 1.72e+03 | 9.30e+05 | 0.00e+00 | 3.90e+02 | 0.00e+00 | 1.36e+07 | 0.00e+00 | 1.35e+02 |
| CE-144  | 1.27e+08 | 3.99e+07 | 0.00e+00 | 2.21e+07 | 0.00e+00 | 1.04e+10 | 0.00e+00 | 6.78e+06 |
| PR-143  | 1.46e+05 | 4.38e+04 | 0.00e+00 | 2.37e+04 | 0.00e+00 | 1.57e+08 | 0.00e+00 | 7.24e+03 |
| PR-144  | 5.64e-26 | 1.74e-26 | 0.00e+00 | 9.22e-27 | 0.00e+00 | 3.75e-23 | 0.00e+00 | 2.84e-27 |
| ND-147  | 7.14e+04 | 5.79e+04 | 0.00e+00 | 3.17e+04 | 0.00e+00 | 9.16e+07 | 0.00e+00 | 4.48e+03 |
| W-187   | 6.43e+04 | 3.81e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.35e+06 | 0.00e+00 | 1.71e+04 |
| NP-239  | 2.56e+03 | 1.84e+02 | 0.00e+00 | 5.31e+02 | 0.00e+00 | 1.36e+07 | 0.00e+00 | 1.29e+02 |

TABLE 2.2-2b (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 7 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 R<sub>i</sub> (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 2 CHILD  
Pathway: 4 Grs/Cow/Meat (CMEAT)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 2.34e+02 | 2.34e+02 | 2.34e+02 | 2.34e+02 | 2.34e+02 | 0.00e+00 | 2.34e+02 |
| C-14    | 3.83e+08 | 7.67e+07 | 7.67e+07 | 7.67e+07 | 7.67e+07 | 7.67e+07 | 0.00e+00 | 7.67e+07 |
| NA-24   | 1.84e-03 | 1.84e-03 | 1.84e-03 | 1.84e-03 | 1.84e-03 | 1.84e-03 | 0.00e+00 | 1.84e-03 |
| P-32    | 7.41e+09 | 3.47e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.05e+08 | 0.00e+00 | 2.86e+08 |
| CR-51   | 0.00e+00 | 0.00e+00 | 4.87e+03 | 1.33e+03 | 8.90e+03 | 4.66e+05 | 0.00e+00 | 8.78e+03 |
| MN-54   | 0.00e+00 | 8.01e+06 | 0.00e+00 | 2.25e+06 | 0.00e+00 | 6.72e+06 | 0.00e+00 | 2.13e+06 |
| MN-56   | 0.00e+00 | 1.56e-53 | 0.00e+00 | 1.89e-53 | 0.00e+00 | 2.26e-51 | 0.00e+00 | 3.52e-54 |
| FE-55   | 4.57e+08 | 2.43e+08 | 0.00e+00 | 0.00e+00 | 1.37e+08 | 4.49e+07 | 0.00e+00 | 7.51e+07 |
| FE-59   | 3.76e+08 | 6.08e+08 | 0.00e+00 | 0.00e+00 | 1.76e+08 | 6.34e+08 | 0.00e+00 | 3.03e+08 |
| CO-58   | 0.00e+00 | 1.64e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.59e+07 | 0.00e+00 | 5.03e+07 |
| CO-60   | 0.00e+00 | 6.93e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.84e+08 | 0.00e+00 | 2.04e+08 |
| NI-63   | 2.91e+10 | 1.56e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.05e+08 | 0.00e+00 | 9.91e+08 |
| NI-65   | 3.55e-52 | 3.34e-53 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.10e-51 | 0.00e+00 | 1.95e-53 |
| CU-64   | 0.00e+00 | 2.77e-07 | 0.00e+00 | 6.68e-07 | 0.00e+00 | 1.30e-05 | 0.00e+00 | 1.67e-07 |
| ZN-65   | 3.75e+08 | 1.00e+09 | 0.00e+00 | 6.30e+08 | 0.00e+00 | 1.76e+08 | 0.00e+00 | 6.22e+08 |
| ZN-69   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.89e-57 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 5.76e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.71e+07 | 0.00e+00 | 3.55e+08 |
| RB-88   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-89   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| SR-89   | 4.81e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.86e+07 | 0.00e+00 | 1.38e+07 |
| SR-90   | 1.04e+10 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.40e+08 | 0.00e+00 | 2.64e+09 |
| SR-91   | 2.26e-10 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.99e-10 | 0.00e+00 | 8.54e-12 |
| SR-92   | 1.69e-49 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.19e-48 | 0.00e+00 | 6.76e-51 |
| Y-90    | 1.73e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.92e+05 | 0.00e+00 | 4.62e+00 |
| Y-91    | 1.80e+06 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.40e+08 | 0.00e+00 | 4.82e+04 |
| Y-91M   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| Y-92    | 2.37e-39 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.84e-35 | 0.00e+00 | 6.77e-41 |
| Y-93    | 6.97e-12 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.04e-07 | 0.00e+00 | 1.91e-13 |
| ZR-95   | 2.67e+06 | 5.86e+05 | 0.00e+00 | 8.39e+05 | 0.00e+00 | 6.11e+08 | 0.00e+00 | 5.22e+05 |
| ZR-97   | 3.16e-05 | 4.57e-06 | 0.00e+00 | 6.56e-06 | 0.00e+00 | 6.93e-01 | 0.00e+00 | 2.70e-06 |
| NB-95   | 3.10e+06 | 1.21e+06 | 0.00e+00 | 1.13e+06 | 0.00e+00 | 2.23e+09 | 0.00e+00 | 8.61e+05 |
| MO-99   | 0.00e+00 | 1.14e+05 | 0.00e+00 | 2.44e+05 | 0.00e+00 | 9.44e+04 | 0.00e+00 | 2.82e+04 |
| TC-99M  | 6.02e-21 | 1.18e-20 | 0.00e+00 | 1.72e-19 | 5.99e-21 | 6.72e-18 | 0.00e+00 | 1.96e-19 |
| TC-101  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RU-103  | 1.55e+08 | 0.00e+00 | 0.00e+00 | 3.90e+08 | 0.00e+00 | 4.00e+09 | 0.00e+00 | 5.95e+07 |
| RU-105  | 8.48e-28 | 0.00e+00 | 0.00e+00 | 7.45e-27 | 0.00e+00 | 5.53e-25 | 0.00e+00 | 3.08e-28 |
| RU-106  | 4.44e+09 | 0.00e+00 | 0.00e+00 | 5.99e+09 | 0.00e+00 | 6.90e+10 | 0.00e+00 | 5.54e+08 |
| AG-110M | 8.39e+06 | 5.67e+06 | 0.00e+00 | 1.06e+07 | 0.00e+00 | 6.74e+08 | 0.00e+00 | 4.53e+06 |
| TE-125M | 5.70e+08 | 1.54e+08 | 1.60e+08 | 0.00e+00 | 0.00e+00 | 5.50e+08 | 0.00e+00 | 7.59e+07 |
| TE-127  | 3.99e-10 | 1.08e-10 | 2.76e-10 | 1.14e-09 | 0.00e+00 | 1.56e-08 | 0.00e+00 | 8.56e-11 |
| TE-127M | 1.78e+09 | 4.78e+08 | 4.24e+08 | 5.06e+09 | 0.00e+00 | 1.44e+09 | 0.00e+00 | 2.11e+08 |
| TE-129  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| TE-129M | 1.79e+09 | 5.00e+08 | 5.77e+08 | 5.25e+09 | 0.00e+00 | 2.18e+09 | 0.00e+00 | 2.78e+08 |
| TE-131  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| TE-131M | 6.97e+02 | 2.41e+02 | 4.96e+02 | 2.33e+03 | 0.00e+00 | 9.78e+03 | 0.00e+00 | 2.57e+02 |

TABLE 2.2-2b (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 8 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 2 CHILD  
Pathway: 4 Grs/Cow/Meat (CMEAT)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 2.09e+06 | 9.23e+05 | 1.35e+06 | 8.57e+06 | 0.00e+00 | 9.30e+06 | 0.00e+00 | 1.12e+06 |
| I-130   | 2.92e-06 | 5.89e-06 | 6.49e-04 | 8.81e-06 | 0.00e+00 | 2.76e-06 | 0.00e+00 | 3.04e-06 |
| I-131   | 1.65e+07 | 1.66e+07 | 5.50e+09 | 2.73e+07 | 0.00e+00 | 1.48e+06 | 0.00e+00 | 9.45e+06 |
| I-132   | 1.05e-58 | 1.93e-58 | 8.93e-57 | 2.95e-58 | 0.00e+00 | 2.27e-58 | 0.00e+00 | 8.85e-59 |
| I-133   | 5.64e-01 | 6.98e-01 | 1.30e+02 | 1.16e+00 | 0.00e+00 | 2.81e-01 | 0.00e+00 | 2.64e-01 |
| I-134   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| I-135   | 6.86e-17 | 1.23e-16 | 1.09e-14 | 1.89e-16 | 0.00e+00 | 9.40e-17 | 0.00e+00 | 5.84e-17 |
| CS-134  | 9.22e+08 | 1.51e+09 | 0.00e+00 | 4.69e+08 | 1.68e+08 | 8.16e+06 | 0.00e+00 | 3.19e+08 |
| CS-136  | 1.62e+07 | 4.45e+07 | 0.00e+00 | 2.37e+07 | 3.54e+06 | 1.57e+06 | 0.00e+00 | 2.88e+07 |
| CS-137  | 1.33e+09 | 1.28e+09 | 0.00e+00 | 4.16e+08 | 1.50e+08 | 7.99e+06 | 0.00e+00 | 1.88e+08 |
| CS-138  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BA-139  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BA-140  | 4.39e+07 | 3.84e+04 | 0.00e+00 | 1.25e+04 | 2.29e+04 | 2.22e+07 | 0.00e+00 | 2.56e+06 |
| BA-141  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BA-142  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| LA-140  | 5.66e-02 | 1.98e-02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.52e+02 | 0.00e+00 | 6.67e-03 |
| LA-142  | 6.20e-92 | 1.98e-92 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.92e-87 | 0.00e+00 | 6.19e-93 |
| CE-141  | 2.22e+04 | 1.11e+04 | 0.00e+00 | 4.85e+03 | 0.00e+00 | 1.38e+07 | 0.00e+00 | 1.64e+03 |
| CE-143  | 3.14e-02 | 1.70e+01 | 0.00e+00 | 7.14e-03 | 0.00e+00 | 2.49e+02 | 0.00e+00 | 2.46e-03 |
| CE-144  | 2.32e+06 | 7.26e+05 | 0.00e+00 | 4.02e+05 | 0.00e+00 | 1.89e+08 | 0.00e+00 | 1.24e+05 |
| PR-143  | 3.34e+04 | 1.00e+04 | 0.00e+00 | 5.44e+03 | 0.00e+00 | 3.61e+07 | 0.00e+00 | 1.66e+03 |
| PR-144  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| ND-147  | 1.17e+04 | 9.46e+03 | 0.00e+00 | 5.19e+03 | 0.00e+00 | 1.50e+07 | 0.00e+00 | 7.32e+02 |
| W-187   | 3.21e-02 | 1.90e-02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.67e+00 | 0.00e+00 | 8.52e-03 |
| NP-239  | 4.23e-01 | 3.04e-02 | 0.00e+00 | 8.79e-02 | 0.00e+00 | 2.25e+03 | 0.00e+00 | 2.14e-02 |

TABLE 2.2-2b (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 9 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 R<sub>i</sub> (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 2 CHILD  
Pathway: 5 Grs/Cow/Milk (CMILK)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 1.57e+03 | 1.57e+03 | 1.57e+03 | 1.57e+03 | 1.57e+03 | 0.00e+00 | 1.57e+03 |
| C-14    | 1.20e+09 | 2.39e+08 | 2.39e+08 | 2.39e+08 | 2.39e+08 | 2.39e+08 | 0.00e+00 | 2.39e+08 |
| NA-24   | 8.93e+06 | 8.93e+06 | 8.93e+06 | 8.93e+06 | 8.93e+06 | 8.93e+06 | 0.00e+00 | 8.93e+06 |
| P-32    | 7.77e+10 | 3.64e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.15e+09 | 0.00e+00 | 3.00e+09 |
| CR-51   | 0.00e+00 | 0.00e+00 | 5.65e+04 | 1.54e+04 | 1.03e+05 | 5.40e+06 | 0.00e+00 | 1.02e+05 |
| MN-54   | 0.00e+00 | 2.10e+07 | 0.00e+00 | 5.88e+06 | 0.00e+00 | 1.76e+07 | 0.00e+00 | 5.59e+06 |
| MN-56   | 0.00e+00 | 1.28e-02 | 0.00e+00 | 1.54e-02 | 0.00e+00 | 1.85e+00 | 0.00e+00 | 2.88e-03 |
| FE-55   | 1.12e+08 | 5.93e+07 | 0.00e+00 | 0.00e+00 | 3.35e+07 | 1.10e+07 | 0.00e+00 | 1.84e+07 |
| FE-59   | 1.20e+08 | 1.94e+08 | 0.00e+00 | 0.00e+00 | 5.64e+07 | 2.03e+08 | 0.00e+00 | 9.69e+07 |
| CO-58   | 0.00e+00 | 1.21e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.08e+07 | 0.00e+00 | 3.71e+07 |
| CO-60   | 0.00e+00 | 4.32e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.39e+08 | 0.00e+00 | 1.27e+08 |
| NI-63   | 2.96e+10 | 1.59e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.07e+08 | 0.00e+00 | 1.01e+09 |
| NI-65   | 1.66e+00 | 1.56e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.91e+01 | 0.00e+00 | 9.11e-02 |
| CU-64   | 0.00e+00 | 7.39e+04 | 0.00e+00 | 1.79e+05 | 0.00e+00 | 3.47e+06 | 0.00e+00 | 4.47e+04 |
| ZN-65   | 4.13e+09 | 1.10e+10 | 0.00e+00 | 6.94e+09 | 0.00e+00 | 1.93e+09 | 0.00e+00 | 6.85e+09 |
| ZN-69   | 9.10e-12 | 1.32e-11 | 0.00e+00 | 7.98e-12 | 0.00e+00 | 8.29e-10 | 0.00e+00 | 1.22e-12 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.37e-01 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.84e-23 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 8.77e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.64e+08 | 0.00e+00 | 5.39e+09 |
| RB-88   | 0.00e+00 | 7.17e-45 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.52e-46 | 0.00e+00 | 4.98e-45 |
| RB-89   | 0.00e+00 | 1.40e-52 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.22e-54 | 0.00e+00 | 1.24e-52 |
| SR-89   | 6.62e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.56e+08 | 0.00e+00 | 1.89e+08 |
| SR-90   | 1.12e+11 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.51e+09 | 0.00e+00 | 2.83e+10 |
| SR-91   | 1.29e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.86e+05 | 0.00e+00 | 4.89e+03 |
| SR-92   | 2.16e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.09e+01 | 0.00e+00 | 8.67e-02 |
| Y-90    | 3.23e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.19e+05 | 0.00e+00 | 8.64e+00 |
| Y-91    | 3.90e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.20e+06 | 0.00e+00 | 1.04e+03 |
| Y-91M   | 2.87e-19 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.62e-16 | 0.00e+00 | 1.04e-20 |
| Y-92    | 2.53e-04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.30e+00 | 0.00e+00 | 7.23e-06 |
| Y-93    | 1.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.50e+04 | 0.00e+00 | 2.76e-02 |
| ZR-95   | 3.83e+03 | 8.43e+02 | 0.00e+00 | 1.21e+03 | 0.00e+00 | 8.79e+05 | 0.00e+00 | 7.50e+02 |
| ZR-97   | 1.92e+00 | 2.77e-01 | 0.00e+00 | 3.97e-01 | 0.00e+00 | 4.19e+04 | 0.00e+00 | 1.63e-01 |
| NB-95   | 3.18e+05 | 1.24e+05 | 0.00e+00 | 1.16e+05 | 0.00e+00 | 2.29e+08 | 0.00e+00 | 8.84e+04 |
| MO-99   | 0.00e+00 | 8.12e+07 | 0.00e+00 | 1.74e+08 | 0.00e+00 | 6.72e+07 | 0.00e+00 | 2.01e+07 |
| TC-99M  | 1.32e+01 | 2.58e+01 | 0.00e+00 | 3.75e+02 | 1.31e+01 | 1.47e+04 | 0.00e+00 | 4.28e+02 |
| TC-101  | 1.08e-59 | 1.13e-59 | 0.00e+00 | 1.92e-58 | 5.95e-60 | 3.58e-59 | 0.00e+00 | 1.43e-58 |
| RU-103  | 4.28e+03 | 0.00e+00 | 0.00e+00 | 1.08e+04 | 0.00e+00 | 1.11e+05 | 0.00e+00 | 1.65e+03 |
| RU-105  | 3.79e-03 | 0.00e+00 | 0.00e+00 | 3.33e-02 | 0.00e+00 | 2.48e+00 | 0.00e+00 | 1.38e-03 |
| RU-106  | 9.24e+04 | 0.00e+00 | 0.00e+00 | 1.25e+05 | 0.00e+00 | 1.44e+06 | 0.00e+00 | 1.15e+04 |
| AG-110M | 2.09e+08 | 1.41e+08 | 0.00e+00 | 2.63e+08 | 0.00e+00 | 1.68e+10 | 0.00e+00 | 1.13e+08 |
| TE-125M | 7.38e+07 | 2.00e+07 | 2.07e+07 | 0.00e+00 | 0.00e+00 | 7.12e+07 | 0.00e+00 | 9.84e+06 |
| TE-127  | 3.04e+03 | 8.19e+02 | 2.10e+03 | 8.64e+03 | 0.00e+00 | 1.19e+05 | 0.00e+00 | 6.51e+02 |
| TE-127M | 2.08e+08 | 5.60e+07 | 4.97e+07 | 5.93e+08 | 0.00e+00 | 1.68e+08 | 0.00e+00 | 2.47e+07 |
| TE-129  | 1.07e-09 | 2.99e-10 | 7.63e-10 | 3.13e-09 | 0.00e+00 | 6.65e-08 | 0.00e+00 | 2.54e-10 |
| TE-129M | 2.71e+08 | 7.58e+07 | 8.75e+07 | 7.97e+08 | 0.00e+00 | 3.31e+08 | 0.00e+00 | 4.21e+07 |
| TE-131  | 1.64e-32 | 5.01e-33 | 1.26e-32 | 4.97e-32 | 0.00e+00 | 8.64e-32 | 0.00e+00 | 4.89e-33 |
| TE-131M | 1.60e+06 | 5.53e+05 | 1.14e+06 | 5.35e+06 | 0.00e+00 | 2.24e+07 | 0.00e+00 | 5.88e+05 |

