APPENDIX B

PROBABILISTIC EVALUATION GRAPHICAL SUMMARY

B.0 PROBABILISTIC EVALUATION GRAPHICAL SUMMARY

B.1 INTRODUCTION TO THE GRAPHICAL SUMMARY

The graphical summary is provided to offer the reader with additional insight into the results of the dose modeling used to derive the soil DCGLs for the site. While all of the data upon which the graphics are plotted is presented in tabular form in the RESRAD output report files contained in Appendix A, it is often more intuitive to view the data in a visual format such as the graphical formats presented in this appendix. The graphics are presented in an appendix to this report rather than in the main text in an effort to preserve the readability of the report.

Three different types of graphical presentations are included in this appendix. Each has its own utility.

B.1.1 Cumulative Probability Plots

Cumulative probability plots portray the range of potential outcomes in terms of total annual effective dose equivalent. The annual dose, including its potential range, can be read on the horizontal axis of the graph. The vertical axis provides a quantitative indication of the cumulative probability that the projected annual dose in the scenario under evaluation will be lower than a given annual dose. For example, in the sample cumulative probability plot below, there is a 70% probability that the peak mean annual dose will be less than 22 mrem/y.

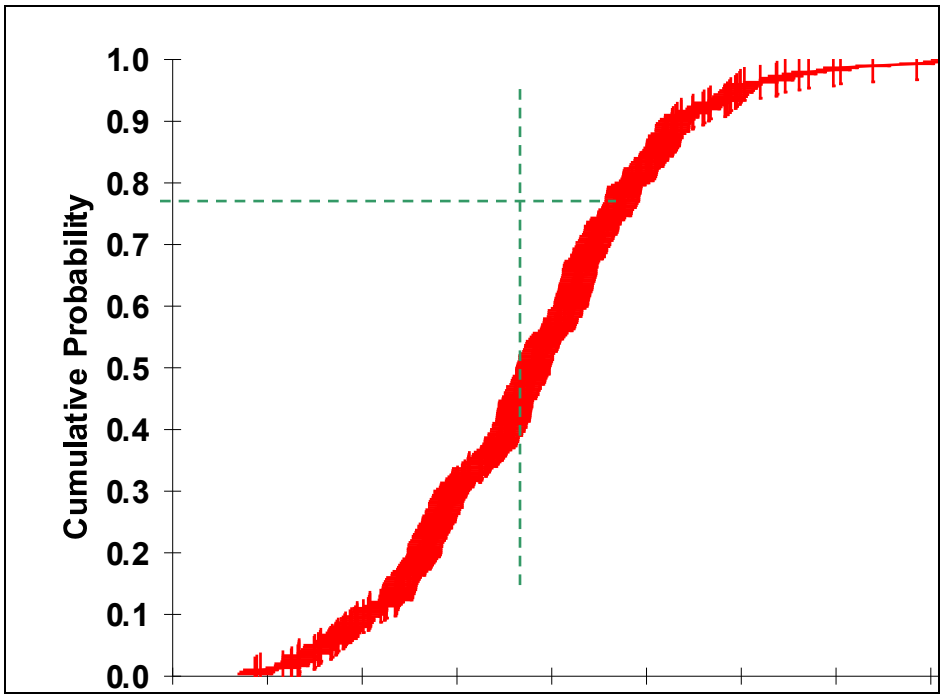


Figure B–1 Sample Cumulative Probability Plot

B.1.2 Temporal Plots

A chronological presentation of the projected annual dose is offered in the temporal plots. The temporal plots graph the peak mean annual dose in three separate random probabilistic runs of the scenario under consideration versus time over the prescribed 1000-year outlook period. The temporal plots provide the reader with a visual means of assessing the relative change in potential annual dose. Downward trends are indicative of increased margin relative to the decommissioning standard.

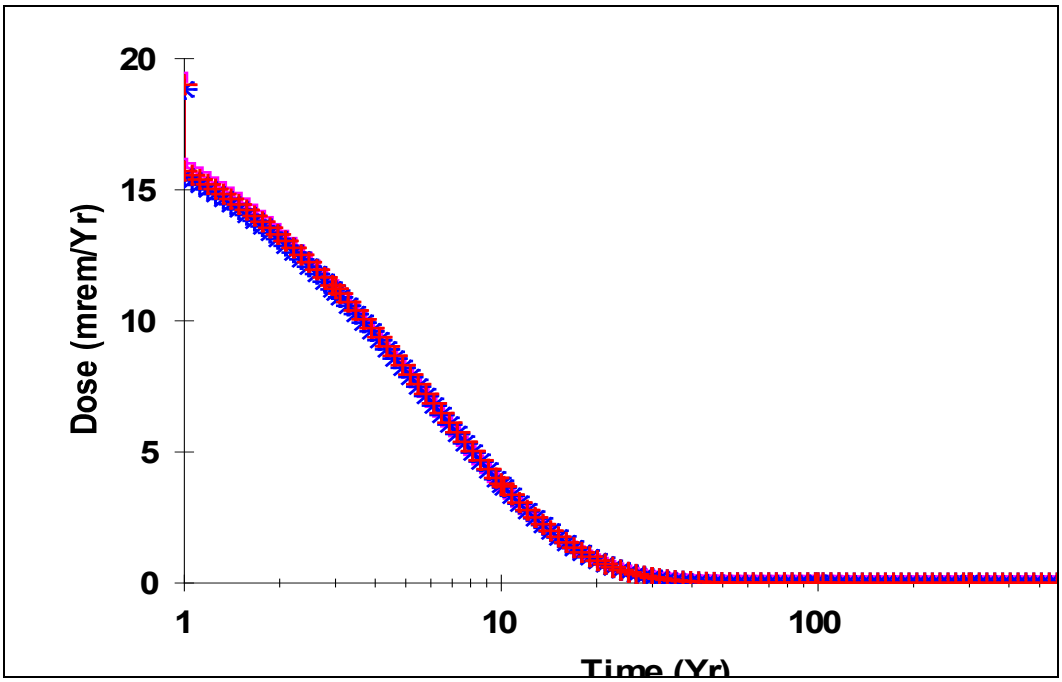


Figure B–2 Sample Temporal Plot

B.1.3 Scatter Plots

Scatter plots are useful in understanding the relationship between individual parameters and the total annual dose in the scenario under consideration. The scatter plot is an effective way of visualizing the presence (or absence) of a correlation between a single parameter and total annual dose. A clear trend in the plotted data indicates a notable correlation and typically a strong dependence between the value of the selected parameter and the resulting annual dose.

For example, sample scatter plot #1 (Figure B–3) indicates a very weak relationship between the depth of the soil mixing layer for thorium and total annual dose. One could reasonably conclude, then, that there is no significant correlation between the depth of the soil mixing layer for thorium and total annual dose and that total annual dose is relatively insensitive to variability in the distribution coefficient over the range considered. On the other hand, sample scatter plot #2 (Figure B–4) indicates a strong relationship between the thickness of the thorium contaminated zone and total annual dose. Thus, the total annual dose is sensitive to variability in the thickness of the thorium contaminated zone parameter over the range considered.

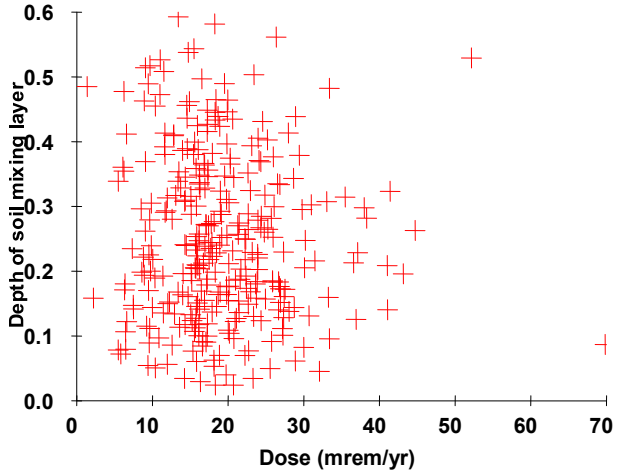


Figure B–3 Sample Scatter Plot #1

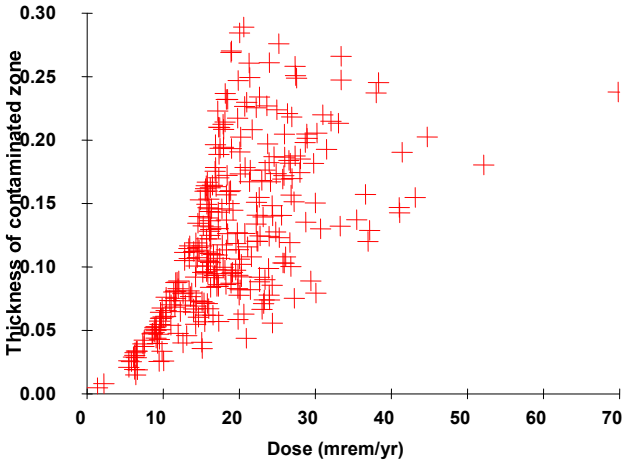


Figure B–4 Sample Scatter Plot #2

B.2 RESIDENT FARMER SCENARIO

B.2.1 Thorium Source Term, Resident Farmer

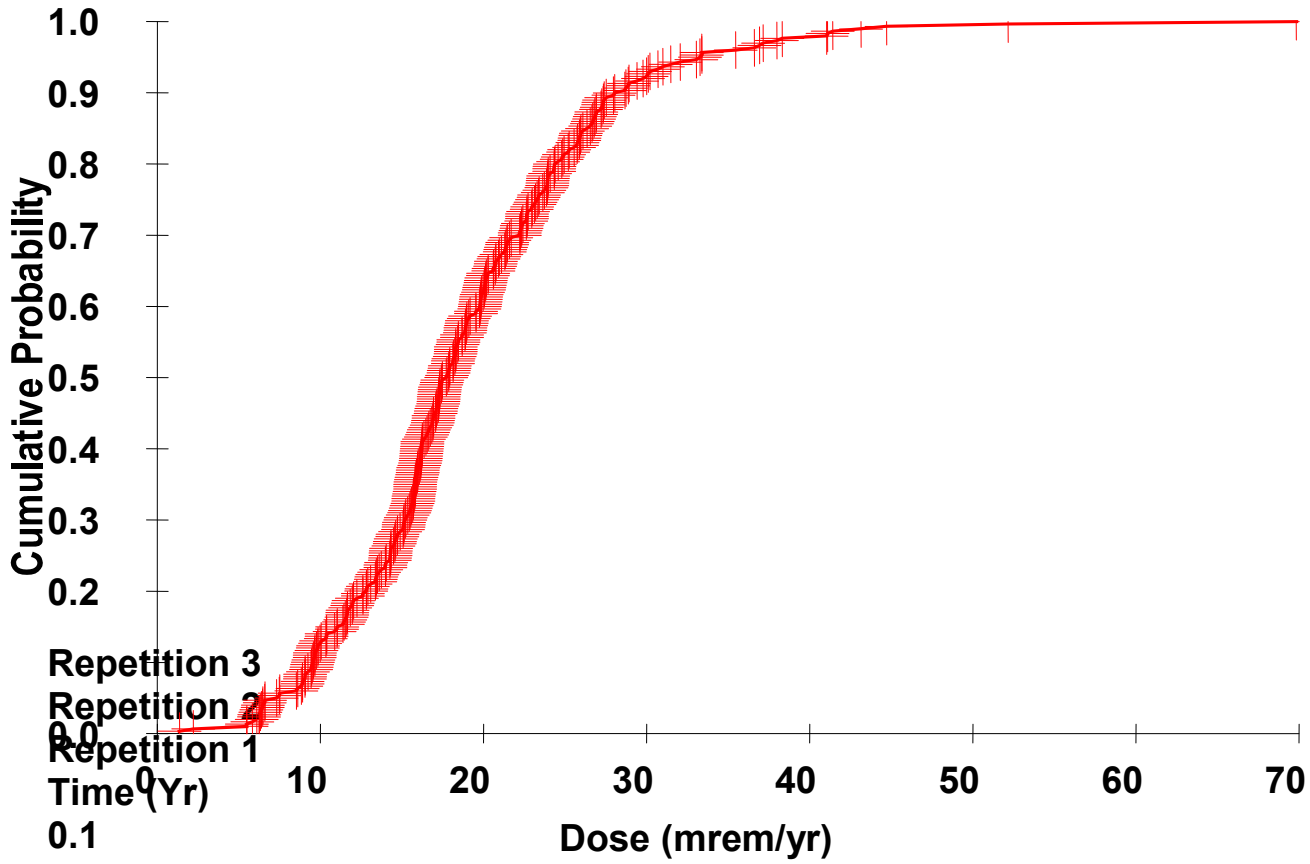


Figure B–5 Cumulative Probability Plot, All Pathways, Resident Farmer, Thorium Source Term

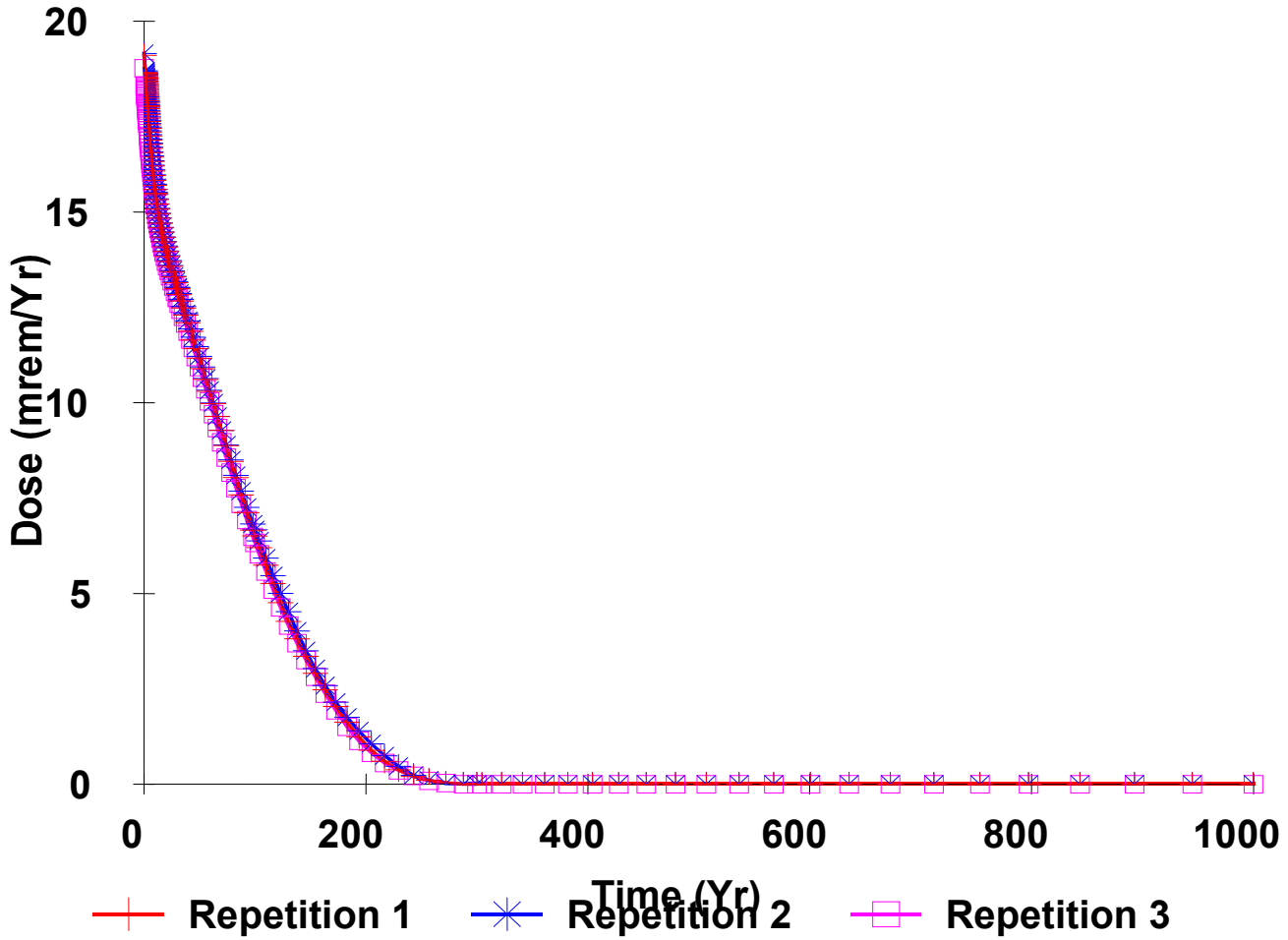


Figure B–6 Temporal Plot, Mean Total Dose, Resident Farmer, Thorium Source Term

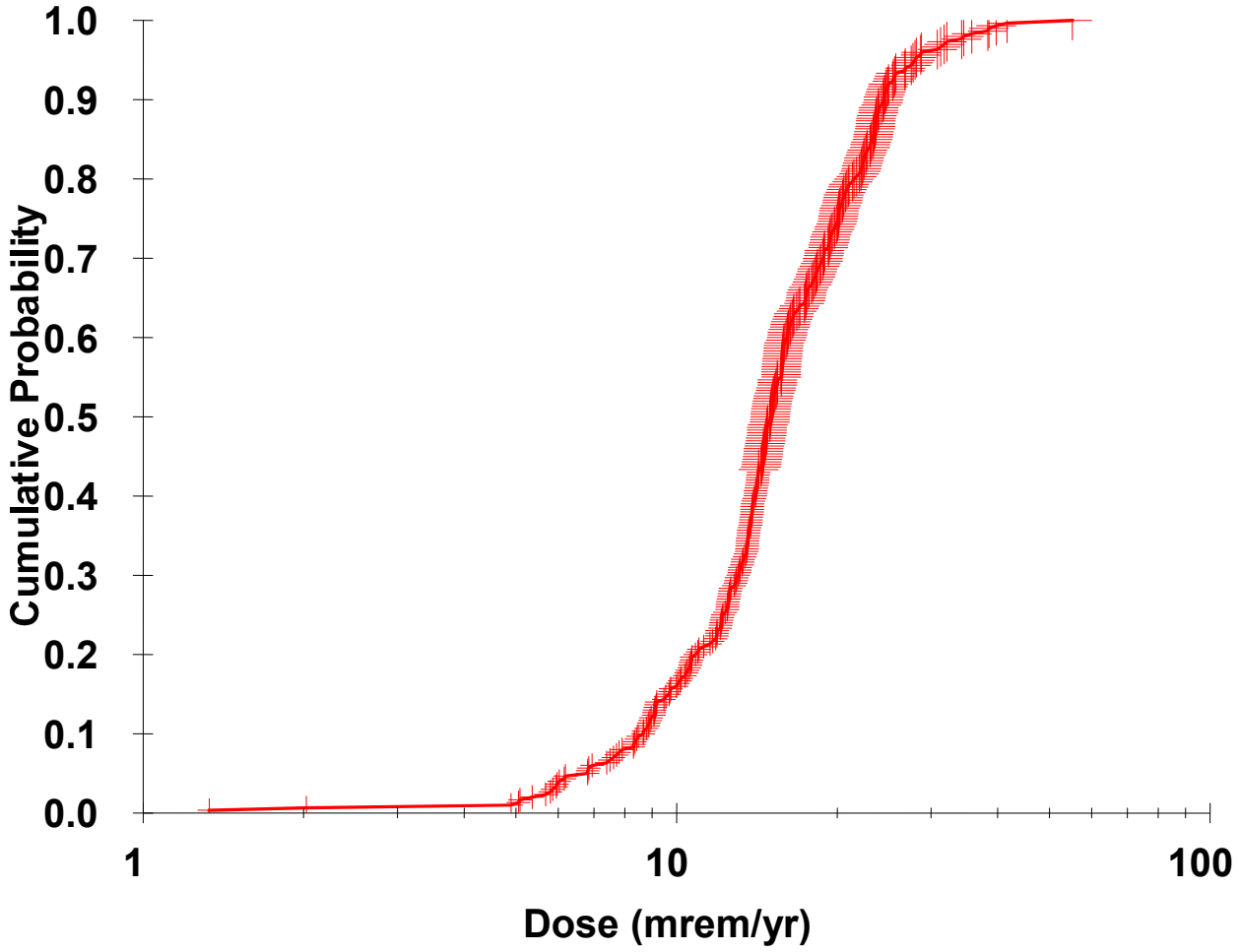


Figure B–7 Cumulative Probability Plot, External Pathway, Resident Farmer, Thorium Source Term

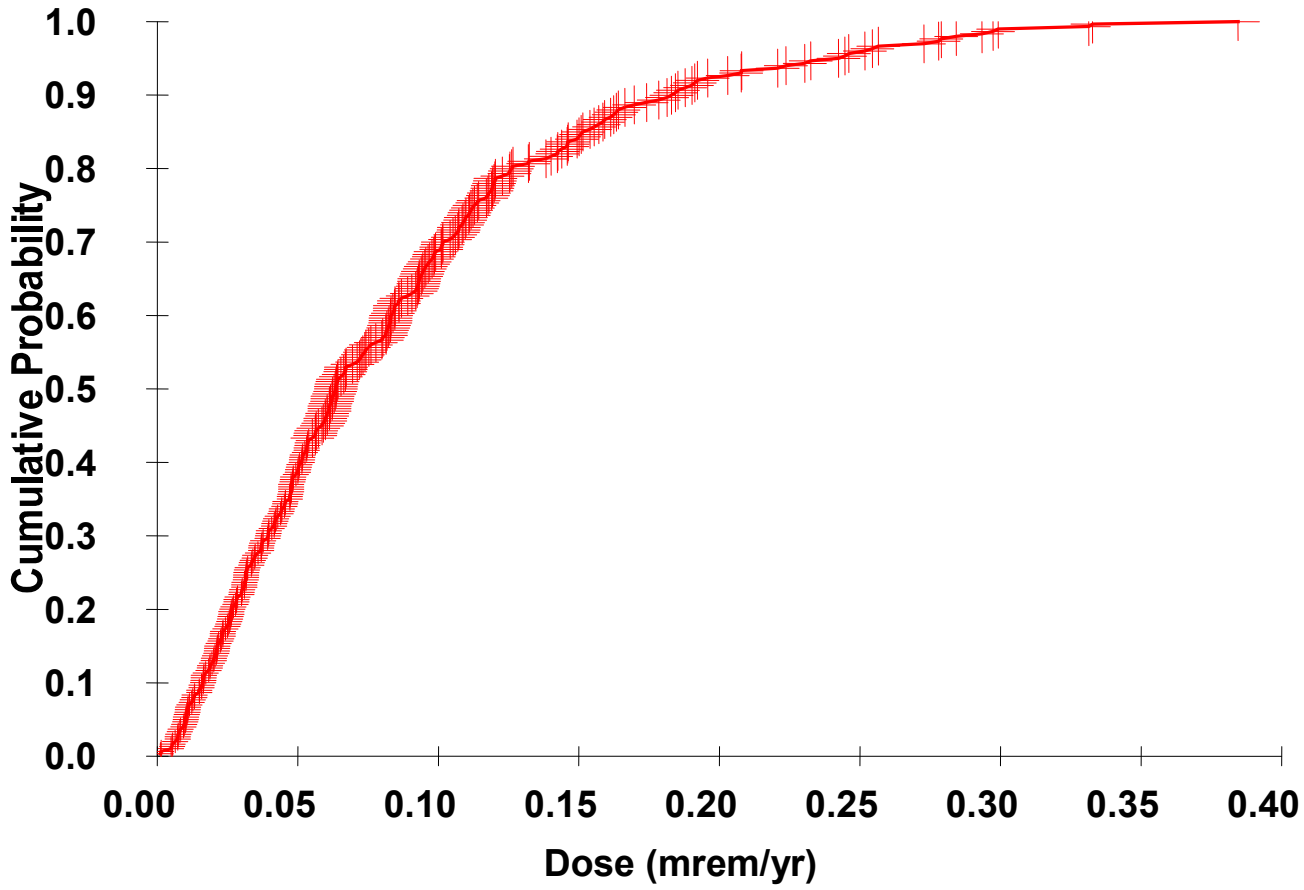


Figure B–8 Cumulative Probability Plot, Inhalation Pathway, Resident Farmer, Thorium Source Term

