

Contract No:

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APPENDIX E: SUPPLEMENTAL TRANSPORT MODEL RESULTS FOR THE LOW-ACTIVITY WASTE AND INTERMEDIATE-LEVEL VAULTS

E.1 LOW-ACTIVITY WASTE VAULT

Supplemental transport model results for the LAWV from Chapter 5, Section 5.2.2 are provided in Section E.1.1 to compare concentrations at the 100-meter POA for the nominal PA case, best estimate case, and various sensitivity cases (Figure E-1 through Figure E-12). Second, Figure E-13 through Figure E-30 in Section E.1.2 display concentrations at the 100-meter POA for decay-chain daughter and parent radionuclides. Third, Figure E-31 through Figure E-34 in Section E.1.3 show maximum concentration contours for I-129. Only contour plots for I-129 from the remaining sensitivity runs are shown because I-129 is identified as the only radionuclide that impacts disposal limits for the LAWV. All concentration units, whether noted or not in the y-axis labels, are pCi L⁻¹ per Ci parent buried.

E.1.1 Case Comparisons of Parent Radionuclide Concentrations

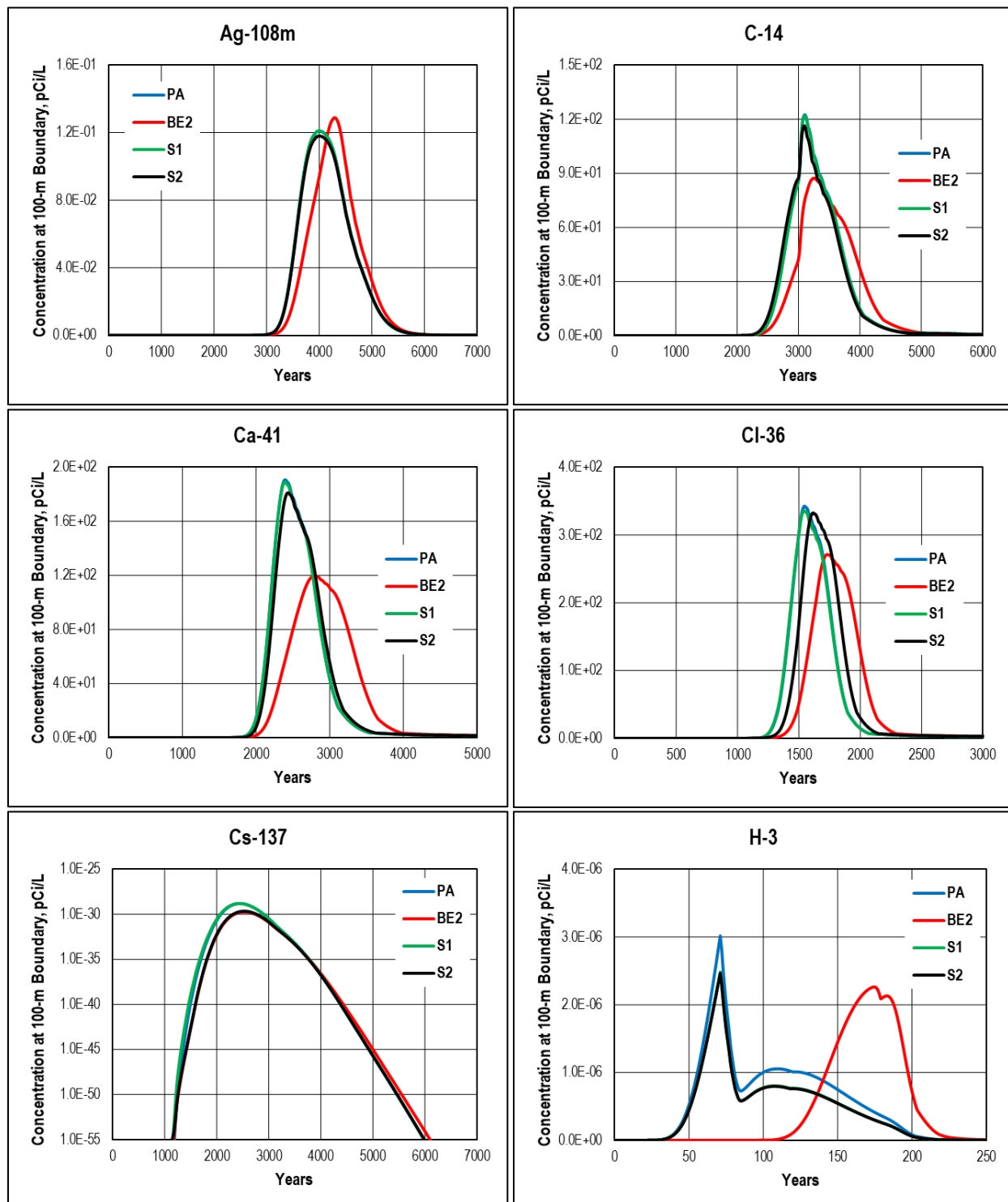


Figure E-1. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides Ag-108m through H-3

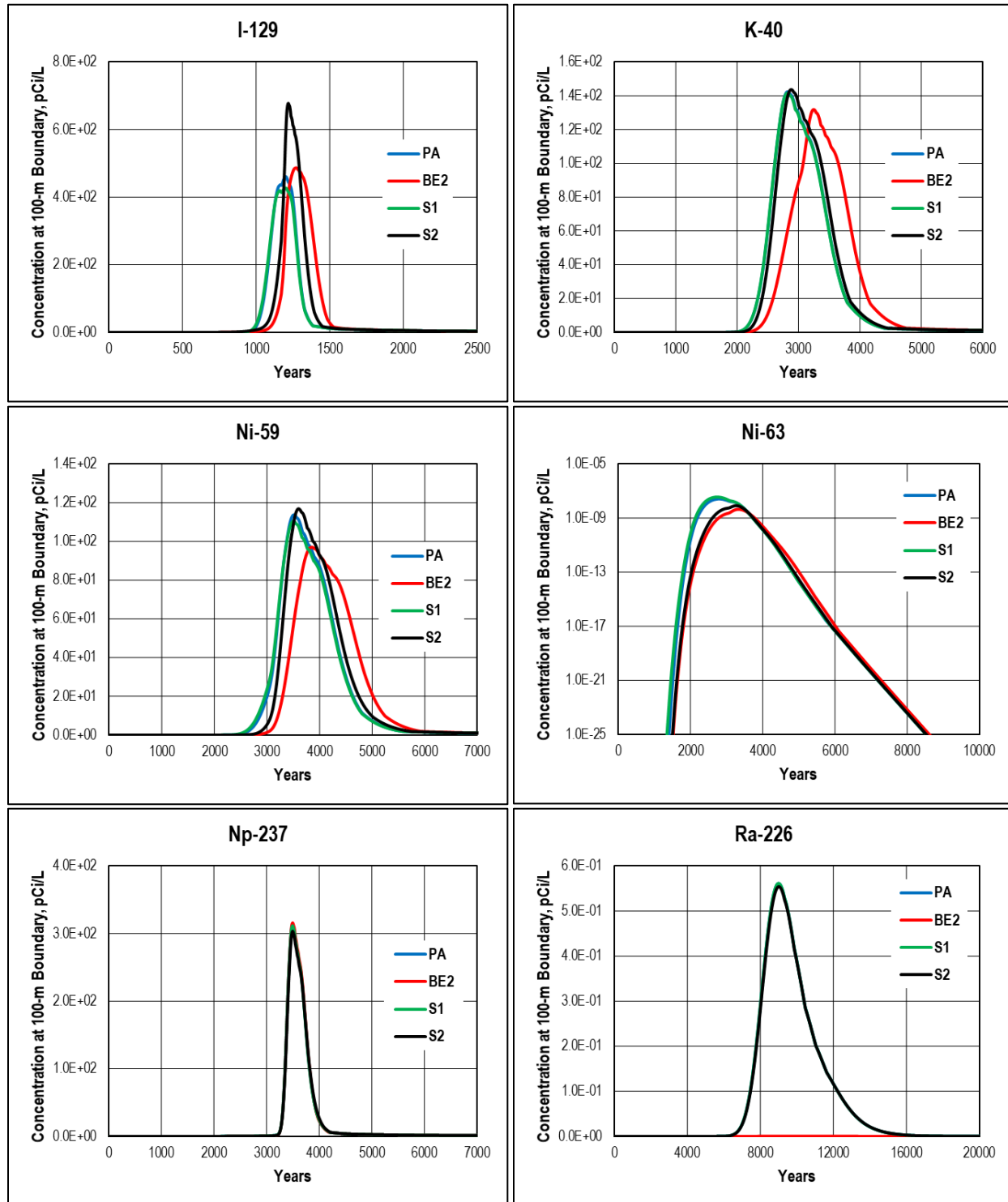


Figure E-2. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides I-129 through Ra-226