TABLE 2.2-2b (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 10 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 R<sub>i</sub> (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 2 CHILD  
Pathway: 5 Grs/Cow/Milk (CMILK)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 1.02e+07 | 4.52e+06 | 6.58e+06 | 4.19e+07 | 0.00e+00 | 4.55e+07 | 0.00e+00 | 5.46e+06 |
| I-130   | 1.72e+06 | 3.47e+06 | 3.83e+08 | 5.19e+06 | 0.00e+00 | 1.62e+06 | 0.00e+00 | 1.79e+06 |
| I-131   | 1.30e+09 | 1.31e+09 | 4.33e+11 | 2.15e+09 | 0.00e+00 | 1.17e+08 | 0.00e+00 | 7.45e+08 |
| I-132   | 6.91e-01 | 1.27e+00 | 5.89e+01 | 1.94e+00 | 0.00e+00 | 1.49e+00 | 0.00e+00 | 5.84e-01 |
| I-133   | 1.72e+07 | 2.12e+07 | 3.94e+09 | 3.54e+07 | 0.00e+00 | 8.55e+06 | 0.00e+00 | 8.03e+06 |
| I-134   | 7.94e-12 | 1.48e-11 | 3.39e-10 | 2.26e-11 | 0.00e+00 | 9.78e-12 | 0.00e+00 | 6.79e-12 |
| I-135   | 5.43e+04 | 9.78e+04 | 8.66e+06 | 1.50e+05 | 0.00e+00 | 7.45e+04 | 0.00e+00 | 4.62e+04 |
| CS-134  | 2.26e+10 | 3.72e+10 | 0.00e+00 | 1.15e+10 | 4.13e+09 | 2.00e+08 | 0.00e+00 | 7.84e+09 |
| CS-136  | 1.01e+09 | 2.78e+09 | 0.00e+00 | 1.48e+09 | 2.21e+08 | 9.77e+07 | 0.00e+00 | 1.80e+09 |
| CS-137  | 3.22e+10 | 3.09e+10 | 0.00e+00 | 1.01e+10 | 3.62e+09 | 1.93e+08 | 0.00e+00 | 4.56e+09 |
| CS-138  | 3.82e-23 | 5.31e-23 | 0.00e+00 | 3.74e-23 | 4.02e-24 | 2.45e-23 | 0.00e+00 | 3.37e-23 |
| BA-139  | 2.02e-07 | 1.08e-10 | 0.00e+00 | 9.39e-11 | 6.33e-11 | 1.16e-05 | 0.00e+00 | 5.84e-09 |
| BA-140  | 1.17e+08 | 1.03e+05 | 0.00e+00 | 3.34e+04 | 6.12e+04 | 5.94e+07 | 0.00e+00 | 6.84e+06 |
| BA-141  | 1.96e-45 | 1.09e-48 | 0.00e+00 | 9.48e-49 | 6.43e-48 | 1.12e-45 | 0.00e+00 | 6.37e-47 |
| BA-142  | 1.93e-80 | 1.39e-83 | 0.00e+00 | 1.12e-83 | 8.15e-84 | 2.51e-82 | 0.00e+00 | 1.08e-81 |
| LA-140  | 1.94e+01 | 6.80e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.90e+05 | 0.00e+00 | 2.29e+00 |
| LA-142  | 8.24e-11 | 2.63e-11 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.20e-06 | 0.00e+00 | 8.22e-12 |
| CE-141  | 2.19e+04 | 1.09e+04 | 0.00e+00 | 4.78e+03 | 0.00e+00 | 1.36e+07 | 0.00e+00 | 1.62e+03 |
| CE-143  | 1.87e+02 | 1.01e+05 | 0.00e+00 | 4.26e+01 | 0.00e+00 | 1.49e+06 | 0.00e+00 | 1.47e+01 |
| CE-144  | 1.62e+06 | 5.09e+05 | 0.00e+00 | 2.82e+05 | 0.00e+00 | 1.33e+08 | 0.00e+00 | 8.66e+04 |
| PR-143  | 7.19e+02 | 2.16e+02 | 0.00e+00 | 1.17e+02 | 0.00e+00 | 7.75e+05 | 0.00e+00 | 3.56e+01 |
| PR-144  | 2.95e-53 | 9.11e-54 | 0.00e+00 | 4.82e-54 | 0.00e+00 | 1.96e-50 | 0.00e+00 | 1.48e-54 |
| ND-147  | 4.44e+02 | 3.60e+02 | 0.00e+00 | 1.98e+02 | 0.00e+00 | 5.70e+05 | 0.00e+00 | 2.79e+01 |
| W-187   | 2.89e+04 | 1.71e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.40e+06 | 0.00e+00 | 7.67e+03 |
| NP-239  | 1.72e+01 | 1.24e+00 | 0.00e+00 | 3.58e+00 | 0.00e+00 | 9.15e+04 | 0.00e+00 | 8.69e-01 |

Units: Inhalation<sub>2</sub> and all tritium pathways - mrem/yr per  $\mu\text{Ci}/\text{m}^3$   
Others - m<sup>2</sup> \* mrem/yr per  $\mu\text{Ci}/\text{sec}$

Values based on standard NUREG-0133, Section 5.3.1 assumptions unless otherwise indicated.

TABLE 2.2-2c

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 1 of 10

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>)) |

AgeGroup: 1 TEEN

Pathway: 0 Ground Plane Deposition (GPD)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| C-14    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| NA-24   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.39e+07 | 1.20e+07 |
| P-32    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| CR-51   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.50e+06 | 4.65e+06 |
| MN-54   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.62e+09 | 1.38e+09 |
| MN-56   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.07e+06 | 9.03e+05 |
| FE-55   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| FE-59   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.20e+08 | 2.73e+08 |
| CO-58   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.45e+08 | 3.80e+08 |
| CO-60   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.53e+10 | 2.15e+10 |
| NI-63   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| NI-65   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.45e+05 | 2.97e+05 |
| CU-64   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.86e+05 | 6.05e+05 |
| ZN-65   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.57e+08 | 7.46e+08 |
| ZN-69   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.08e+03 | 4.87e+03 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.37e+05 | 2.03e+05 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.03e+07 | 8.98e+06 |
| RB-88   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.78e+04 | 3.31e+04 |
| RB-89   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.48e+05 | 1.23e+05 |
| SR-89   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.51e+04 | 2.16e+04 |
| SR-90   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| SR-91   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.51e+06 | 2.15e+06 |
| SR-92   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.62e+05 | 7.76e+05 |
| Y-90    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.31e+03 | 4.50e+03 |
| Y-91    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.21e+06 | 1.07e+06 |
| Y-91M   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.16e+05 | 1.00e+05 |
| Y-92    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.14e+05 | 1.80e+05 |
| Y-93    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.50e+05 | 1.83e+05 |
| ZR-95   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.85e+08 | 2.45e+08 |
| ZR-97   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.44e+06 | 2.96e+06 |
| NB-95   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.61e+08 | 1.37e+08 |
| MO-99   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.62e+06 | 3.99e+06 |
| TC-99M  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.11e+05 | 1.84e+05 |
| TC-101  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.26e+04 | 2.03e+04 |
| RU-103  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.26e+08 | 1.08e+08 |
| RU-105  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.21e+05 | 6.36e+05 |
| RU-106  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.04e+08 | 4.20e+08 |
| AG-110M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.02e+09 | 3.45e+09 |
| TE-125M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.13e+06 | 1.56e+06 |
| TE-127  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.29e+03 | 2.99e+03 |
| TE-127M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.08e+05 | 9.17e+04 |
| TE-129  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.08e+04 | 2.61e+04 |
| TE-129M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.31e+07 | 1.98e+07 |
| TE-131  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.45e+07 | 2.92e+04 |
| TE-131M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.46e+06 | 8.02e+06 |



TABLE 2.2-2c (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)<sub>1</sub>

Page 2 of 10

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 1 TEEN

Pathway: 0 Ground Plane Deposition (GPD)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.97e+06 | 4.22e+06 |
| I-130   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.68e+06 | 5.50e+06 |
| I-131   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.09e+07 | 1.72e+07 |
| I-132   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.47e+06 | 1.25e+06 |
| I-133   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.98e+06 | 2.45e+06 |
| I-134   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.30e+05 | 4.46e+05 |
| I-135   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.95e+06 | 2.53e+06 |
| CS-134  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.05e+09 | 6.90e+09 |
| CS-136  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.71e+08 | 1.51e+08 |
| CS-137  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.20e+10 | 1.03e+10 |
| CS-138  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.10e+05 | 3.59e+05 |
| BA-139  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.19e+05 | 1.06e+05 |
| BA-140  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.35e+07 | 2.05e+07 |
| BA-141  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.75e+04 | 4.17e+04 |
| BA-142  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.06e+04 | 4.44e+04 |
| LA-140  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.18e+07 | 1.92e+07 |
| LA-142  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.12e+05 | 7.60e+05 |
| CE-141  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.54e+07 | 1.37e+07 |
| CE-143  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.63e+06 | 2.31e+06 |
| CE-144  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.05e+07 | 6.96e+07 |
| PR-143  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| PR-144  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.11e+03 | 1.84e+03 |
| ND-147  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.01e+07 | 8.39e+06 |
| W-187   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.73e+06 | 2.35e+06 |
| NP-239  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.98e+06 | 1.71e+06 |

TABLE 2.2-2c (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 3 of 10

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 1 TEEN

Pathway: 1 Inhalation (INHL)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 1.27e+03 | 1.27e+03 | 1.27e+03 | 1.27e+03 | 1.27e+03 | 0.00e+00 | 1.27e+03 |
| C-14    | 2.60e+04 | 4.87e+03 | 4.87e+03 | 4.87e+03 | 4.87e+03 | 4.87e+03 | 0.00e+00 | 4.87e+03 |
| NA-24   | 1.38e+04 | 1.38e+04 | 1.38e+04 | 1.38e+04 | 1.38e+04 | 1.38e+04 | 0.00e+00 | 1.38e+04 |
| P-32    | 1.89e+06 | 1.10e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.28e+04 | 0.00e+00 | 7.16e+04 |
| CR-51   | 0.00e+00 | 0.00e+00 | 7.50e+01 | 3.07e+01 | 2.10e+04 | 3.00e+03 | 0.00e+00 | 1.35e+02 |
| MN-54   | 0.00e+00 | 5.11e+04 | 0.00e+00 | 1.27e+04 | 1.98e+06 | 6.68e+04 | 0.00e+00 | 8.40e+03 |
| MN-56   | 0.00e+00 | 1.70e+00 | 0.00e+00 | 1.79e+00 | 1.52e+04 | 5.74e+04 | 0.00e+00 | 2.52e-01 |
| FE-55   | 3.34e+04 | 2.38e+04 | 0.00e+00 | 0.00e+00 | 1.24e+05 | 6.39e+03 | 0.00e+00 | 5.54e+03 |
| FE-59   | 1.59e+04 | 3.70e+04 | 0.00e+00 | 0.00e+00 | 1.53e+06 | 1.78e+05 | 0.00e+00 | 1.43e+04 |
| CO-58   | 0.00e+00 | 2.07e+03 | 0.00e+00 | 0.00e+00 | 1.34e+06 | 9.52e+04 | 0.00e+00 | 2.78e+03 |
| CO-60   | 0.00e+00 | 1.51e+04 | 0.00e+00 | 0.00e+00 | 8.72e+06 | 2.59e+05 | 0.00e+00 | 1.98e+04 |
| NI-63   | 5.80e+05 | 4.34e+04 | 0.00e+00 | 0.00e+00 | 3.07e+05 | 1.42e+04 | 0.00e+00 | 1.98e+04 |
| NI-65   | 2.18e+00 | 2.93e-01 | 0.00e+00 | 0.00e+00 | 9.36e+03 | 3.67e+04 | 0.00e+00 | 1.27e-01 |
| CU-64   | 0.00e+00 | 2.03e+00 | 0.00e+00 | 6.41e+00 | 1.11e+04 | 6.14e+04 | 0.00e+00 | 8.48e-01 |
| ZN-65   | 3.86e+04 | 1.34e+05 | 0.00e+00 | 8.64e+04 | 1.24e+06 | 4.66e+04 | 0.00e+00 | 6.24e+04 |
| ZN-69   | 4.83e-02 | 9.20e-02 | 0.00e+00 | 6.02e-02 | 1.58e+03 | 2.85e+02 | 0.00e+00 | 6.46e-03 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.44e+02 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.33e+02 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.83e+01 |
| RB-86   | 0.00e+00 | 1.90e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.77e+04 | 0.00e+00 | 8.40e+04 |
| RB-88   | 0.00e+00 | 5.46e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.92e-05 | 0.00e+00 | 2.72e+02 |
| RB-89   | 0.00e+00 | 3.52e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.38e-07 | 0.00e+00 | 2.33e+02 |
| SR-89   | 4.34e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.42e+06 | 3.71e+05 | 0.00e+00 | 1.25e+04 |
| SR-90   | 1.08e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.65e+07 | 7.65e+05 | 0.00e+00 | 6.68e+06 |
| SR-91   | 8.80e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.07e+04 | 2.59e+05 | 0.00e+00 | 3.51e+00 |
| SR-92   | 9.52e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.74e+04 | 1.19e+05 | 0.00e+00 | 4.06e-01 |
| Y-90    | 2.98e+03 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.93e+05 | 5.59e+05 | 0.00e+00 | 8.00e+01 |
| Y-91    | 6.61e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.94e+06 | 4.09e+05 | 0.00e+00 | 1.77e+04 |
| Y-91M   | 3.70e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.20e+03 | 3.02e+01 | 0.00e+00 | 1.42e-02 |
| Y-92    | 1.47e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.68e+04 | 1.65e+05 | 0.00e+00 | 4.29e-01 |
| Y-93    | 1.35e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.32e+04 | 5.79e+05 | 0.00e+00 | 3.72e+00 |
| ZR-95   | 1.46e+05 | 4.58e+04 | 0.00e+00 | 6.74e+04 | 2.69e+06 | 1.49e+05 | 0.00e+00 | 3.15e+04 |
| ZR-97   | 1.38e+02 | 2.72e+01 | 0.00e+00 | 4.12e+01 | 1.30e+05 | 6.30e+05 | 0.00e+00 | 1.26e+01 |
| NB-95   | 1.86e+04 | 1.03e+04 | 0.00e+00 | 1.00e+04 | 7.51e+05 | 9.68e+04 | 0.00e+00 | 5.66e+03 |
| MO-99   | 0.00e+00 | 1.69e+02 | 0.00e+00 | 4.11e+02 | 1.54e+05 | 2.69e+05 | 0.00e+00 | 3.22e+01 |
| TC-99M  | 1.38e-03 | 3.86e-03 | 0.00e+00 | 5.76e-02 | 1.15e+03 | 6.13e+03 | 0.00e+00 | 4.99e-02 |
| TC-101  | 5.92e-05 | 8.40e-05 | 0.00e+00 | 1.52e-03 | 6.67e+02 | 8.72e-07 | 0.00e+00 | 8.24e-04 |
| RU-103  | 2.10e+03 | 0.00e+00 | 0.00e+00 | 7.43e+03 | 7.83e+05 | 1.09e+05 | 0.00e+00 | 8.96e+02 |
| RU-105  | 1.12e+00 | 0.00e+00 | 0.00e+00 | 1.41e+00 | 1.82e+04 | 9.04e+04 | 0.00e+00 | 4.34e-01 |
| RU-106  | 9.84e+04 | 0.00e+00 | 0.00e+00 | 1.90e+05 | 1.61e+07 | 9.60e+05 | 0.00e+00 | 1.24e+04 |
| AG-110M | 1.38e+04 | 1.31e+04 | 0.00e+00 | 2.50e+04 | 6.75e+06 | 2.73e+05 | 0.00e+00 | 7.99e+03 |
| TE-125M | 4.88e+03 | 2.24e+03 | 1.40e+03 | 0.00e+00 | 5.36e+05 | 7.50e+04 | 0.00e+00 | 6.67e+02 |
| TE-127  | 2.01e+00 | 9.12e-01 | 1.42e+00 | 7.28e+00 | 1.12e+04 | 8.08e+04 | 0.00e+00 | 4.42e-01 |
| TE-127M | 1.80e+04 | 8.16e+03 | 4.38e+03 | 6.54e+04 | 1.66e+06 | 1.59e+05 | 0.00e+00 | 2.18e+03 |
| TE-129  | 7.10e-02 | 3.38e-02 | 5.18e-02 | 2.66e-01 | 3.30e+03 | 1.62e+03 | 0.00e+00 | 1.76e-02 |
| TE-129M | 1.39e+04 | 6.58e+03 | 4.58e+03 | 5.19e+04 | 1.98e+06 | 4.05e+05 | 0.00e+00 | 2.25e+03 |
| TE-131  | 1.58e-02 | 8.32e-03 | 1.24e-02 | 6.18e-02 | 2.34e+03 | 1.51e+01 | 0.00e+00 | 5.04e-03 |
| TE-131M | 9.84e+01 | 6.01e+01 | 7.25e+01 | 4.39e+02 | 2.38e+05 | 6.21e+05 | 0.00e+00 | 4.02e+01 |