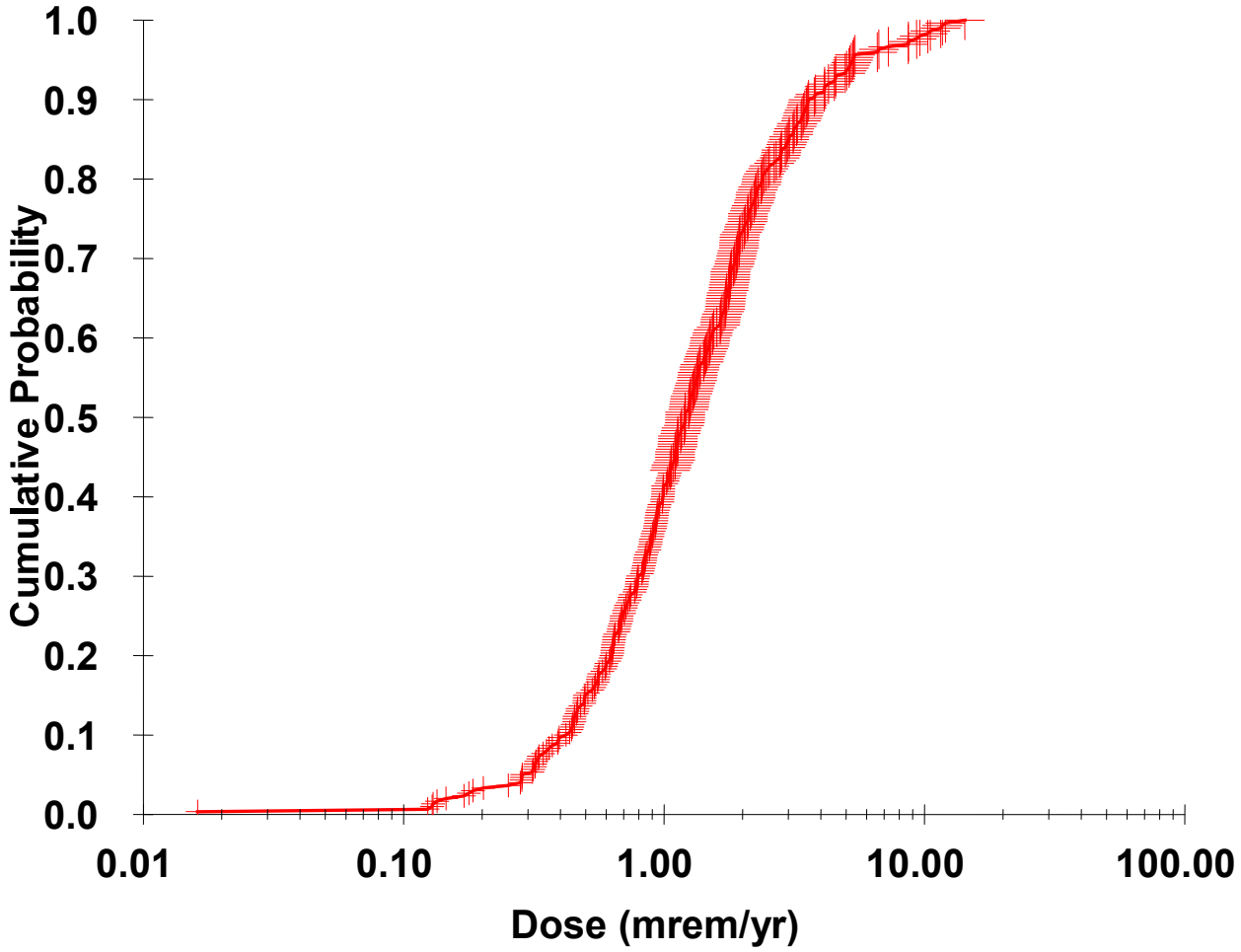


Figure B–9 Cumulative Probability Plot, Plant Ingestion Pathway, Resident Farmer, Thorium Source Term

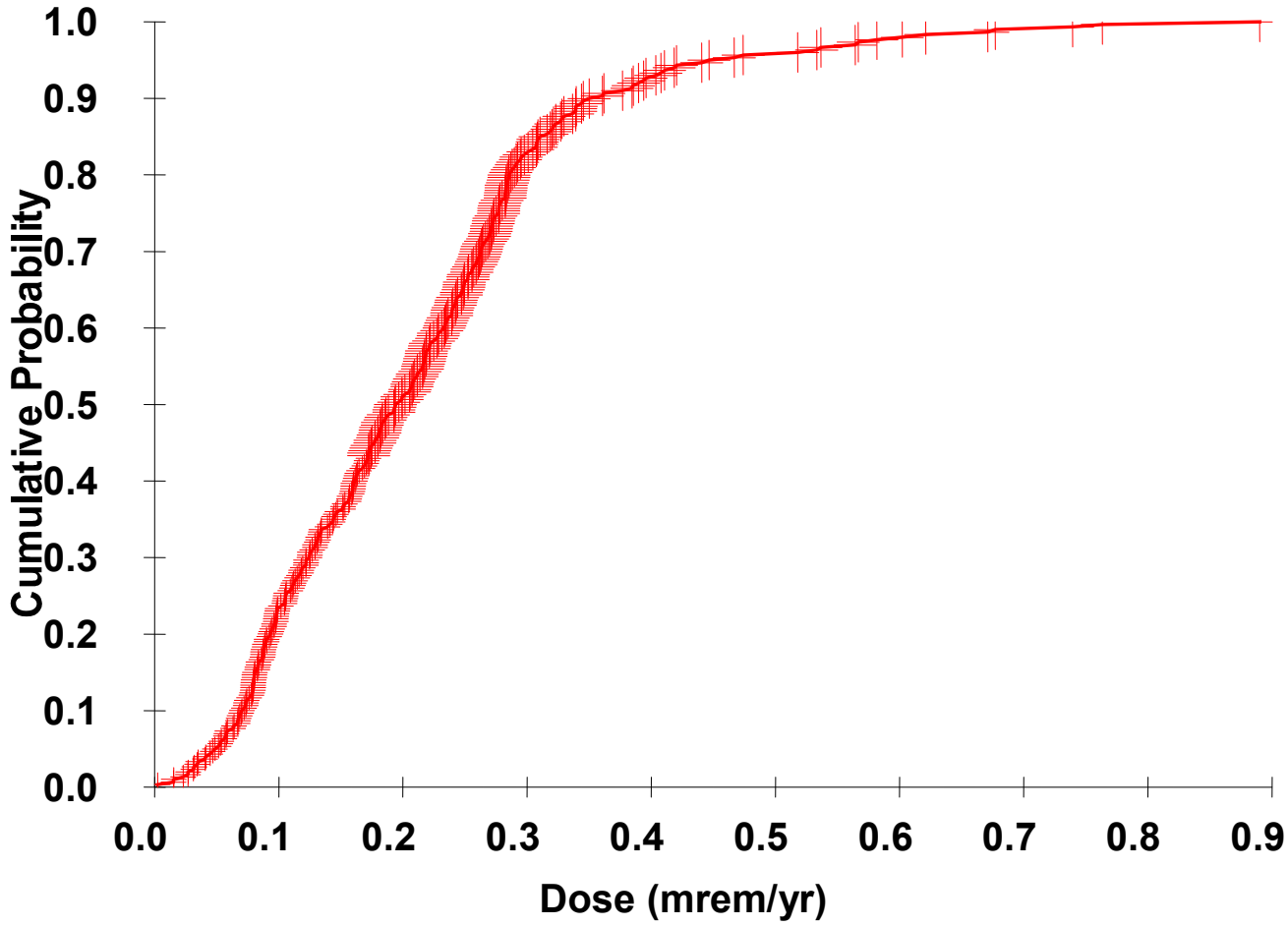


Figure B–10 Cumulative Probability Plot, Meat Ingestion Pathway, Resident Farmer, Thorium Source Term

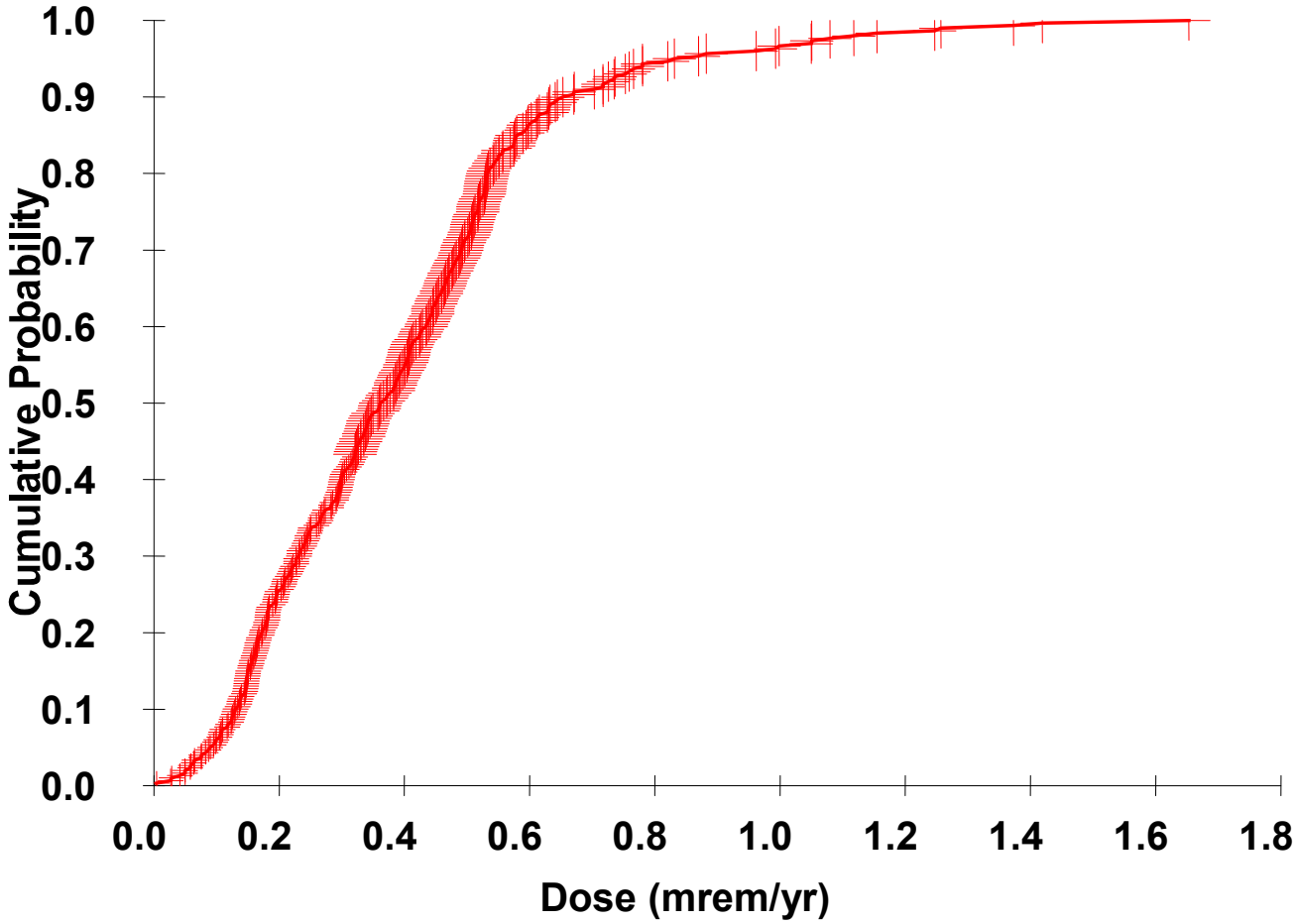


Figure B–11 Cumulative Probability Plot, Milk Ingestion Pathway, Resident Farmer, Thorium Source Term

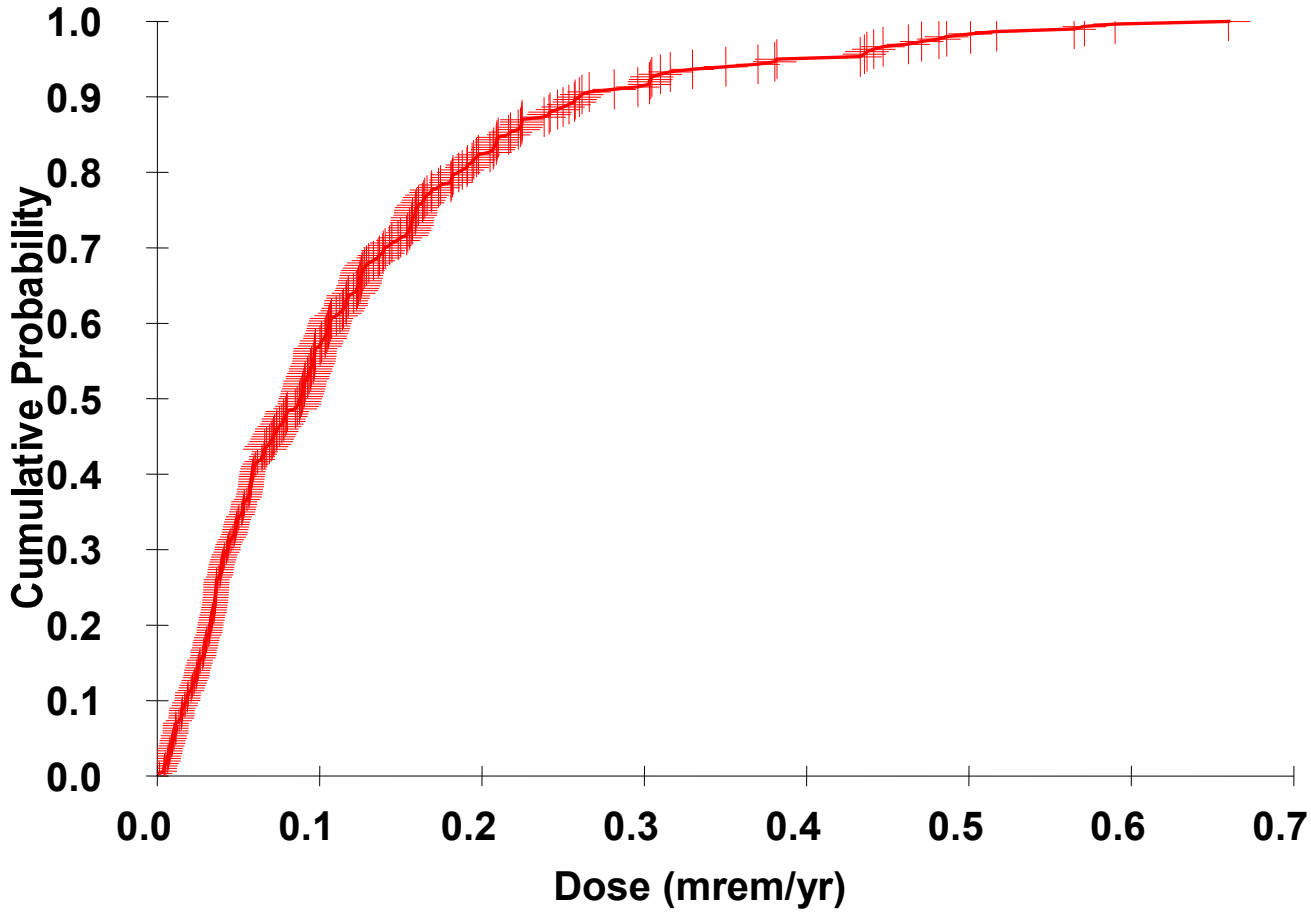


Figure B–12 Cumulative Probability Plot, Soil Ingestion Pathway, Resident Farmer, Thorium Source Term

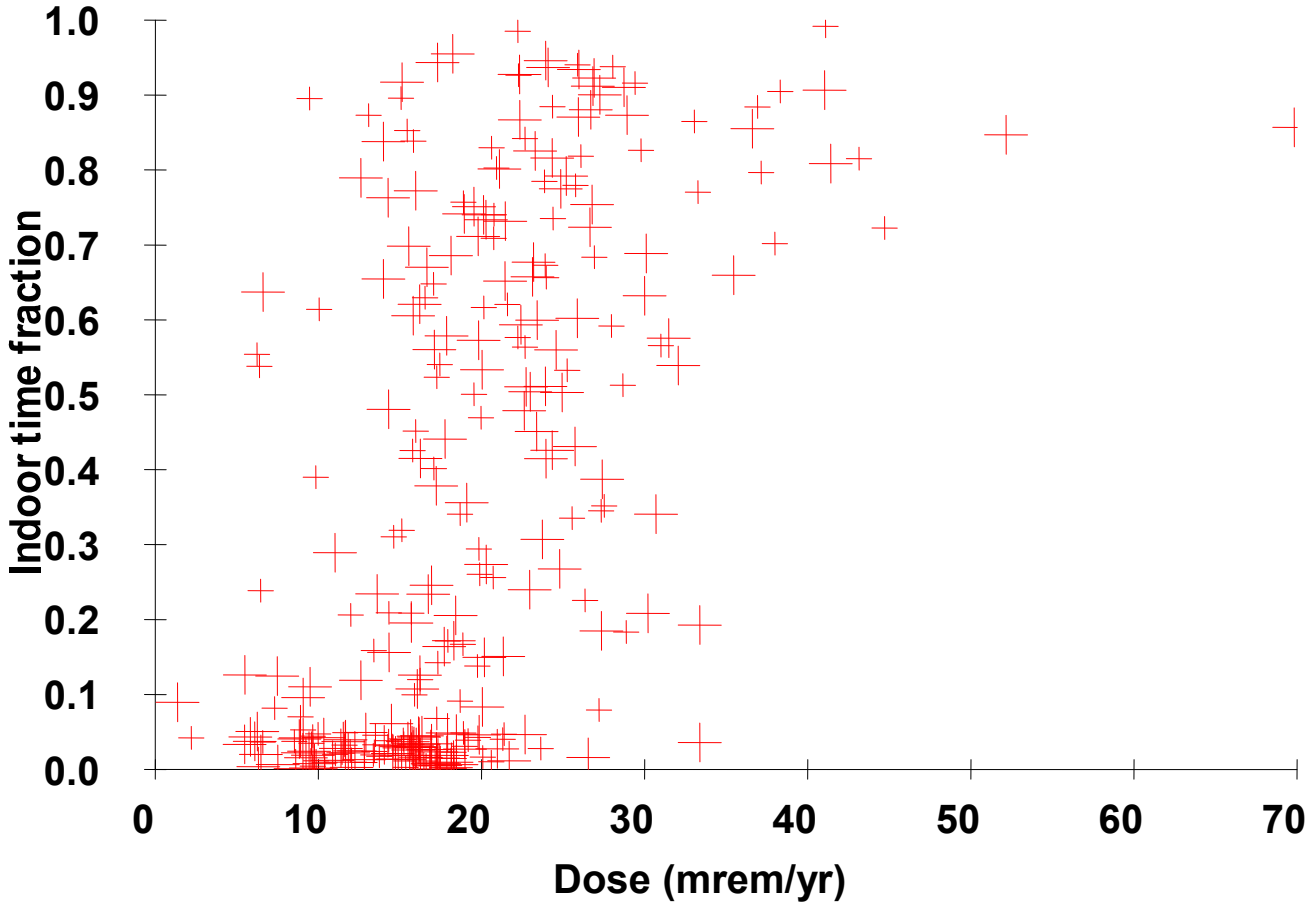


Figure B–13 Scatter Plot, Dose from All Pathways vs. Indoor Time Fraction, Resident Farmer, Thorium Source Term

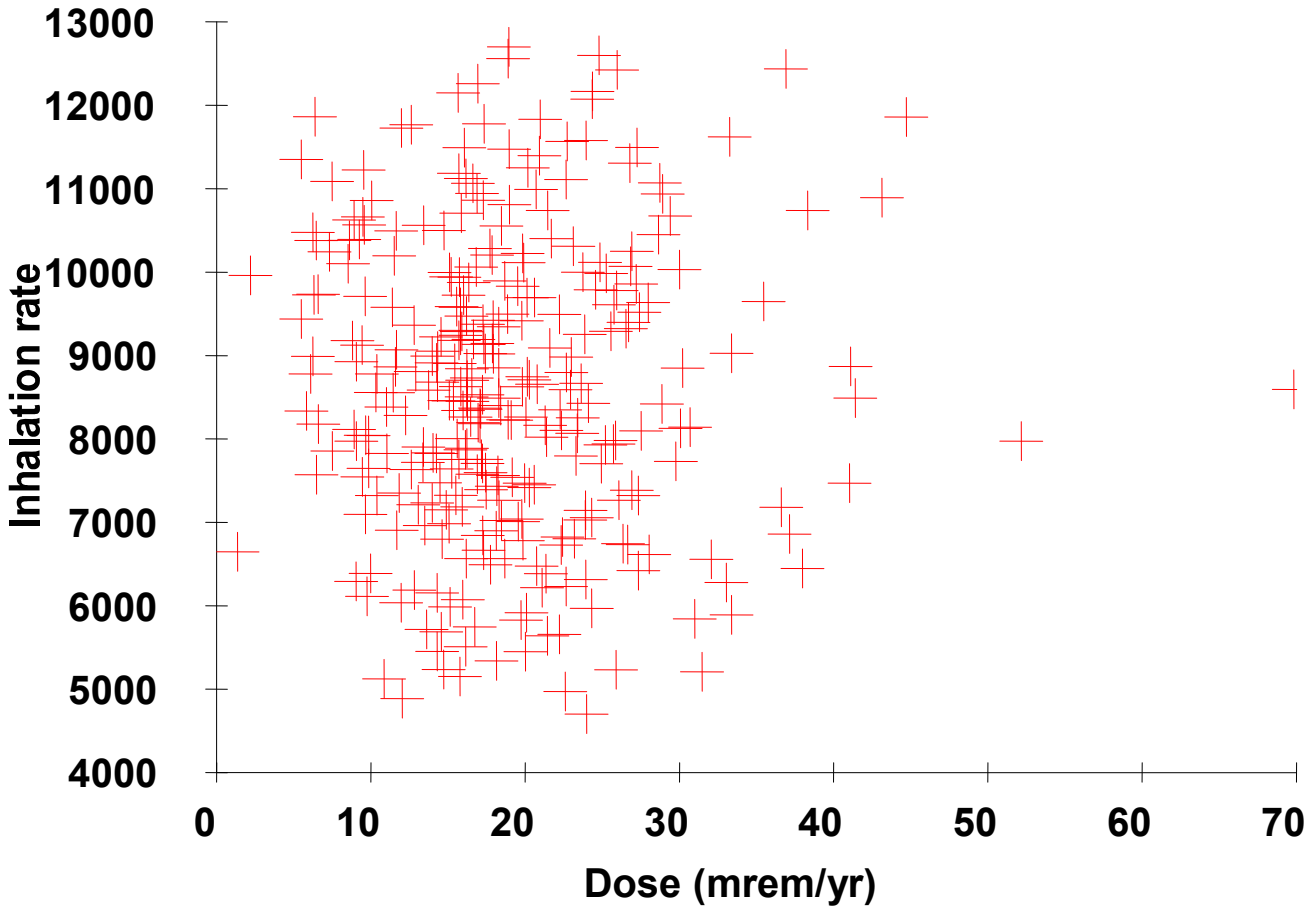


Figure B–14 Scatter Plot, Dose from All Pathways vs. Inhalation Rate, Resident Farmer, Thorium Source Term