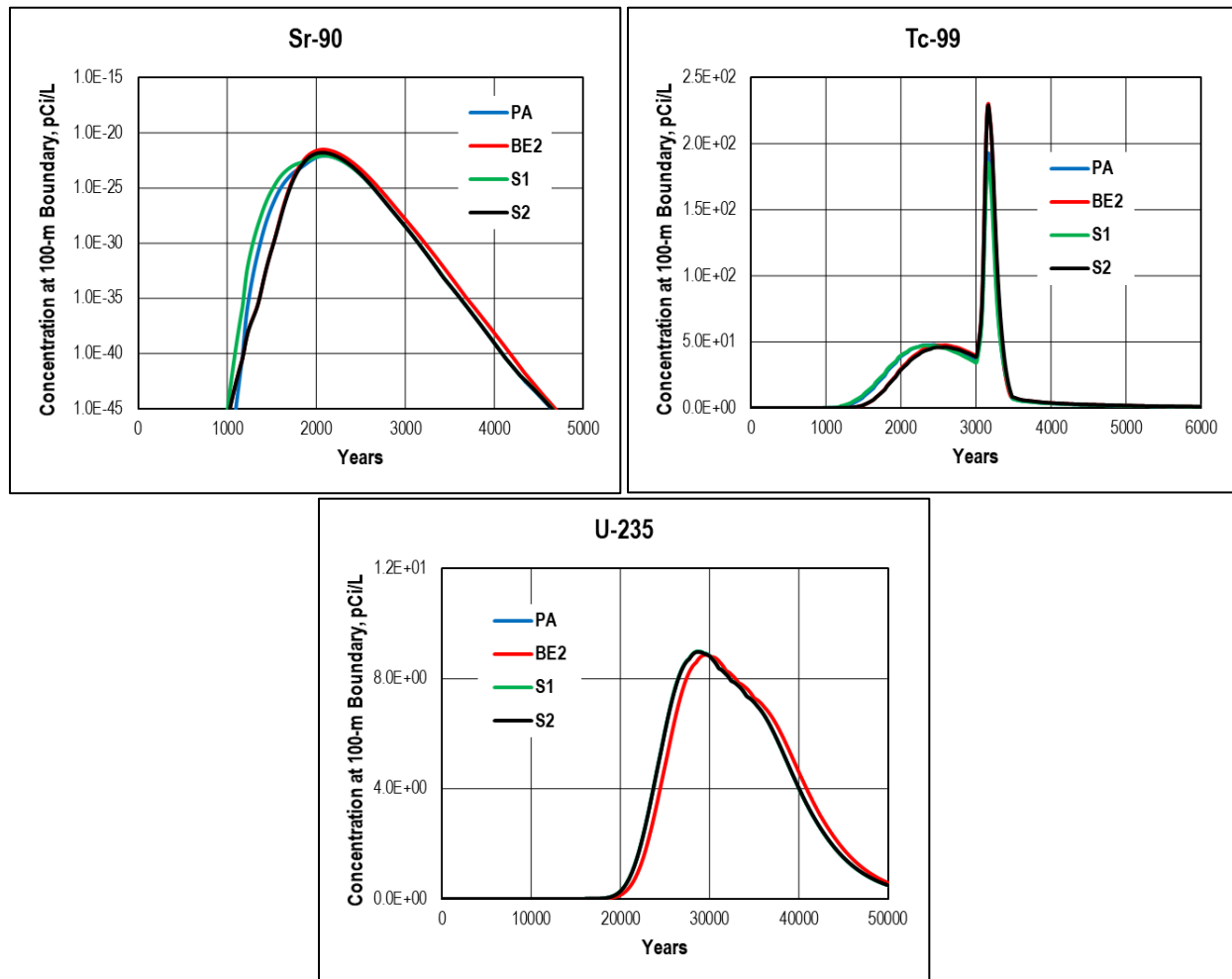


Figure E-3. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations ($\text{pCi L}^{-1} \text{Ci}^{-1}$ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides Sr-90 through U-235

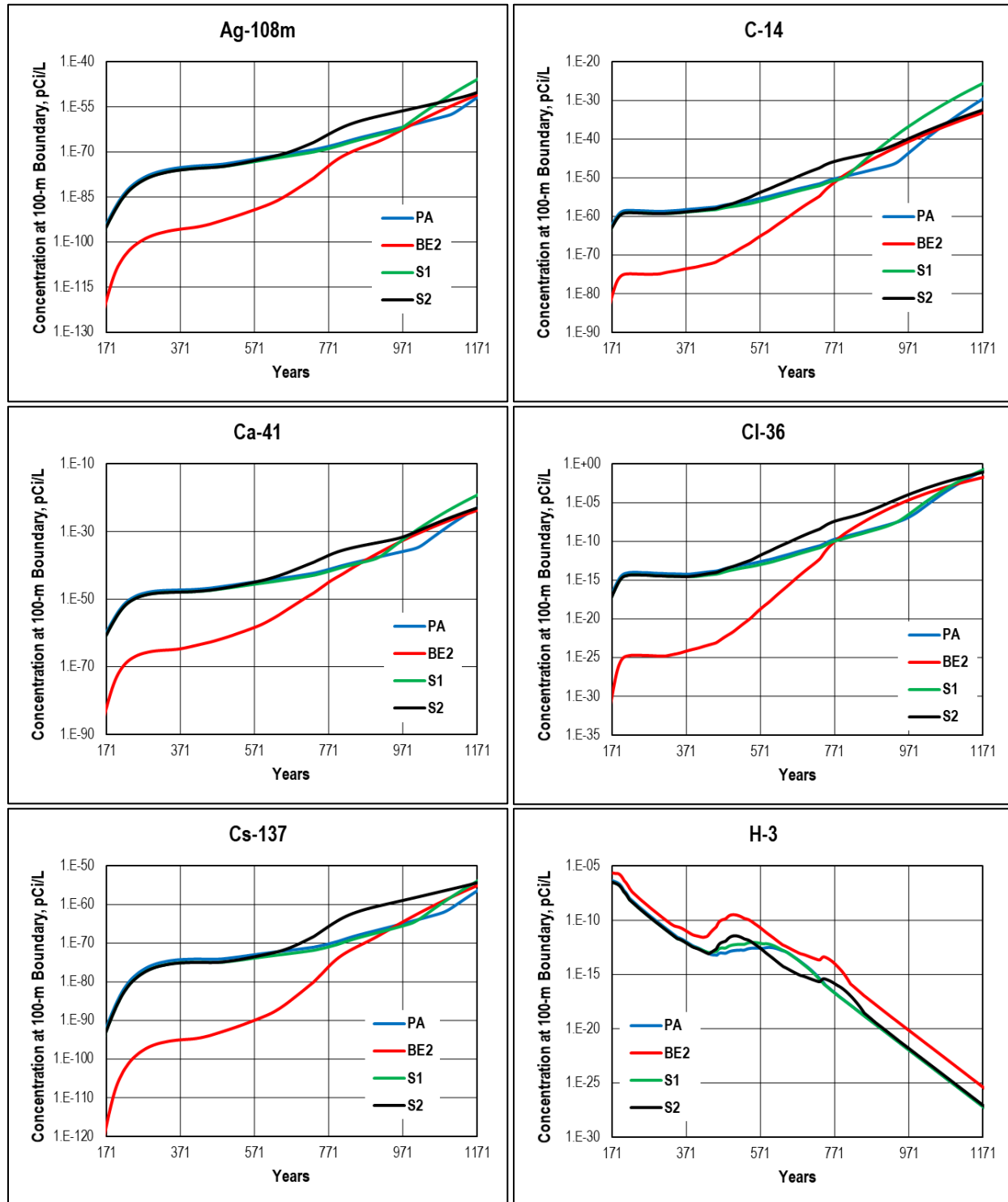


Figure E-4. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides Ag-108m through H-3 During the Compliance Period

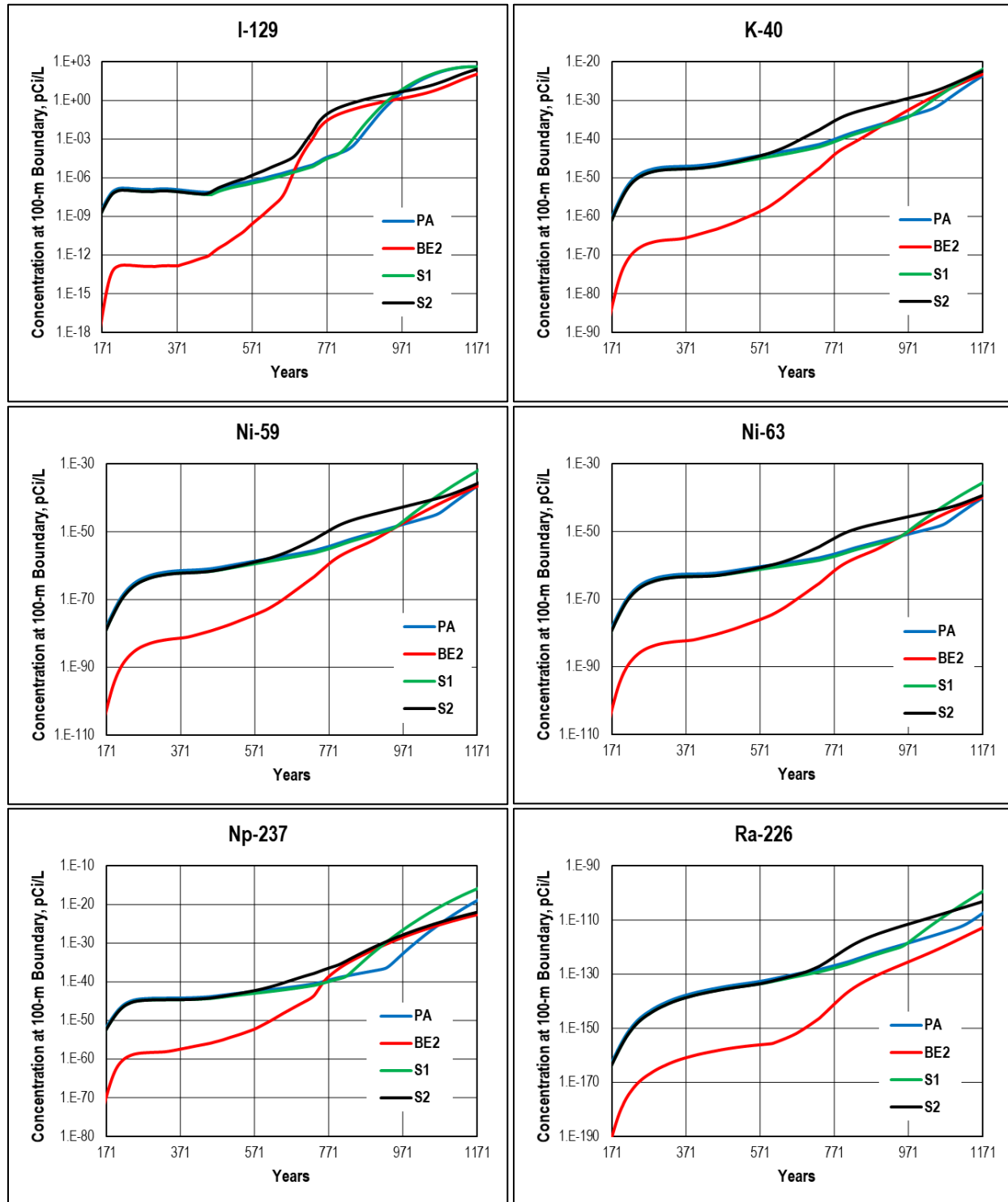


Figure E-5. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides I-129 through Ra-226 During the Compliance Period