TABLE 2.2-2c (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 4 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 1 TEEN  
Pathway: 1 Inhalation (INHL)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 3.60e+02 | 2.90e+02 | 2.46e+02 | 1.95e+03 | 4.49e+05 | 4.63e+05 | 0.00e+00 | 2.19e+02 |
| I-130   | 6.24e+03 | 1.79e+04 | 1.49e+06 | 2.75e+04 | 0.00e+00 | 9.12e+03 | 0.00e+00 | 7.17e+03 |
| I-131   | 3.54e+04 | 4.91e+04 | 1.46e+07 | 8.40e+04 | 0.00e+00 | 6.49e+03 | 0.00e+00 | 2.64e+04 |
| I-132   | 1.59e+03 | 4.38e+03 | 1.51e+05 | 6.92e+03 | 0.00e+00 | 1.27e+03 | 0.00e+00 | 1.58e+03 |
| I-133   | 1.22e+04 | 2.05e+04 | 2.92e+06 | 3.59e+04 | 0.00e+00 | 1.03e+04 | 0.00e+00 | 6.22e+03 |
| I-134   | 8.88e+02 | 2.32e+03 | 3.95e+04 | 3.66e+03 | 0.00e+00 | 2.04e+01 | 0.00e+00 | 8.40e+02 |
| I-135   | 3.70e+03 | 9.44e+03 | 6.21e+05 | 1.49e+04 | 0.00e+00 | 6.95e+03 | 0.00e+00 | 3.49e+03 |
| CS-134  | 5.02e+05 | 1.13e+06 | 0.00e+00 | 3.75e+05 | 1.46e+05 | 9.76e+03 | 0.00e+00 | 5.49e+05 |
| CS-136  | 5.15e+04 | 1.94e+05 | 0.00e+00 | 1.10e+05 | 1.78e+04 | 1.09e+04 | 0.00e+00 | 1.37e+05 |
| CS-137  | 6.70e+05 | 8.48e+05 | 0.00e+00 | 3.04e+05 | 1.21e+05 | 8.48e+03 | 0.00e+00 | 3.11e+05 |
| CS-138  | 4.66e+02 | 8.56e+02 | 0.00e+00 | 6.62e+02 | 7.87e+01 | 2.70e-01 | 0.00e+00 | 4.46e+02 |
| BA-139  | 1.34e+00 | 9.44e-04 | 0.00e+00 | 8.88e-04 | 6.46e+03 | 6.45e+03 | 0.00e+00 | 3.90e-02 |
| BA-140  | 5.47e+04 | 6.70e+01 | 0.00e+00 | 2.28e+01 | 2.03e+06 | 2.29e+05 | 0.00e+00 | 3.52e+03 |
| BA-141  | 1.42e-01 | 1.06e-04 | 0.00e+00 | 9.84e-05 | 3.29e+03 | 7.46e-04 | 0.00e+00 | 4.74e-03 |
| BA-142  | 3.70e-02 | 3.70e-05 | 0.00e+00 | 3.14e-05 | 1.91e+03 | 4.79e-10 | 0.00e+00 | 2.27e-03 |
| LA-140  | 4.79e+02 | 2.36e+02 | 0.00e+00 | 0.00e+00 | 2.14e+05 | 4.87e+05 | 0.00e+00 | 6.26e+01 |
| LA-142  | 9.60e-01 | 4.25e-01 | 0.00e+00 | 0.00e+00 | 1.02e+04 | 1.20e+04 | 0.00e+00 | 1.06e-01 |
| CE-141  | 2.84e+04 | 1.90e+04 | 0.00e+00 | 8.88e+03 | 6.14e+05 | 1.26e+05 | 0.00e+00 | 2.17e+03 |
| CE-143  | 2.66e+02 | 1.94e+02 | 0.00e+00 | 8.64e+01 | 1.30e+05 | 2.55e+05 | 0.00e+00 | 2.16e+01 |
| CE-144  | 4.89e+06 | 2.02e+06 | 0.00e+00 | 1.21e+06 | 1.34e+07 | 8.64e+05 | 0.00e+00 | 2.62e+05 |
| PR-143  | 1.34e+04 | 5.31e+03 | 0.00e+00 | 3.09e+03 | 4.83e+05 | 2.14e+05 | 0.00e+00 | 6.62e+02 |
| PR-144  | 4.30e-02 | 1.76e-02 | 0.00e+00 | 1.01e-02 | 1.75e+03 | 2.35e-04 | 0.00e+00 | 2.18e-03 |
| ND-147  | 7.86e+03 | 8.56e+03 | 0.00e+00 | 5.02e+03 | 3.72e+05 | 1.82e+05 | 0.00e+00 | 5.13e+02 |
| W-187   | 1.20e+01 | 9.76e+00 | 0.00e+00 | 0.00e+00 | 4.74e+04 | 1.77e+05 | 0.00e+00 | 3.43e+00 |
| NP-239  | 3.38e+02 | 3.19e+01 | 0.00e+00 | 1.00e+02 | 6.49e+04 | 1.32e+05 | 0.00e+00 | 1.77e+01 |

TABLE 2.2-2c (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 5 of 10

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 1 TEEN

Pathway: 2 Vegetation (VEG)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 2.59e+03 | 2.59e+03 | 2.59e+03 | 2.59e+03 | 2.59e+03 | 0.00e+00 | 2.59e+03 |
| C-14    | 3.69e+08 | 7.38e+07 | 7.38e+07 | 7.38e+07 | 7.38e+07 | 7.38e+07 | 0.00e+00 | 7.38e+07 |
| NA-24   | 2.40e+05 | 2.40e+05 | 2.40e+05 | 2.40e+05 | 2.40e+05 | 2.40e+05 | 0.00e+00 | 2.40e+05 |
| P-32    | 1.61e+09 | 9.95e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.35e+08 | 0.00e+00 | 6.23e+07 |
| CR-51   | 0.00e+00 | 0.00e+00 | 3.42e+04 | 1.35e+04 | 8.79e+04 | 1.03e+07 | 0.00e+00 | 6.16e+04 |
| MN-54   | 0.00e+00 | 4.54e+08 | 0.00e+00 | 1.36e+08 | 0.00e+00 | 9.32e+08 | 0.00e+00 | 9.01e+07 |
| MN-56   | 0.00e+00 | 1.43e+01 | 0.00e+00 | 1.81e+01 | 0.00e+00 | 9.41e+02 | 0.00e+00 | 2.54e+00 |
| FE-55   | 3.26e+08 | 2.31e+08 | 0.00e+00 | 0.00e+00 | 1.47e+08 | 1.00e+08 | 0.00e+00 | 5.39e+07 |
| FE-59   | 1.79e+08 | 4.18e+08 | 0.00e+00 | 0.00e+00 | 1.32e+08 | 9.89e+08 | 0.00e+00 | 1.61e+08 |
| CO-58   | 0.00e+00 | 4.37e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.02e+08 | 0.00e+00 | 1.01e+08 |
| CO-60   | 0.00e+00 | 2.49e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.24e+09 | 0.00e+00 | 5.60e+08 |
| NI-63   | 1.61e+10 | 1.13e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.81e+08 | 0.00e+00 | 5.45e+08 |
| NI-65   | 5.73e+01 | 7.32e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.97e+02 | 0.00e+00 | 3.33e+00 |
| CU-64   | 0.00e+00 | 8.29e+03 | 0.00e+00 | 2.10e+04 | 0.00e+00 | 6.43e+05 | 0.00e+00 | 3.90e+03 |
| ZN-65   | 4.24e+08 | 1.47e+09 | 0.00e+00 | 9.42e+08 | 0.00e+00 | 6.23e+08 | 0.00e+00 | 6.86e+08 |
| ZN-69   | 5.04e-06 | 9.61e-06 | 0.00e+00 | 6.28e-06 | 0.00e+00 | 1.77e-05 | 0.00e+00 | 6.72e-07 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.90e+00 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.31e-11 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 2.74e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.05e+07 | 0.00e+00 | 1.29e+08 |
| RB-88   | 0.00e+00 | 3.17e-22 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.72e-29 | 0.00e+00 | 1.69e-22 |
| RB-89   | 0.00e+00 | 3.57e-26 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.46e-35 | 0.00e+00 | 2.52e-26 |
| SR-89   | 1.51e+10 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.80e+09 | 0.00e+00 | 4.33e+08 |
| SR-90   | 7.51e+11 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.11e+10 | 0.00e+00 | 1.85e+11 |
| SR-91   | 2.83e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.29e+06 | 0.00e+00 | 1.13e+04 |
| SR-92   | 3.95e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.01e+04 | 0.00e+00 | 1.68e+01 |
| Y-90    | 1.24e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.03e+08 | 0.00e+00 | 3.35e+02 |
| Y-91    | 7.84e+06 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.22e+09 | 0.00e+00 | 2.10e+05 |
| Y-91M   | 5.04e-09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.38e-07 | 0.00e+00 | 1.93e-10 |
| Y-92    | 8.59e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.36e+04 | 0.00e+00 | 2.49e-02 |
| Y-93    | 1.58e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.83e+06 | 0.00e+00 | 4.34e+00 |
| ZR-95   | 1.72e+06 | 5.44e+05 | 0.00e+00 | 7.99e+05 | 0.00e+00 | 1.26e+09 | 0.00e+00 | 3.74e+05 |
| ZR-97   | 3.12e+02 | 6.17e+01 | 0.00e+00 | 9.36e+01 | 0.00e+00 | 1.67e+07 | 0.00e+00 | 2.84e+01 |
| NB-95   | 1.92e+05 | 1.07e+05 | 0.00e+00 | 1.03e+05 | 0.00e+00 | 4.56e+08 | 0.00e+00 | 5.87e+04 |
| MO-99   | 0.00e+00 | 5.64e+06 | 0.00e+00 | 1.29e+07 | 0.00e+00 | 1.01e+07 | 0.00e+00 | 1.08e+06 |
| TC-99M  | 2.73e+00 | 7.62e+00 | 0.00e+00 | 1.14e+02 | 4.23e+02 | 5.00e+03 | 0.00e+00 | 9.87e+01 |
| TC-101  | 7.35e-31 | 1.04e-30 | 0.00e+00 | 1.89e-29 | 6.37e-31 | 1.79e-37 | 0.00e+00 | 1.03e-29 |
| RU-103  | 6.82e+06 | 0.00e+00 | 0.00e+00 | 2.40e+07 | 0.00e+00 | 5.69e+08 | 0.00e+00 | 2.91e+06 |
| RU-105  | 4.98e+01 | 0.00e+00 | 0.00e+00 | 6.29e+02 | 0.00e+00 | 4.02e+04 | 0.00e+00 | 1.93e+01 |
| RU-106  | 3.09e+08 | 0.00e+00 | 0.00e+00 | 5.97e+08 | 0.00e+00 | 1.48e+10 | 0.00e+00 | 3.90e+07 |
| AG-110M | 1.52e+07 | 1.44e+07 | 0.00e+00 | 2.74e+07 | 0.00e+00 | 4.03e+09 | 0.00e+00 | 8.73e+06 |
| TE-125M | 1.49e+08 | 5.35e+07 | 4.15e+07 | 0.00e+00 | 0.00e+00 | 4.38e+08 | 0.00e+00 | 1.99e+07 |
| TE-127  | 5.40e+03 | 1.91e+03 | 3.73e+03 | 2.19e+04 | 0.00e+00 | 4.17e+05 | 0.00e+00 | 1.16e+03 |
| TE-127M | 5.52e+08 | 1.96e+08 | 1.31e+08 | 2.24e+09 | 0.00e+00 | 1.37e+09 | 0.00e+00 | 6.56e+07 |
| TE-129  | 6.50e-04 | 2.42e-04 | 4.64e-04 | 2.73e-03 | 0.00e+00 | 3.56e-03 | 0.00e+00 | 1.58e-04 |
| TE-129M | 3.61e+08 | 1.34e+08 | 1.17e+08 | 1.51e+09 | 0.00e+00 | 1.36e+09 | 0.00e+00 | 5.72e+07 |
| TE-131  | 1.41e-15 | 5.80e-16 | 1.08e-15 | 6.15e-15 | 0.00e+00 | 1.16e-16 | 0.00e+00 | 4.40e-16 |
| TE-131M | 8.44e+05 | 4.05e+05 | 6.09e+05 | 4.22e+06 | 0.00e+00 | 3.25e+07 | 0.00e+00 | 3.38e+05 |

TABLE 2.2-2c (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 6 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 1 TEEN  
Pathway: 2 Vegetation (VEG)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 3.90e+06 | 2.47e+06 | 2.60e+06 | 2.37e+07 | 0.00e+00 | 7.81e+07 | 0.00e+00 | 2.32e+06 |
| I-130   | 3.50e+05 | 1.01e+06 | 8.25e+07 | 1.56e+06 | 0.00e+00 | 7.77e+05 | 0.00e+00 | 4.04e+05 |
| I-131   | 7.68e+07 | 1.08e+08 | 3.14e+10 | 1.85e+08 | 0.00e+00 | 2.13e+07 | 0.00e+00 | 5.78e+07 |
| I-132   | 5.20e+01 | 1.36e+02 | 4.59e+03 | 2.14e+02 | 0.00e+00 | 5.93e+01 | 0.00e+00 | 4.88e+01 |
| I-133   | 1.94e+06 | 3.28e+06 | 4.58e+08 | 5.76e+06 | 0.00e+00 | 2.49e+06 | 0.00e+00 | 1.00e+06 |
| I-134   | 8.44e-05 | 2.24e-04 | 3.73e-03 | 3.53e-04 | 0.00e+00 | 2.95e-06 | 0.00e+00 | 8.03e-05 |
| I-135   | 3.53e+04 | 9.10e+04 | 5.85e+06 | 1.44e+05 | 0.00e+00 | 1.01e+05 | 0.00e+00 | 3.37e+04 |
| CS-134  | 7.10e+09 | 1.67e+10 | 0.00e+00 | 5.31e+09 | 2.03e+09 | 2.08e+08 | 0.00e+00 | 7.76e+09 |
| CS-136  | 4.37e+07 | 1.72e+08 | 0.00e+00 | 9.36e+07 | 1.48e+07 | 1.38e+07 | 0.00e+00 | 1.16e+08 |
| CS-137  | 1.01e+10 | 1.35e+10 | 0.00e+00 | 4.59e+09 | 1.78e+09 | 1.92e+08 | 0.00e+00 | 4.70e+09 |
| CS-138  | 3.54e-11 | 6.80e-11 | 0.00e+00 | 5.02e-11 | 5.84e-12 | 3.08e-14 | 0.00e+00 | 3.40e-11 |
| BA-139  | 2.69e-02 | 1.89e-05 | 0.00e+00 | 1.79e-05 | 1.31e-05 | 2.40e-01 | 0.00e+00 | 7.84e-04 |
| BA-140  | 1.38e+08 | 1.69e+05 | 0.00e+00 | 5.74e+04 | 1.14e+05 | 2.13e+08 | 0.00e+00 | 8.91e+06 |
| BA-141  | 1.11e-21 | 8.26e-25 | 0.00e+00 | 7.67e-25 | 5.66e-25 | 2.36e-27 | 0.00e+00 | 3.69e-23 |
| BA-142  | 2.24e-39 | 2.24e-42 | 0.00e+00 | 1.90e-42 | 1.49e-42 | 6.88e-51 | 0.00e+00 | 1.38e-40 |
| LA-140  | 1.81e+03 | 8.89e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.11e+07 | 0.00e+00 | 2.37e+02 |
| LA-142  | 1.87e-04 | 8.31e-05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.53e+00 | 0.00e+00 | 2.07e-05 |
| CE-141  | 2.83e+05 | 1.89e+05 | 0.00e+00 | 8.89e+04 | 0.00e+00 | 5.40e+08 | 0.00e+00 | 2.17e+04 |
| CE-143  | 9.31e+02 | 6.78e+05 | 0.00e+00 | 3.04e+02 | 0.00e+00 | 2.04e+07 | 0.00e+00 | 7.57e+01 |
| CE-144  | 5.28e+07 | 2.18e+07 | 0.00e+00 | 1.30e+07 | 0.00e+00 | 1.33e+10 | 0.00e+00 | 2.83e+06 |
| PR-143  | 7.02e+04 | 2.80e+04 | 0.00e+00 | 1.63e+04 | 0.00e+00 | 2.31e+08 | 0.00e+00 | 3.49e+03 |
| PR-144  | 3.04e-26 | 1.24e-26 | 0.00e+00 | 7.13e-27 | 0.00e+00 | 3.35e-29 | 0.00e+00 | 1.54e-27 |
| ND-147  | 3.62e+04 | 3.93e+04 | 0.00e+00 | 2.31e+04 | 0.00e+00 | 1.42e+08 | 0.00e+00 | 2.36e+03 |
| W-187   | 3.54e+04 | 2.88e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.80e+06 | 0.00e+00 | 1.01e+04 |
| NP-239  | 1.38e+03 | 1.31e+02 | 0.00e+00 | 4.10e+02 | 0.00e+00 | 2.10e+07 | 0.00e+00 | 7.25e+01 |