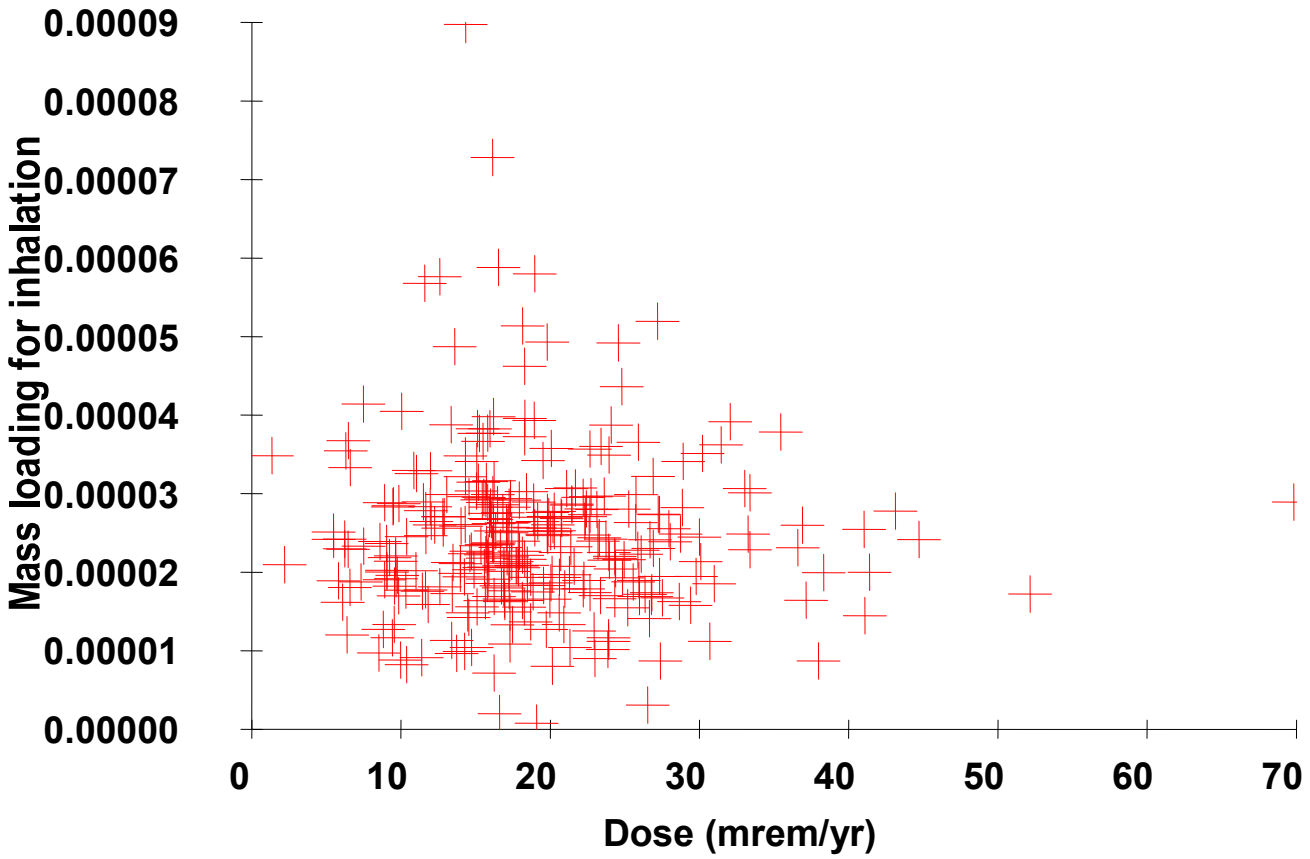


Figure B–15 Scatter Plot, Dose from All Pathways vs. Mass Loading for Inhalation, Resident Farmer, Thorium Source Term

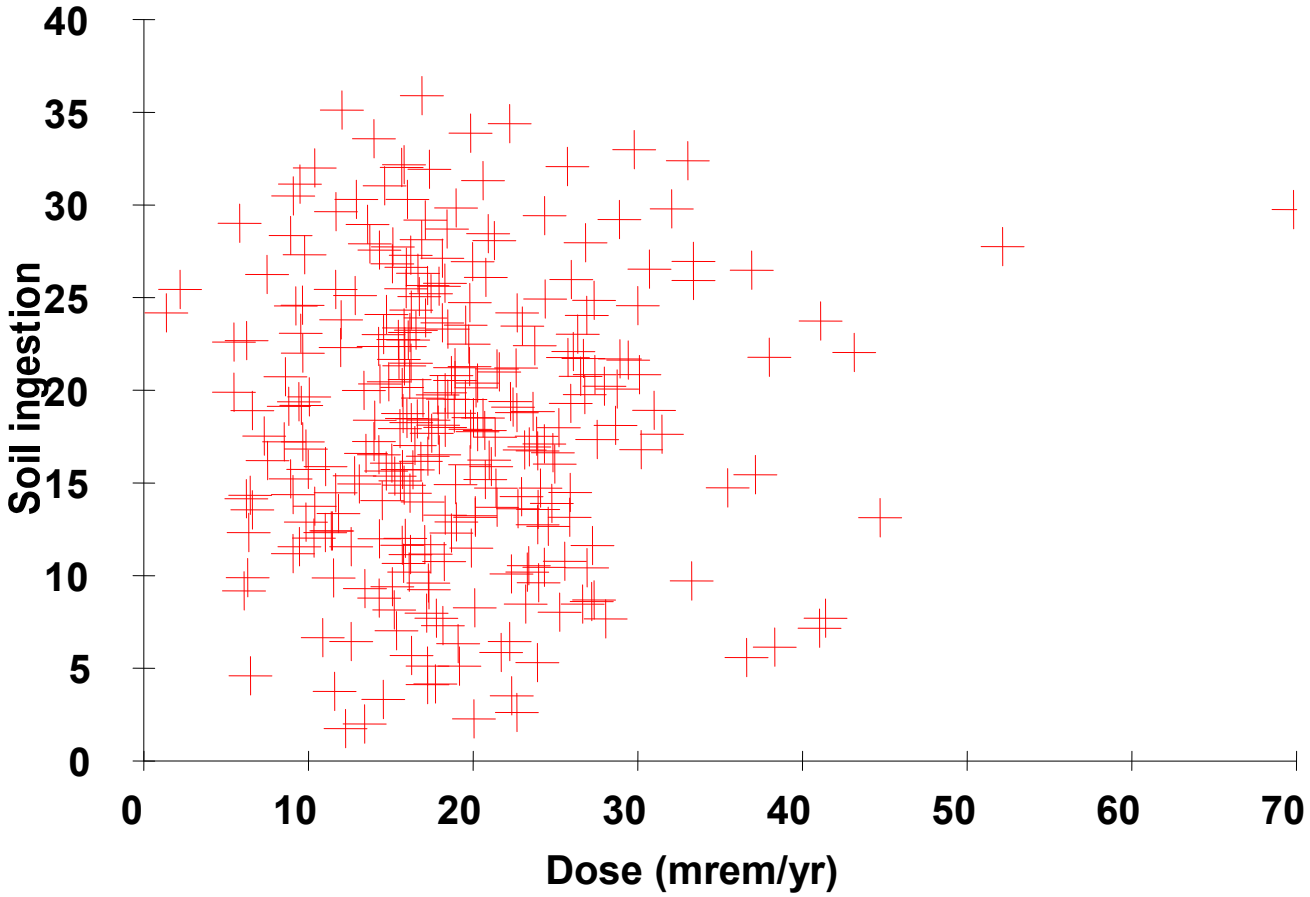


Figure B–16 Scatter Plot, Dose from All Pathways vs. Soil Ingestion Rate, Resident Farmer, Thorium Source Term

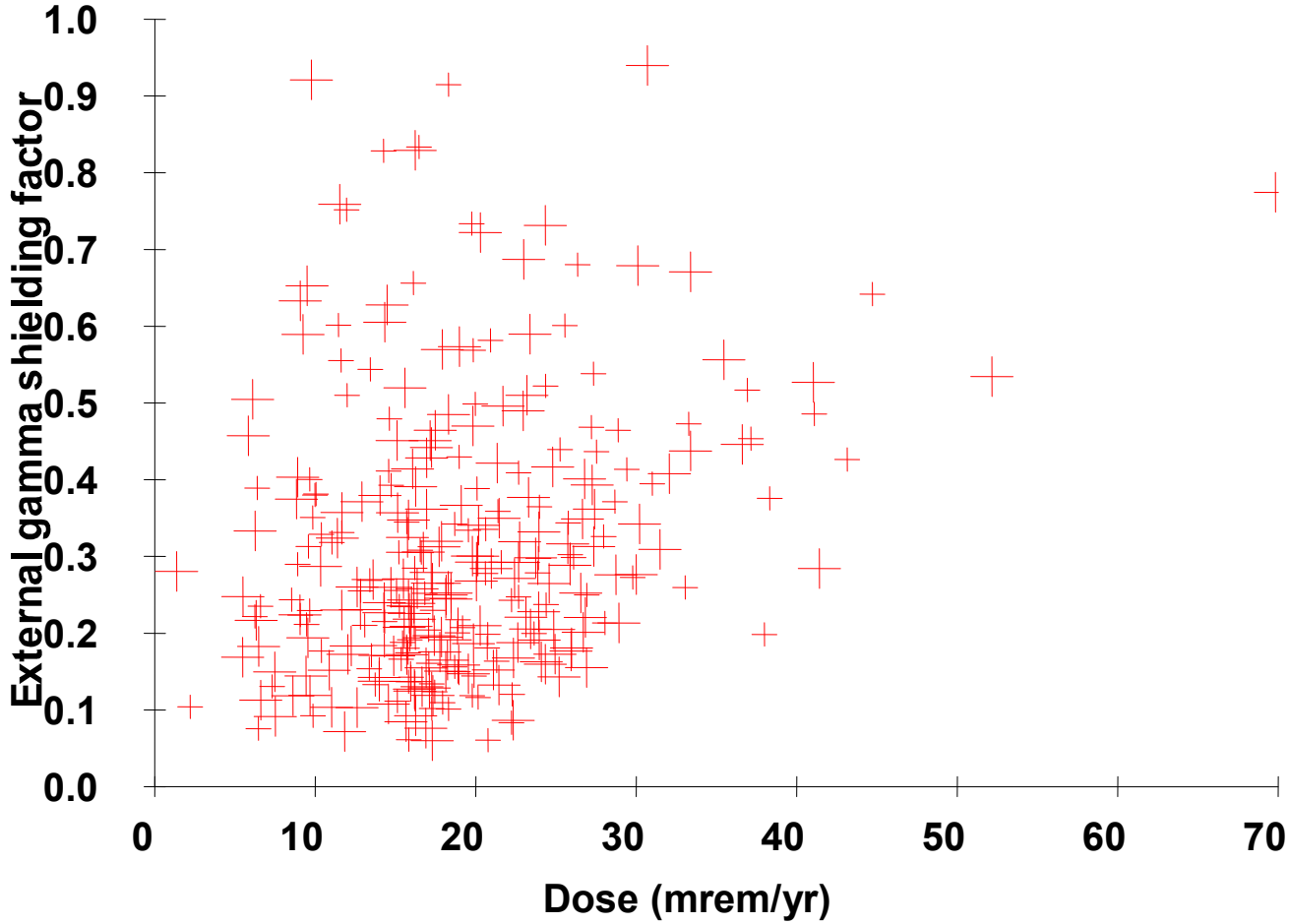


Figure B–17 Scatter Plot, Dose from All Pathways vs. External Gamma Shielding Factor, Resident Farmer, Thorium Source Term

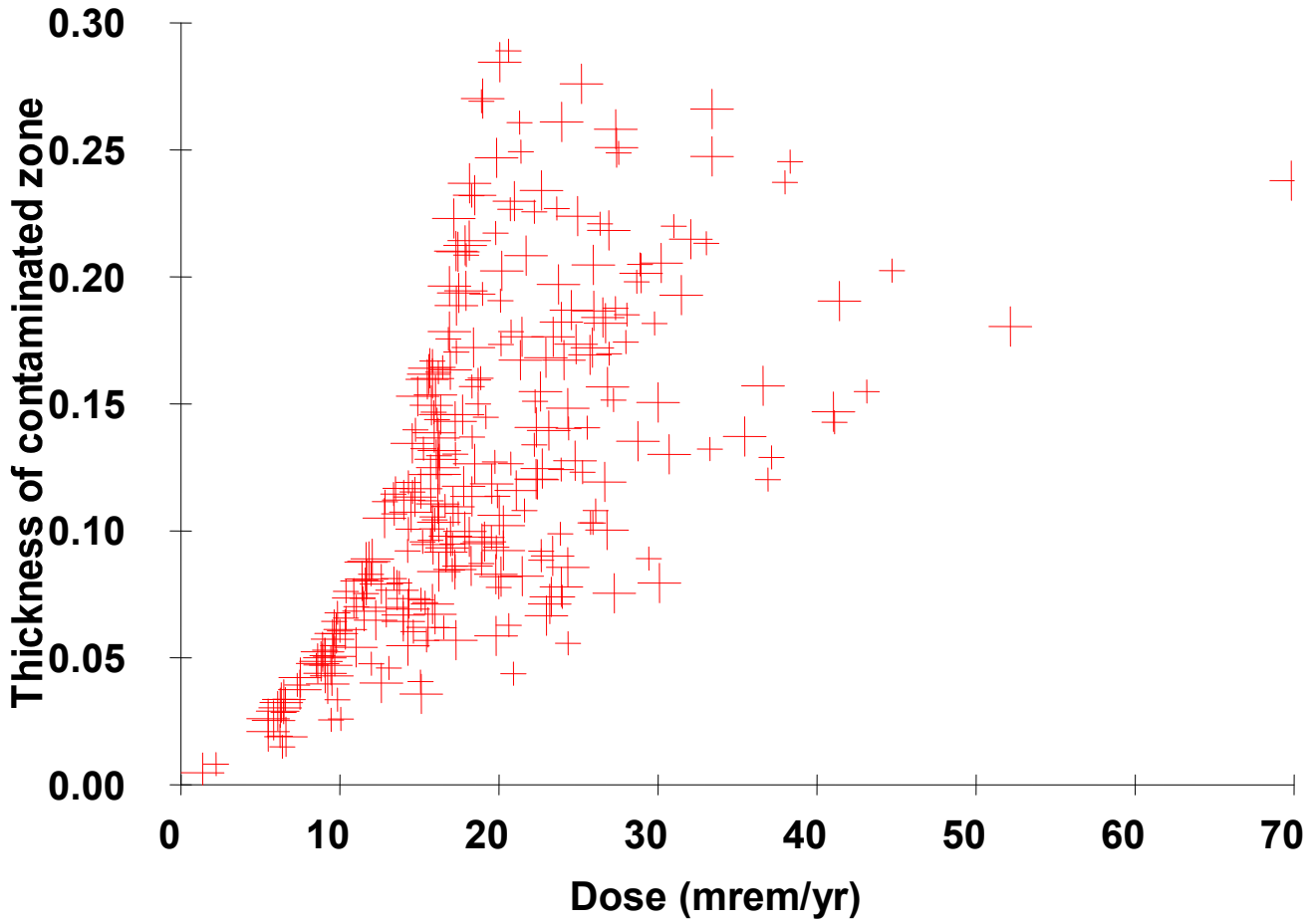


Figure B–18 Scatter Plot, Dose from All Pathways vs. Thickness of Contaminated Zone, Resident Farmer, Thorium Source Term

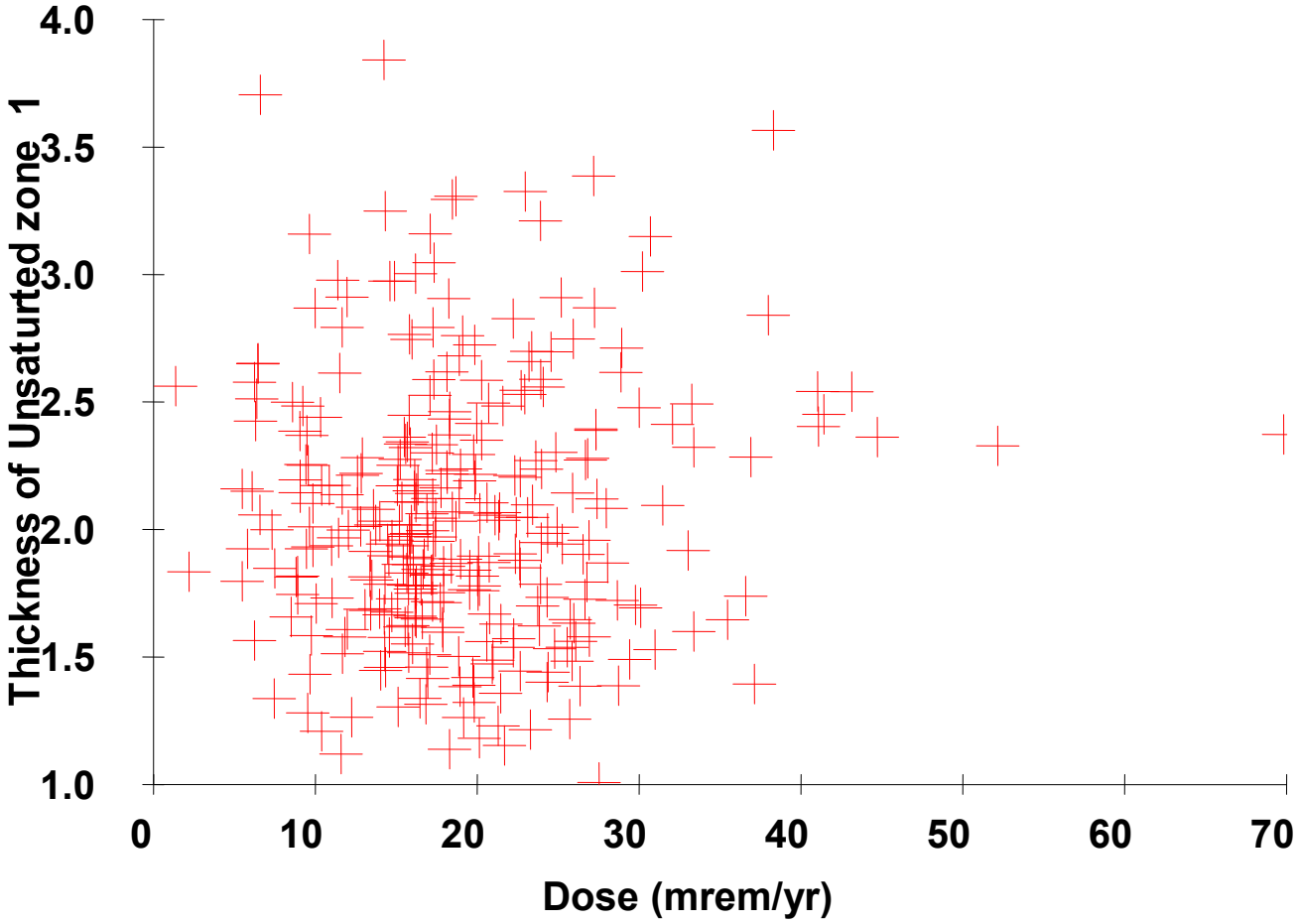


Figure B–19 Scatter Plot, Dose from All Pathways vs. Thickness of Unsaturated Zone #1, Resident Farmer, Thorium Source Term

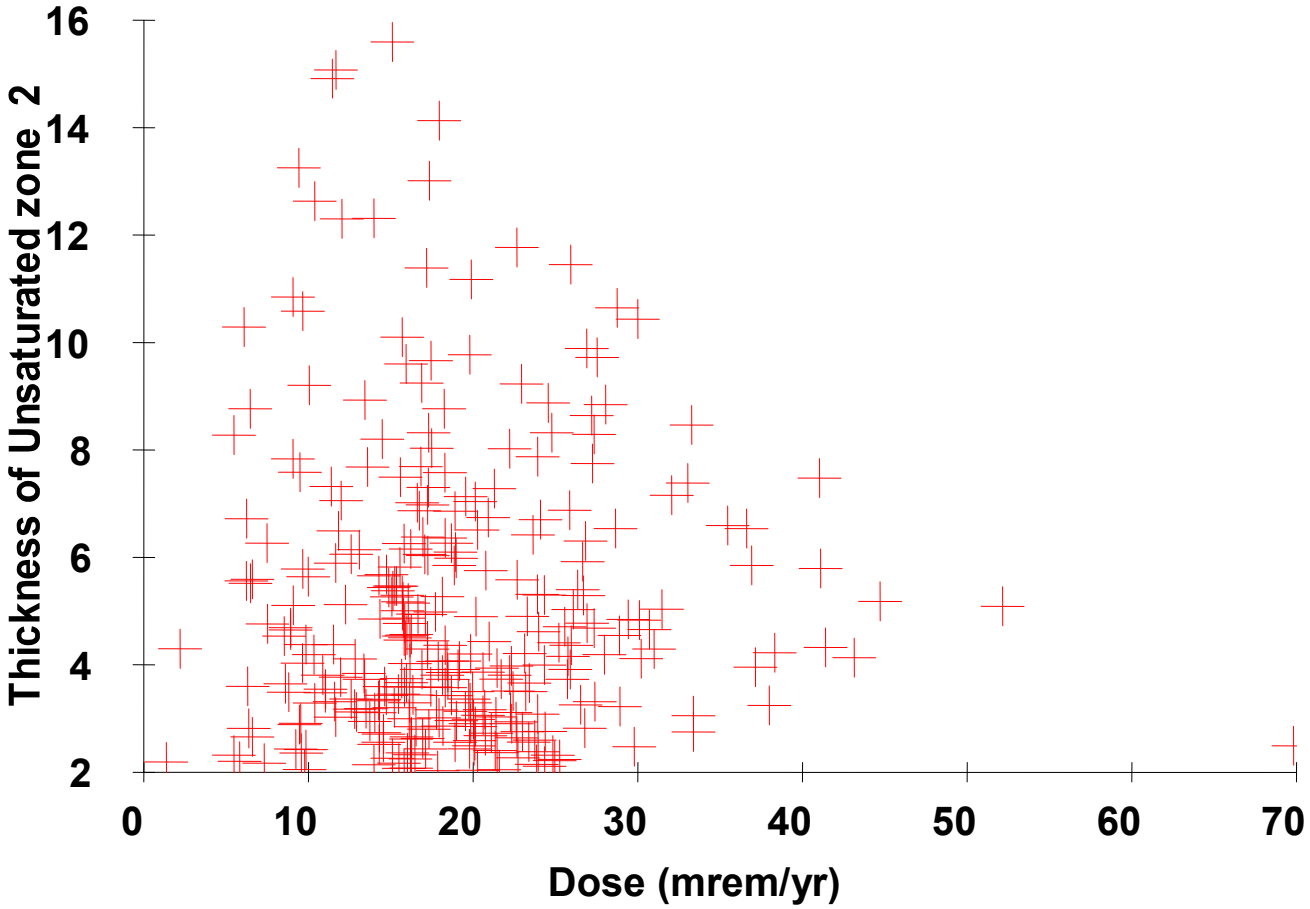


Figure B–20 Scatter Plot, Dose from All Pathways vs. Thickness of Unsaturated Zone #2, Resident Farmer, Thorium Source Term