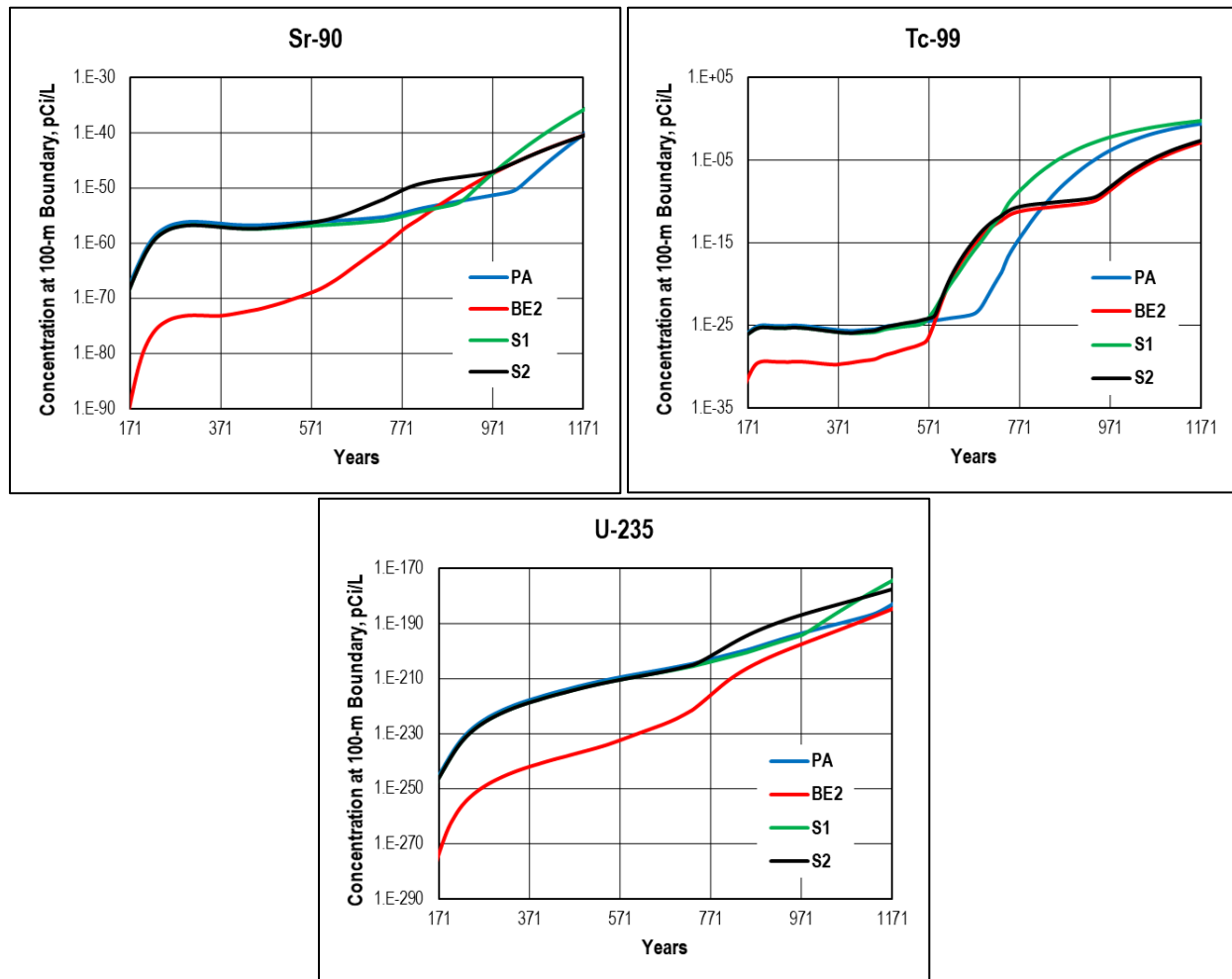


Figure E-6. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides Sr-90 through U-235 During the Compliance Period

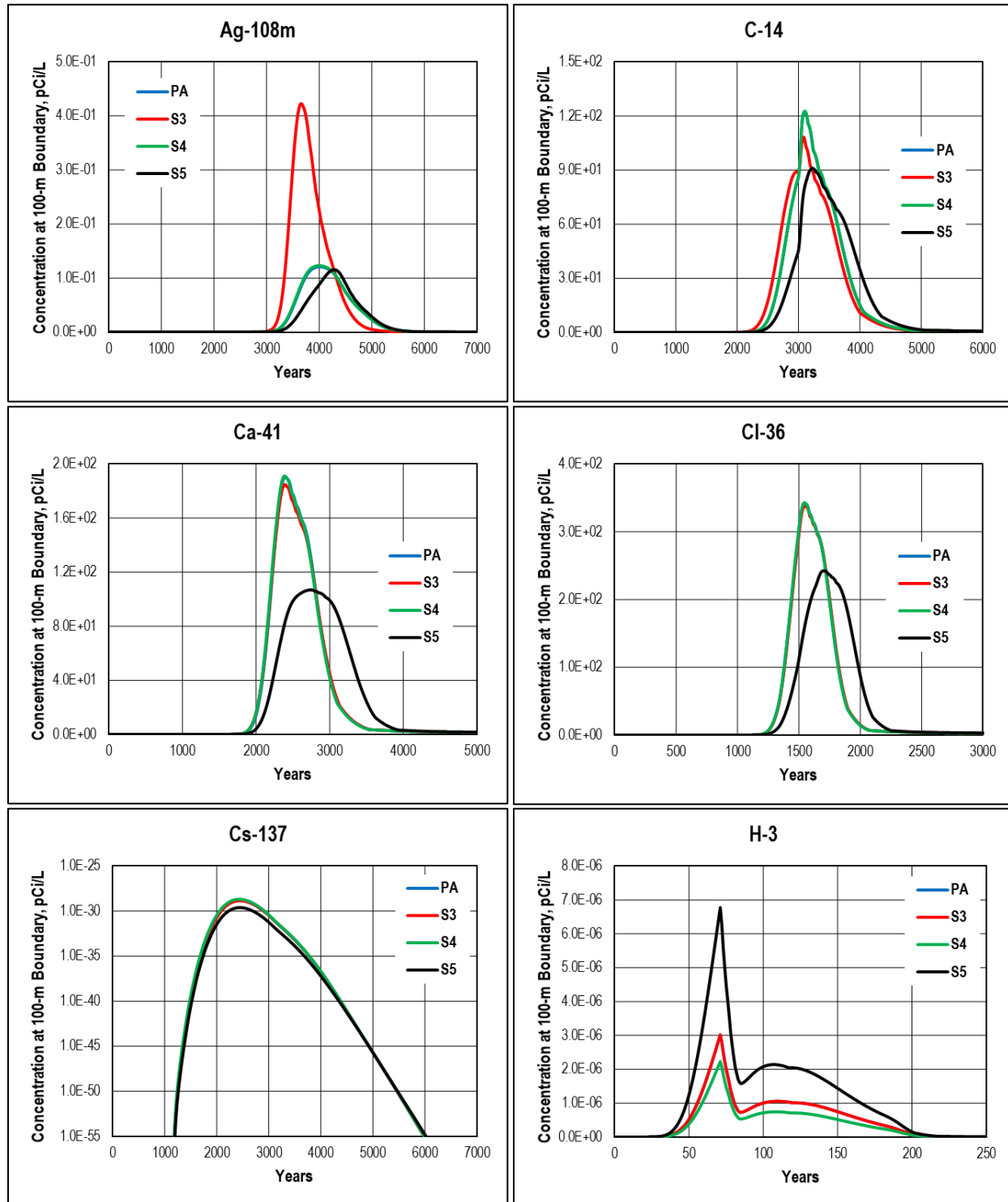


Figure E-7. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides Ag-108m through H-3