TABLE 2.2-2c (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 7 of 10

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 1 TEEN

Pathway: 4 Grs/Cow/Meat (CMEAT)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 1.94e+02 | 1.94e+02 | 1.94e+02 | 1.94e+02 | 1.94e+02 | 0.00e+00 | 1.94e+02 |
| C-14    | 2.04e+08 | 4.08e+07 | 4.08e+07 | 4.08e+07 | 4.08e+07 | 4.08e+07 | 0.00e+00 | 4.08e+07 |
| NA-24   | 1.16e-03 | 1.16e-03 | 1.16e-03 | 1.16e-03 | 1.16e-03 | 1.16e-03 | 0.00e+00 | 1.16e-03 |
| P-32    | 3.93e+09 | 2.43e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.30e+08 | 0.00e+00 | 1.52e+08 |
| CR-51   | 0.00e+00 | 0.00e+00 | 3.13e+03 | 1.23e+03 | 8.04e+03 | 9.46e+05 | 0.00e+00 | 5.63e+03 |
| MN-54   | 0.00e+00 | 7.00e+06 | 0.00e+00 | 2.09e+06 | 0.00e+00 | 1.44e+07 | 0.00e+00 | 1.39e+06 |
| MN-56   | 0.00e+00 | 1.17e-53 | 0.00e+00 | 1.48e-53 | 0.00e+00 | 7.71e-52 | 0.00e+00 | 2.08e-54 |
| FE-55   | 2.38e+08 | 1.69e+08 | 0.00e+00 | 0.00e+00 | 1.07e+08 | 7.31e+07 | 0.00e+00 | 3.94e+07 |
| FE-59   | 2.12e+08 | 4.95e+08 | 0.00e+00 | 0.00e+00 | 1.56e+08 | 1.17e+09 | 0.00e+00 | 1.91e+08 |
| CO-58   | 0.00e+00 | 1.41e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.94e+08 | 0.00e+00 | 3.24e+07 |
| CO-60   | 0.00e+00 | 5.84e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.60e+08 | 0.00e+00 | 1.31e+08 |
| NI-63   | 1.52e+10 | 1.07e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.71e+08 | 0.00e+00 | 5.15e+08 |
| NI-65   | 1.90e-52 | 2.43e-53 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.32e-51 | 0.00e+00 | 1.11e-53 |
| CU-64   | 0.00e+00 | 2.06e-07 | 0.00e+00 | 5.21e-07 | 0.00e+00 | 1.60e-05 | 0.00e+00 | 9.68e-08 |
| ZN-65   | 2.50e+08 | 8.69e+08 | 0.00e+00 | 5.56e+08 | 0.00e+00 | 3.68e+08 | 0.00e+00 | 4.05e+08 |
| ZN-69   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.73e-57 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 4.07e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.02e+07 | 0.00e+00 | 1.91e+08 |
| RB-88   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-89   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| SR-89   | 2.54e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.03e+07 | 0.00e+00 | 7.28e+06 |
| SR-90   | 8.05e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.26e+08 | 0.00e+00 | 1.99e+09 |
| SR-91   | 1.21e-10 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.47e-10 | 0.00e+00 | 4.80e-12 |
| SR-92   | 9.02e-50 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.30e-48 | 0.00e+00 | 3.85e-51 |
| Y-90    | 9.13e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.53e+05 | 0.00e+00 | 2.46e+00 |
| Y-91    | 9.54e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.91e+08 | 0.00e+00 | 2.56e+04 |
| Y-91M   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| Y-92    | 1.26e-39 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.46e-35 | 0.00e+00 | 3.65e-41 |
| Y-93    | 3.71e-12 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.13e-07 | 0.00e+00 | 1.02e-13 |
| ZR-95   | 1.50e+06 | 4.74e+05 | 0.00e+00 | 6.96e+05 | 0.00e+00 | 1.09e+09 | 0.00e+00 | 3.26e+05 |
| ZR-97   | 1.70e-05 | 3.37e-06 | 0.00e+00 | 5.10e-06 | 0.00e+00 | 9.11e-01 | 0.00e+00 | 1.55e-06 |
| NB-95   | 1.79e+06 | 9.95e+05 | 0.00e+00 | 9.64e+05 | 0.00e+00 | 4.25e+09 | 0.00e+00 | 5.48e+05 |
| MO-99   | 0.00e+00 | 8.21e+04 | 0.00e+00 | 1.88e+05 | 0.00e+00 | 1.47e+05 | 0.00e+00 | 1.57e+04 |
| TC-99M  | 3.43e-21 | 9.57e-21 | 0.00e+00 | 1.43e-19 | 5.31e-21 | 6.29e-18 | 0.00e+00 | 1.24e-19 |
| TC-101  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RU-103  | 8.57e+07 | 0.00e+00 | 0.00e+00 | 3.02e+08 | 0.00e+00 | 7.15e+09 | 0.00e+00 | 3.66e+07 |
| RU-105  | 4.54e-28 | 0.00e+00 | 0.00e+00 | 5.73e-27 | 0.00e+00 | 3.67e-25 | 0.00e+00 | 1.76e-28 |
| RU-106  | 2.36e+09 | 0.00e+00 | 0.00e+00 | 4.55e+09 | 0.00e+00 | 1.13e+11 | 0.00e+00 | 2.97e+08 |
| AG-110M | 5.06e+06 | 4.79e+06 | 0.00e+00 | 9.13e+06 | 0.00e+00 | 1.35e+09 | 0.00e+00 | 2.91e+06 |
| TE-125M | 3.03e+08 | 1.09e+08 | 8.48e+07 | 0.00e+00 | 0.00e+00 | 8.95e+08 | 0.00e+00 | 4.06e+07 |
| TE-127  | 2.12e-10 | 7.52e-11 | 1.47e-10 | 8.60e-10 | 0.00e+00 | 1.64e-08 | 0.00e+00 | 4.57e-11 |
| TE-127M | 9.42e+08 | 3.34e+08 | 2.24e+08 | 3.82e+09 | 0.00e+00 | 2.35e+09 | 0.00e+00 | 1.12e+08 |
| TE-129  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| TE-129M | 9.49e+08 | 3.52e+08 | 3.06e+08 | 3.97e+09 | 0.00e+00 | 3.56e+09 | 0.00e+00 | 1.50e+08 |
| TE-131  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| TE-131M | 3.75e+02 | 1.80e+02 | 2.70e+02 | 1.87e+03 | 0.00e+00 | 1.44e+04 | 0.00e+00 | 1.50e+02 |

TABLE 2.2-2c (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 8 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 1 TEEN  
Pathway: 4 Grs/Cow/Meat (CMEAT)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 1.14e+06 | 7.24e+05 | 7.63e+05 | 6.94e+06 | 0.00e+00 | 2.29e+07 | 0.00e+00 | 6.81e+05 |
| I-130   | 1.63e-06 | 4.72e-06 | 3.85e-04 | 7.27e-06 | 0.00e+00 | 3.63e-06 | 0.00e+00 | 1.89e-06 |
| I-131   | 8.92e+06 | 1.25e+07 | 3.64e+09 | 2.15e+07 | 0.00e+00 | 2.47e+06 | 0.00e+00 | 6.71e+06 |
| I-132   | 5.79e-59 | 1.52e-58 | 5.11e-57 | 2.39e-58 | 0.00e+00 | 6.60e-59 | 0.00e+00 | 5.44e-59 |
| I-133   | 3.04e-01 | 5.15e-01 | 7.19e+01 | 9.03e-01 | 0.00e+00 | 3.90e-01 | 0.00e+00 | 1.57e-01 |
| I-134   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| I-135   | 3.79e-17 | 9.75e-17 | 6.27e-15 | 1.54e-16 | 0.00e+00 | 1.08e-16 | 0.00e+00 | 3.61e-17 |
| CS-134  | 5.23e+08 | 1.23e+09 | 0.00e+00 | 3.91e+08 | 1.49e+08 | 1.53e+07 | 0.00e+00 | 5.71e+08 |
| CS-136  | 9.39e+06 | 3.69e+07 | 0.00e+00 | 2.01e+07 | 3.17e+06 | 2.97e+06 | 0.00e+00 | 2.48e+07 |
| CS-137  | 7.24e+08 | 9.63e+08 | 0.00e+00 | 3.28e+08 | 1.27e+08 | 1.37e+07 | 0.00e+00 | 3.36e+08 |
| CS-138  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BA-139  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BA-140  | 2.38e+07 | 2.91e+04 | 0.00e+00 | 9.88e+03 | 1.96e+04 | 3.67e+07 | 0.00e+00 | 1.53e+06 |
| BA-141  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BA-142  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| LA-140  | 3.09e-02 | 1.52e-02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.73e+02 | 0.00e+00 | 4.05e-03 |
| LA-142  | 3.36e-92 | 1.49e-92 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.54e-88 | 0.00e+00 | 3.71e-93 |
| CE-141  | 1.18e+04 | 7.87e+03 | 0.00e+00 | 3.71e+03 | 0.00e+00 | 2.25e+07 | 0.00e+00 | 9.04e+02 |
| CE-143  | 1.67e-02 | 1.22e+01 | 0.00e+00 | 5.46e-03 | 0.00e+00 | 3.66e+02 | 0.00e+00 | 1.36e-03 |
| CE-144  | 1.23e+06 | 5.08e+05 | 0.00e+00 | 3.04e+05 | 0.00e+00 | 3.09e+08 | 0.00e+00 | 6.60e+04 |
| PR-143  | 1.77e+04 | 7.05e+03 | 0.00e+00 | 4.10e+03 | 0.00e+00 | 5.81e+07 | 0.00e+00 | 8.79e+02 |
| PR-144  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| ND-147  | 6.22e+03 | 6.77e+03 | 0.00e+00 | 3.97e+03 | 0.00e+00 | 2.44e+07 | 0.00e+00 | 4.05e+02 |
| W-187   | 1.73e-02 | 1.41e-02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.82e+00 | 0.00e+00 | 4.94e-03 |
| NP-239  | 2.25e-01 | 2.12e-02 | 0.00e+00 | 6.66e-02 | 0.00e+00 | 3.41e+03 | 0.00e+00 | 1.18e-02 |

TABLE 2.2-2c (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 9 of 10

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 1 TEEN

Pathway: 5 Grs/Cow/Milk (CMILK)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 9.94e+02 | 9.94e+02 | 9.94e+02 | 9.94e+02 | 9.94e+02 | 0.00e+00 | 9.94e+02 |
| C-14    | 4.86e+08 | 9.72e+07 | 9.72e+07 | 9.72e+07 | 9.72e+07 | 9.72e+07 | 0.00e+00 | 9.72e+07 |
| NA-24   | 4.29e+06 | 4.29e+06 | 4.29e+06 | 4.29e+06 | 4.29e+06 | 4.29e+06 | 0.00e+00 | 4.29e+06 |
| P-32    | 3.15e+10 | 1.95e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.65e+09 | 0.00e+00 | 1.22e+09 |
| CR-51   | 0.00e+00 | 0.00e+00 | 2.77e+04 | 1.09e+04 | 7.12e+04 | 8.38e+06 | 0.00e+00 | 4.99e+04 |
| MN-54   | 0.00e+00 | 1.40e+07 | 0.00e+00 | 4.18e+06 | 0.00e+00 | 2.87e+07 | 0.00e+00 | 2.78e+06 |
| MN-56   | 0.00e+00 | 7.32e-03 | 0.00e+00 | 9.27e-03 | 0.00e+00 | 4.82e-01 | 0.00e+00 | 1.30e-03 |
| FE-55   | 4.45e+07 | 3.16e+07 | 0.00e+00 | 0.00e+00 | 2.00e+07 | 1.37e+07 | 0.00e+00 | 7.36e+06 |
| FE-59   | 5.18e+07 | 1.21e+08 | 0.00e+00 | 0.00e+00 | 3.81e+07 | 2.86e+08 | 0.00e+00 | 4.67e+07 |
| CO-58   | 0.00e+00 | 7.94e+06 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.10e+08 | 0.00e+00 | 1.83e+07 |
| CO-60   | 0.00e+00 | 2.78e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.62e+08 | 0.00e+00 | 6.26e+07 |
| NI-63   | 1.18e+10 | 8.35e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.33e+08 | 0.00e+00 | 4.01e+08 |
| NI-65   | 6.78e-01 | 8.66e-02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.70e+00 | 0.00e+00 | 3.94e-02 |
| CU-64   | 0.00e+00 | 4.21e+04 | 0.00e+00 | 1.06e+05 | 0.00e+00 | 3.26e+06 | 0.00e+00 | 1.98e+04 |
| ZN-65   | 2.11e+09 | 7.31e+09 | 0.00e+00 | 4.68e+09 | 0.00e+00 | 3.10e+09 | 0.00e+00 | 3.41e+09 |
| ZN-69   | 3.70e-12 | 7.05e-12 | 0.00e+00 | 4.61e-12 | 0.00e+00 | 1.30e-11 | 0.00e+00 | 4.94e-13 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.78e-01 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.02e-23 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 4.73e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.00e+08 | 0.00e+00 | 2.22e+09 |
| RB-88   | 0.00e+00 | 3.90e-45 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.34e-52 | 0.00e+00 | 2.08e-45 |
| RB-89   | 0.00e+00 | 7.96e-53 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.22e-61 | 0.00e+00 | 5.63e-53 |
| SR-89   | 2.67e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.18e+08 | 0.00e+00 | 7.66e+07 |
| SR-90   | 6.61e+10 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.86e+09 | 0.00e+00 | 1.63e+10 |
| SR-91   | 5.27e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.39e+05 | 0.00e+00 | 2.10e+03 |
| SR-92   | 8.85e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.26e+01 | 0.00e+00 | 3.77e-02 |
| Y-90    | 1.30e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.08e+06 | 0.00e+00 | 3.51e+00 |
| Y-91    | 1.58e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.48e+06 | 0.00e+00 | 4.24e+02 |
| Y-91M   | 1.18e-19 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.55e-18 | 0.00e+00 | 4.49e-21 |
| Y-92    | 1.03e-04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.82e+00 | 0.00e+00 | 2.98e-06 |
| Y-93    | 4.09e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.25e+04 | 0.00e+00 | 1.12e-02 |
| ZR-95   | 1.65e+03 | 5.21e+02 | 0.00e+00 | 7.65e+02 | 0.00e+00 | 1.20e+06 | 0.00e+00 | 3.58e+02 |
| ZR-97   | 7.87e-01 | 1.56e-01 | 0.00e+00 | 2.36e-01 | 0.00e+00 | 4.22e+04 | 0.00e+00 | 7.17e-02 |
| NB-95   | 1.41e+05 | 7.81e+04 | 0.00e+00 | 7.57e+04 | 0.00e+00 | 3.34e+08 | 0.00e+00 | 4.30e+04 |
| MO-99   | 0.00e+00 | 4.46e+07 | 0.00e+00 | 1.02e+08 | 0.00e+00 | 8.00e+07 | 0.00e+00 | 8.51e+06 |
| TC-99M  | 5.74e+00 | 1.60e+01 | 0.00e+00 | 2.39e+02 | 8.89e+00 | 1.05e+04 | 0.00e+00 | 2.08e+02 |
| TC-101  | 4.39e-60 | 6.24e-60 | 0.00e+00 | 1.13e-58 | 3.80e-60 | 1.07e-66 | 0.00e+00 | 6.13e-59 |
| RU-103  | 1.81e+03 | 0.00e+00 | 0.00e+00 | 6.38e+03 | 0.00e+00 | 1.51e+05 | 0.00e+00 | 7.74e+02 |
| RU-105  | 1.55e-03 | 0.00e+00 | 0.00e+00 | 1.96e-02 | 0.00e+00 | 1.25e+00 | 0.00e+00 | 6.03e-04 |
| RU-106  | 3.75e+04 | 0.00e+00 | 0.00e+00 | 7.23e+04 | 0.00e+00 | 1.80e+06 | 0.00e+00 | 4.73e+03 |
| AG-110M | 9.63e+07 | 9.11e+07 | 0.00e+00 | 1.74e+08 | 0.00e+00 | 2.56e+10 | 0.00e+00 | 5.54e+07 |
| TE-125M | 3.01e+07 | 1.08e+07 | 8.40e+06 | 0.00e+00 | 0.00e+00 | 8.87e+07 | 0.00e+00 | 4.02e+06 |
| TE-127  | 1.24e+03 | 4.38e+02 | 8.52e+02 | 5.00e+03 | 0.00e+00 | 9.54e+04 | 0.00e+00 | 2.66e+02 |
| TE-127M | 8.44e+07 | 2.99e+07 | 2.01e+07 | 3.42e+08 | 0.00e+00 | 2.10e+08 | 0.00e+00 | 1.00e+07 |
| TE-129  | 4.33e-10 | 1.62e-10 | 3.10e-10 | 1.82e-09 | 0.00e+00 | 2.37e-09 | 0.00e+00 | 1.05e-10 |
| TE-129M | 1.10e+08 | 4.09e+07 | 3.55e+07 | 4.61e+08 | 0.00e+00 | 4.13e+08 | 0.00e+00 | 1.74e+07 |
| TE-131  | 6.70e-33 | 2.76e-33 | 5.16e-33 | 2.93e-32 | 0.00e+00 | 5.50e-34 | 0.00e+00 | 2.09e-33 |
| TE-131M | 6.57e+05 | 3.15e+05 | 4.74e+05 | 3.28e+06 | 0.00e+00 | 2.53e+07 | 0.00e+00 | 2.63e+05 |