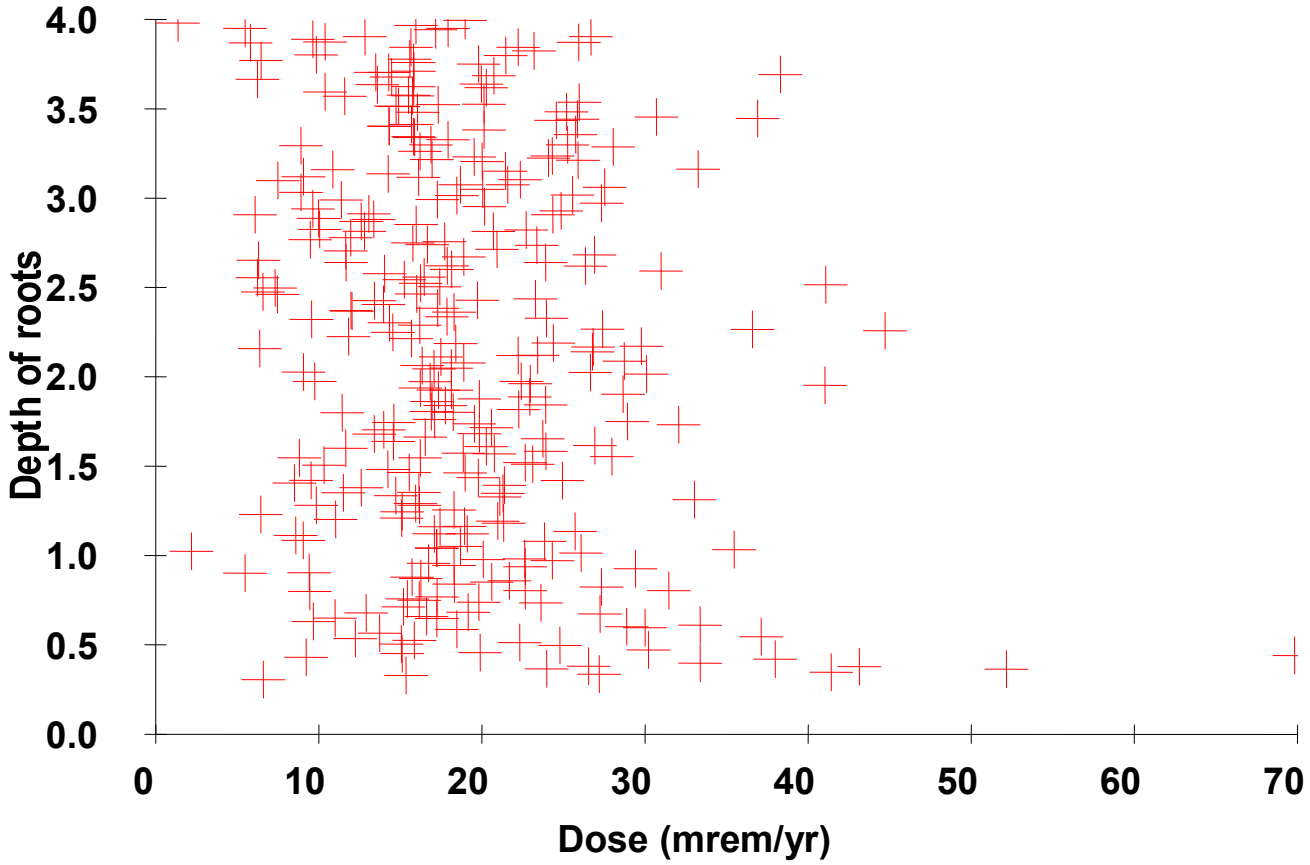


Figure B–21 Scatter Plot, Dose from All Pathways vs. Depth of Roots, Resident Farmer, Thorium Source Term

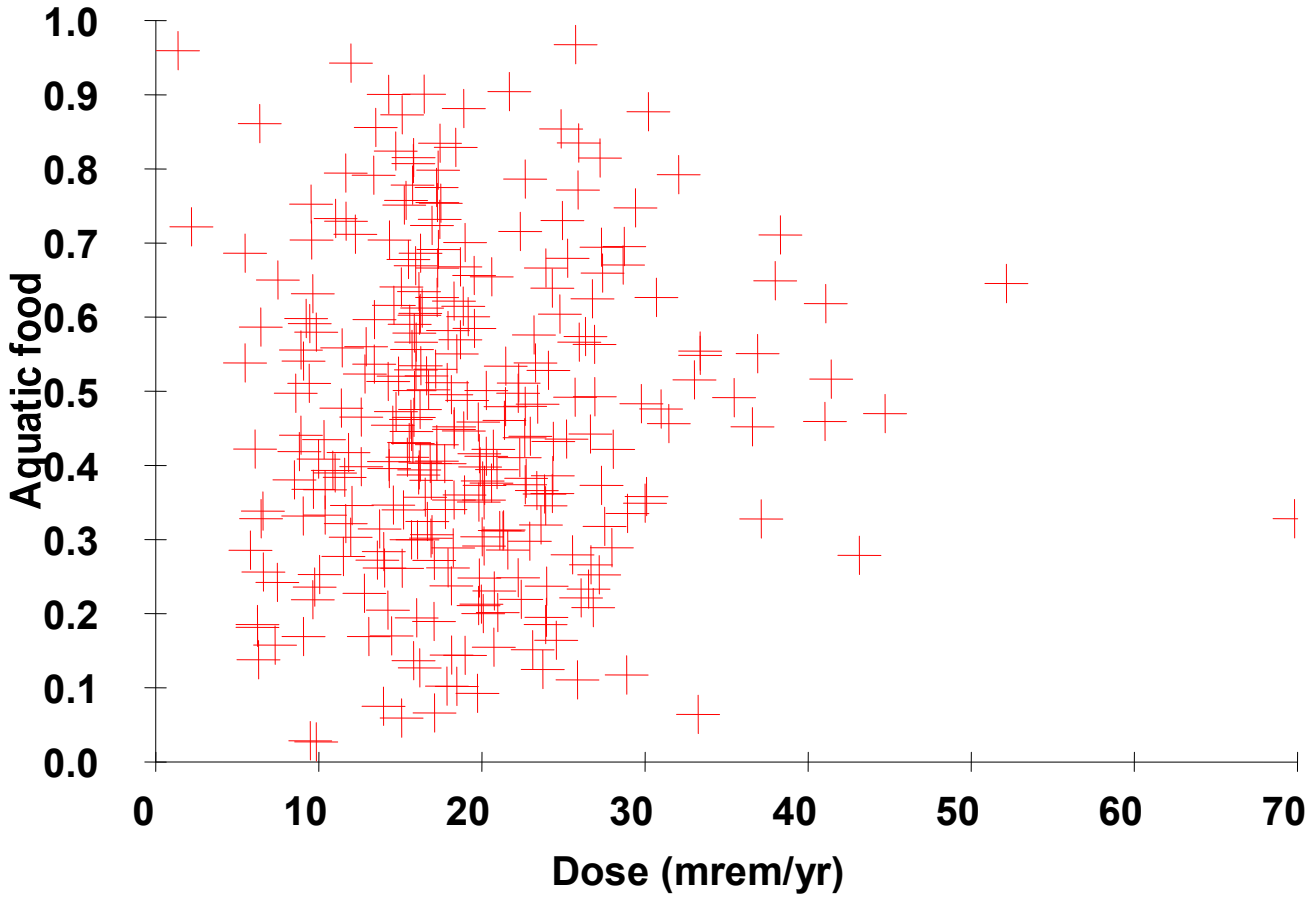


Figure B–22 Scatter Plot, Dose from All Pathways vs. Contaminated Fraction of Aquatic Food, Resident Farmer, Thorium Source Term

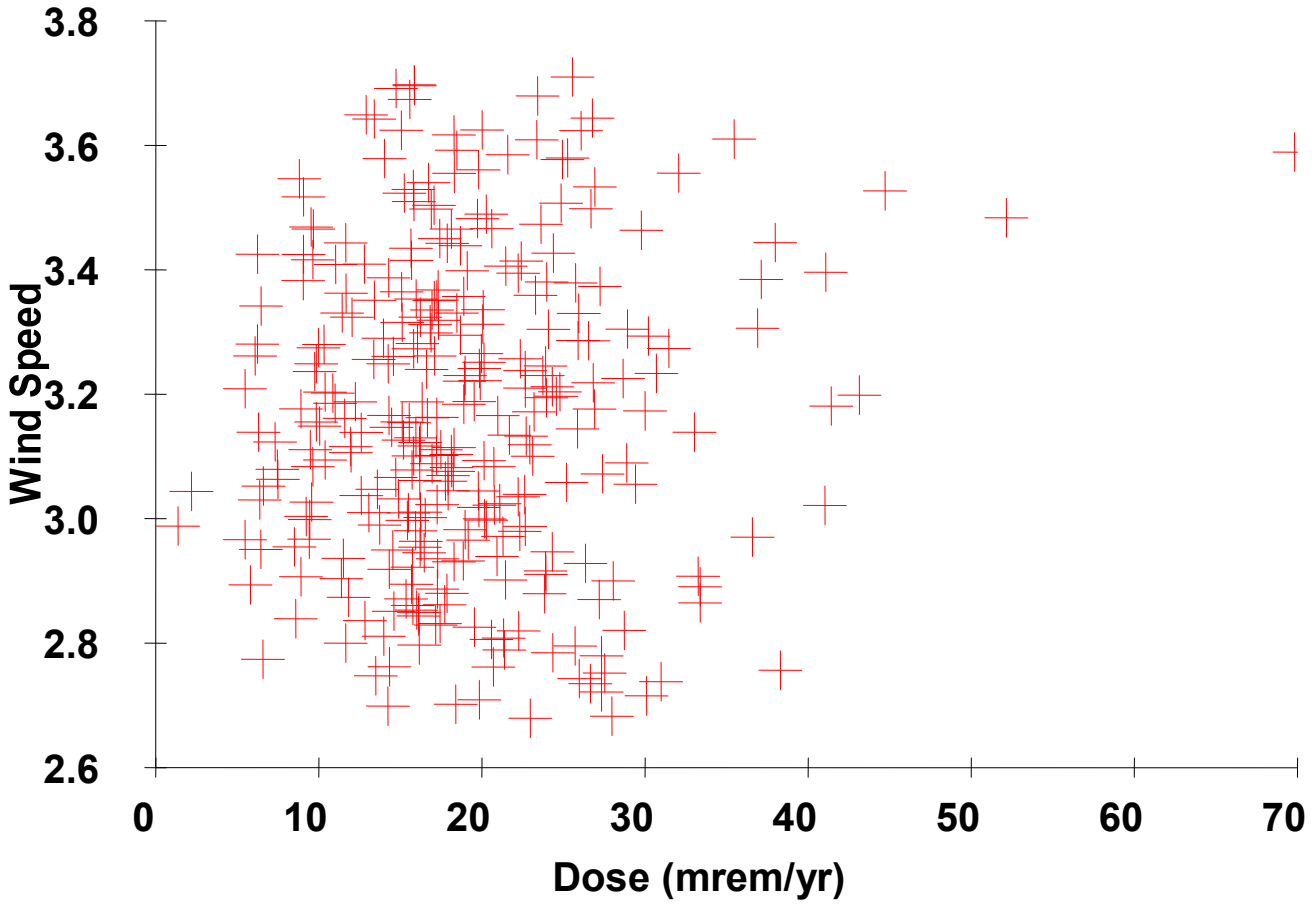


Figure B–23 Scatter Plot, Dose from All Pathways vs. Average Annual Wind Speed, Resident Farmer, Thorium Source Term

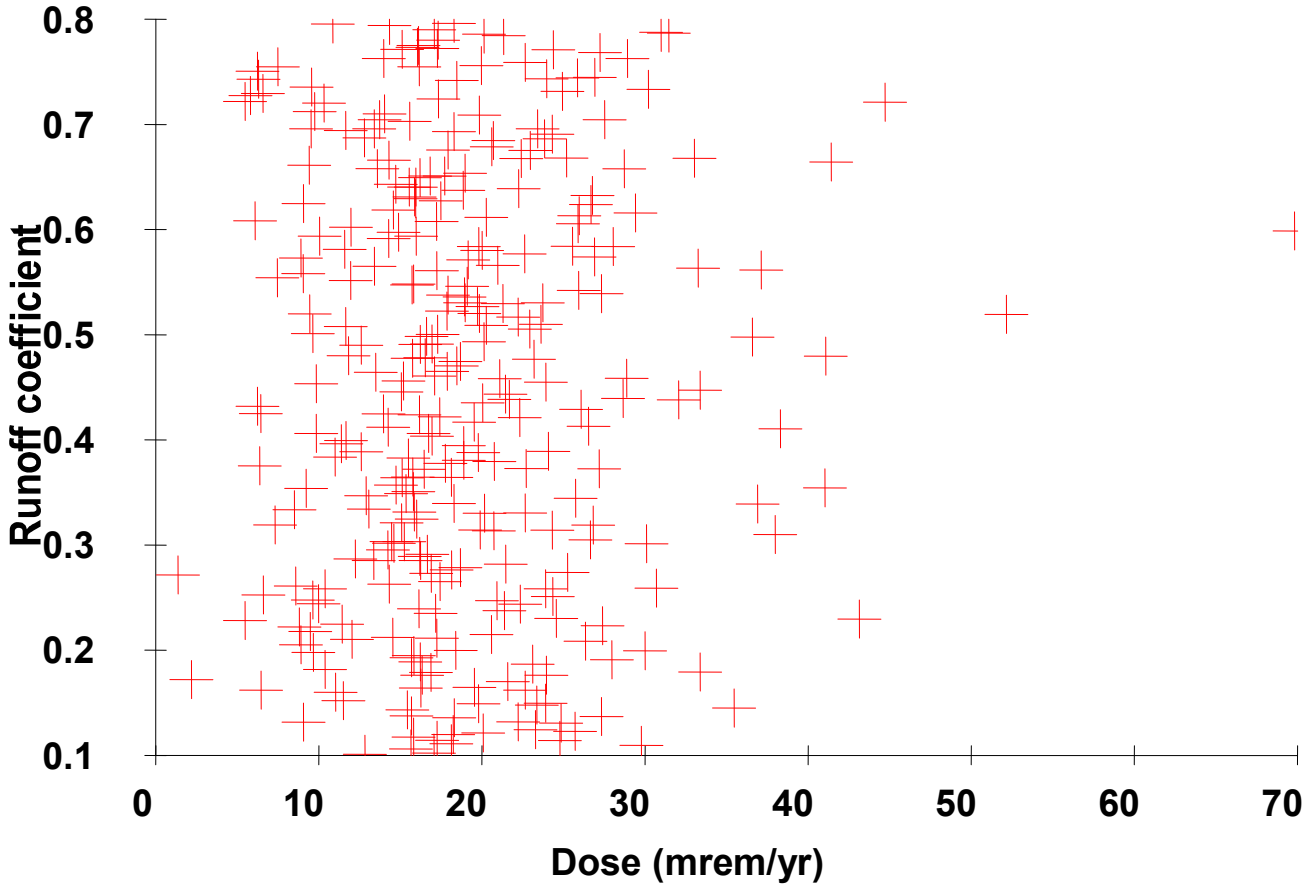


Figure B–24 Scatter Plot, Dose from All Pathways vs. Runoff Coefficient, Resident Farmer, Thorium Source Term

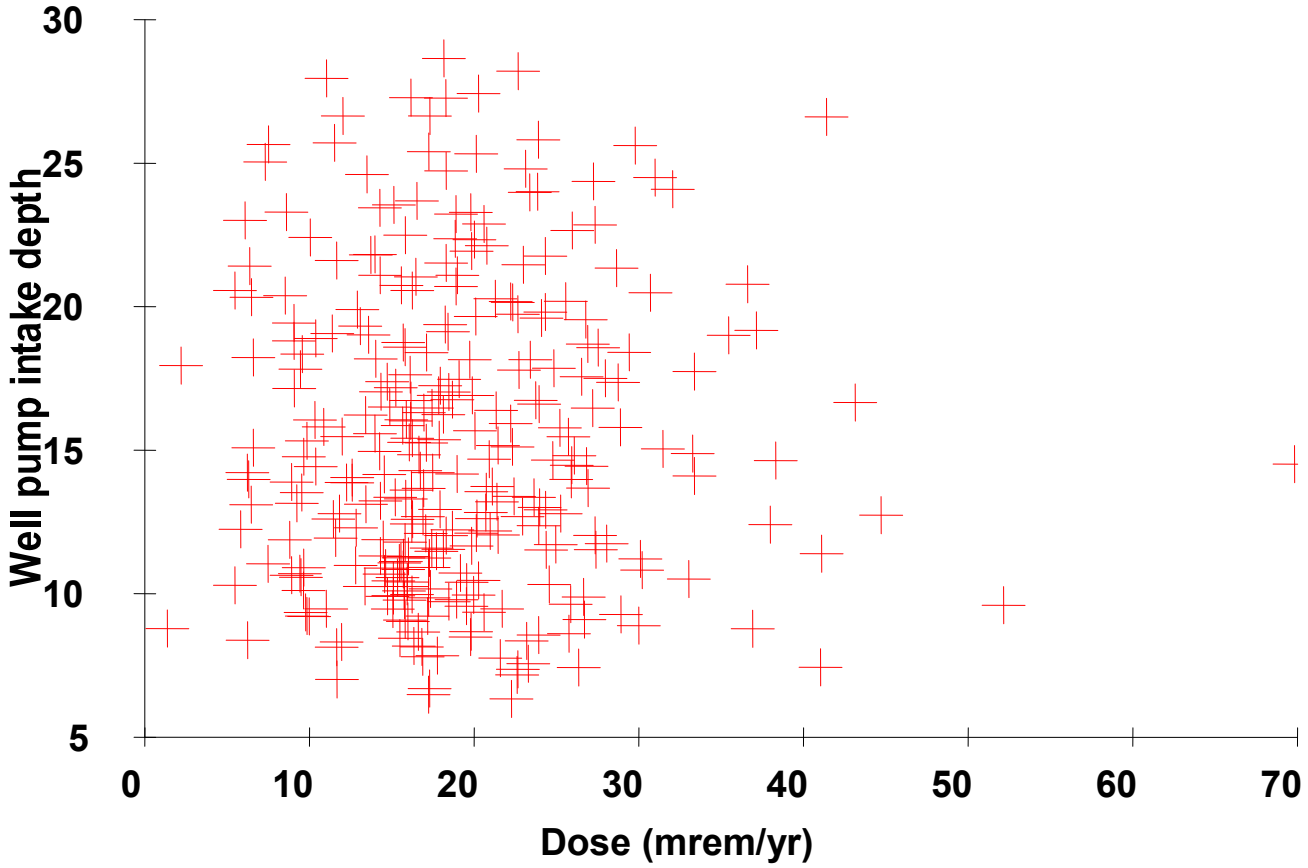


Figure B–25 Scatter Plot, Dose from All Pathways vs. Well Pump Intake Depth, Resident Farmer, Thorium Source Term

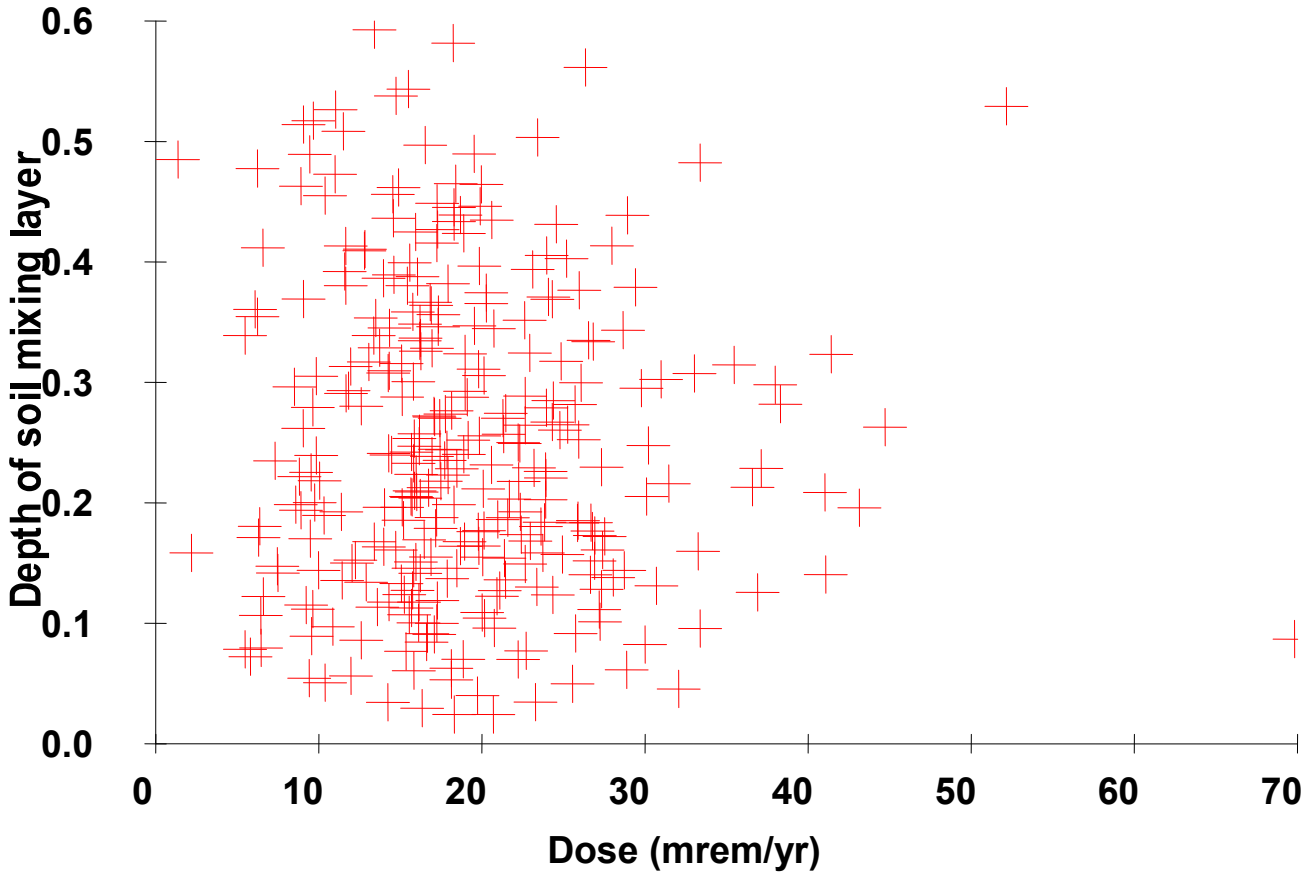


Figure B–26 Scatter Plot, Dose from All Pathways vs. Depth of Soil Mixing Layer, Resident Farmer, Thorium Source Term