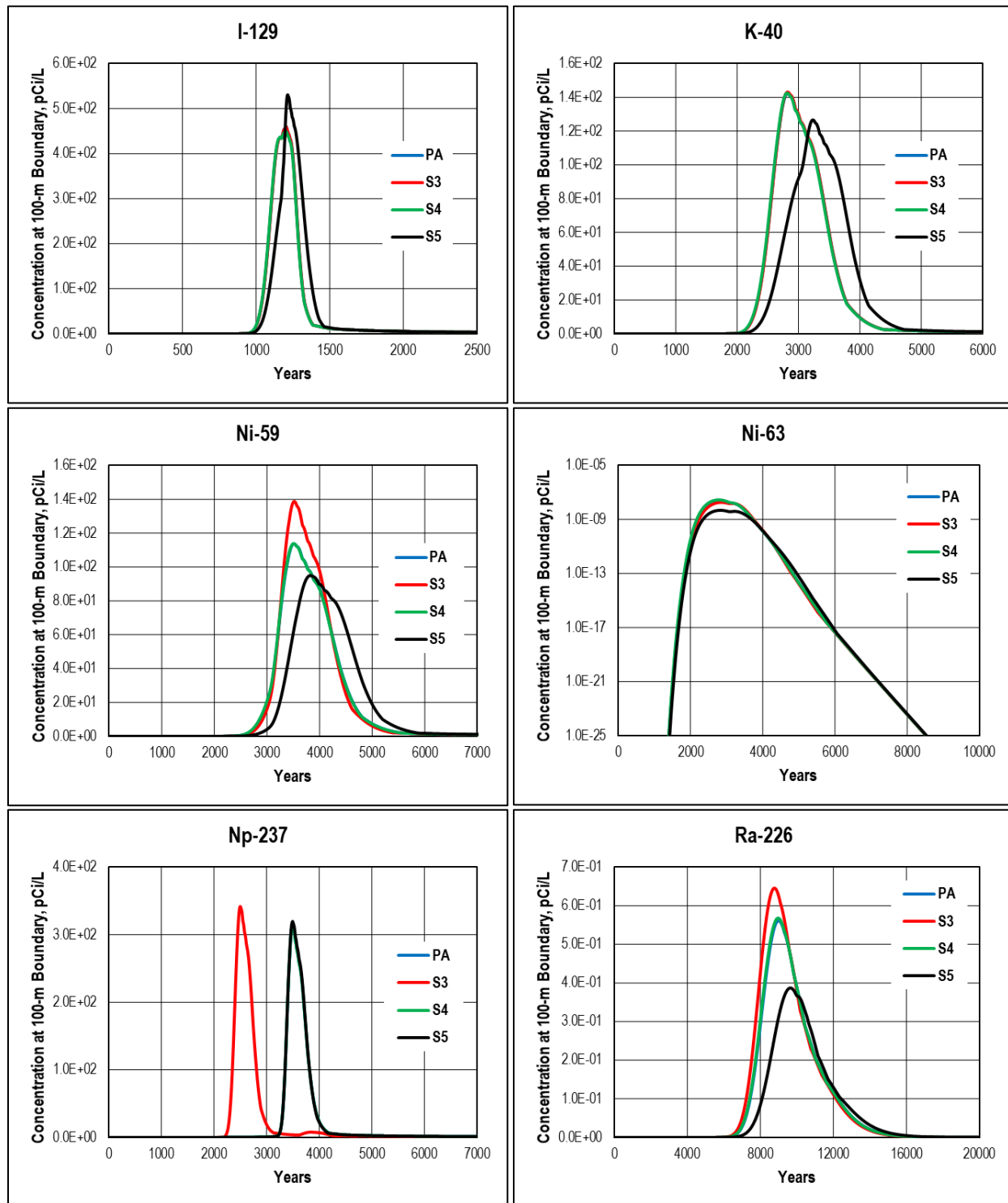


Figure E-8. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations ($\text{pCi L}^{-1} \text{Ci}^{-1}$ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides I-129 through Ra-226

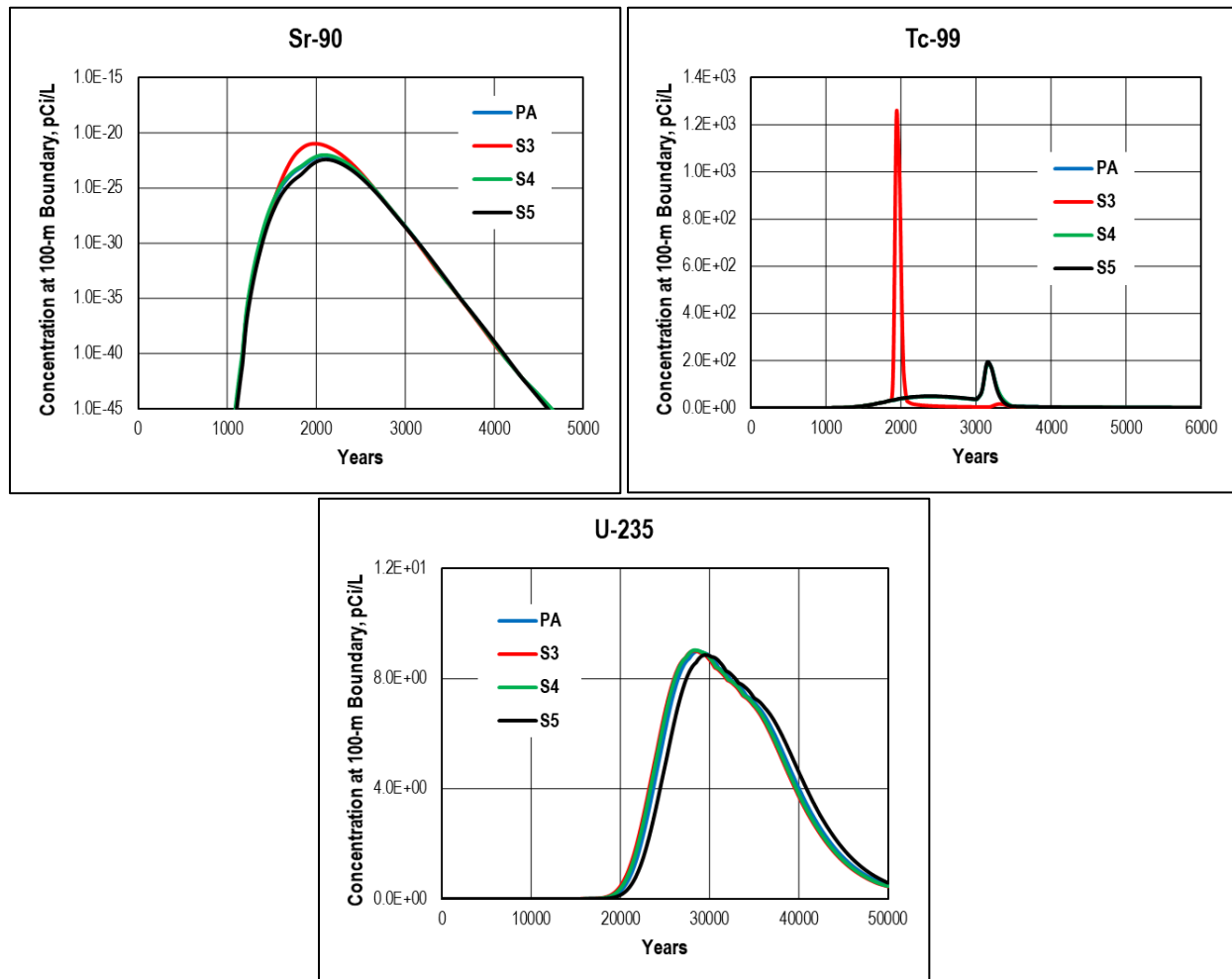


Figure E-9. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations ($\text{pCi L}^{-1} \text{Ci}^{-1}$ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides Sr-90 through U-235

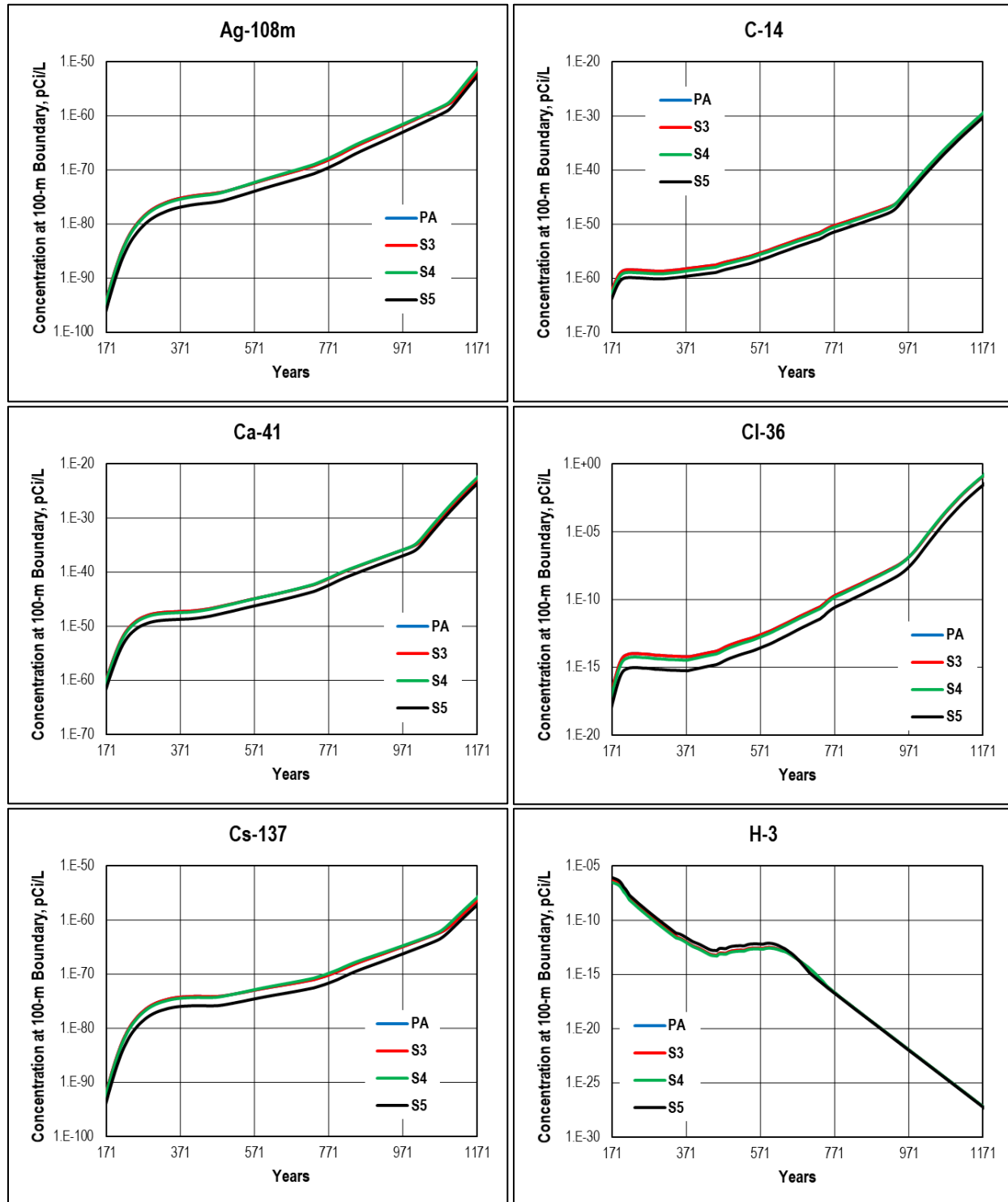


Figure E-10. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides Ag-108m through H-3 During the Compliance Period