TABLE 2.2-2c (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 10 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 1 TEEN  
Pathway: 5 Grs/Cow/Milk (CMILK)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 4.28e+06 | 2.71e+06 | 2.85e+06 | 2.60e+07 | 0.00e+00 | 8.57e+07 | 0.00e+00 | 2.55e+06 |
| I-130   | 7.35e+05 | 2.13e+06 | 1.73e+08 | 3.27e+06 | 0.00e+00 | 1.63e+06 | 0.00e+00 | 8.49e+05 |
| I-131   | 5.37e+08 | 7.52e+08 | 2.19e+11 | 1.30e+09 | 0.00e+00 | 1.49e+08 | 0.00e+00 | 4.04e+08 |
| I-132   | 2.92e-01 | 7.64e-01 | 2.58e+01 | 1.20e+00 | 0.00e+00 | 3.33e-01 | 0.00e+00 | 2.74e-01 |
| I-133   | 7.06e+06 | 1.20e+07 | 1.67e+09 | 2.10e+07 | 0.00e+00 | 9.06e+06 | 0.00e+00 | 3.65e+06 |
| I-134   | 3.36e-12 | 8.89e-12 | 1.48e-10 | 1.40e-11 | 0.00e+00 | 1.17e-13 | 0.00e+00 | 3.19e-12 |
| I-135   | 2.29e+04 | 5.91e+04 | 3.80e+06 | 9.33e+04 | 0.00e+00 | 6.55e+04 | 0.00e+00 | 2.19e+04 |
| CS-134  | 9.82e+09 | 2.31e+10 | 0.00e+00 | 7.34e+09 | 2.80e+09 | 2.87e+08 | 0.00e+00 | 1.07e+10 |
| CS-136  | 4.48e+08 | 1.76e+09 | 0.00e+00 | 9.60e+08 | 1.51e+08 | 1.42e+08 | 0.00e+00 | 1.18e+09 |
| CS-137  | 1.34e+10 | 1.78e+10 | 0.00e+00 | 6.06e+09 | 2.35e+09 | 2.53e+08 | 0.00e+00 | 6.20e+09 |
| CS-138  | 1.58e-23 | 3.03e-23 | 0.00e+00 | 2.23e-23 | 2.60e-24 | 1.37e-26 | 0.00e+00 | 1.51e-23 |
| BA-139  | 8.20e-08 | 5.77e-11 | 0.00e+00 | 5.44e-11 | 3.98e-11 | 7.31e-07 | 0.00e+00 | 2.39e-09 |
| BA-140  | 4.85e+07 | 5.95e+04 | 0.00e+00 | 2.02e+04 | 4.00e+04 | 7.49e+07 | 0.00e+00 | 3.13e+06 |
| BA-141  | 7.95e-46 | 5.94e-49 | 0.00e+00 | 5.51e-49 | 4.07e-49 | 1.70e-51 | 0.00e+00 | 2.66e-47 |
| BA-142  | 7.98e-81 | 7.98e-84 | 0.00e+00 | 6.75e-84 | 5.31e-84 | 2.45e-92 | 0.00e+00 | 4.91e-82 |
| LA-140  | 8.12e+00 | 3.99e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.29e+05 | 0.00e+00 | 1.06e+00 |
| LA-142  | 3.41e-11 | 1.52e-11 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.61e-07 | 0.00e+00 | 3.77e-12 |
| CE-141  | 8.88e+03 | 5.93e+03 | 0.00e+00 | 2.79e+03 | 0.00e+00 | 1.70e+07 | 0.00e+00 | 6.81e+02 |
| CE-143  | 7.62e+01 | 5.55e+04 | 0.00e+00 | 2.49e+01 | 0.00e+00 | 1.67e+06 | 0.00e+00 | 6.20e+00 |
| CE-144  | 6.58e+05 | 2.72e+05 | 0.00e+00 | 1.63e+05 | 0.00e+00 | 1.66e+08 | 0.00e+00 | 3.54e+04 |
| PR-143  | 2.90e+02 | 1.16e+02 | 0.00e+00 | 6.74e+01 | 0.00e+00 | 9.55e+05 | 0.00e+00 | 1.44e+01 |
| PR-144  | 1.19e-53 | 4.87e-54 | 0.00e+00 | 2.79e-54 | 0.00e+00 | 1.31e-56 | 0.00e+00 | 6.03e-55 |
| ND-147  | 1.81e+02 | 1.97e+02 | 0.00e+00 | 1.16e+02 | 0.00e+00 | 7.11e+05 | 0.00e+00 | 1.18e+01 |
| W-187   | 1.19e+04 | 9.71e+03 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.63e+06 | 0.00e+00 | 3.40e+03 |
| NP-239  | 7.00e+00 | 6.60e-01 | 0.00e+00 | 2.07e+00 | 0.00e+00 | 1.06e+05 | 0.00e+00 | 3.67e-01 |

Units: Inhalation and all tritium pathways mrem/yr per  $\mu\text{Ci}/\text{m}^3$   
Others -  $\text{m}^2$  . mrem/yr per  $\mu\text{Ci}/\text{sec}$

Values based on standard NUREG-0133, Section 5.3.1 assumptions unless otherwise indicated.

TABLE 2.2-2d

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 1 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 0 ADULT  
Pathway: 0 Ground Plane Deposition (GPD)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| C-14    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| NA-24   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.39e+07 | 1.20e+07 |
| P-32    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| CR-51   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.50e+06 | 4.65e+06 |
| MN-54   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.62e+09 | 1.38e+09 |
| MN-56   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.07e+06 | 9.03e+05 |
| FE-55   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| FE-59   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.20e+08 | 2.73e+08 |
| CO-58   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.45e+08 | 3.80e+08 |
| CO-60   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.53e+10 | 2.15e+10 |
| NI-63   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| NI-65   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.45e+05 | 2.97e+05 |
| CU-64   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.86e+05 | 6.05e+05 |
| ZN-65   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.57e+08 | 7.46e+08 |
| ZN-69   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.08e+03 | 4.87e+03 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.37e+05 | 2.03e+05 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.03e+07 | 8.98e+06 |
| RB-88   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.78e+04 | 3.31e+04 |
| RB-89   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.48e+05 | 1.23e+05 |
| SR-89   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.51e+04 | 2.16e+04 |
| SR-90   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| SR-91   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.51e+06 | 2.15e+06 |
| SR-92   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.62e+05 | 7.76e+05 |
| Y-90    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.31e+03 | 4.50e+03 |
| Y-91    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.21e+06 | 1.07e+06 |
| Y-91M   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.16e+05 | 1.00e+05 |
| Y-92    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.14e+05 | 1.80e+05 |
| Y-93    | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.50e+05 | 1.83e+05 |
| ZR-95   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.85e+08 | 2.45e+08 |
| ZR-97   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.44e+06 | 2.96e+06 |
| NB-95   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.61e+08 | 1.37e+08 |
| MO-99   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.62e+06 | 3.99e+06 |
| TC-99M  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.11e+05 | 1.84e+05 |
| TC-101  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.26e+04 | 2.03e+04 |
| RU-103  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.26e+08 | 1.08e+08 |
| RU-105  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.21e+05 | 6.36e+05 |
| RU-106  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.04e+08 | 4.20e+08 |
| AG-110M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.02e+09 | 3.45e+09 |
| TE-125M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.13e+06 | 1.56e+06 |
| TE-127  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.29e+03 | 2.99e+03 |
| TE-127M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.08e+05 | 9.17e+04 |
| TE-129  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.08e+04 | 2.61e+04 |
| TE-129M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.31e+07 | 1.98e+07 |
| TE-131  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.45e+07 | 2.92e+04 |
| TE-131M | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.46e+06 | 8.02e+06 |

TABLE 2.2-2d (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 2 of 10

Release Type: 2 Gaseous

Dose Factor: 2 R<sub>i</sub> (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 0 ADULT

Pathway: 0 Ground Plane Deposition (GPD)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.97e+06 | 4.22e+06 |
| I-130   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.68e+06 | 5.50e+06 |
| I-131   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.09e+07 | 1.72e+07 |
| I-132   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.47e+06 | 1.25e+06 |
| I-133   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.98e+06 | 2.45e+06 |
| I-134   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.30e+05 | 4.46e+05 |
| I-135   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.95e+06 | 2.53e+06 |
| CS-134  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.05e+09 | 6.90e+09 |
| CS-136  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.71e+08 | 1.51e+08 |
| CS-137  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.20e+10 | 1.03e+10 |
| CS-138  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.10e+05 | 3.59e+05 |
| BA-139  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.19e+05 | 1.06e+05 |
| BA-140  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.35e+07 | 2.05e+07 |
| BA-141  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.75e+04 | 4.17e+04 |
| BA-142  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.06e+04 | 4.44e+04 |
| LA-140  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.18e+07 | 1.92e+07 |
| LA-142  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.12e+05 | 7.60e+05 |
| CE-141  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.54e+07 | 1.37e+07 |
| CE-143  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.63e+06 | 2.31e+06 |
| CE-144  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.05e+07 | 6.96e+07 |
| PR-143  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| PR-144  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.11e+03 | 1.84e+03 |
| ND-147  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.01e+07 | 8.39e+06 |
| W-187   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.73e+06 | 2.35e+06 |
| NP-239  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.98e+06 | 1.71e+06 |

TABLE 2.2-2d (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 3 of 10

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 0 ADULT

Pathway: 1 Inhalation (INHL)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 1.26e+03 | 1.26e+03 | 1.26e+03 | 1.26e+03 | 1.26e+03 | 0.00e+00 | 1.26e+03 |
| C-14    | 1.82e+04 | 3.41e+03 | 3.41e+03 | 3.41e+03 | 3.41e+03 | 3.41e+03 | 0.00e+00 | 3.41e+03 |
| NA-24   | 1.02e+04 | 1.02e+04 | 1.02e+04 | 1.02e+04 | 1.02e+04 | 1.02e+04 | 0.00e+00 | 1.02e+04 |
| P-32    | 1.32e+06 | 7.71e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.64e+04 | 0.00e+00 | 5.01e+04 |
| CR-51   | 0.00e+00 | 0.00e+00 | 5.95e+01 | 2.28e+01 | 1.44e+04 | 3.32e+03 | 0.00e+00 | 1.00e+02 |
| MN-54   | 0.00e+00 | 3.96e+04 | 0.00e+00 | 9.84e+03 | 1.40e+06 | 7.74e+04 | 0.00e+00 | 6.30e+03 |
| MN-56   | 0.00e+00 | 1.24e+00 | 0.00e+00 | 1.30e+00 | 9.44e+03 | 2.02e+04 | 0.00e+00 | 1.83e-01 |
| FE-55   | 2.46e+04 | 1.70e+04 | 0.00e+00 | 0.00e+00 | 7.21e+04 | 6.03e+03 | 0.00e+00 | 3.94e+03 |
| FE-59   | 1.18e+04 | 2.78e+04 | 0.00e+00 | 0.00e+00 | 1.02e+06 | 1.88e+05 | 0.00e+00 | 1.06e+04 |
| CO-58   | 0.00e+00 | 1.58e+03 | 0.00e+00 | 0.00e+00 | 9.28e+05 | 1.06e+05 | 0.00e+00 | 2.07e+03 |
| CO-60   | 0.00e+00 | 1.15e+04 | 0.00e+00 | 0.00e+00 | 5.97e+06 | 2.85e+05 | 0.00e+00 | 1.48e+04 |
| NI-63   | 4.32e+05 | 3.14e+04 | 0.00e+00 | 0.00e+00 | 1.78e+05 | 1.34e+04 | 0.00e+00 | 1.45e+04 |
| NI-65   | 1.54e+00 | 2.10e-01 | 0.00e+00 | 0.00e+00 | 5.60e+03 | 1.23e+04 | 0.00e+00 | 9.12e-02 |
| CU-64   | 0.00e+00 | 1.46e+00 | 0.00e+00 | 4.62e+00 | 6.78e+03 | 4.90e+04 | 0.00e+00 | 6.15e-01 |
| ZN-65   | 3.24e+04 | 1.03e+05 | 0.00e+00 | 6.90e+04 | 8.64e+05 | 5.34e+04 | 0.00e+00 | 4.66e+04 |
| ZN-69   | 3.38e-02 | 6.51e-02 | 0.00e+00 | 4.22e-02 | 9.20e+02 | 1.63e+01 | 0.00e+00 | 4.52e-03 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.32e+02 | 0.00e+00 | 2.41e+02 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.64e-03 | 0.00e+00 | 3.13e+02 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.28e+01 |
| RB-86   | 0.00e+00 | 1.35e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.66e+04 | 0.00e+00 | 5.90e+04 |
| RB-88   | 0.00e+00 | 3.87e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.34e-09 | 0.00e+00 | 1.93e+02 |
| RB-89   | 0.00e+00 | 2.56e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.28e-12 | 0.00e+00 | 1.70e+02 |
| SR-89   | 3.04e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.40e+06 | 3.50e+05 | 0.00e+00 | 8.72e+03 |
| SR-90   | 9.92e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.60e+06 | 7.22e+05 | 0.00e+00 | 6.10e+06 |
| SR-91   | 6.19e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.65e+04 | 1.91e+05 | 0.00e+00 | 2.50e+00 |
| SR-92   | 6.74e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.65e+04 | 4.30e+04 | 0.00e+00 | 2.91e-01 |
| Y-90    | 2.09e+03 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.70e+05 | 5.06e+05 | 0.00e+00 | 5.61e+01 |
| Y-91    | 4.62e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.70e+06 | 3.85e+05 | 0.00e+00 | 1.24e+04 |
| Y-91M   | 2.61e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.92e+03 | 1.33e+00 | 0.00e+00 | 1.02e-02 |
| Y-92    | 1.03e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.57e+04 | 7.35e+04 | 0.00e+00 | 3.02e-01 |
| Y-93    | 9.44e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.85e+04 | 4.22e+05 | 0.00e+00 | 2.61e+00 |
| ZR-95   | 1.07e+05 | 3.44e+04 | 0.00e+00 | 5.42e+04 | 1.77e+06 | 1.50e+05 | 0.00e+00 | 2.33e+04 |
| ZR-97   | 9.68e+01 | 1.96e+01 | 0.00e+00 | 2.97e+01 | 7.87e+04 | 5.23e+05 | 0.00e+00 | 9.04e+00 |
| NB-95   | 1.41e+04 | 7.82e+03 | 0.00e+00 | 7.74e+03 | 5.05e+05 | 1.04e+05 | 0.00e+00 | 4.21e+03 |
| MO-99   | 0.00e+00 | 1.21e+02 | 0.00e+00 | 2.91e+02 | 9.12e+04 | 2.48e+05 | 0.00e+00 | 2.30e+01 |
| TC-99M  | 1.03e-03 | 2.91e-03 | 0.00e+00 | 4.42e-02 | 7.64e+02 | 4.16e+03 | 0.00e+00 | 3.70e-02 |
| TC-101  | 4.18e-05 | 6.02e-05 | 0.00e+00 | 1.08e-03 | 3.99e+02 | 1.09e-11 | 0.00e+00 | 5.90e-04 |
| RU-103  | 1.53e+03 | 0.00e+00 | 0.00e+00 | 5.83e+03 | 5.05e+05 | 1.10e+05 | 0.00e+00 | 6.58e+02 |
| RU-105  | 7.90e-01 | 0.00e+00 | 0.00e+00 | 1.02e+00 | 1.10e+04 | 4.82e+04 | 0.00e+00 | 3.11e-01 |
| RU-106  | 6.91e+04 | 0.00e+00 | 0.00e+00 | 1.34e+05 | 9.36e+06 | 9.12e+05 | 0.00e+00 | 8.72e+03 |
| AG-110M | 1.08e+04 | 1.00e+04 | 0.00e+00 | 1.97e+04 | 4.63e+06 | 3.02e+05 | 0.00e+00 | 5.94e+03 |
| TE-125M | 3.42e+03 | 1.58e+03 | 1.05e+03 | 1.24e+04 | 3.14e+05 | 7.06e+04 | 0.00e+00 | 4.67e+02 |
| TE-127  | 1.40e+00 | 6.42e-01 | 1.06e+00 | 5.10e+00 | 6.51e+03 | 5.74e+04 | 0.00e+00 | 3.10e-01 |
| TE-127M | 1.26e+04 | 5.77e+03 | 3.29e+03 | 4.58e+04 | 9.60e+05 | 1.50e+05 | 0.00e+00 | 1.57e+03 |
| TE-129  | 4.98e-02 | 2.39e-02 | 3.90e-02 | 1.87e-01 | 1.94e+03 | 1.57e+02 | 0.00e+00 | 1.24e-02 |
| TE-129M | 9.76e+03 | 4.67e+03 | 3.44e+03 | 3.66e+04 | 1.16e+06 | 3.83e+05 | 0.00e+00 | 1.58e+03 |
| TE-131  | 1.11e-02 | 5.95e-03 | 9.36e-03 | 4.37e-02 | 1.39e+03 | 1.84e+01 | 0.00e+00 | 3.59e-03 |
| TE-131M | 6.99e+01 | 4.36e+01 | 5.50e+01 | 3.09e+02 | 1.46e+05 | 5.56e+05 | 0.00e+00 | 2.90e+01 |

