

**Model Procedure for Conducting a Public Dose Compliance Study**

## Appendix A.

# PROCEDURE FOR CALCULATING TOTAL EFFECTIVE DOSE EQUIVALENT (TEDE)

If licensed for, or seeking licensure for possession and use of radioactive material (RAM), in accordance with section 64E-5.313, Florida Administrative Code (F.A.C), the radiation hazard resulting from licensed operations must be evaluated to demonstrate compliance with the member of public (MOP) dose limits described in section 64E-5.312, F.A.C. The BRC staff has developed guidance for calculating MOP doses resulting from RAM use. Refer to Page 2 for instructions on completing this procedure.

**License Name:** \_\_\_\_\_ **Date Prepared/Revised:** \_\_\_\_\_

**License No.:** \_\_\_\_\_ **Prepared By:** \_\_\_\_\_

<b>Table 1.</b>		<b>SEALED SOURCES</b>
<input type="checkbox"/>	TEDE (mrem)	<ul style="list-style-type: none"> <li>- Complete and attach Appendix B [Deep Dose Equivalent (DDE)]</li> <li>- Enter the calculated DDE value in the space provided to the left; for external doses from sealed sources; DDE = TEDE</li> </ul> <p style="margin-left: 20px;">←</p> <p style="margin-left: 20px;"><u>Note:</u> To demonstrate compliance with the annual MOP dose limit specified in 64E-5.312(1)(a), the TEDE must be <math>\leq</math> 100 mrem.</p>

<b>Table 2.</b>		<b>UNSEALED RAM or SEALED SOURCES &amp; UNSEALED RAM</b>
<input type="checkbox"/>	<b>Method 1.</b>	
	DDE (mrem)	<ul style="list-style-type: none"> <li>- Complete and attach Appendix B [Deep Dose Equivalent (DDE)]</li> </ul> <p style="margin-left: 20px;">← - Enter the calculated DDE in the space provided to the left</p>
	CEDE (mrem)	<ul style="list-style-type: none"> <li>- Complete &amp; attach Appendix C or D [Committed Effective Dose Equivalent (CEDE)]; App. C is for non-medical, and App. D is for medical licensees</li> </ul> <p style="margin-left: 20px;">← - Enter the calculated CEDE in the space provided to the left</p>
<b>SUM</b>	TEDE (mrem)	<ul style="list-style-type: none"> <li>- Add the DDE and CEDE values to determine the TEDE (DDE + CEDE = TEDE)</li> </ul> <p style="margin-left: 20px;">← - Enter the TEDE value in the space provided to the left</p> <p style="margin-left: 20px;"><u>Note:</u> To demonstrate compliance w/ 64E-5.312(1)(a), TEDE must be <math>\leq</math> 100 mrem</p>
<input type="checkbox"/>	<b>Method 2.</b>	
	DDE (mrem)	<ul style="list-style-type: none"> <li>- Complete and attach Appendix B [Deep Dose Equivalent (DDE)]</li> </ul> <p style="margin-left: 20px;">← - Enter the DDE value in the space provided to the left</p> <p style="margin-left: 20px;"><u>Note:</u> To demonstrate compliance w/ 64E-5.313(2)(b).2, DDE must be <math>\leq</math> 50 mrem</p>
	Annual average effluent concentrations < values listed in <i>ALIs, DACs, and Effluent Concentrations*</i>	<ul style="list-style-type: none"> <li>- Attach documentation for effluent concentrations released in a 12 month period for all radionuclides possessed; the values must be <math>\leq</math> values listed in <i>ALIs, DACs, and Effluent Concentrations*</i></li> <li>- Attach the calculations and assumptions for each radionuclide used to determine effluent concentrations; e.g., ventilation rates or volatility based on usage (heating or aerosol production, etc.)</li> </ul>

**Model Procedure for Conducting a Public Dose Compliance Study****Appendix A. PROCEDURE FOR CALCULATING TEDE****INSTRUCTIONS**

1. If licensed only for sealed sources of radioactive material (RAM), complete Table 1.
  2. If licensed for unsealed RAM, or both sealed sources and unsealed RAM, complete Table 2, using Method 1 or 2.
  3. Include all additional attachments as appropriate.
  4. Sum the millirem values for the TEDE boxes as directed. If a RAM use is not among the listed categories, an independent assessment of its contribution to the MOP dose must be made. Attach documentation of all dose calculations performed to complete the assessments.
- \* RAM effluent values are listed in "State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations," July 1993; this document is appended to the end of Chapter 64E-5, F.A.C.

**DEFINITIONS & ACRONYMS****(from section 64E-5.101, F.A.C.)**

- ALI** Annual limit on intake; means the derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by Reference Man that would result in a CEDE of 5 rem, or a CDE of 50 rem to any individual organ or tissue. ALI values for intake by ingestion & by inhalation of selected radionuclides are given in *State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations*, July 1993, Table 1, Columns 1 & 2.
- CEDE** Committed effective dose equivalent ( $H_{E,50}$ ); is the sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to each of these organs or tissues ( $H_{E,50} = \sum W_T H_{T,50}$ ).
- DAC** Derived air concentrations; means the concentration of a given radionuclide in air which, if breathed by Reference Man for a working year of 2,000 hours under conditions of light work, results in an intake of one ALI. For regulatory purposes, the condition of light work is an inhalation rate of 1.2 cubic meters of air per hour for 2,000 hours in a year. DAC values are given in *State of Florida Bureau of Radiation Control ALIs, DACs, and Effluent Concentrations*, July 1993, Table 1, Column 3.
- DDE** Deep dose equivalent ( $H_D$ ); applies to external whole body exposure; means the dose equivalent at a tissue depth of 1 centimeter ( $1,000 \text{ mg/cm}^2$ ) (ref. 64E-5.101).
- MOP** Member of the public; means any individual except when that individual is receiving an occupational dose. Note: A licensee's employees are MOPs when they are not receiving an occupational dose.
- Occupational Dose** Dose received by an individual in the course of employment while engaged in activities licensed or registered by the department in which the individual's assigned duties involve exposure to sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include dose received from background radiation, as a patient from medical practices, from voluntary participation in medical programs or as a MOP.
- TEDE** Total effective dose equivalent; means the sum of the DDE for external exposures and the CEDE for internal exposures; ( $DDE + CEDE = TEDE$ ).