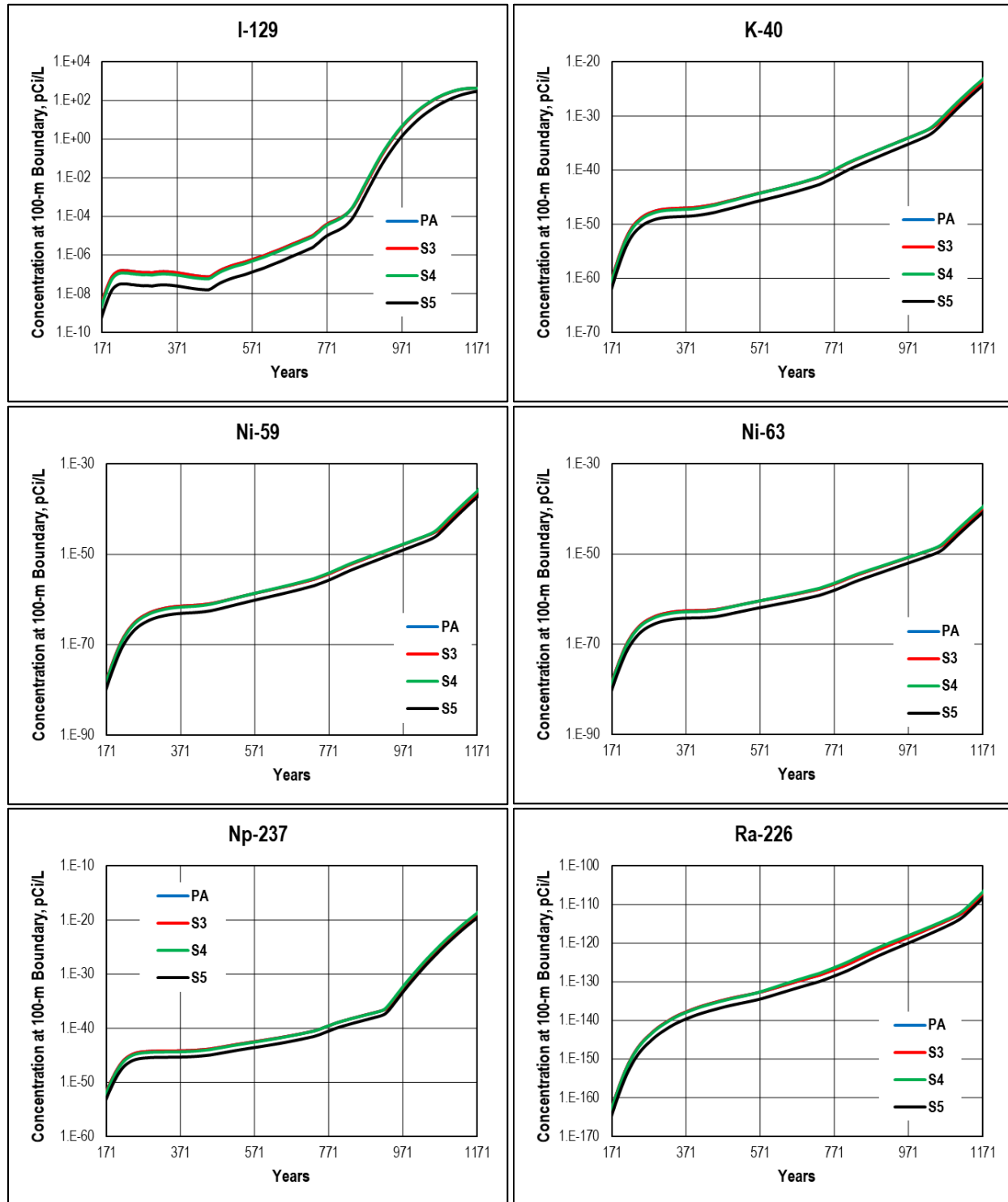


Figure E-11. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides I-129 through Ra-226 During the Compliance Period

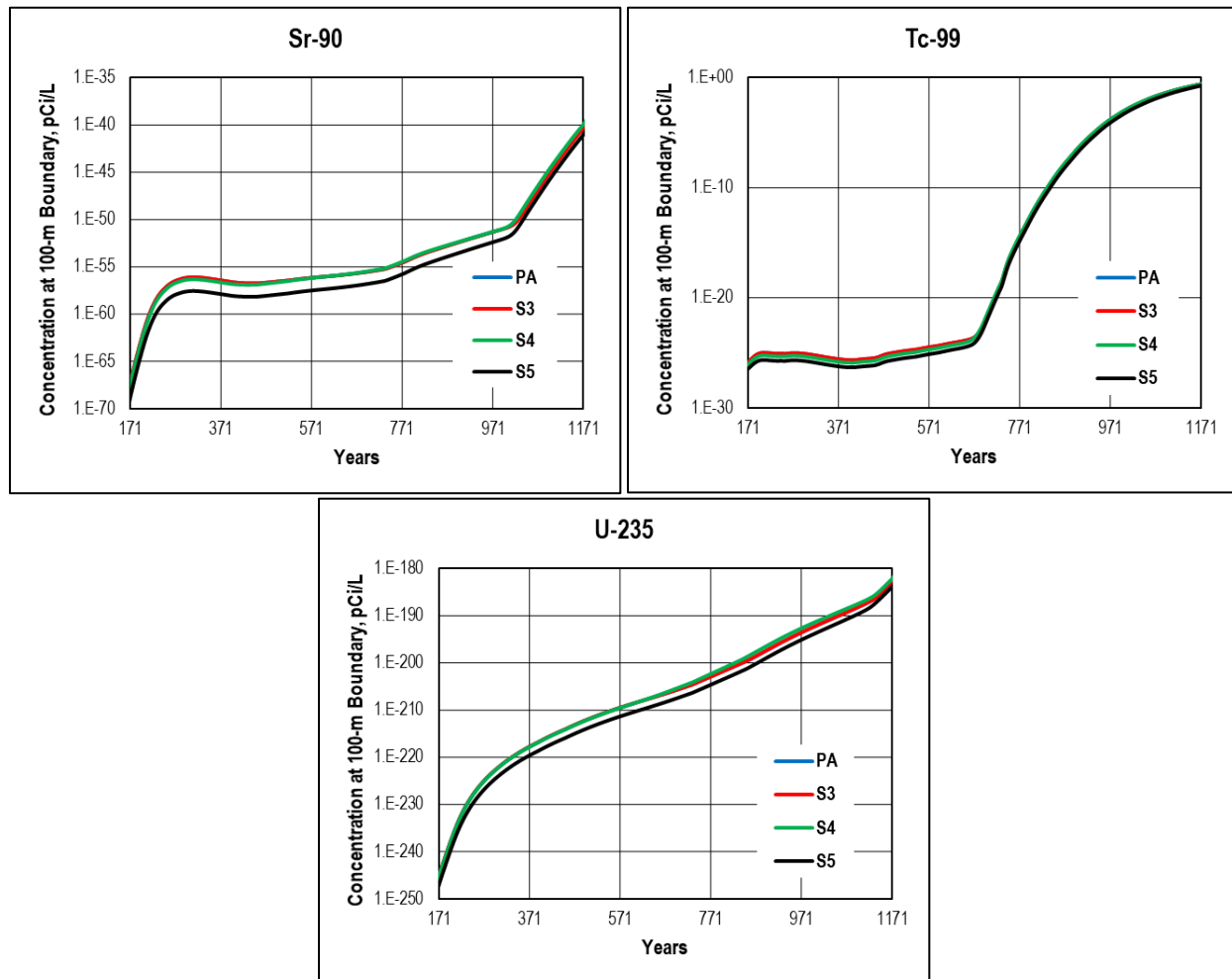


Figure E-12. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations ($\text{pCi L}^{-1} \text{Ci}^{-1}$ parent buried) for Low-Activity Waste Vault at 100-meter POA for Parent Radionuclides Sr-90 through U-235 During the Compliance Period