TABLE 2.2-2d (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 4 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 0 ADULT  
Pathway: 1 Inhalation (INHL)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 2.60e+02 | 2.15e+02 | 1.90e+02 | 1.46e+03 | 2.88e+05 | 5.10e+05 | 0.00e+00 | 1.62e+02 |
| I-130   | 4.58e+03 | 1.34e+04 | 1.14e+06 | 2.09e+04 | 0.00e+00 | 7.69e+03 | 0.00e+00 | 5.28e+03 |
| I-131   | 2.52e+04 | 3.58e+04 | 1.19e+07 | 6.13e+04 | 0.00e+00 | 6.28e+03 | 0.00e+00 | 2.05e+04 |
| I-132   | 1.16e+03 | 3.26e+03 | 1.14e+05 | 5.18e+03 | 0.00e+00 | 4.06e+02 | 0.00e+00 | 1.16e+03 |
| I-133   | 8.64e+03 | 1.48e+04 | 2.15e+06 | 2.58e+04 | 0.00e+00 | 8.88e+03 | 0.00e+00 | 4.52e+03 |
| I-134   | 6.44e+02 | 1.73e+03 | 2.98e+04 | 2.75e+03 | 0.00e+00 | 1.01e+00 | 0.00e+00 | 6.15e+02 |
| I-135   | 2.68e+03 | 6.98e+03 | 4.48e+05 | 1.11e+04 | 0.00e+00 | 5.25e+03 | 0.00e+00 | 2.57e+03 |
| CS-134  | 3.73e+05 | 8.48e+05 | 0.00e+00 | 2.87e+05 | 9.76e+04 | 1.04e+04 | 0.00e+00 | 7.28e+05 |
| CS-136  | 3.90e+04 | 1.46e+05 | 0.00e+00 | 8.56e+04 | 1.20e+04 | 1.17e+04 | 0.00e+00 | 1.10e+05 |
| CS-137  | 4.78e+05 | 6.21e+05 | 0.00e+00 | 2.22e+05 | 7.52e+04 | 8.40e+03 | 0.00e+00 | 4.28e+05 |
| CS-138  | 3.31e+02 | 6.21e+02 | 0.00e+00 | 4.80e+02 | 4.86e+01 | 1.86e-03 | 0.00e+00 | 3.24e+02 |
| BA-139  | 9.36e-01 | 6.66e-04 | 0.00e+00 | 6.22e-04 | 3.76e+03 | 8.96e+02 | 0.00e+00 | 2.74e-02 |
| BA-140  | 3.90e+04 | 4.90e+01 | 0.00e+00 | 1.67e+01 | 1.27e+06 | 2.18e+05 | 0.00e+00 | 2.57e+03 |
| BA-141  | 1.00e-01 | 7.53e-05 | 0.00e+00 | 7.00e-05 | 1.94e+03 | 1.16e-07 | 0.00e+00 | 3.36e-03 |
| BA-142  | 2.63e-02 | 2.70e-05 | 0.00e+00 | 2.29e-05 | 1.19e+03 | 1.57e-16 | 0.00e+00 | 1.66e-03 |
| LA-140  | 3.44e+02 | 1.74e+02 | 0.00e+00 | 0.00e+00 | 1.36e+05 | 4.58e+05 | 0.00e+00 | 4.58e+01 |
| LA-142  | 6.83e-01 | 3.10e-01 | 0.00e+00 | 0.00e+00 | 6.33e+03 | 2.11e+03 | 0.00e+00 | 7.72e-02 |
| CE-141  | 1.99e+04 | 1.35e+04 | 0.00e+00 | 6.26e+03 | 3.62e+05 | 1.20e+05 | 0.00e+00 | 1.53e+03 |
| CE-143  | 1.86e+02 | 1.38e+02 | 0.00e+00 | 6.08e+01 | 7.98e+04 | 2.26e+05 | 0.00e+00 | 1.53e+01 |
| CE-144  | 3.43e+06 | 1.43e+06 | 0.00e+00 | 8.48e+05 | 7.78e+06 | 8.16e+05 | 0.00e+00 | 1.84e+05 |
| PR-143  | 9.36e+03 | 3.75e+03 | 0.00e+00 | 2.16e+03 | 2.81e+05 | 2.00e+05 | 0.00e+00 | 4.64e+02 |
| PR-144  | 3.01e-02 | 1.25e-02 | 0.00e+00 | 7.05e-03 | 1.02e+03 | 2.15e-08 | 0.00e+00 | 1.53e-03 |
| ND-147  | 5.27e+03 | 6.10e+03 | 0.00e+00 | 3.56e+03 | 2.21e+05 | 1.73e+05 | 0.00e+00 | 3.65e+02 |
| W-187   | 8.48e+00 | 7.08e+00 | 0.00e+00 | 0.00e+00 | 2.90e+04 | 1.55e+05 | 0.00e+00 | 2.48e+00 |
| NP-239  | 2.30e+02 | 2.26e+01 | 0.00e+00 | 7.00e+01 | 3.76e+04 | 1.19e+05 | 0.00e+00 | 1.24e+01 |

TABLE 2.2-2d (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, ( $R_i$ )

Page 5 of 10

Release Type: 2 Gaseous

Dose Factor: 2  $R_i$  ( $m^2 \cdot (mrem/yr) / (uCi/sec)$  or  $(mrem/yr) / (uCi/m^3)$ )

AgeGroup: 0 ADULT

Pathway: 2 Vegetation (VEG)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 2.26e+03 | 2.26e+03 | 2.26e+03 | 2.26e+03 | 2.26e+03 | 0.00e+00 | 2.26e+03 |
| C-14    | 2.28e+08 | 4.55e+07 | 4.55e+07 | 4.55e+07 | 4.55e+07 | 4.55e+07 | 0.00e+00 | 4.55e+07 |
| NA-24   | 2.71e+05 | 2.71e+05 | 2.71e+05 | 2.71e+05 | 2.71e+05 | 2.71e+05 | 0.00e+00 | 2.71e+05 |
| P-32    | 1.40e+09 | 8.72e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.58e+08 | 0.00e+00 | 5.42e+07 |
| CR-51   | 0.00e+00 | 0.00e+00 | 2.77e+04 | 1.02e+04 | 6.15e+04 | 1.17e+07 | 0.00e+00 | 4.64e+04 |
| MN-54   | 0.00e+00 | 3.13e+08 | 0.00e+00 | 9.31e+07 | 0.00e+00 | 9.58e+08 | 0.00e+00 | 5.97e+07 |
| MN-56   | 0.00e+00 | 1.59e+01 | 0.00e+00 | 2.01e+01 | 0.00e+00 | 5.06e+02 | 0.00e+00 | 2.81e+00 |
| FE-55   | 2.10e+08 | 1.45e+08 | 0.00e+00 | 0.00e+00 | 8.08e+07 | 8.31e+07 | 0.00e+00 | 3.38e+07 |
| FE-59   | 1.26e+08 | 2.96e+08 | 0.00e+00 | 0.00e+00 | 8.27e+07 | 9.87e+08 | 0.00e+00 | 1.14e+08 |
| CO-58   | 0.00e+00 | 3.08e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.24e+08 | 0.00e+00 | 6.90e+07 |
| CO-60   | 0.00e+00 | 1.67e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.14e+09 | 0.00e+00 | 3.69e+08 |
| NI-63   | 1.04e+10 | 7.21e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.51e+08 | 0.00e+00 | 3.49e+08 |
| NI-65   | 6.15e+01 | 7.99e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.03e+02 | 0.00e+00 | 3.65e+00 |
| CU-64   | 0.00e+00 | 9.15e+03 | 0.00e+00 | 2.31e+04 | 0.00e+00 | 7.80e+05 | 0.00e+00 | 4.29e+03 |
| ZN-65   | 3.17e+08 | 1.01e+09 | 0.00e+00 | 6.75e+08 | 0.00e+00 | 6.36e+08 | 0.00e+00 | 4.56e+08 |
| ZN-69   | 5.38e-06 | 1.03e-05 | 0.00e+00 | 6.69e-06 | 0.00e+00 | 1.55e-06 | 0.00e+00 | 7.16e-07 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.46e+00 | 0.00e+00 | 3.10e+00 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.99e-16 | 0.00e+00 | 2.54e-11 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 2.19e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.33e+07 | 0.00e+00 | 1.02e+08 |
| RB-88   | 0.00e+00 | 3.43e-22 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.74e-33 | 0.00e+00 | 1.82e-22 |
| RB-89   | 0.00e+00 | 3.96e-26 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.30e-39 | 0.00e+00 | 2.79e-26 |
| SR-89   | 9.95e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.60e+09 | 0.00e+00 | 2.86e+08 |
| SR-90   | 6.05e+11 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.75e+10 | 0.00e+00 | 1.48e+11 |
| SR-91   | 3.03e+05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.45e+06 | 0.00e+00 | 1.23e+04 |
| SR-92   | 4.24e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.41e+03 | 0.00e+00 | 1.84e+01 |
| Y-90    | 1.33e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.41e+08 | 0.00e+00 | 3.57e+02 |
| Y-91    | 5.12e+06 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.82e+09 | 0.00e+00 | 1.37e+05 |
| Y-91M   | 5.41e-09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.59e-08 | 0.00e+00 | 2.10e-10 |
| Y-92    | 9.14e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.60e+04 | 0.00e+00 | 2.67e-02 |
| Y-93    | 1.69e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.35e+06 | 0.00e+00 | 4.66e+00 |
| ZR-95   | 1.18e+06 | 3.77e+05 | 0.00e+00 | 5.92e+05 | 0.00e+00 | 1.20e+09 | 0.00e+00 | 2.55e+05 |
| ZR-97   | 3.37e+02 | 6.80e+01 | 0.00e+00 | 1.03e+02 | 0.00e+00 | 2.11e+07 | 0.00e+00 | 3.11e+01 |
| NB-95   | 1.42e+05 | 7.91e+04 | 0.00e+00 | 7.82e+04 | 0.00e+00 | 4.80e+08 | 0.00e+00 | 4.25e+04 |
| MO-99   | 0.00e+00 | 6.14e+06 | 0.00e+00 | 1.39e+07 | 0.00e+00 | 1.42e+07 | 0.00e+00 | 1.17e+06 |
| TC-99M  | 3.10e+00 | 8.75e+00 | 0.00e+00 | 1.33e+02 | 4.29e+00 | 5.18e+03 | 0.00e+00 | 1.11e+02 |
| TC-101  | 7.90e-31 | 1.14e-30 | 0.00e+00 | 2.05e-29 | 5.82e-31 | 3.42e-42 | 0.00e+00 | 1.12e-29 |
| RU-103  | 4.77e+06 | 0.00e+00 | 0.00e+00 | 1.82e+07 | 0.00e+00 | 5.57e+08 | 0.00e+00 | 2.05e+06 |
| RU-105  | 5.36e+01 | 0.00e+00 | 0.00e+00 | 6.93e+02 | 0.00e+00 | 3.28e+04 | 0.00e+00 | 2.12e+01 |
| RU-106  | 1.93e+08 | 0.00e+00 | 0.00e+00 | 3.72e+08 | 0.00e+00 | 1.25e+10 | 0.00e+00 | 2.44e+07 |
| AG-110M | 1.05e+07 | 9.75e+06 | 0.00e+00 | 1.92e+07 | 0.00e+00 | 3.98e+09 | 0.00e+00 | 5.79e+06 |
| TE-125M | 9.67e+07 | 3.50e+07 | 2.91e+07 | 3.93e+08 | 0.00e+00 | 3.86e+08 | 0.00e+00 | 1.30e+07 |
| TE-127  | 5.73e+03 | 2.06e+03 | 4.25e+03 | 2.33e+04 | 0.00e+00 | 4.52e+05 | 0.00e+00 | 1.24e+03 |
| TE-127M | 3.49e+08 | 1.25e+08 | 8.92e+07 | 1.42e+09 | 0.00e+00 | 1.17e+09 | 0.00e+00 | 4.26e+07 |
| TE-129  | 6.94e-04 | 2.61e-04 | 5.33e-04 | 2.92e-03 | 0.00e+00 | 5.24e-04 | 0.00e+00 | 1.69e-04 |
| TE-129M | 2.51e+08 | 9.37e+07 | 8.62e+07 | 1.05e+09 | 0.00e+00 | 1.26e+09 | 0.00e+00 | 3.97e+07 |
| TE-131  | 1.51e-15 | 6.32e-16 | 1.24e-15 | 6.63e-15 | 0.00e+00 | 2.14e-16 | 0.00e+00 | 4.78e-16 |
| TE-131M | 9.12e+05 | 4.46e+05 | 7.06e+05 | 4.52e+06 | 0.00e+00 | 4.43e+07 | 0.00e+00 | 3.72e+05 |

TABLE 2.2-2d (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 6 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 0 ADULT  
Pathway: 2 Vegetation (VEG)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 4.29e+06 | 2.77e+06 | 3.06e+06 | 2.67e+07 | 0.00e+00 | 1.31e+08 | 0.00e+00 | 2.60e+06 |
| I-130   | 3.91e+05 | 1.15e+06 | 9.78e+07 | 1.80e+06 | 0.00e+00 | 9.93e+05 | 0.00e+00 | 4.55e+05 |
| I-131   | 8.07e+07 | 1.16e+08 | 3.79e+10 | 1.98e+08 | 0.00e+00 | 3.05e+07 | 0.00e+00 | 6.62e+07 |
| I-132   | 5.76e+01 | 1.54e+02 | 5.40e+03 | 2.46e+02 | 0.00e+00 | 2.90e+01 | 0.00e+00 | 5.40e+01 |
| I-133   | 2.08e+06 | 3.63e+06 | 5.33e+08 | 6.33e+06 | 0.00e+00 | 3.26e+06 | 0.00e+00 | 1.11e+06 |
| I-134   | 9.33e-05 | 2.54e-04 | 4.39e-03 | 4.03e-04 | 0.00e+00 | 2.21e-07 | 0.00e+00 | 9.07e-05 |
| I-135   | 3.91e+04 | 1.02e+05 | 6.75e+06 | 1.64e+05 | 0.00e+00 | 1.16e+05 | 0.00e+00 | 3.78e+04 |
| CS-134  | 4.67e+09 | 1.11e+10 | 0.00e+00 | 3.60e+09 | 1.19e+09 | 1.94e+08 | 0.00e+00 | 9.08e+09 |
| CS-136  | 4.27e+07 | 1.68e+08 | 0.00e+00 | 9.37e+07 | 1.28e+07 | 1.91e+07 | 0.00e+00 | 1.21e+08 |
| CS-137  | 6.36e+09 | 8.70e+09 | 0.00e+00 | 2.95e+09 | 9.81e+08 | 1.68e+08 | 0.00e+00 | 5.70e+09 |
| CS-138  | 3.84e-11 | 7.58e-11 | 0.00e+00 | 5.57e-11 | 5.50e-12 | 3.23e-16 | 0.00e+00 | 3.75e-11 |
| BA-139  | 2.86e-02 | 2.04e-05 | 0.00e+00 | 1.91e-05 | 1.16e-05 | 5.07e-02 | 0.00e+00 | 8.38e-04 |
| BA-140  | 1.29e+08 | 1.62e+05 | 0.00e+00 | 5.49e+04 | 9.25e+04 | 2.65e+08 | 0.00e+00 | 8.42e+06 |
| BA-141  | 1.18e-21 | 8.95e-25 | 0.00e+00 | 8.32e-25 | 5.08e-25 | 5.58e-31 | 0.00e+00 | 4.00e-23 |
| BA-142  | 2.43e-39 | 2.50e-42 | 0.00e+00 | 2.11e-42 | 1.42e-42 | 3.43e-57 | 0.00e+00 | 1.53e-40 |
| LA-140  | 1.98e+03 | 9.99e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.33e+07 | 0.00e+00 | 2.64e+02 |
| LA-142  | 2.04e-04 | 9.27e-05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.77e-01 | 0.00e+00 | 2.31e-05 |
| CE-141  | 1.97e+05 | 1.33e+05 | 0.00e+00 | 6.19e+04 | 0.00e+00 | 5.09e+08 | 0.00e+00 | 1.51e+04 |
| CE-143  | 9.97e+02 | 7.37e+05 | 0.00e+00 | 3.24e+02 | 0.00e+00 | 2.75e+07 | 0.00e+00 | 8.15e+01 |
| CE-144  | 3.29e+07 | 1.38e+07 | 0.00e+00 | 8.16e+06 | 0.00e+00 | 1.11e+10 | 0.00e+00 | 1.77e+06 |
| PR-143  | 6.27e+04 | 2.52e+04 | 0.00e+00 | 1.45e+04 | 0.00e+00 | 2.75e+08 | 0.00e+00 | 3.11e+03 |
| PR-144  | 3.24e-26 | 1.34e-26 | 0.00e+00 | 7.58e-27 | 0.00e+00 | 4.66e-33 | 0.00e+00 | 1.65e-27 |
| ND-147  | 3.33e+04 | 3.85e+04 | 0.00e+00 | 2.25e+04 | 0.00e+00 | 1.85e+08 | 0.00e+00 | 2.30e+03 |
| W-187   | 3.80e+04 | 3.18e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.04e+07 | 0.00e+00 | 1.11e+04 |
| NP-239  | 1.43e+03 | 1.40e+02 | 0.00e+00 | 4.37e+02 | 0.00e+00 | 2.88e+07 | 0.00e+00 | 7.73e+01 |