B.2.2 Radium Source Term, Resident Farmer

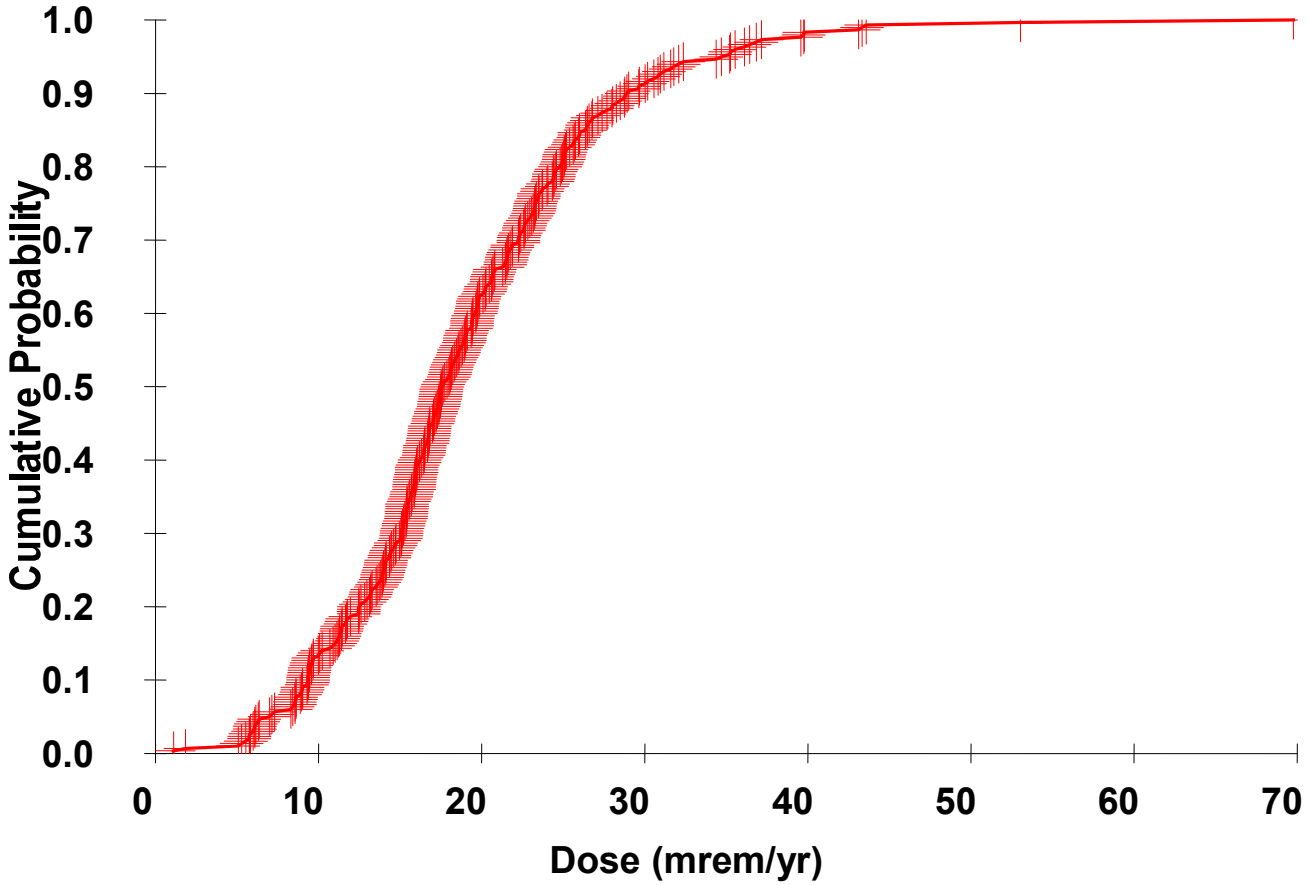


Figure B–27 Cumulative Probability Plot, All Pathways, Resident Farmer, Radium Source Term

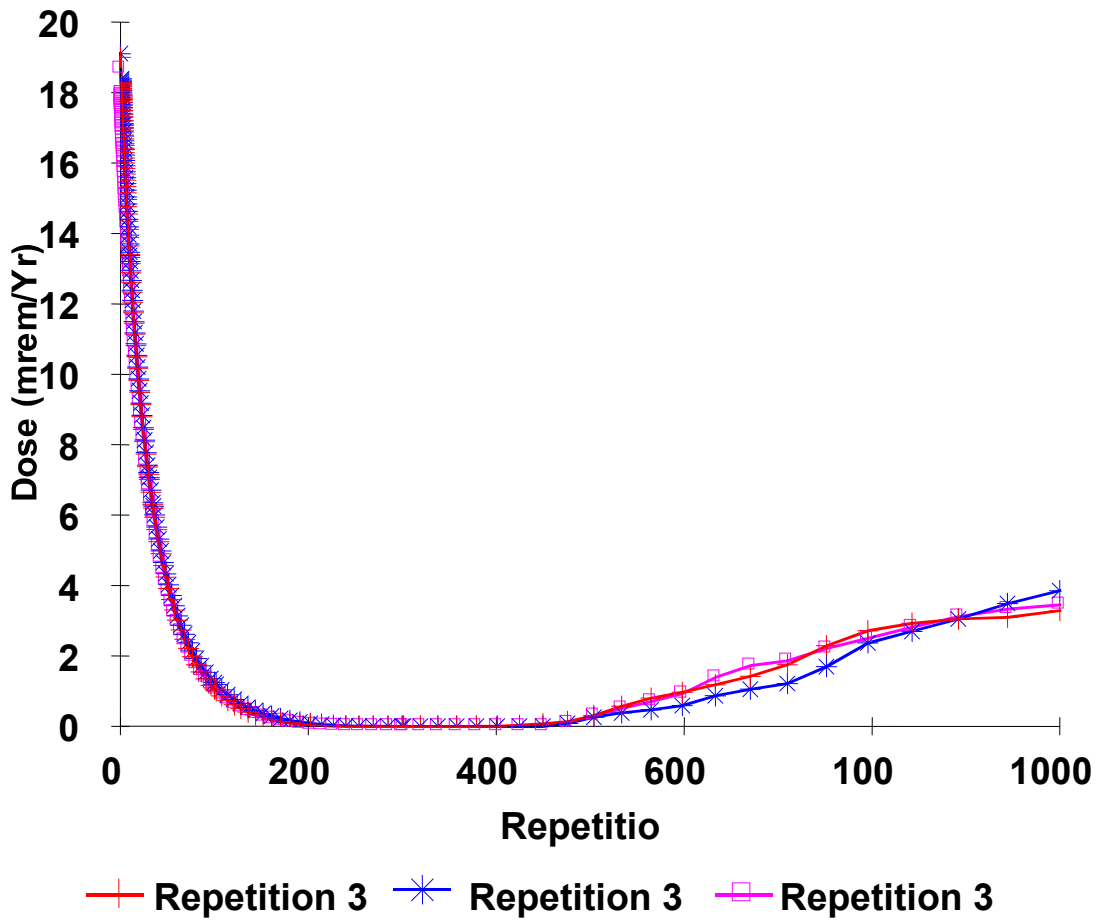


Figure B–28 Temporal Plot, Mean Total Dose, Resident Farmer, Radium Source Term

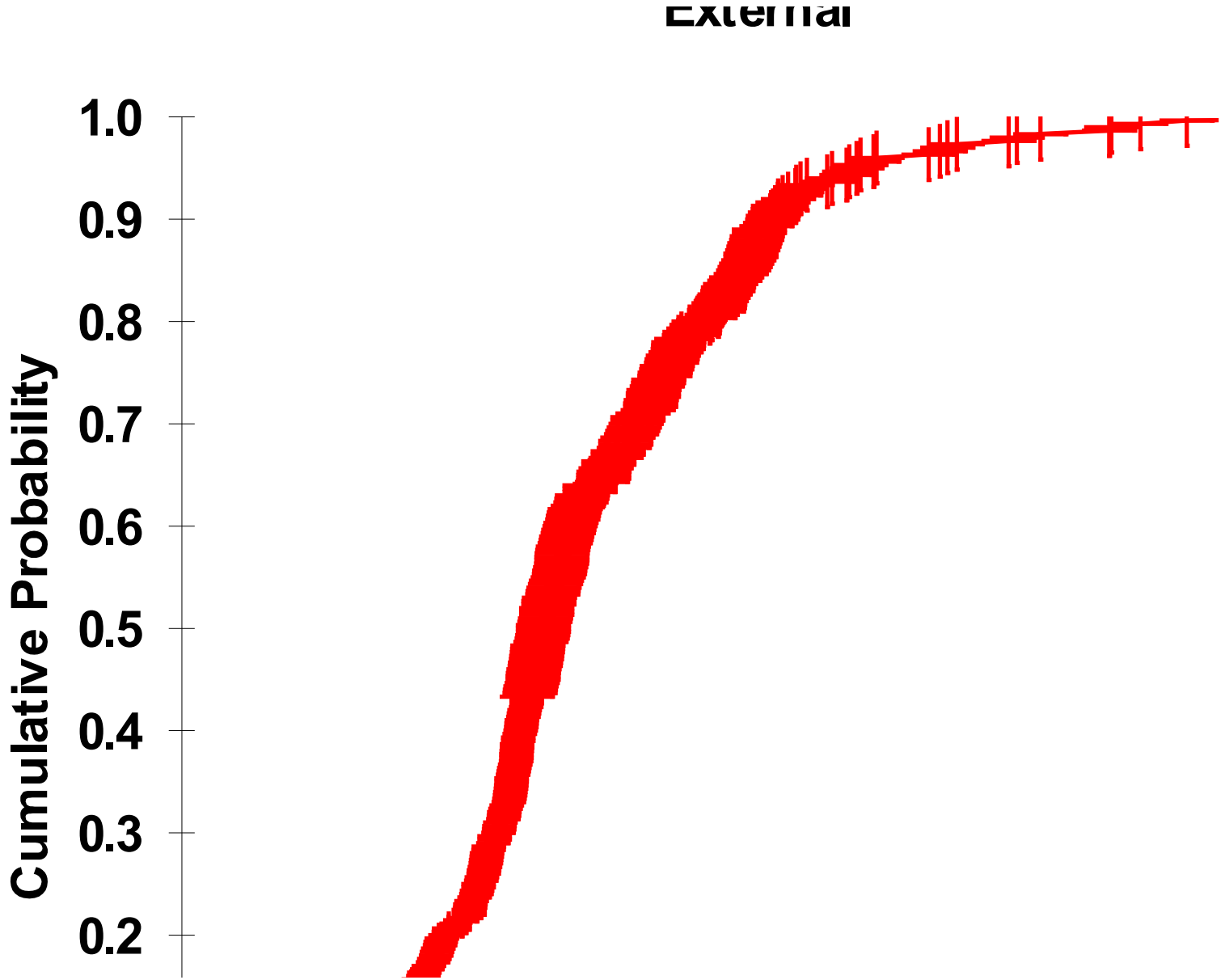


Figure B–29 Cumulative Probability Plot, External Pathway, Resident Farmer, Radium Source Term

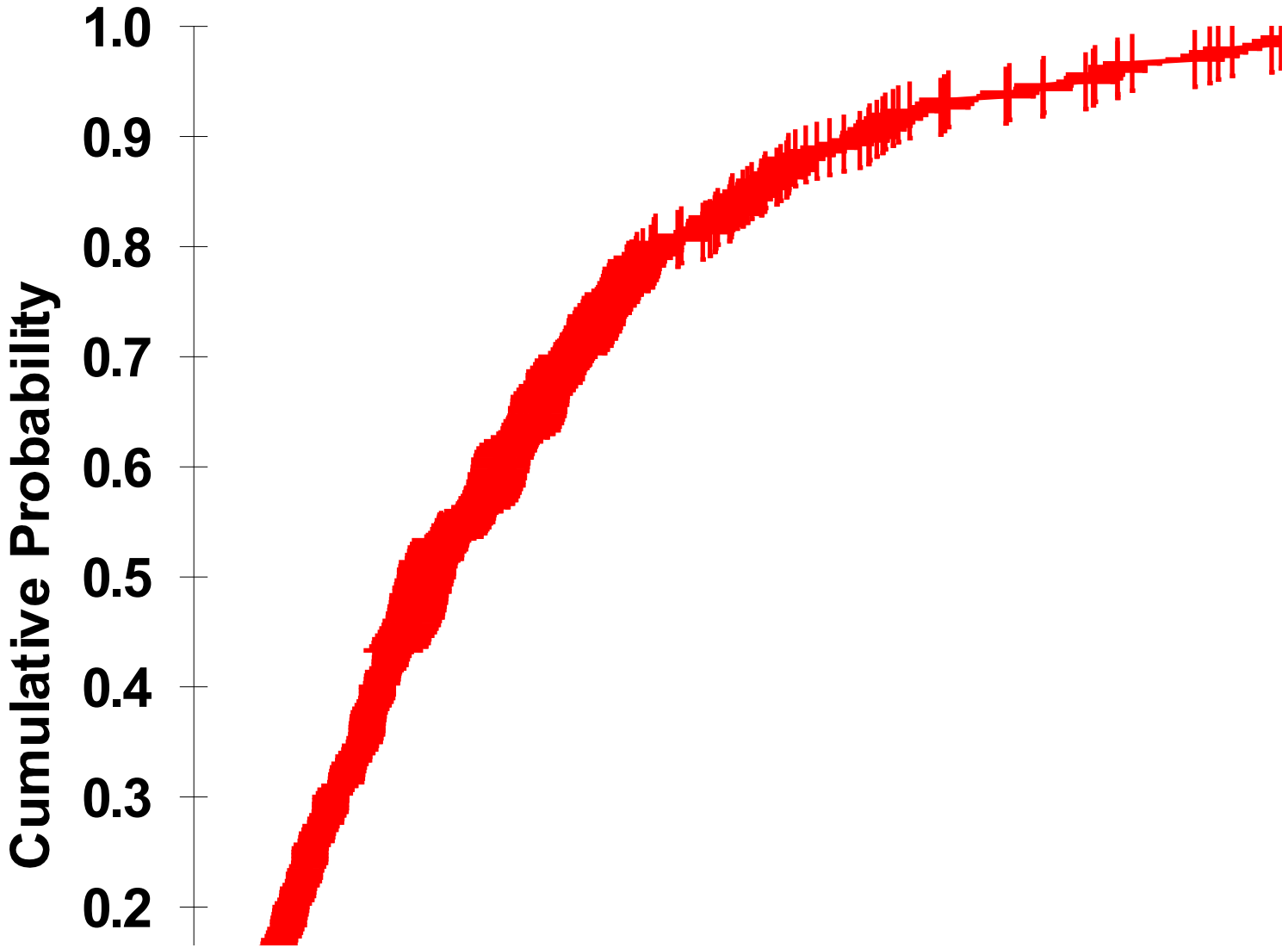


Figure B–30 Cumulative Probability Plot, Inhalation Pathway, Resident Farmer, Radium Source Term

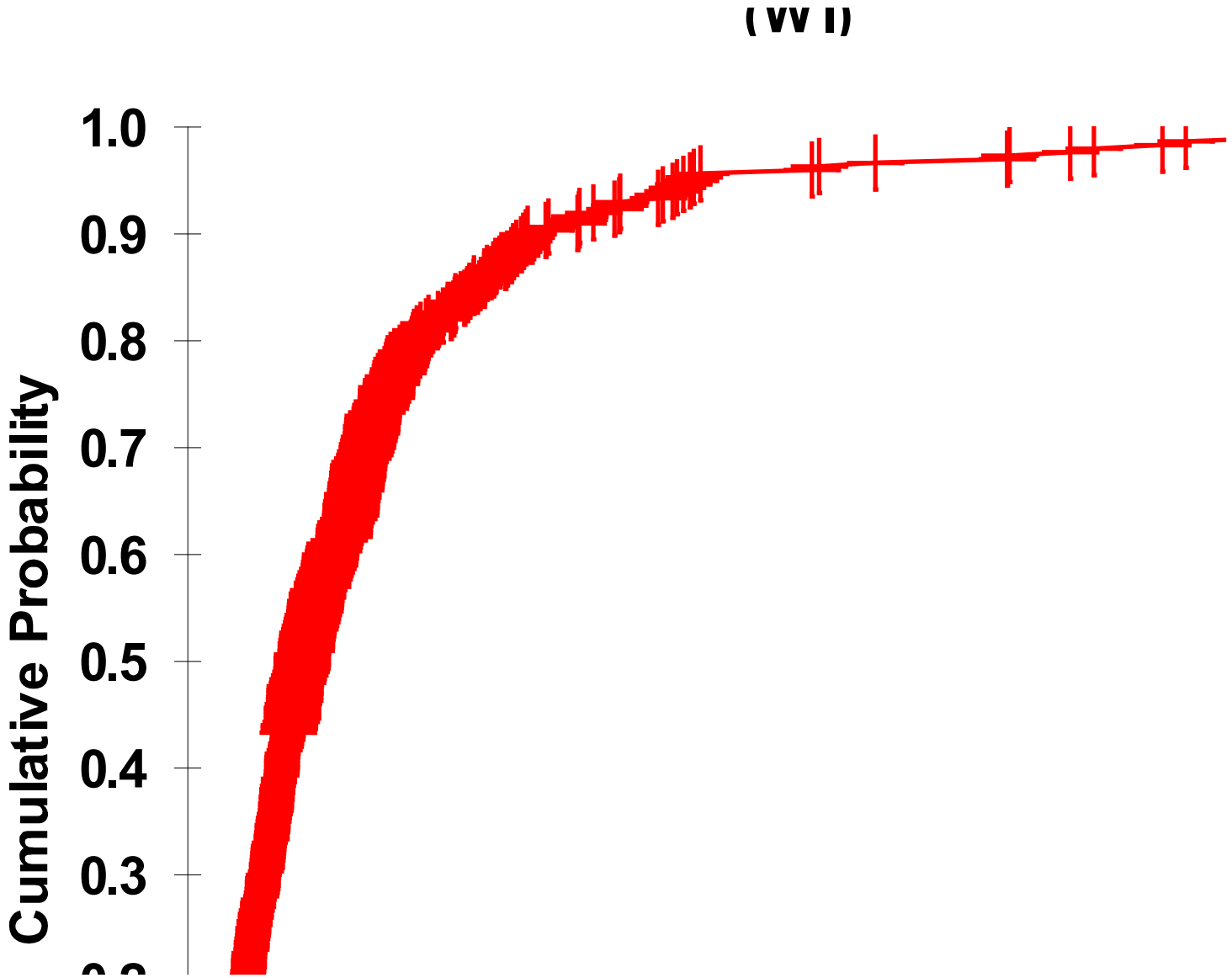


Figure B–31 Cumulative Probability Plot, Plant Ingestion Pathway, Resident Farmer, Radium Source Term

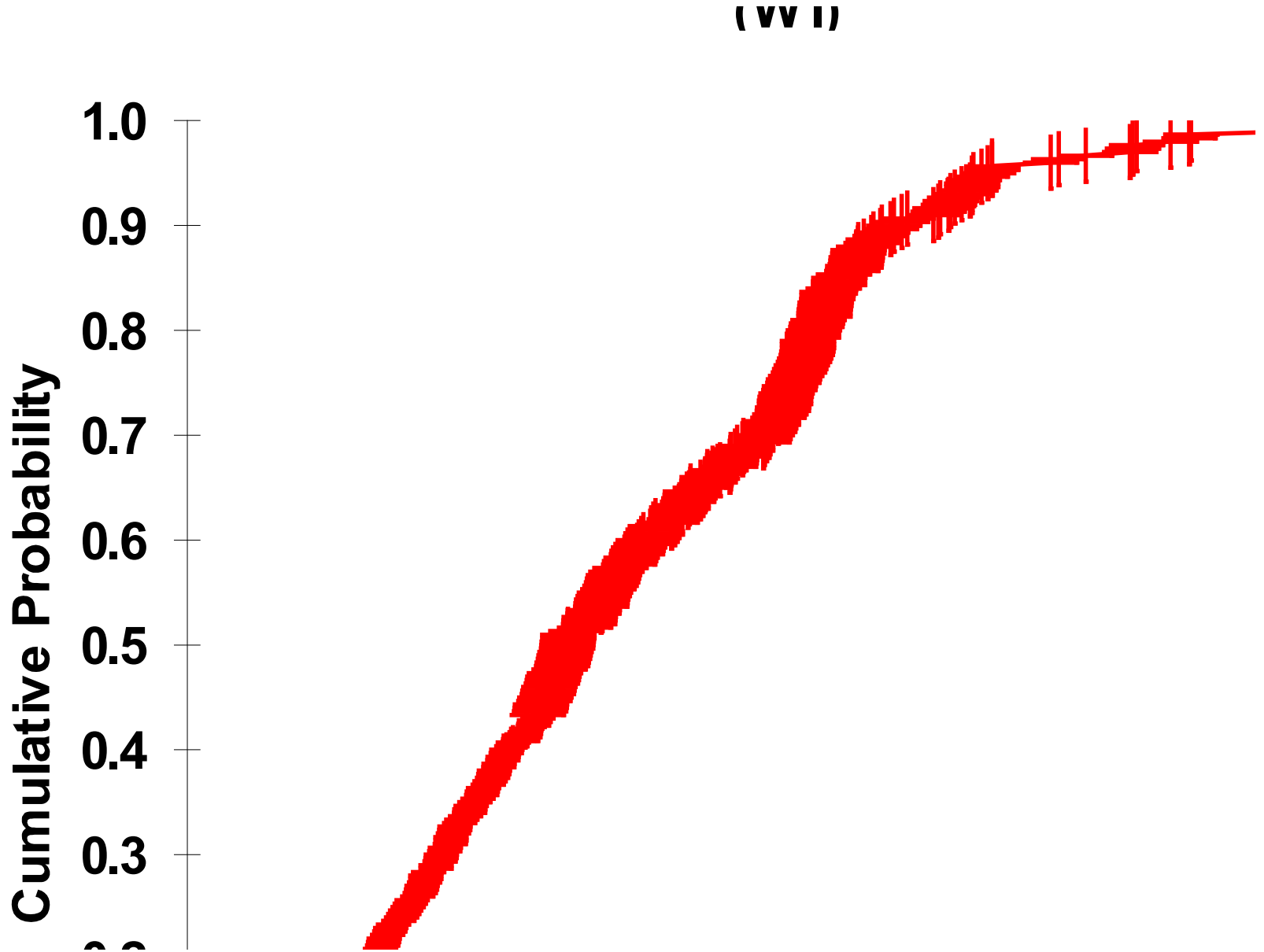


Figure B–32 Cumulative Probability Plot, Meat Ingestion Pathway, Resident Farmer, Radium Source Term