E.1.2 Concentrations for Decay Chain Daughter and Parent Radionuclides

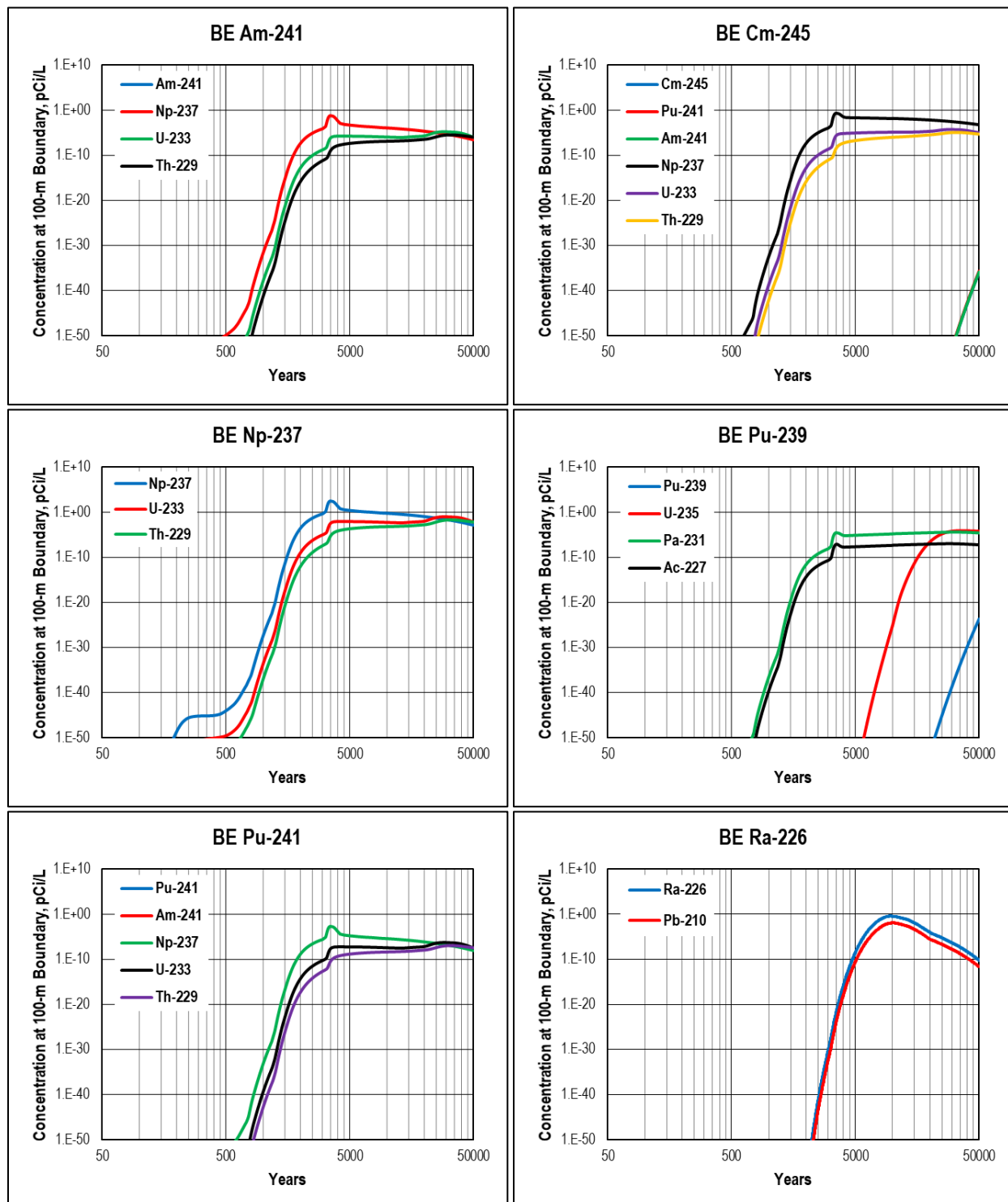


Figure E-13. Best Estimate Case Concentrations ($\text{pCi L}^{-1} \text{Ci}^{-1}$ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parents Am-241 through Ra-226 and Daughter Radionuclides

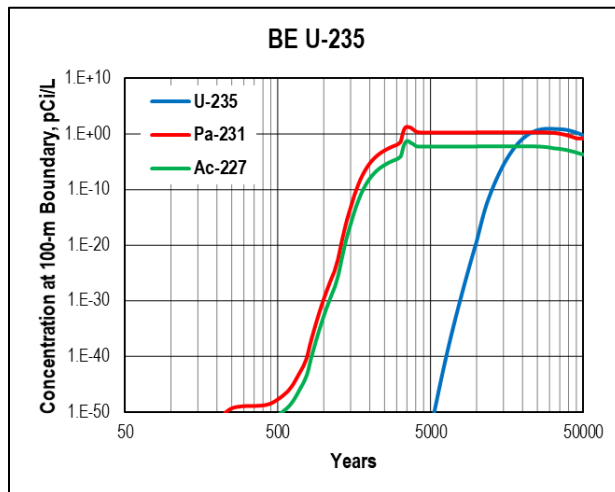


Figure E-14. Best Estimate Case Concentrations (pCi L^{-1} Ci^{-1} parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parent U-235 and Daughter Radionuclides

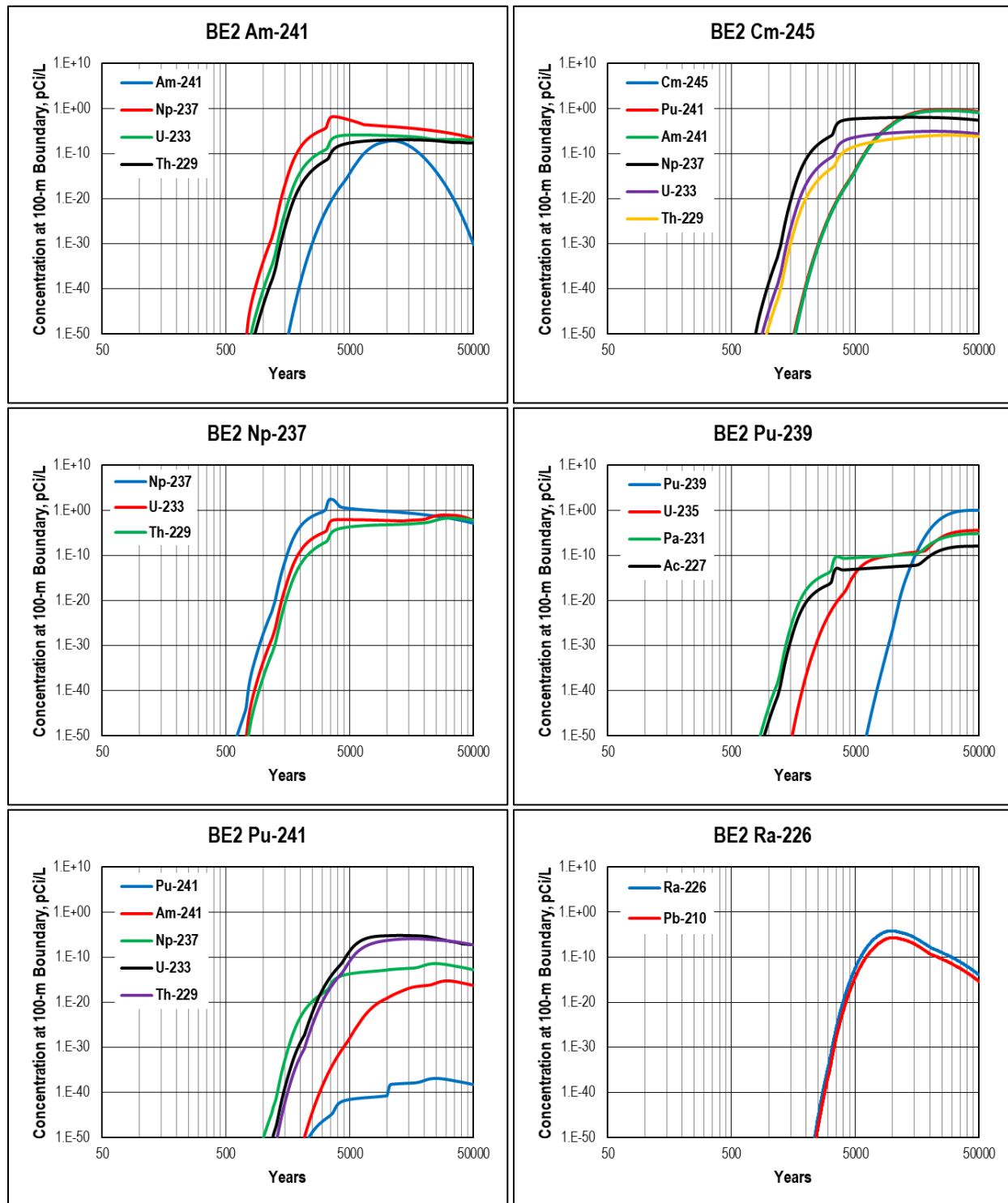


Figure E-15. Best Estimate 2 Case Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parents Am-241 through Ra-226 and Daughter Radionuclides

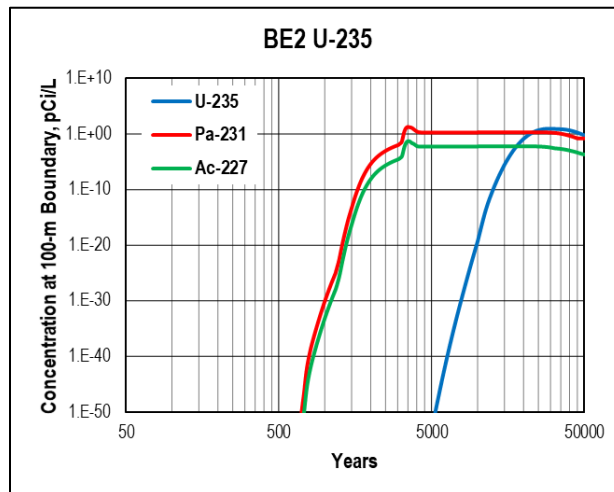


Figure E-16. Best Estimate Case 2 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parent U-235 and Daughter Radionuclides