TABLE 2.2-2d (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 7 of 10

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 0 ADULT

Pathway: 4 Grs/Cow/Meat (CMEAT)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 3.25e+02 | 3.25e+02 | 3.25e+02 | 3.25e+02 | 3.25e+02 | 0.00e+00 | 3.25e+02 |
| C-14    | 2.41e+08 | 4.83e+07 | 4.83e+07 | 4.83e+07 | 4.83e+07 | 4.83e+07 | 0.00e+00 | 4.83e+07 |
| NA-24   | 1.45e-03 | 1.45e-03 | 1.45e-03 | 1.45e-03 | 1.45e-03 | 1.45e-03 | 0.00e+00 | 1.45e-03 |
| P-32    | 4.65e+09 | 2.89e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.23e+08 | 0.00e+00 | 1.80e+08 |
| CR-51   | 0.00e+00 | 0.00e+00 | 4.21e+03 | 1.55e+03 | 9.34e+03 | 1.77e+06 | 0.00e+00 | 7.04e+03 |
| MN-54   | 0.00e+00 | 9.18e+06 | 0.00e+00 | 2.73e+06 | 0.00e+00 | 2.81e+07 | 0.00e+00 | 1.75e+06 |
| MN-56   | 0.00e+00 | 1.44e-53 | 0.00e+00 | 1.83e-53 | 0.00e+00 | 4.60e-52 | 0.00e+00 | 2.56e-54 |
| FE-55   | 2.93e+08 | 2.03e+08 | 0.00e+00 | 0.00e+00 | 1.13e+08 | 1.16e+08 | 0.00e+00 | 4.73e+07 |
| FE-59   | 2.65e+08 | 6.24e+08 | 0.00e+00 | 0.00e+00 | 1.74e+08 | 2.08e+09 | 0.00e+00 | 2.39e+08 |
| CO-58   | 0.00e+00 | 1.83e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.70e+08 | 0.00e+00 | 4.09e+07 |
| CO-60   | 0.00e+00 | 7.52e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.41e+09 | 0.00e+00 | 1.66e+08 |
| NI-63   | 1.89e+10 | 1.31e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.73e+08 | 0.00e+00 | 6.33e+08 |
| NI-65   | 2.27e-52 | 2.94e-53 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.47e-52 | 0.00e+00 | 1.34e-53 |
| CU-64   | 0.00e+00 | 2.52e-07 | 0.00e+00 | 6.36e-07 | 0.00e+00 | 2.15e-05 | 0.00e+00 | 1.18e-07 |
| ZN-65   | 3.56e+08 | 1.13e+09 | 0.00e+00 | 7.57e+08 | 0.00e+00 | 7.13e+08 | 0.00e+00 | 5.12e+08 |
| ZN-69   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 8.08e-57 | 0.00e+00 | 5.61e-57 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 4.87e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.60e+07 | 0.00e+00 | 2.27e+08 |
| RB-88   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-89   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| SR-89   | 3.01e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.83e+07 | 0.00e+00 | 8.65e+06 |
| SR-90   | 1.24e+10 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.59e+08 | 0.00e+00 | 3.05e+09 |
| SR-91   | 1.43e-10 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.83e-10 | 0.00e+00 | 5.79e-12 |
| SR-92   | 1.08e-49 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.13e-48 | 0.00e+00 | 4.66e-51 |
| Y-90    | 1.08e+02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.15e+06 | 0.00e+00 | 2.91e+00 |
| Y-91    | 1.13e+06 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.23e+08 | 0.00e+00 | 3.03e+04 |
| Y-91M   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| Y-92    | 1.49e-39 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.61e-35 | 0.00e+00 | 4.36e-41 |
| Y-93    | 4.39e-12 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.39e-07 | 0.00e+00 | 1.21e-13 |
| ZR-95   | 1.87e+06 | 6.01e+05 | 0.00e+00 | 9.43e+05 | 0.00e+00 | 1.91e+09 | 0.00e+00 | 4.07e+05 |
| ZR-97   | 2.04e-05 | 4.12e-06 | 0.00e+00 | 6.22e-06 | 0.00e+00 | 1.27e+00 | 0.00e+00 | 1.88e-06 |
| NB-95   | 2.30e+06 | 1.28e+06 | 0.00e+00 | 1.26e+06 | 0.00e+00 | 7.75e+09 | 0.00e+00 | 6.87e+05 |
| MO-99   | 0.00e+00 | 9.93e+04 | 0.00e+00 | 2.25e+05 | 0.00e+00 | 2.30e+05 | 0.00e+00 | 1.89e+04 |
| TC-99M  | 4.32e-21 | 1.22e-20 | 0.00e+00 | 1.86e-19 | 5.98e-21 | 7.23e-18 | 0.00e+00 | 1.56e-19 |
| TC-101  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RU-103  | 1.05e+08 | 0.00e+00 | 0.00e+00 | 4.01e+08 | 0.00e+00 | 1.23e+10 | 0.00e+00 | 4.53e+07 |
| RU-105  | 5.43e-28 | 0.00e+00 | 0.00e+00 | 7.02e-27 | 0.00e+00 | 3.32e-25 | 0.00e+00 | 2.15e-28 |
| RU-106  | 2.80e+09 | 0.00e+00 | 0.00e+00 | 5.40e+09 | 0.00e+00 | 1.81e+11 | 0.00e+00 | 3.54e+08 |
| AG-110M | 6.68e+06 | 6.18e+06 | 0.00e+00 | 1.22e+07 | 0.00e+00 | 2.52e+09 | 0.00e+00 | 3.67e+06 |
| TE-125M | 3.59e+08 | 1.30e+08 | 1.08e+08 | 1.46e+09 | 0.00e+00 | 1.43e+09 | 0.00e+00 | 4.81e+07 |
| TE-127  | 2.50e-10 | 8.98e-11 | 1.85e-10 | 1.02e-09 | 0.00e+00 | 1.97e-08 | 0.00e+00 | 5.41e-11 |
| TE-127M | 1.12e+09 | 3.99e+08 | 2.85e+08 | 4.53e+09 | 0.00e+00 | 3.74e+09 | 0.00e+00 | 1.36e+08 |
| TE-129  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| TE-129M | 1.13e+09 | 4.23e+08 | 3.89e+08 | 4.73e+09 | 0.00e+00 | 5.71e+09 | 0.00e+00 | 1.79e+08 |
| TE-131  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| TE-131M | 4.49e+02 | 2.20e+02 | 3.48e+02 | 2.23e+03 | 0.00e+00 | 2.18e+04 | 0.00e+00 | 1.83e+02 |



TABLE 2.2-2d (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 8 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 0 ADULT  
Pathway: 4 Grs/Cow/Meat (CMEAT)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 1.40e+06 | 9.03e+05 | 9.98e+05 | 8.70e+06 | 0.00e+00 | 4.27e+07 | 0.00e+00 | 8.48e+05 |
| I-130   | 2.03e-06 | 5.98e-06 | 5.07e-04 | 9.33e-06 | 0.00e+00 | 5.15e-06 | 0.00e+00 | 2.36e-06 |
| I-131   | 1.07e+07 | 1.54e+07 | 5.03e+09 | 2.63e+07 | 0.00e+00 | 4.05e+06 | 0.00e+00 | 8.80e+06 |
| I-132   | 7.13e-59 | 1.91e-58 | 6.68e-57 | 3.04e-58 | 0.00e+00 | 3.58e-59 | 0.00e+00 | 6.68e-59 |
| I-133   | 3.63e-01 | 6.31e-01 | 9.28e+01 | 1.10e+00 | 0.00e+00 | 5.68e-01 | 0.00e+00 | 1.93e-01 |
| I-134   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| I-135   | 4.66e-17 | 1.22e-16 | 8.04e-15 | 1.96e-16 | 0.00e+00 | 1.38e-16 | 0.00e+00 | 4.50e-17 |
| CS-134  | 6.58e+08 | 1.57e+09 | 0.00e+00 | 5.07e+08 | 1.68e+08 | 2.74e+07 | 0.00e+00 | 1.28e+09 |
| CS-136  | 1.20e+07 | 4.75e+07 | 0.00e+00 | 2.65e+07 | 3.63e+06 | 5.40e+06 | 0.00e+00 | 3.42e+07 |
| CS-137  | 8.72e+08 | 1.19e+09 | 0.00e+00 | 4.05e+08 | 1.35e+08 | 2.31e+07 | 0.00e+00 | 7.81e+08 |
| CS-138  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BA-139  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BA-140  | 2.88e+07 | 3.61e+04 | 0.00e+00 | 1.23e+04 | 2.07e+04 | 5.92e+07 | 0.00e+00 | 1.88e+06 |
| BA-141  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| BA-142  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| LA-140  | 3.76e-02 | 1.90e-02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.39e+03 | 0.00e+00 | 5.01e-03 |
| LA-142  | 4.06e-92 | 1.85e-92 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.35e-88 | 0.00e+00 | 4.60e-93 |
| CE-141  | 1.40e+04 | 9.50e+03 | 0.00e+00 | 4.41e+03 | 0.00e+00 | 3.63e+07 | 0.00e+00 | 1.08e+03 |
| CE-143  | 1.99e-02 | 1.47e+01 | 0.00e+00 | 6.47e-03 | 0.00e+00 | 5.49e+02 | 0.00e+00 | 1.62e-03 |
| CE-144  | 1.46e+06 | 6.09e+05 | 0.00e+00 | 3.62e+05 | 0.00e+00 | 4.93e+08 | 0.00e+00 | 7.83e+04 |
| PR-143  | 2.10e+04 | 8.42e+03 | 0.00e+00 | 4.86e+03 | 0.00e+00 | 9.20e+07 | 0.00e+00 | 1.04e+03 |
| PR-144  | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| ND-147  | 7.06e+03 | 8.16e+03 | 0.00e+00 | 4.77e+03 | 0.00e+00 | 3.92e+07 | 0.00e+00 | 4.88e+02 |
| W-187   | 2.07e-02 | 1.73e-02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.66e+00 | 0.00e+00 | 6.04e-03 |
| NP-239  | 2.57e-01 | 2.53e-02 | 0.00e+00 | 7.90e-02 | 0.00e+00 | 5.19e+03 | 0.00e+00 | 1.40e-02 |

TABLE 2.2-2d (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>1</sub>)

Page 9 of 10

Release Type: 2 Gaseous

Dose Factor: 2 Ri (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))

AgeGroup: 0 ADULT

Pathway: 5 Grs/Cow/Milk (CMILK)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| H-3     | 0.00e+00 | 7.63e+02 | 7.63e+02 | 7.63e+02 | 7.63e+02 | 7.63e+02 | 0.00e+00 | 7.63e+02 |
| C-14    | 2.63e+08 | 5.27e+07 | 5.27e+07 | 5.27e+07 | 5.27e+07 | 5.27e+07 | 0.00e+00 | 5.27e+07 |
| NA-24   | 2.46e+06 | 2.46e+06 | 2.46e+06 | 2.46e+06 | 2.46e+06 | 2.46e+06 | 0.00e+00 | 2.46e+06 |
| P-32    | 1.71e+10 | 1.06e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.92e+09 | 0.00e+00 | 6.60e+08 |
| CR-51   | 0.00e+00 | 0.00e+00 | 1.71e+04 | 6.29e+03 | 3.79e+04 | 7.18e+06 | 0.00e+00 | 2.86e+04 |
| MN-54   | 0.00e+00 | 8.41e+06 | 0.00e+00 | 2.50e+06 | 0.00e+00 | 2.58e+07 | 0.00e+00 | 1.61e+06 |
| MN-56   | 0.00e+00 | 4.13e-03 | 0.00e+00 | 5.24e-03 | 0.00e+00 | 1.32e-01 | 0.00e+00 | 7.32e-04 |
| FE-55   | 2.51e+07 | 1.74e+07 | 0.00e+00 | 0.00e+00 | 9.68e+06 | 9.95e+06 | 0.00e+00 | 4.05e+06 |
| FE-59   | 2.97e+07 | 6.98e+07 | 0.00e+00 | 0.00e+00 | 1.95e+07 | 2.33e+08 | 0.00e+00 | 2.68e+07 |
| CO-58   | 0.00e+00 | 4.72e+06 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.56e+07 | 0.00e+00 | 1.06e+07 |
| CO-60   | 0.00e+00 | 1.64e+07 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 3.08e+08 | 0.00e+00 | 3.62e+07 |
| NI-63   | 6.73e+09 | 4.66e+08 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.73e+07 | 0.00e+00 | 2.26e+08 |
| NI-65   | 3.70e-01 | 4.81e-02 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.22e+00 | 0.00e+00 | 2.20e-02 |
| CU-64   | 0.00e+00 | 2.36e+04 | 0.00e+00 | 5.95e+04 | 0.00e+00 | 2.01e+06 | 0.00e+00 | 1.11e+04 |
| ZN-65   | 1.37e+09 | 4.37e+09 | 0.00e+00 | 2.92e+09 | 0.00e+00 | 2.75e+09 | 0.00e+00 | 1.97e+09 |
| ZN-69   | 2.01e-12 | 3.84e-12 | 0.00e+00 | 2.50e-12 | 0.00e+00 | 5.78e-13 | 0.00e+00 | 2.67e-13 |
| BR-83   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.39e-01 | 0.00e+00 | 9.65e-02 |
| BR-84   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.33e-28 | 0.00e+00 | 1.69e-23 |
| BR-85   | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 |
| RB-86   | 0.00e+00 | 2.60e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 5.12e+08 | 0.00e+00 | 1.21e+09 |
| RB-88   | 0.00e+00 | 2.14e-45 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.96e-56 | 0.00e+00 | 1.14e-45 |
| RB-89   | 0.00e+00 | 4.50e-53 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.61e-66 | 0.00e+00 | 3.16e-53 |
| SR-89   | 1.45e+09 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 2.33e+08 | 0.00e+00 | 4.16e+07 |
| SR-90   | 4.68e+10 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.35e+09 | 0.00e+00 | 1.15e+10 |
| SR-91   | 2.87e+04 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.37e+05 | 0.00e+00 | 1.16e+03 |
| SR-92   | 4.84e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.58e+00 | 0.00e+00 | 2.09e-02 |
| Y-90    | 7.10e+01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.52e+05 | 0.00e+00 | 1.90e+00 |
| Y-91    | 8.59e+03 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 4.73e+06 | 0.00e+00 | 2.30e+02 |
| Y-91M   | 6.42e-20 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.89e-19 | 0.00e+00 | 2.49e-21 |
| Y-92    | 5.57e-05 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 9.75e-01 | 0.00e+00 | 1.63e-06 |
| Y-93    | 2.22e-01 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 7.03e+03 | 0.00e+00 | 6.12e-03 |
| ZR-95   | 9.44e+02 | 3.03e+02 | 0.00e+00 | 4.75e+02 | 0.00e+00 | 9.59e+05 | 0.00e+00 | 2.05e+02 |
| ZR-97   | 4.32e-01 | 8.72e-02 | 0.00e+00 | 1.32e-01 | 0.00e+00 | 2.70e+04 | 0.00e+00 | 3.99e-02 |
| NB-95   | 8.25e+04 | 4.59e+04 | 0.00e+00 | 4.54e+04 | 0.00e+00 | 2.79e+08 | 0.00e+00 | 2.47e+04 |
| MO-99   | 0.00e+00 | 2.47e+07 | 0.00e+00 | 5.60e+07 | 0.00e+00 | 5.73e+07 | 0.00e+00 | 4.71e+06 |
| TC-99M  | 3.31e+00 | 9.35e+00 | 0.00e+00 | 1.42e+02 | 4.58e+00 | 5.53e+03 | 0.00e+00 | 1.19e+02 |
| TC-101  | 2.40e-60 | 3.46e-60 | 0.00e+00 | 6.22e-59 | 1.77e-60 | 1.04e-71 | 0.00e+00 | 3.39e-59 |
| RU-103  | 1.02e+03 | 0.00e+00 | 0.00e+00 | 3.88e+03 | 0.00e+00 | 1.19e+05 | 0.00e+00 | 4.39e+02 |
| RU-105  | 8.51e-04 | 0.00e+00 | 0.00e+00 | 1.10e-02 | 0.00e+00 | 5.20e-01 | 0.00e+00 | 3.36e-04 |
| RU-106  | 2.04e+04 | 0.00e+00 | 0.00e+00 | 3.94e+04 | 0.00e+00 | 1.32e+06 | 0.00e+00 | 2.58e+03 |
| AG-110M | 5.82e+07 | 5.39e+07 | 0.00e+00 | 1.06e+08 | 0.00e+00 | 2.20e+10 | 0.00e+00 | 3.20e+07 |
| TE-125M | 1.63e+07 | 5.91e+06 | 4.90e+06 | 6.63e+07 | 0.00e+00 | 6.51e+07 | 0.00e+00 | 2.18e+06 |
| TE-127  | 6.66e+02 | 2.39e+02 | 4.94e+02 | 2.71e+03 | 0.00e+00 | 5.26e+04 | 0.00e+00 | 1.44e+02 |
| TE-127M | 4.58e+07 | 1.64e+07 | 1.17e+07 | 1.86e+08 | 0.00e+00 | 1.54e+08 | 0.00e+00 | 5.58e+06 |
| TE-129  | 2.35e-10 | 8.85e-11 | 1.81e-10 | 9.89e-10 | 0.00e+00 | 1.78e-10 | 0.00e+00 | 5.74e-11 |
| TE-129M | 6.02e+07 | 2.25e+07 | 2.07e+07 | 2.51e+08 | 0.00e+00 | 3.03e+08 | 0.00e+00 | 9.52e+06 |
| TE-131  | 3.66e-33 | 1.53e-33 | 3.01e-33 | 1.61e-32 | 0.00e+00 | 5.19e-34 | 0.00e+00 | 1.16e-33 |
| TE-131M | 3.61e+05 | 1.76e+05 | 2.80e+05 | 1.79e+06 | 0.00e+00 | 1.75e+07 | 0.00e+00 | 1.47e+05 |