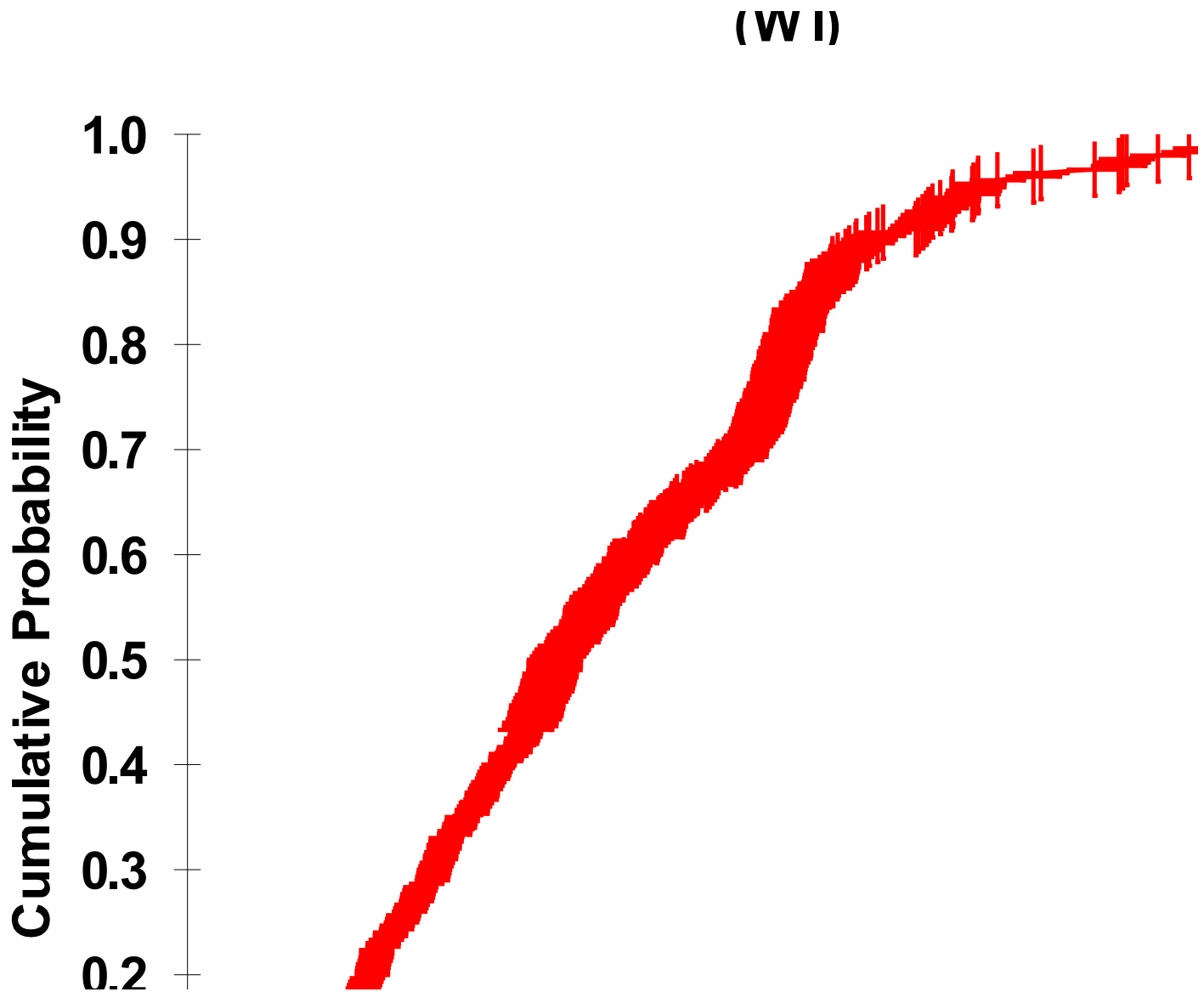


Figure B–33 Cumulative Probability Plot, Milk Ingestion Pathway, Resident Farmer, Radium Source Term

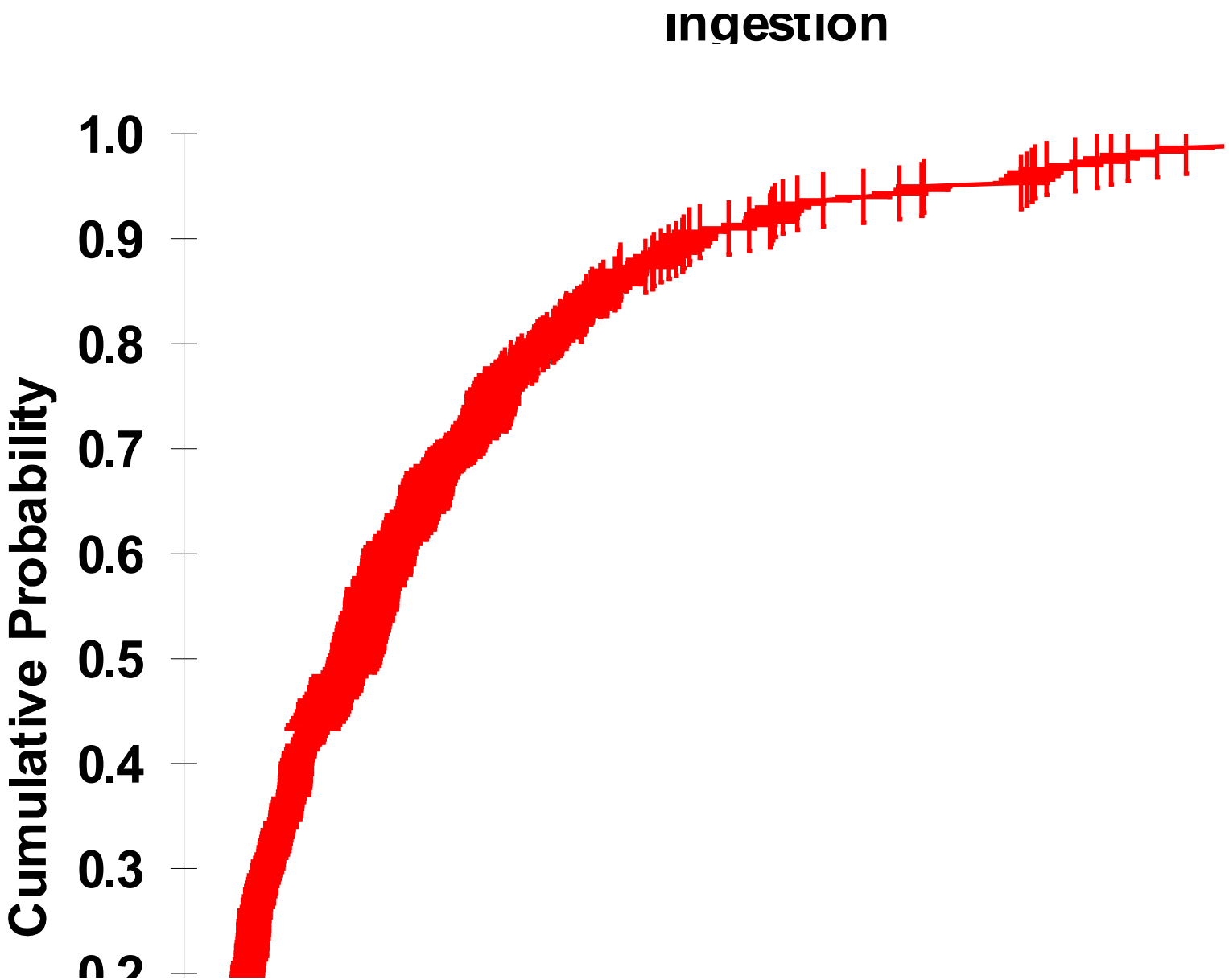


Figure B–34 Cumulative Probability Plot, Soil Ingestion Pathway, Resident Farmer, Radium Source Term

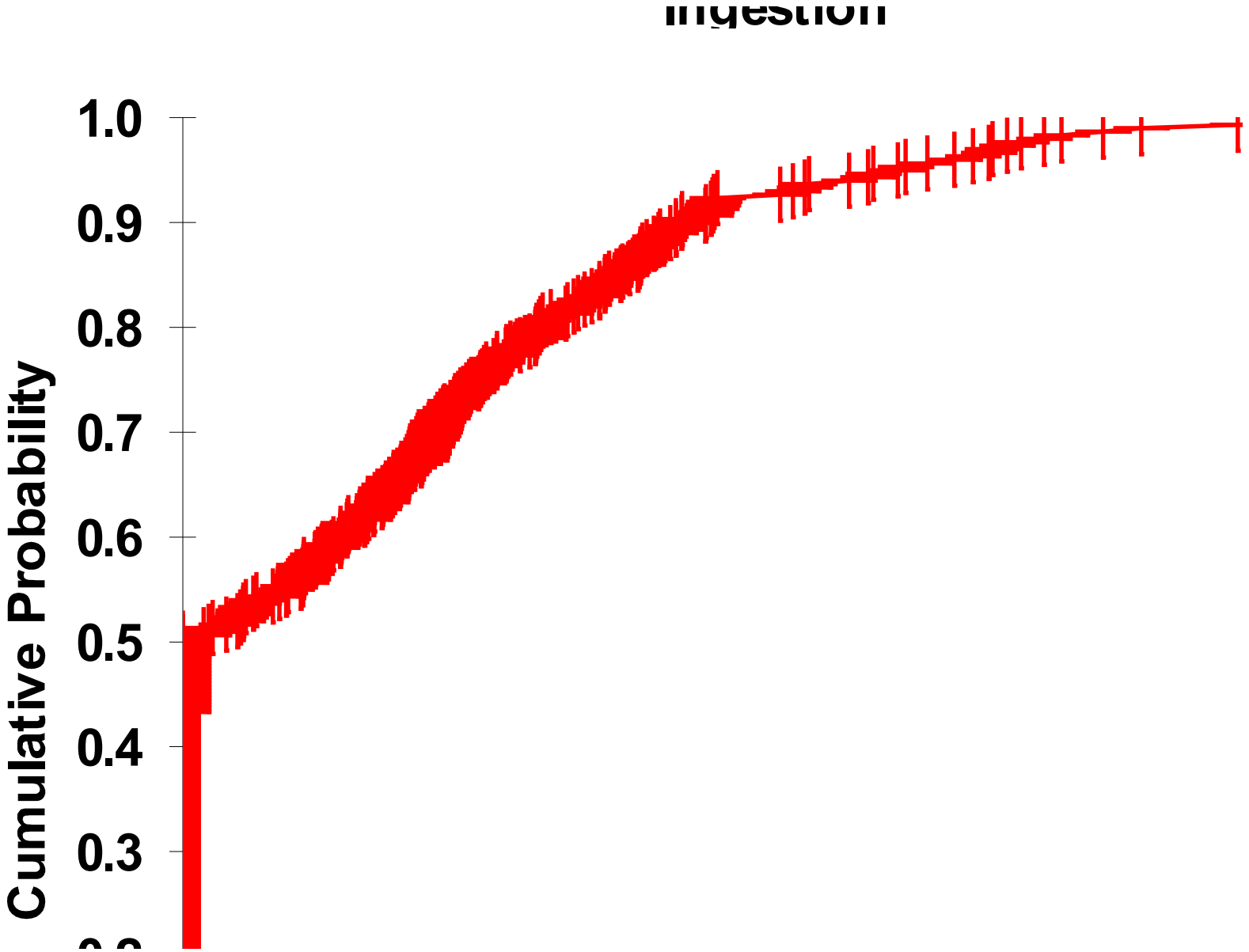


Figure B–35 Cumulative Probability Plot, Drinking Water Pathway, Resident Farmer, Radium Source Term

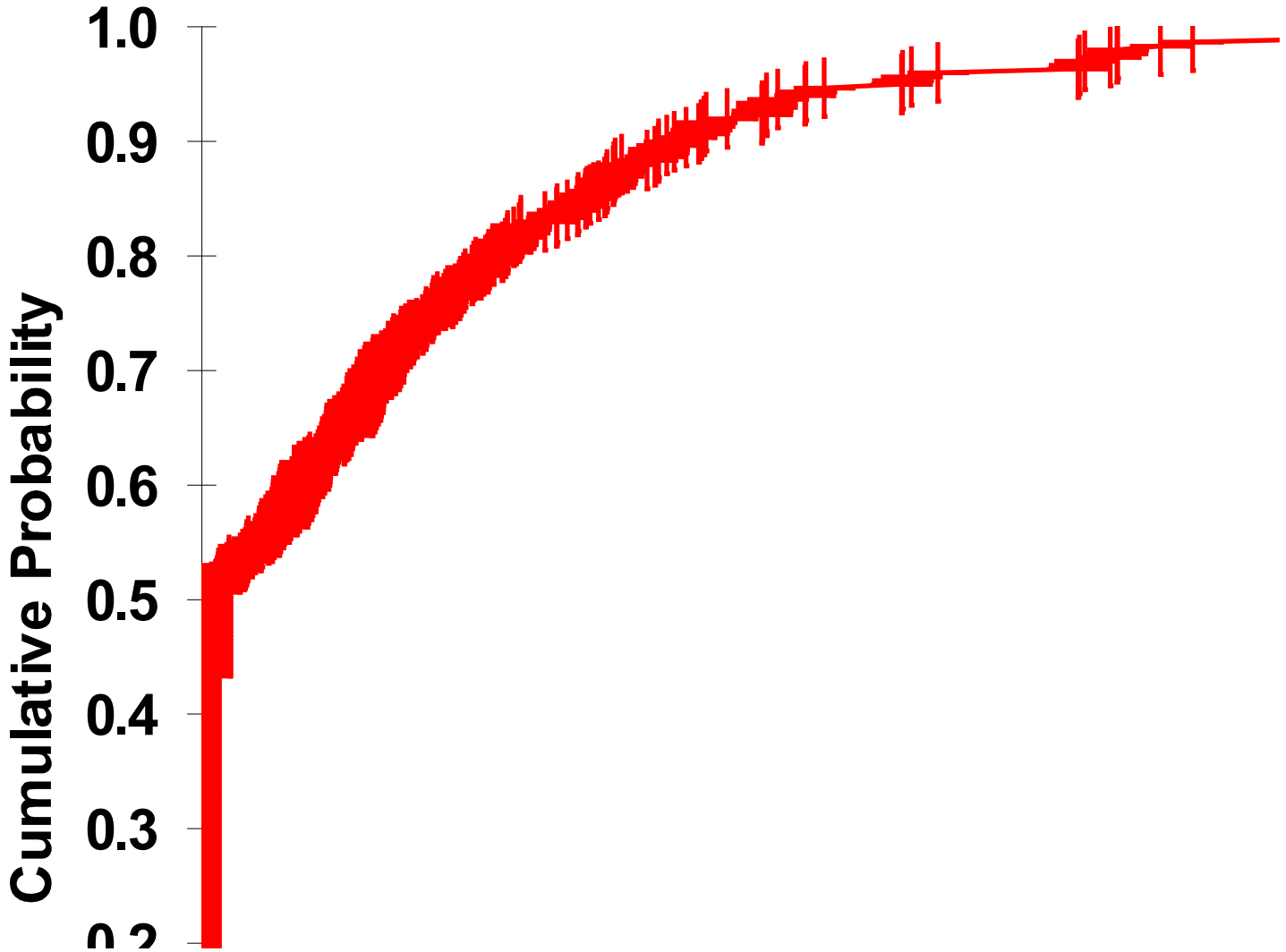


Figure B–36 Cumulative Probability Plot, Aquatic Foods Ingestion Pathway, Resident Farmer, Radium Source Term

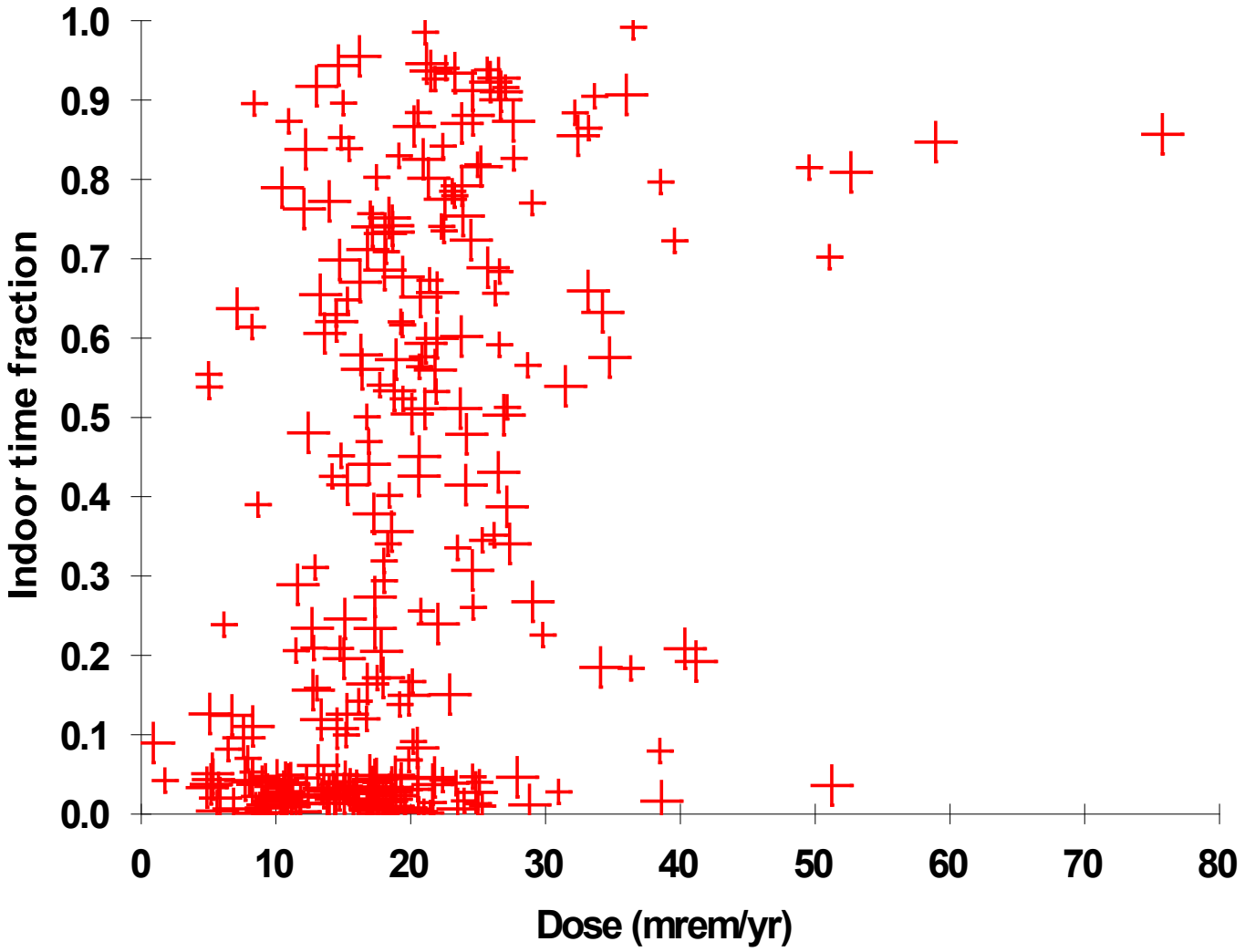


Figure B–37 Scatter Plot, Dose from All Pathways vs. Indoor Time Fraction, Resident Farmer, Radium Source Term

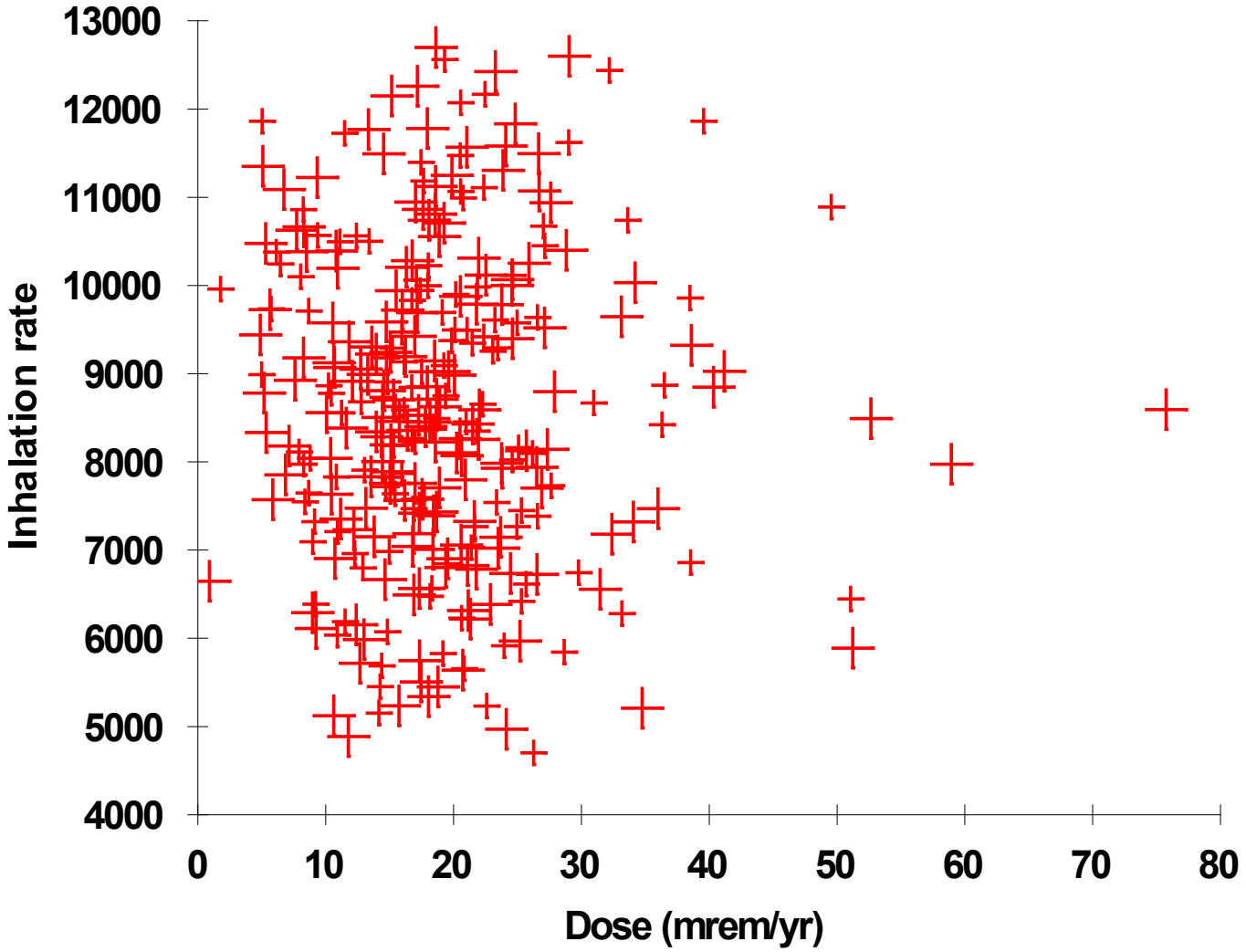


Figure B–38 Scatter Plot, Dose from All Pathways vs. Inhalation Rate, Resident Farmer, Radium Source Term