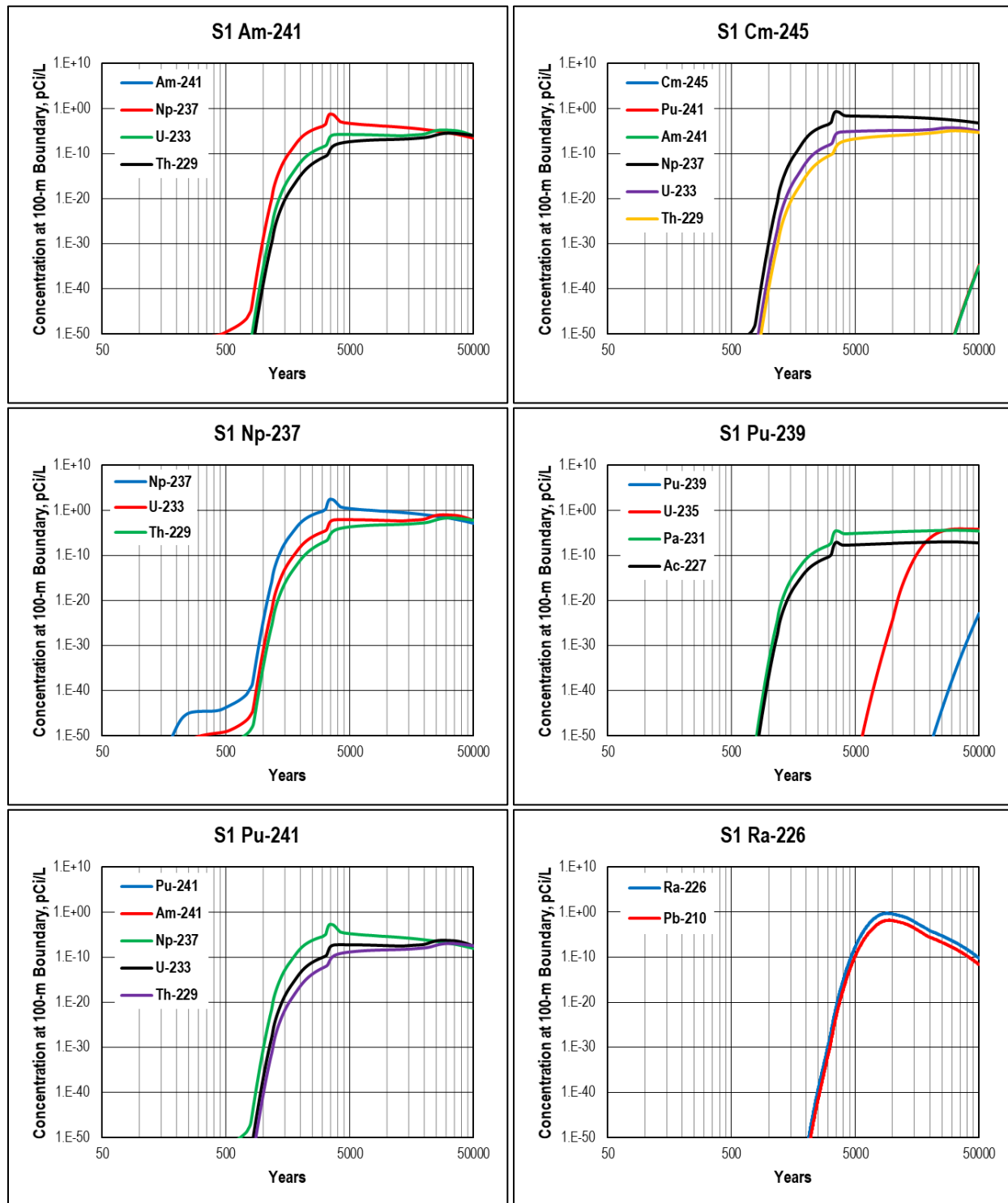


Figure E-17. Sensitivity Case 1 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parents Am-241 through Ra-226 and Daughter Radionuclides

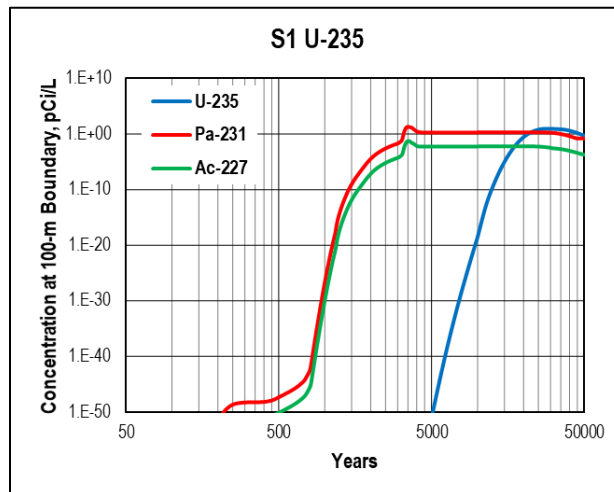


Figure E-18. Sensitivity Case 1 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parent U-235 and Daughter Radionuclides

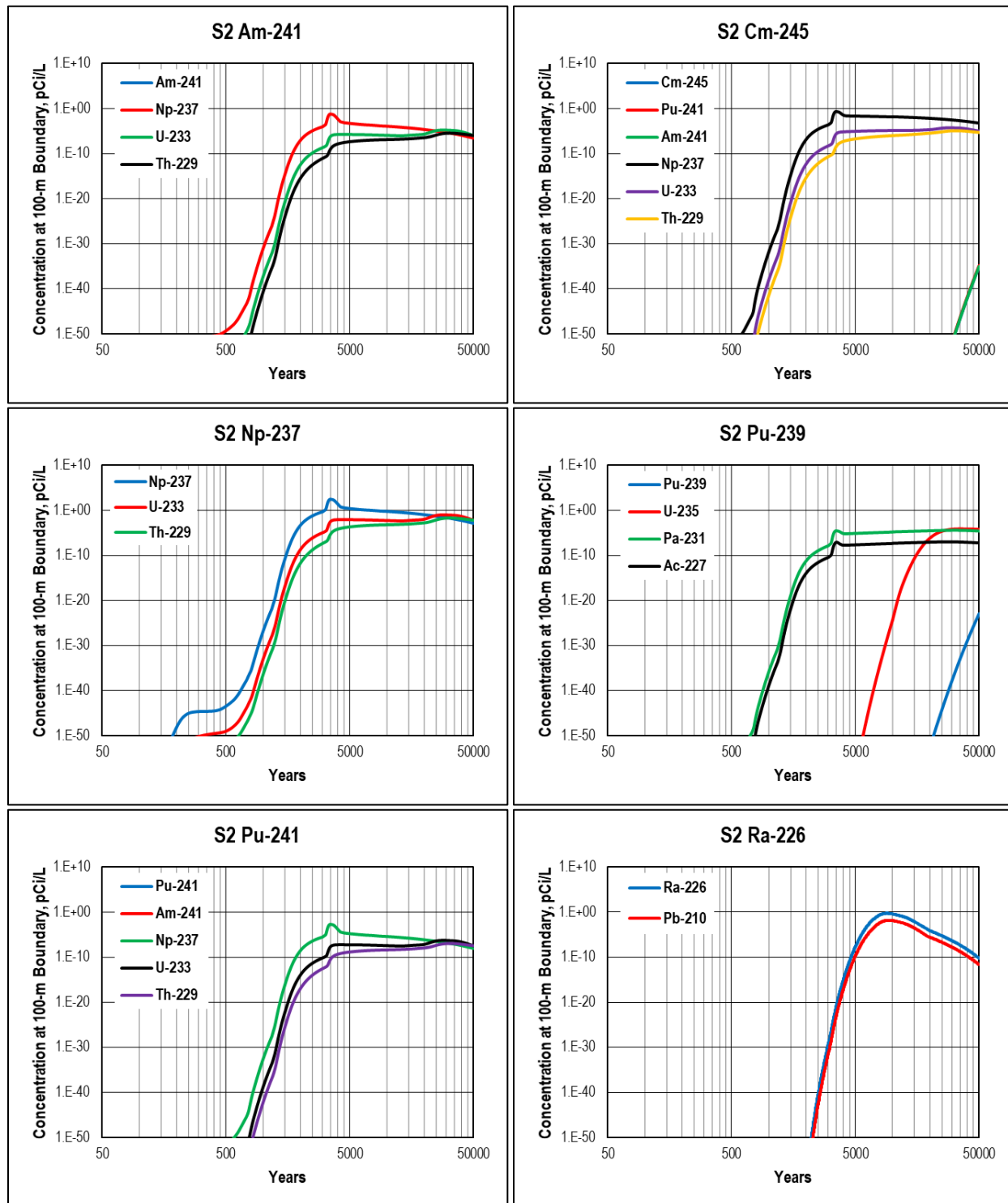


Figure E-19. Sensitivity Case 2 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parents Am-241 through Ra-226 and Daughter Radionuclides

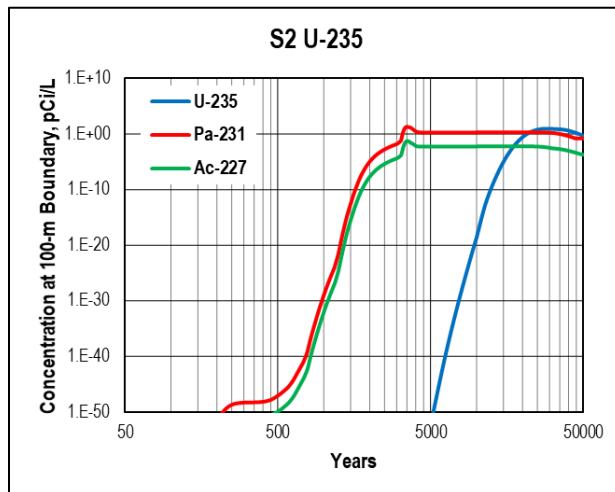


Figure E-20. Sensitivity Case 2 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parent U-235 and Daughter Radionuclides