TABLE 2.2-2d (Continued)

PATHWAY DOSE FACTORS FOR LCO 6.11.6 AND  
SECTION 2.2.2.b, (R<sub>i</sub>)

Page 10 of 10

Release Type: 2 Gaseous  
Dose Factor: 2 R<sub>i</sub> (m<sup>2</sup> \* (mrem/yr)/(uCi/sec) or (mrem/yr)/(uCi/m<sup>3</sup>))  
AgeGroup: 0 ADULT  
Pathway: 5 Grs/Cow/Milk (CMILK)

| Nuclide | Bone     | Liver    | Thyroid  | Kidney   | Lung     | GI-Lli   | Skin     | TB       |
|---------|----------|----------|----------|----------|----------|----------|----------|----------|
| TE-132  | 2.39e+06 | 1.55e+06 | 1.71e+06 | 1.49e+07 | 0.00e+00 | 7.32e+07 | 0.00e+00 | 1.45e+06 |
| I-130   | 4.18e+05 | 1.23e+06 | 1.05e+08 | 1.92e+06 | 0.00e+00 | 1.06e+06 | 0.00e+00 | 4.86e+05 |
| I-131   | 2.96e+08 | 4.23e+08 | 1.39e+11 | 7.26e+08 | 0.00e+00 | 1.12e+08 | 0.00e+00 | 2.43e+08 |
| I-132   | 1.65e-01 | 4.40e-01 | 1.54e+01 | 7.02e-01 | 0.00e+00 | 8.27e-02 | 0.00e+00 | 1.54e-01 |
| I-133   | 3.87e+06 | 6.73e+06 | 9.88e+08 | 1.17e+07 | 0.00e+00 | 6.04e+06 | 0.00e+00 | 2.05e+06 |
| I-134   | 1.89e-12 | 5.13e-12 | 8.89e-11 | 8.15e-12 | 0.00e+00 | 4.47e-15 | 0.00e+00 | 1.83e-12 |
| I-135   | 1.29e+04 | 3.38e+04 | 2.23e+06 | 5.42e+04 | 0.00e+00 | 3.82e+04 | 0.00e+00 | 1.25e+04 |
| CS-134  | 5.65e+09 | 1.35e+10 | 0.00e+00 | 4.35e+09 | 1.45e+09 | 2.35e+08 | 0.00e+00 | 1.10e+10 |
| CS-136  | 2.63e+08 | 1.04e+09 | 0.00e+00 | 5.78e+08 | 7.92e+07 | 1.18e+08 | 0.00e+00 | 7.48e+08 |
| CS-137  | 7.38e+09 | 1.01e+10 | 0.00e+00 | 3.43e+09 | 1.14e+09 | 1.95e+08 | 0.00e+00 | 6.61e+09 |
| CS-138  | 8.69e-24 | 1.72e-23 | 0.00e+00 | 1.26e-23 | 1.25e-24 | 7.32e-29 | 0.00e+00 | 8.50e-24 |
| BA-139  | 4.43e-08 | 3.16e-11 | 0.00e+00 | 2.95e-11 | 1.79e-11 | 7.86e-08 | 0.00e+00 | 1.30e-09 |
| BA-140  | 2.69e+07 | 3.38e+04 | 0.00e+00 | 1.15e+04 | 1.93e+04 | 5.54e+07 | 0.00e+00 | 1.76e+06 |
| BA-141  | 4.33e-46 | 3.27e-49 | 0.00e+00 | 3.04e-49 | 1.86e-49 | 2.04e-55 | 0.00e+00 | 1.46e-47 |
| BA-142  | 4.41e-81 | 4.53e-84 | 0.00e+00 | 3.83e-84 | 2.57e-84 | 0.00e+00 | 0.00e+00 | 2.77e-82 |
| LA-140  | 4.52e+00 | 2.28e+00 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.67e+05 | 0.00e+00 | 6.03e-01 |
| LA-142  | 1.89e-11 | 8.60e-12 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 6.28e-08 | 0.00e+00 | 2.14e-12 |
| CE-141  | 4.84e+03 | 3.28e+03 | 0.00e+00 | 1.52e+03 | 0.00e+00 | 1.25e+07 | 0.00e+00 | 3.72e+02 |
| CE-143  | 4.15e+01 | 3.07e+04 | 0.00e+00 | 1.35e+01 | 0.00e+00 | 1.15e+06 | 0.00e+00 | 3.39e+00 |
| CE-144  | 3.58e+05 | 1.50e+05 | 0.00e+00 | 8.87e+04 | 0.00e+00 | 1.21e+08 | 0.00e+00 | 1.92e+04 |
| PR-143  | 1.58e+02 | 6.34e+01 | 0.00e+00 | 3.66e+01 | 0.00e+00 | 6.92e+05 | 0.00e+00 | 7.83e+00 |
| PR-144  | 6.45e-54 | 2.68e-54 | 0.00e+00 | 1.51e-54 | 0.00e+00 | 9.28e-61 | 0.00e+00 | 3.28e-55 |
| ND-147  | 9.41e+01 | 1.09e+02 | 0.00e+00 | 6.36e+01 | 0.00e+00 | 5.22e+05 | 0.00e+00 | 6.51e+00 |
| W-187   | 6.51e+03 | 5.45e+03 | 0.00e+00 | 0.00e+00 | 0.00e+00 | 1.78e+06 | 0.00e+00 | 1.90e+03 |
| NP-239  | 3.67e+00 | 3.61e-01 | 0.00e+00 | 1.13e+00 | 0.00e+00 | 7.40e+04 | 0.00e+00 | 1.99e-01 |

Units: Inhalation<sub>2</sub> and all tritium pathways - mrem/yr per  $\mu\text{Ci}/\text{m}^3$   
Others - m<sup>2</sup> \* mrem/yr per  $\mu\text{Ci}/\text{sec}$

Values based on standard NUREG-0133, Section 5.3.1 assumptions unless otherwise indicated.

TABLE 2.2-3

CONTROLLING RECEPTORS, LOCATIONS, AND ATMOSPHERIC DISPERSION PARAMETERS  
for LCO 6.11.5, 6.11.6, AND 6.11.8

| SECTOR | DIRECTION | NEAREST<br>RESIDENCE,<br>MILES** | X/Q*   | D/Q*    | NEAREST<br>GARDEN,<br>MILES** | D/Q*    |
|--------|-----------|----------------------------------|--------|---------|-------------------------------|---------|
| A      | N         | 0.94                             | 1.1E-6 | 4.7E-9  | 1.78                          | 1.6E-9  |
| B      | NNE       | 0.83                             | 9.3E-7 | 4.4E-9  | 1.52                          | 1.6E-9  |
| C      | NE        | 0.67                             | 8.1E-7 | 5.1E-9  | 0.67                          | 5.1E-9  |
| D      | ENE       | 2.57                             | 1.1E-7 | 5.3E-10 | 2.86                          | 4.4E-10 |
| E      | E         | 0.83                             | 5.5E-7 | 3.0E-9  | 0.89                          | 2.7E-09 |
| F      | ESE       | 2.25                             | 8.4E-8 | 4.1E-10 | 4.05                          | 1.4E-10 |
| G      | SE        | 2.10                             | 9.1E-8 | 3.8E-10 | 3.81                          | 1.3E-10 |
| H      | SSE       | 1.11                             | 4.3E-7 | 2.6E-9  | 1.11                          | 2.6E-9  |
| J      | S         | 3.16                             | 1.3E-7 | 6.2E-10 | 3.16                          | 6.2E-10 |
| K      | SSW       | 2.23                             | 4.2E-7 | 1.2E-9  | 2.23                          | 1.2E-9  |
| L      | SW        | 0.89                             | 3.8E-6 | 8.0E-9  | 0.89                          | 8.0E-9  |
| M      | WSW       | >5                               | N/A    | N/A     | >5                            | N/A     |
| N      | W         | >5                               | N/A    | N/A     | >5                            | N/A     |
| P      | WNW       | >5                               | N/A    | N/A     | >5                            | N/A     |
| Q      | NW        | >5                               | N/A    | N/A     | >5                            | N/A     |
| R      | NNW       | 1.11                             | 8.8E-7 | 3.6E-9  | 1.46                          | 2.2E-9  |
|        |           |                                  |        |         |                               |         |

Table 2.2-3 locations based on 2008 Land Use Census, onsite vegetation sample locations are not considered for the Land Use Census.

\* Values from ODCM Reference 19.

\*\* Distances shown are actual miles in each sector. In cases where dispersion and deposition parameters were not available for a location, they were calculated based on values at known distances.

N/A: No residence/garden within 5 miles.

TABLE 2.2-3a

SITE BOUNDARY ATMOSPHERIC DISPERSION PARAMETERS  
for LCO 6.11.4

| SECTOR | DIRECTION | SITE BOUNDARY<br>DISTANCE,<br>MILES** | x/Q*   | D/Q*   |
|--------|-----------|---------------------------------------|--------|--------|
| A      | N         | 0.79                                  | 1.4E-6 | 6.4E-9 |
| B      | NNE       | 0.66                                  | 1.3E-6 | 6.4E-9 |
| C      | NE        | 0.63                                  | 9.0E-7 | 5.6E-9 |
| D      | ENE       | 0.63                                  | 1.0E-6 | 5.9E-9 |
| E      | E         | 0.55                                  | 1.1E-6 | 6.0E-9 |
| F      | ESE       | 0.55                                  | 8.0E-7 | 4.5E-9 |
| G      | SE        | 0.51                                  | 8.3E-7 | 4.2E-9 |
| H      | SSE       | 0.46                                  | 1.8E-6 | 1.1E-8 |
| J      | S         | 0.61                                  | 1.7E-6 | 1.0E-8 |
| K      | SSW       | 0.65                                  | 2.7E-6 | 1.0E-8 |
| L      | SW        | 0.85                                  | 4.1E-6 | 8.7E-9 |
| M      | WSW       | 1.07                                  | 3.9E-6 | 4.9E-9 |
| N      | W         | 1.14                                  | 3.2E-6 | 4.0E-9 |
| P      | WNW       | 1.34                                  | 1.7E-6 | 2.9E-9 |
| Q      | NW        | 1.37                                  | 1.0E-6 | 3.1E-9 |
| R      | NNW       | 1.02                                  | 1.0E-6 | 4.1E-9 |
|        |           |                                       |        |        |

\* Values from ODCM Reference 19.

\*\* Distances shown are actual miles in each sector.

TABLE 2.2-3b

## ADDITIONAL RECEPTOR LOCATIONS WITHIN THE SITE BOUNDARY\*\*

For LCO 6.11.4

| SECTOR | DIRECTION | MILES | DESCRIPTION                         | x/Q*   | D/Q*   | Unrestricted Area Within Site Boundary |
|--------|-----------|-------|-------------------------------------|--------|--------|--|
| B      | NNE       | 0.5   | Recreational Vehicle Laydown Area   | 2.0E-6 | 1.0E-8 | Yes                                    |
| R      | NNW       | 0.5   | Energy Services Center <sup>1</sup> | 3.0E-6 | 1.3E-8 | Yes                                    |
| Q      | NW        | 0.75  | Gin Lake <sup>1</sup>               | 2.6E-6 | 8.5E-9 | Yes                                    |
| P      | WNW       | 0.75  | Hamilton Lake <sup>1</sup>          | 4.3E-6 | 7.7E-9 | Yes                                    |
| J      | S         | 0.40  | Onsite vegetation sample locations  | 3.4E-6 | 2.1E-8 | Yes                                    |
| H      | SSE       | 0.46  | Onsite vegetation sample location   | 1.8E-6 | 1.1E-8 | Yes                                    |

<sup>1</sup>These locations occupy multiple sectors. In each case the SITE BOUNDARY locations used in the dose calculation was limiting.

\*Values from ODCM Reference 19

\*\*The X/Q and D/Q factors from ODCM References 14 and 19 may be used to evaluate dose to members of the public that are located inside the site boundary. If appropriate, occupancy factors should be applied to the dose calculation.

## 2.3 Meteorological Model

### 2.3.1 Atmospheric Dispersion (Annual Average)

The XOQDOQ software, NUREG/CR-2919, Computer Program for the Meteorological Evaluation of Routine Effluent Releases at Nuclear Power Stations, or similar, should be used to calculate atmospheric dispersion factors for routine continuous long term releases. Software input parameters use the normal settings as described in Table 2.1 of NUREG/CR-2919 with the following exceptions:

Calm values are distributed in a separate windspeed category (i.e., 1<sup>st</sup> windspeed category) with the same proportion and direction as the direction frequency of the 2<sup>nd</sup> windspeed class. (Reference 10,14,15)

No terrain recirculation factor is applied. (Reference 5, Section 3A)

0.224 m/sec for calm (Reference 7, 15)

14 windspeed categories are used (Reference 14,15)

7 stability classes, A-G (Reference 10,14,15)

1 release exit point (Reference 10,14,15)

10 meter for measured wind, ground level release (Reference 7, 10, 14, 15)

No decay

Normally, maximum windspeed categories are 0.224, 0.5, 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.50, 3.00, 4.00, 5.00, 7.00, 13.00 (m/sec) (Reference 14, 15)

Height of vent's release point = 31 meters (Reference 15)

Height of vent's building = 53.3 meters (Reference 15)

Minimum cross-sectional area for the vent's building = 2729 meters<sup>2</sup> (Reference 14, 15)

### 2.3.2 Atmospheric Dispersion (Hourly Average)

The atmospheric dispersion for gaseous releases may be calculated using a ground level, wake-split form of the straight line flow model.

$$X/Q = \frac{2.03 \delta k}{ru\Sigma} \text{ atmospheric dispersion (sec/m}^3\text{)}$$

where:

- r = distance (m) from release point to location of interest
- $\delta$  = plume depletion factor at distance r from ODCM Figure 2.3-1
- u = hourly average wind speed at ground level (m/sec)
- k = open terrain recirculation factor at distance r, from ODCM Reference 16
- $\Sigma$  = the lesser of  $(\sigma^2 + b^2/2\pi)^{1/2}$  or  $(3)^{1/2}\sigma$

where:

- $\sigma$  = vertical standard deviation (m) of the plume at distance r for ground level releases under the stability category indicated by  $\Delta T$ , from ODCM Figure 2.3-2
- $\Delta T$  = temperature differential with vertical separation ( $^{\circ}\text{F}/40\text{m}$ )
- b = height of the reactor building = 53.3m



### 2.3.3

#### Deposition (Hourly Average)

Relative deposition per unit area for all releases is calculated for a ground level release as follows:

$$\begin{aligned} D/Q &= \text{relative deposition per unit area (m}^{-2}\text{)} \\ &= (2.55 \times D_g \times K)/r \end{aligned}$$

where:

$D_g$  = relative deposition rate at distance  $r$  for ground level releases from ODCM Figure 2.3-3

$k$  = open Terrain Recirc Factor (ODCM Reference 16)

$r$  = distance from release point (meters)

Additional information on the  $X/Q$  and  $D/Q$  calculations can be found in ODCM References 9 and 10.

"TEXT DELETED"

"TEXT DELETED"

"TEXT DELETED"

"TEXT DELETED"