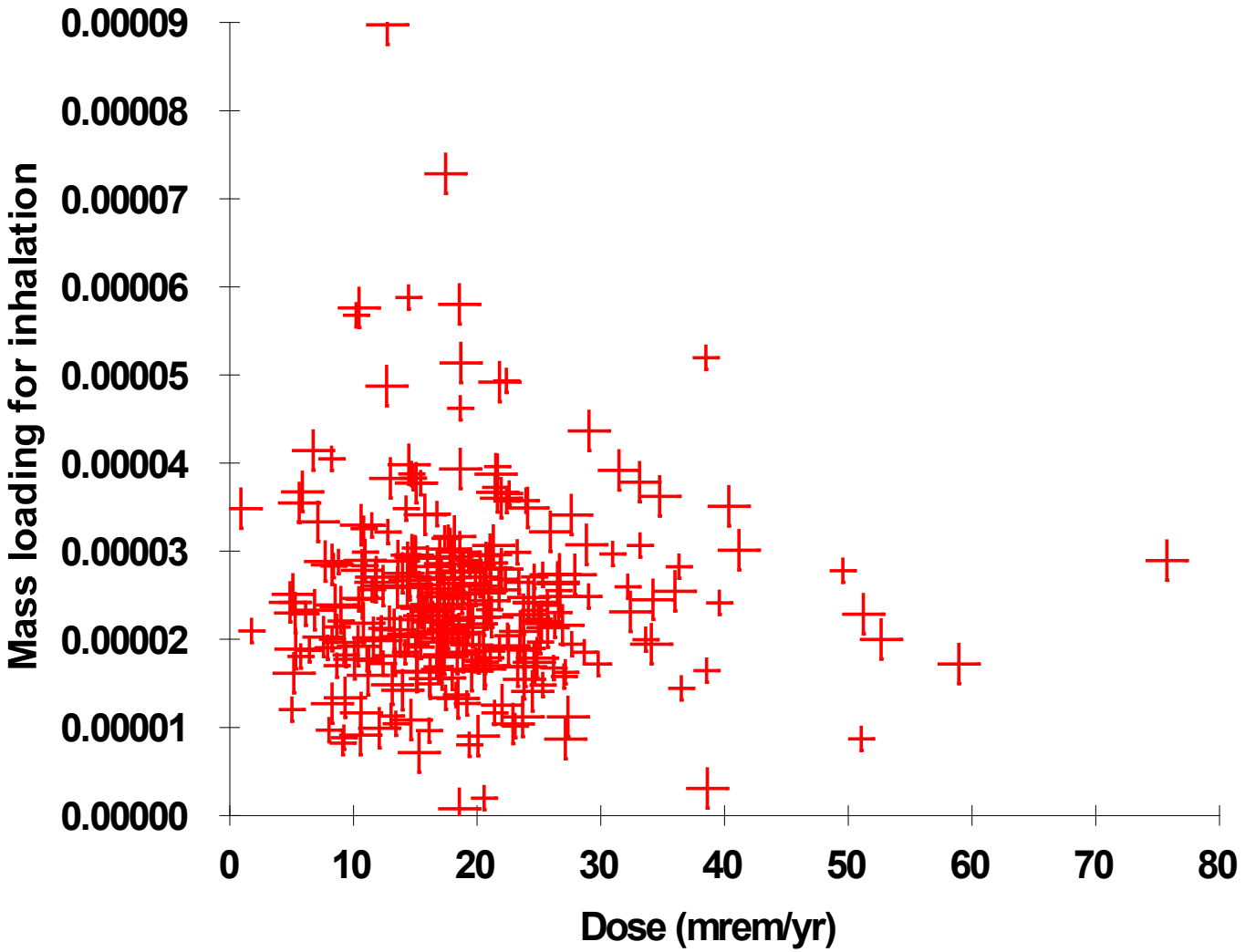


Figure B–39 Scatter Plot, Dose from All Pathways vs. Mass Loading for Inhalation, Resident Farmer, Radium Source Term

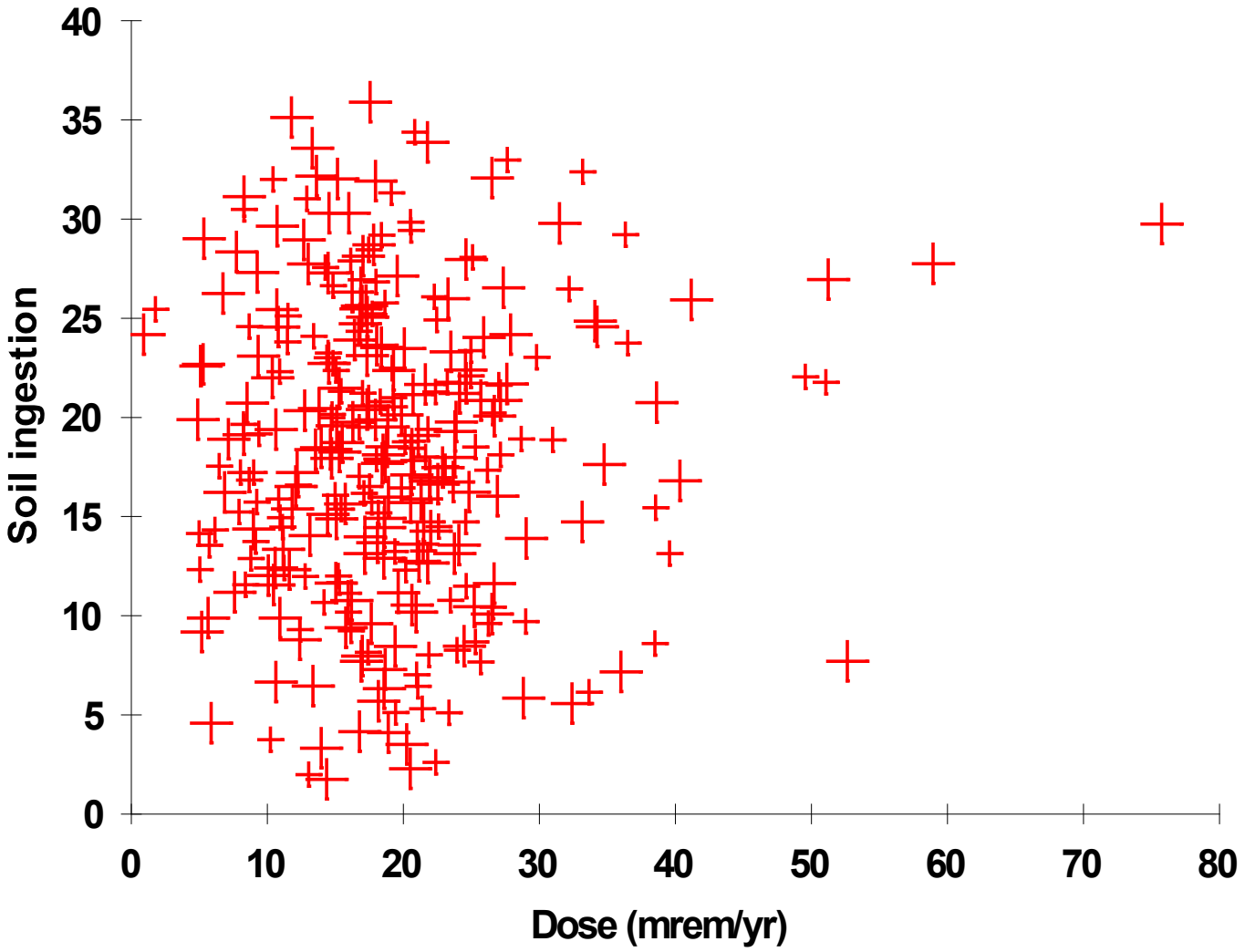


Figure B–40 Scatter Plot, Dose from All Pathways vs. Soil Ingestion Rate, Resident Farmer, Radium Source Term

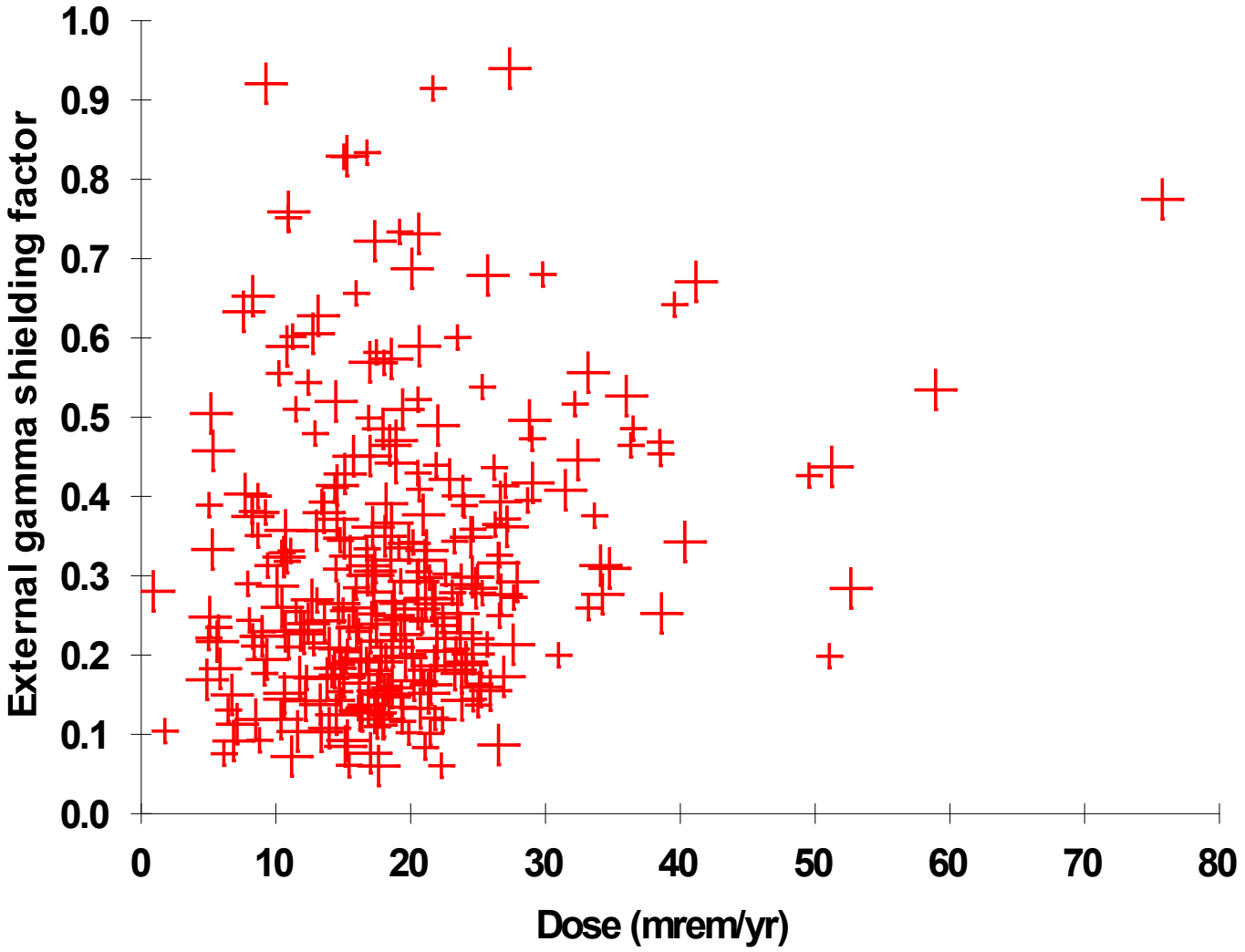


Figure B–41 Scatter Plot, Dose from All Pathways vs. External Gamma Shielding Factor, Resident Farmer, Radium Source Term

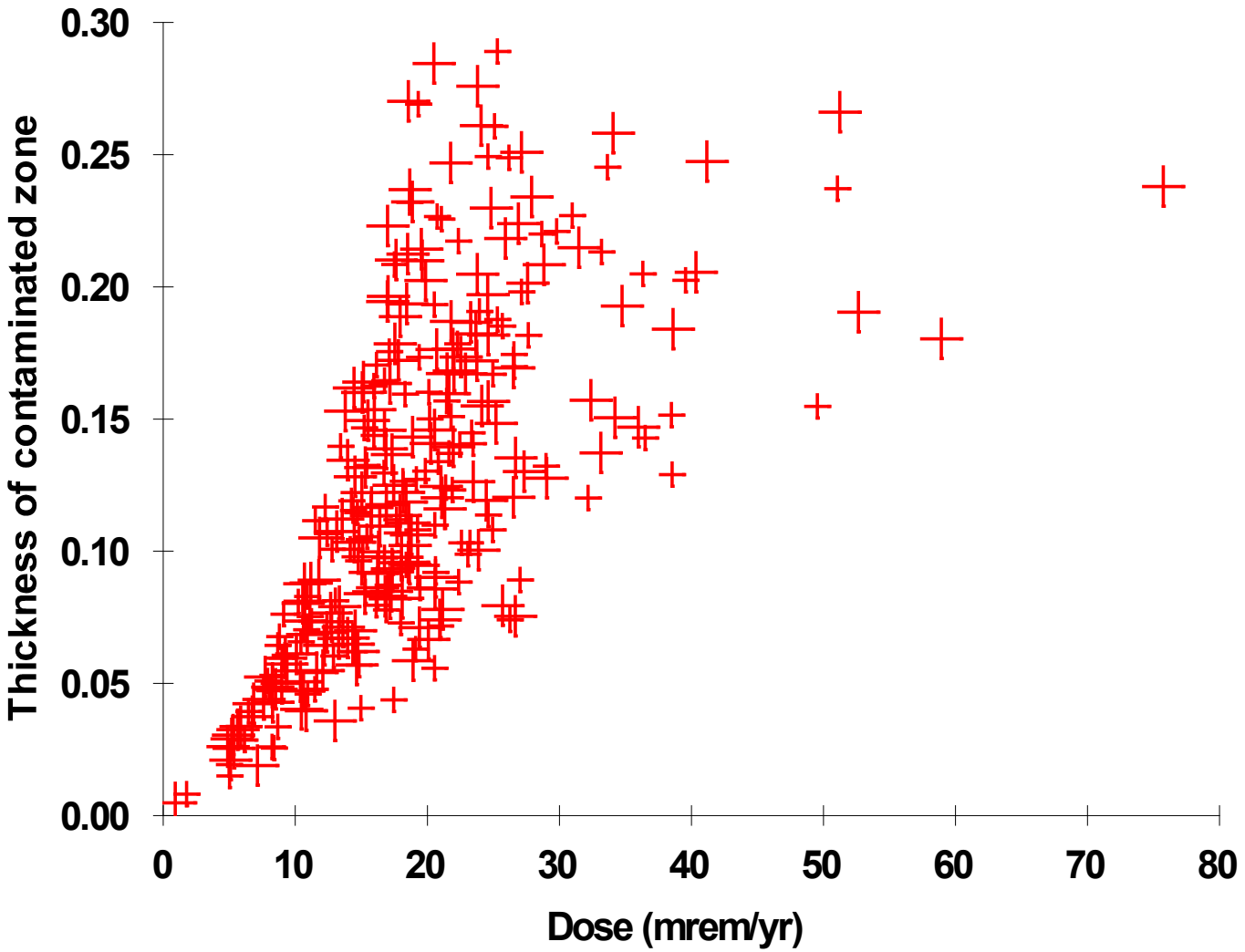


Figure B–42 Scatter Plot, Dose from All Pathways vs. Thickness of Contaminated Zone, Resident Farmer, Radium Source Term

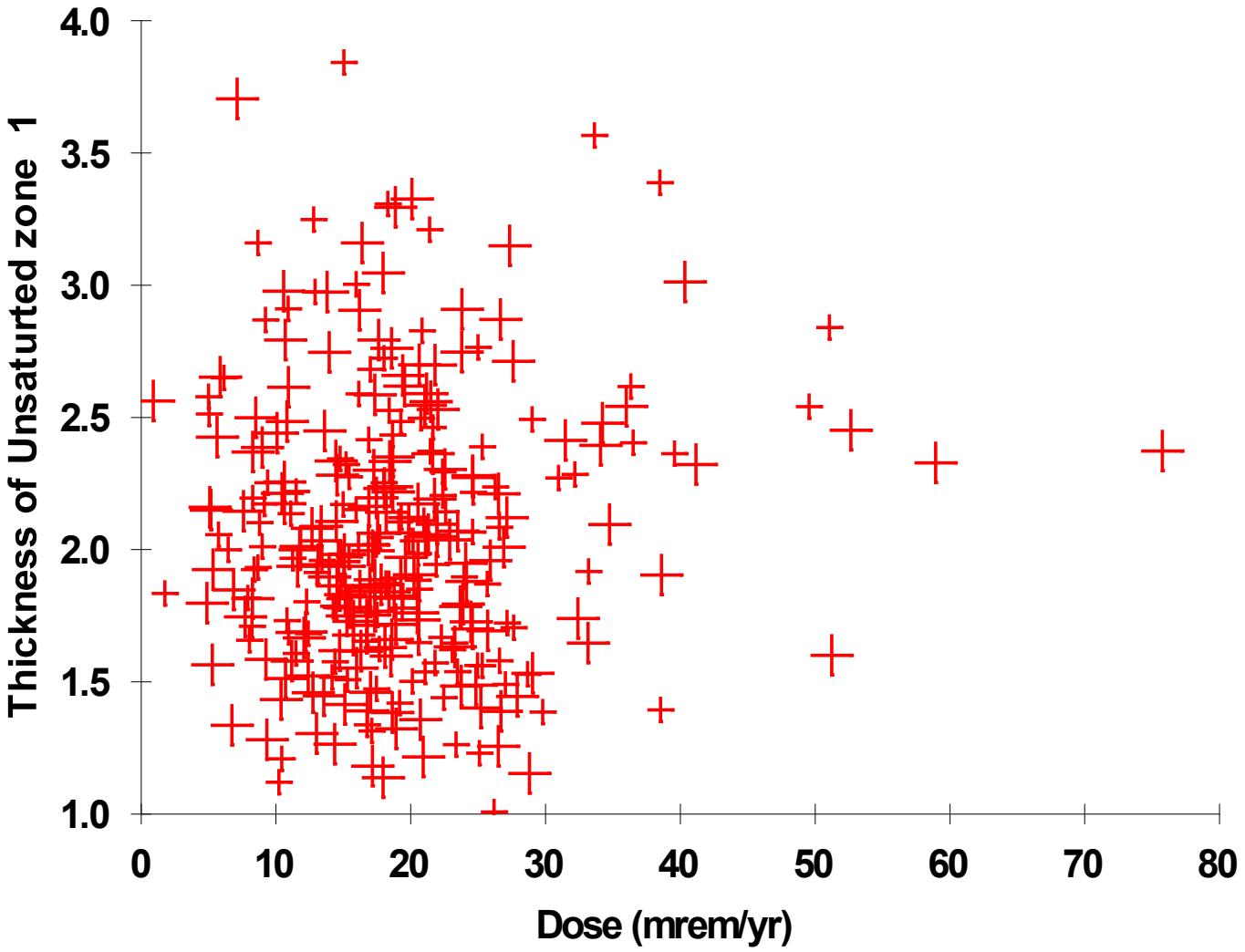


Figure B–43 Scatter Plot, Dose from All Pathways vs. Thickness of Unsaturated Zone #1, Resident Farmer, Radium Source Term

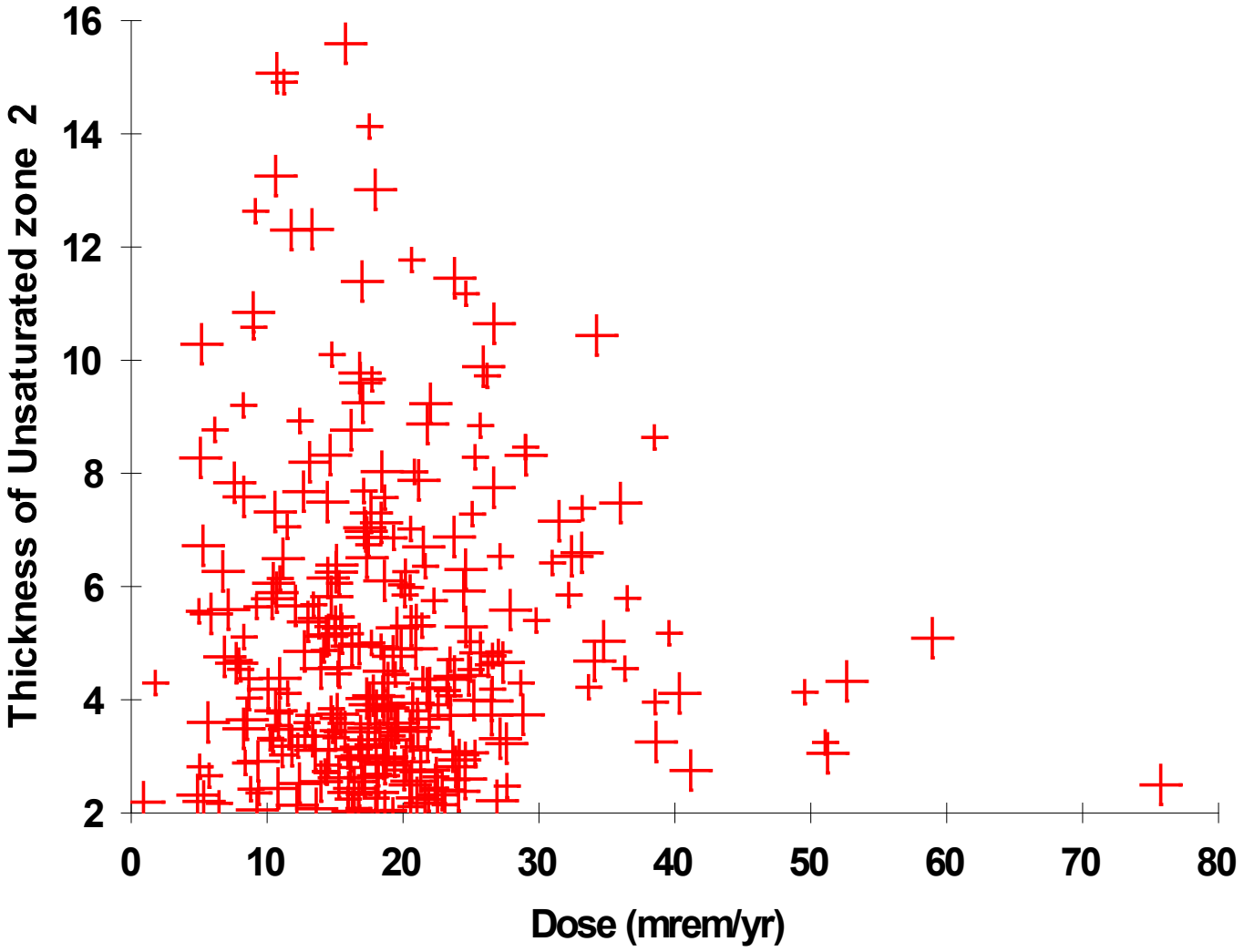


Figure B–44 Scatter Plot, Dose from All Pathways vs. Thickness of Unsaturated Zone #2, Resident Farmer, Radium Source Term

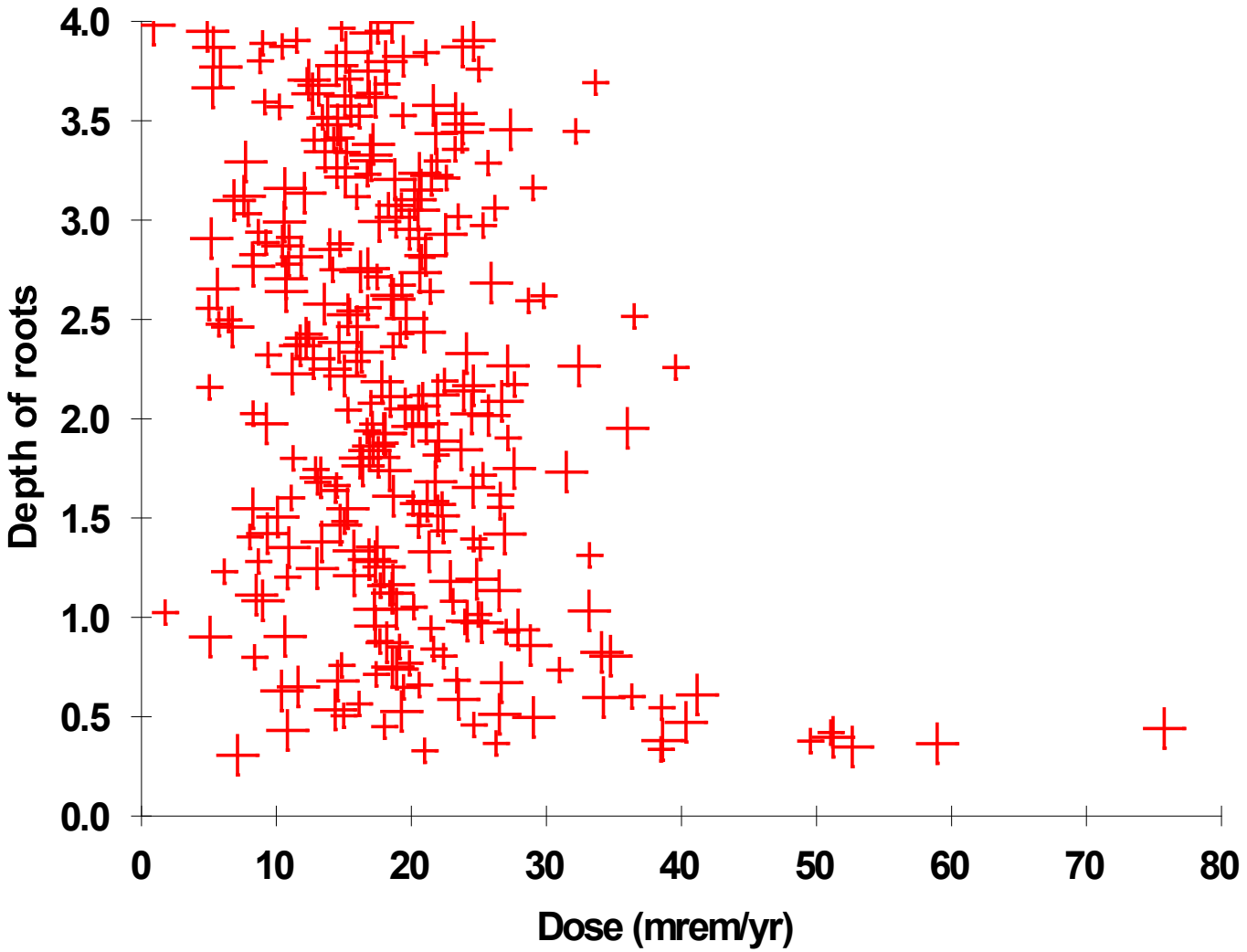


Figure B–45 Scatter Plot, Dose from All Pathways vs. Depth of Roots, Resident Farmer, Radium Source Term

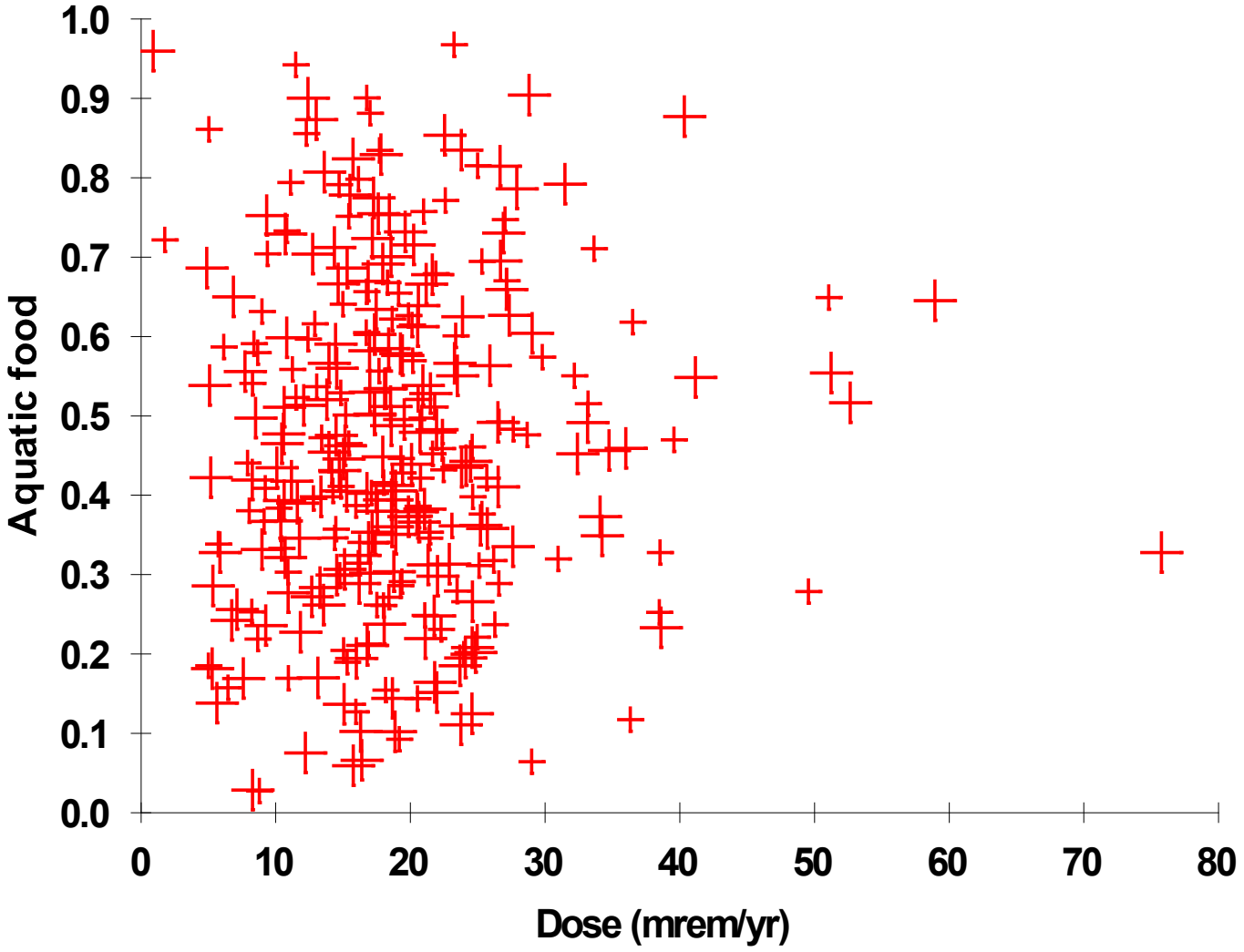


Figure B–46 Scatter Plot, Dose from All Pathways vs. Contaminated Fraction of Aquatic Food, Resident Farmer, Radium Source Term

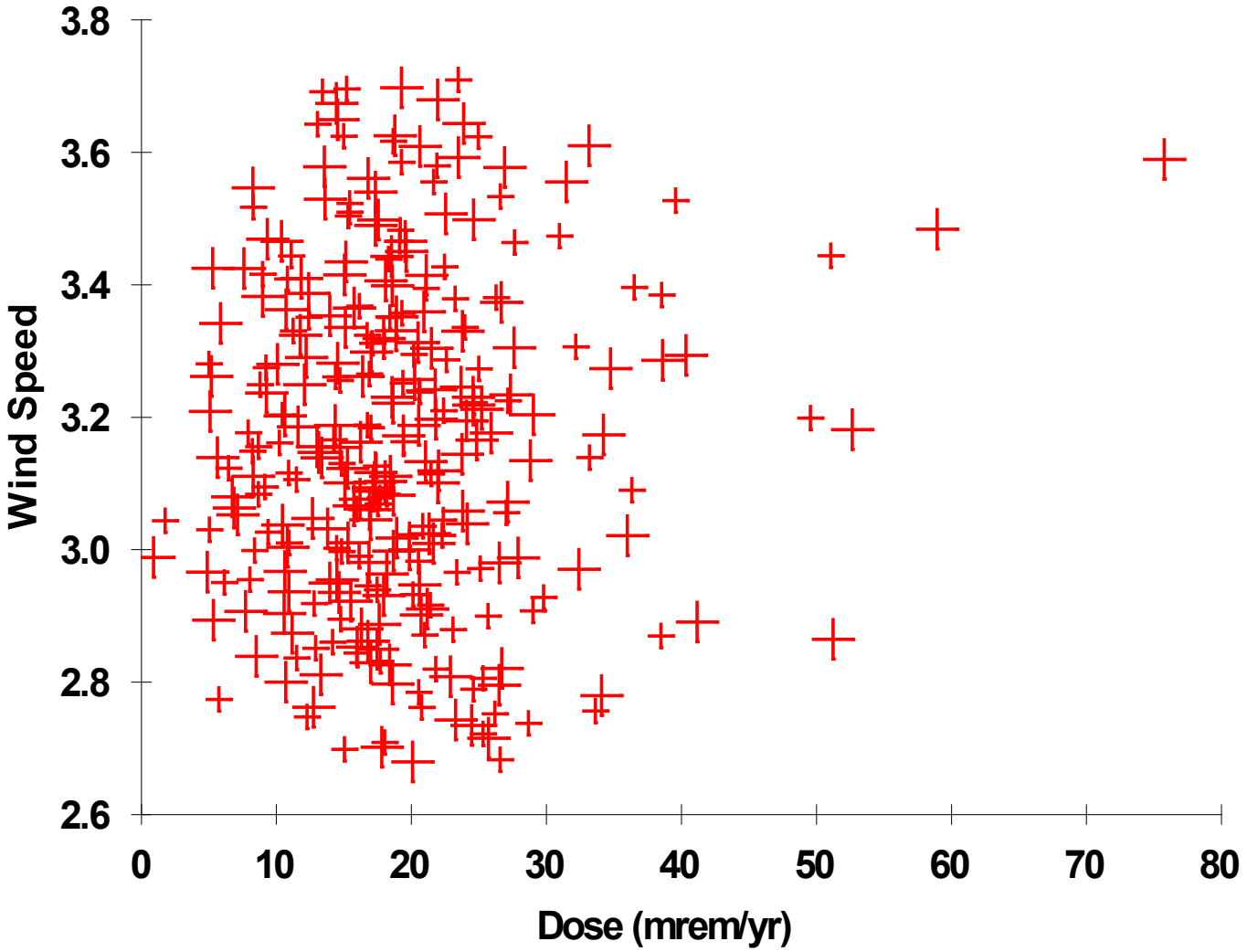


Figure B–47 Scatter Plot, Dose from All Pathways vs. Average Annual Wind Speed, Resident Farmer, Radium Source Term

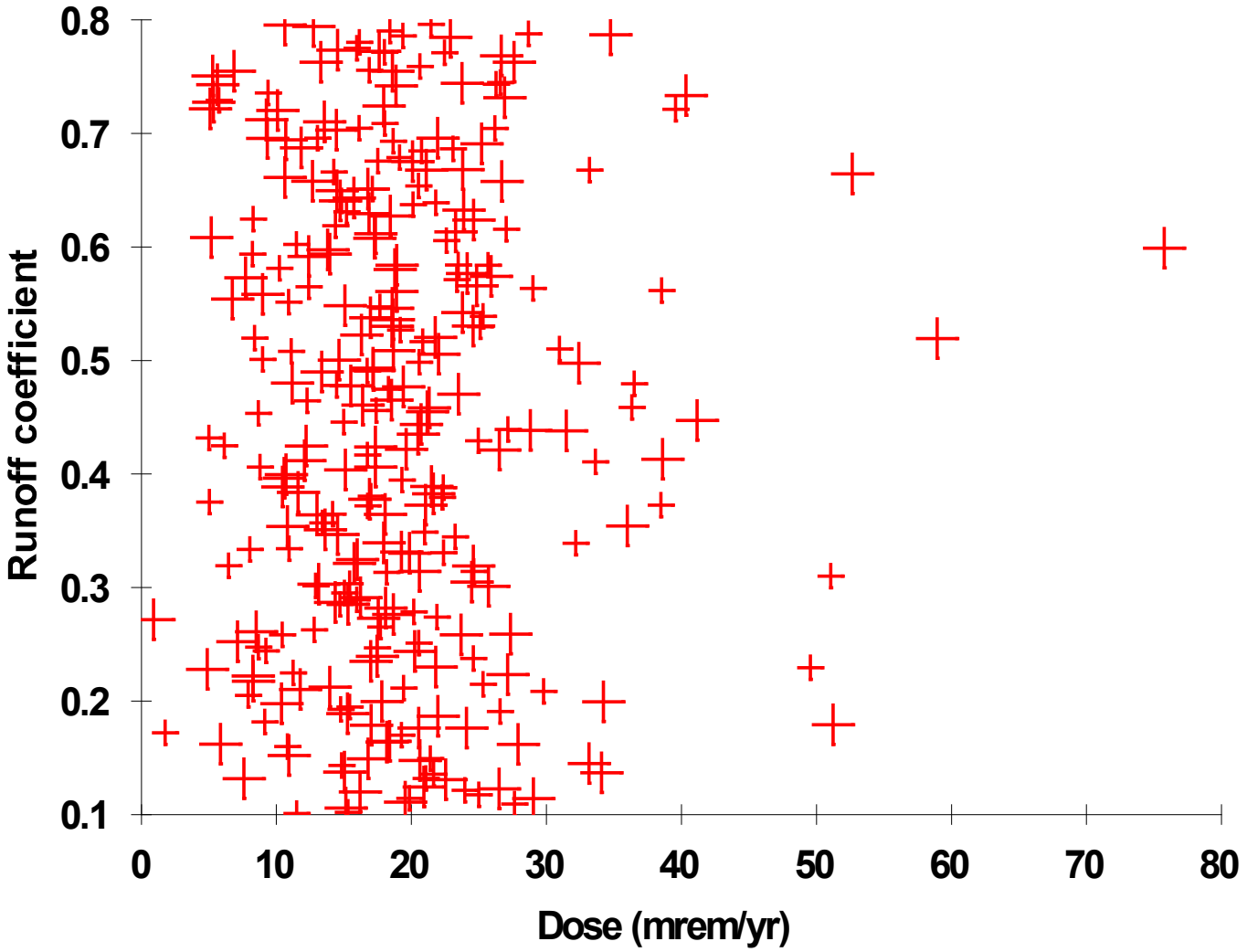
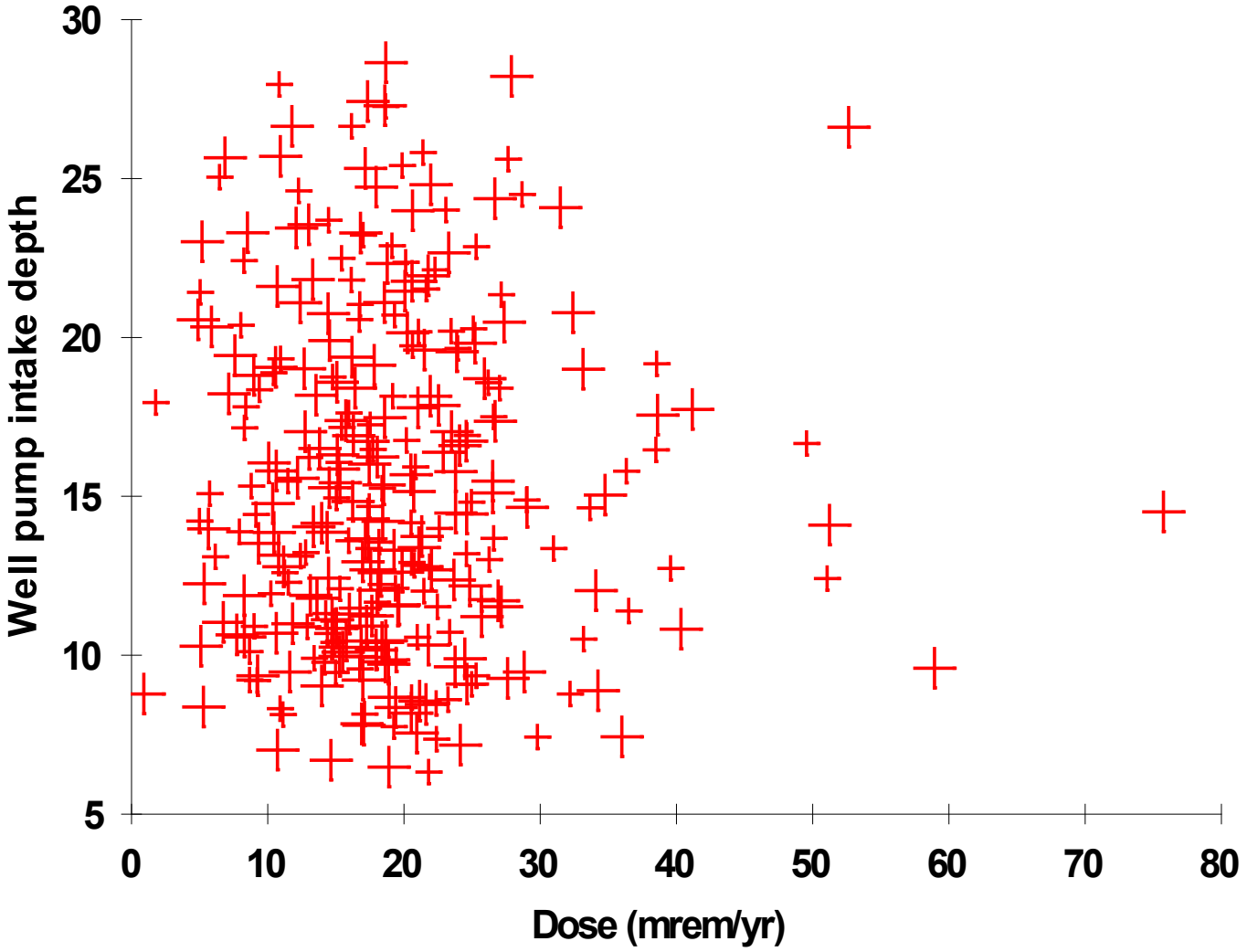


Figure B–48 Scatter Plot, Dose from All Pathways vs. Runoff Coefficient, Resident Farmer, Radium Source Term



B–49 Scatter Plot, Dose from All Pathways vs. Well Pump Intake Depth, Resident Farmer, Radium Source Term

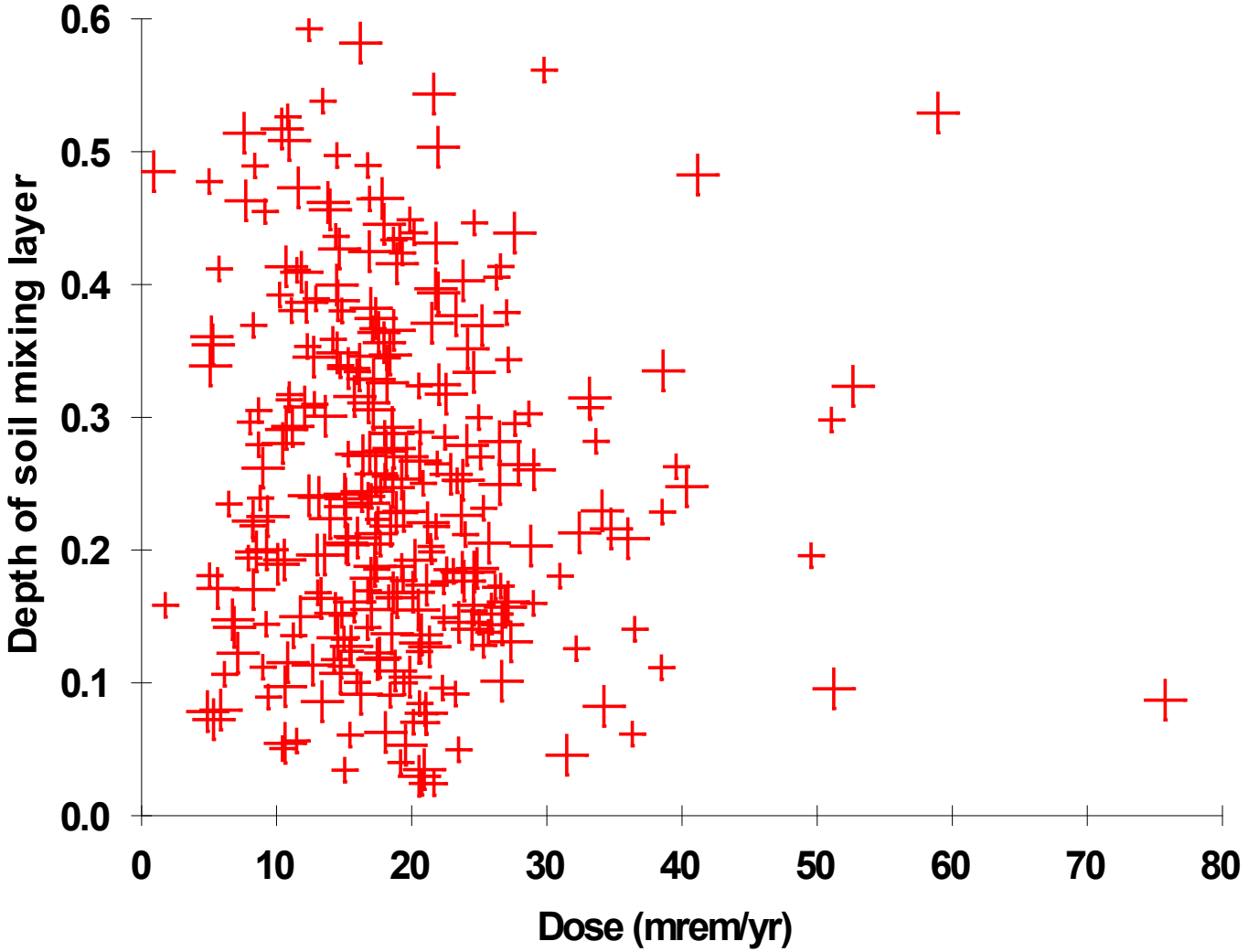


Figure B–50 Scatter Plot, Dose from All Pathways vs. Depth of Soil Mixing Layer, Resident Farmer, Radium Source Term