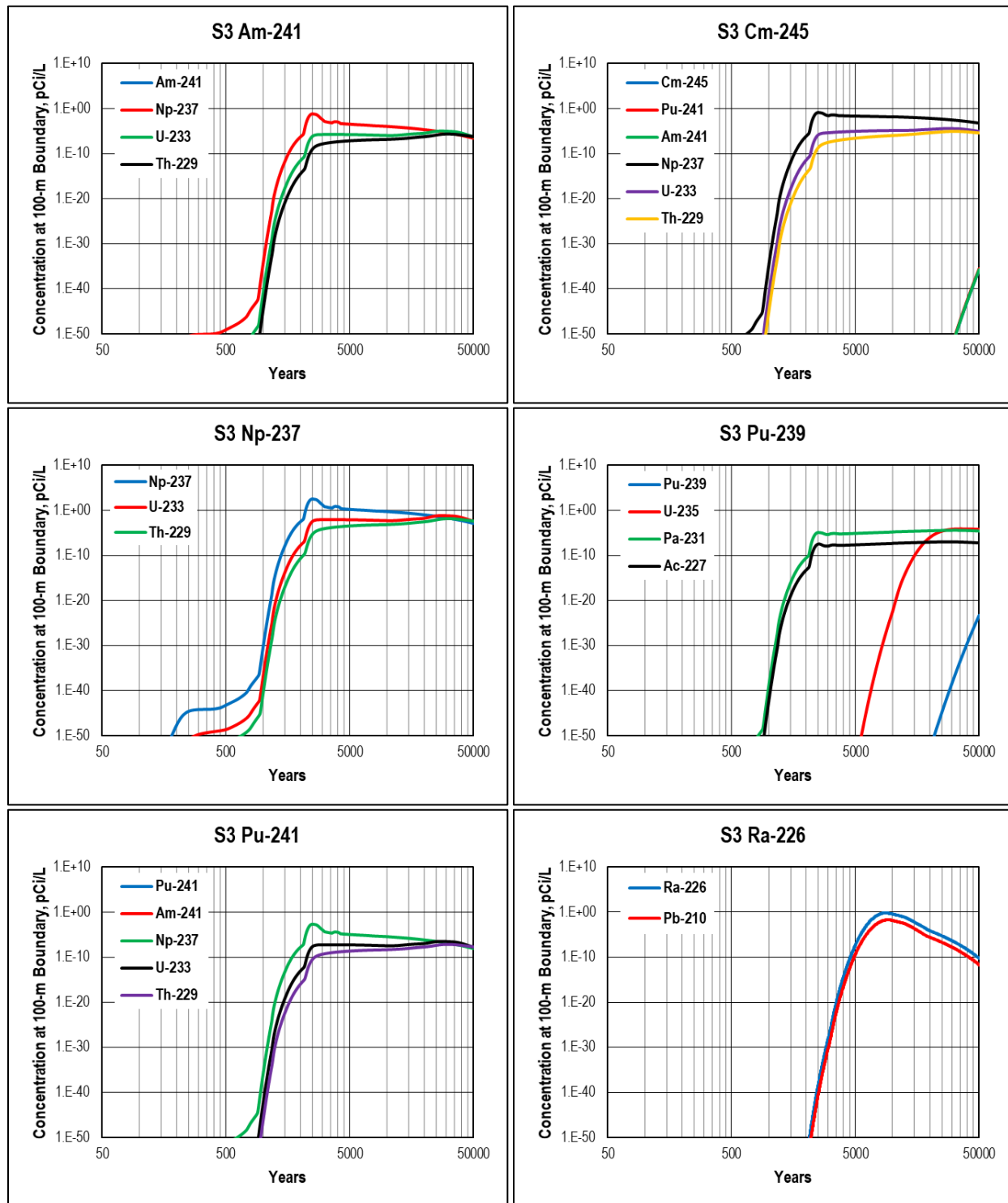


Figure E-21. Sensitivity Case 3 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parents Am-241 through Ra-226 and Daughter Radionuclides

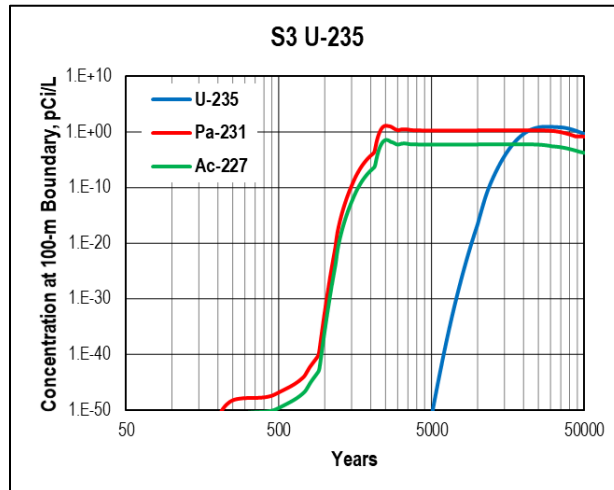


Figure E-22. Sensitivity Case 3 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parent U-235 and Daughter Radionuclides

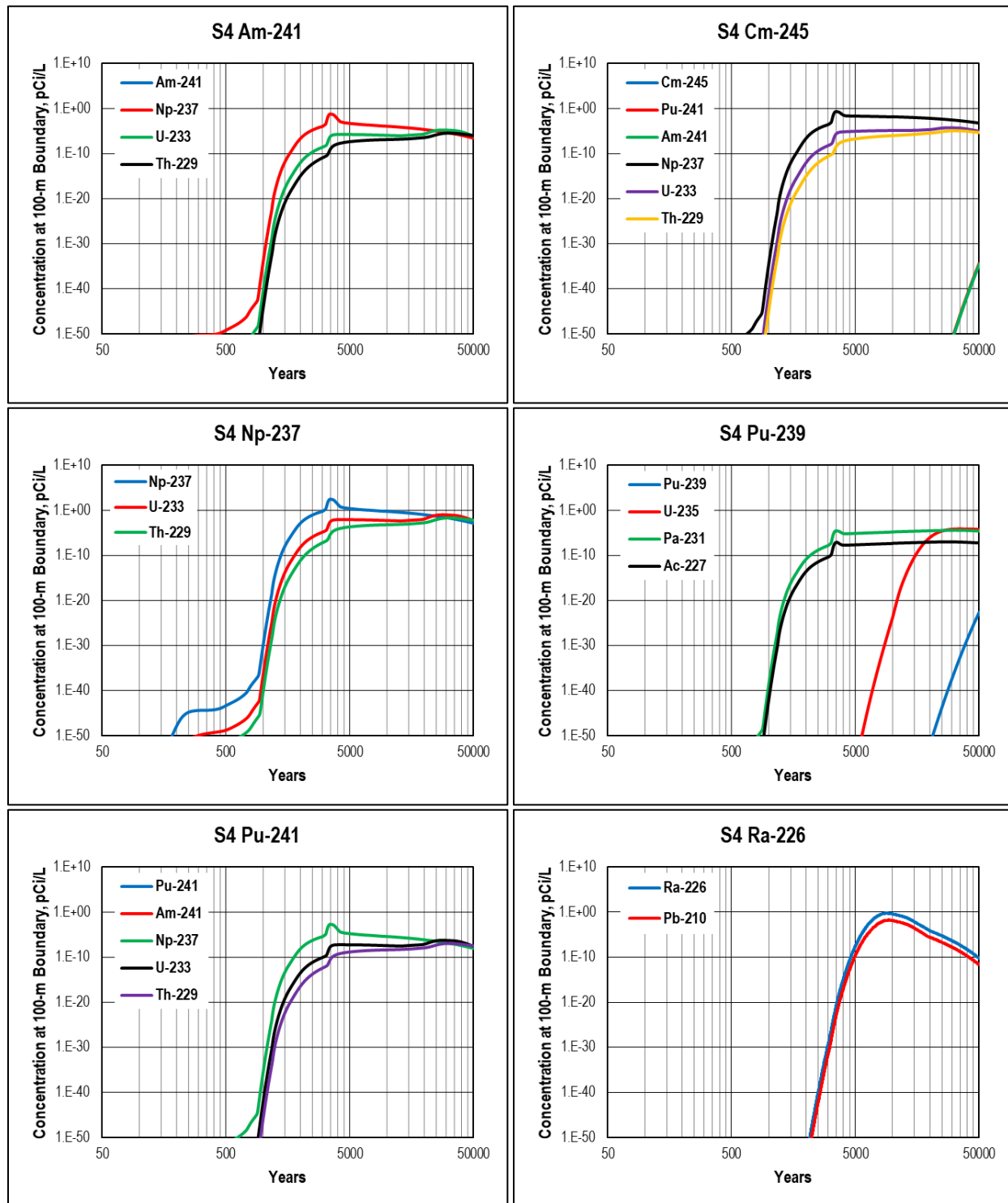


Figure E-23. Sensitivity Case 4 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parents Am-241 through Ra-226 and Daughter Radionuclides

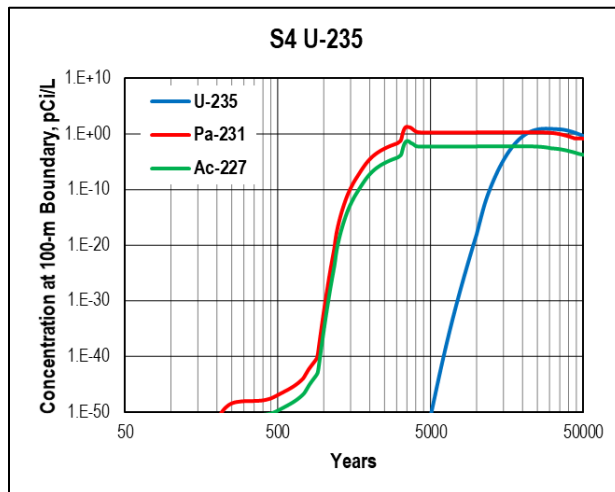


Figure E-24. Sensitivity Case 4 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parent U-235 and Daughter Radionuclides

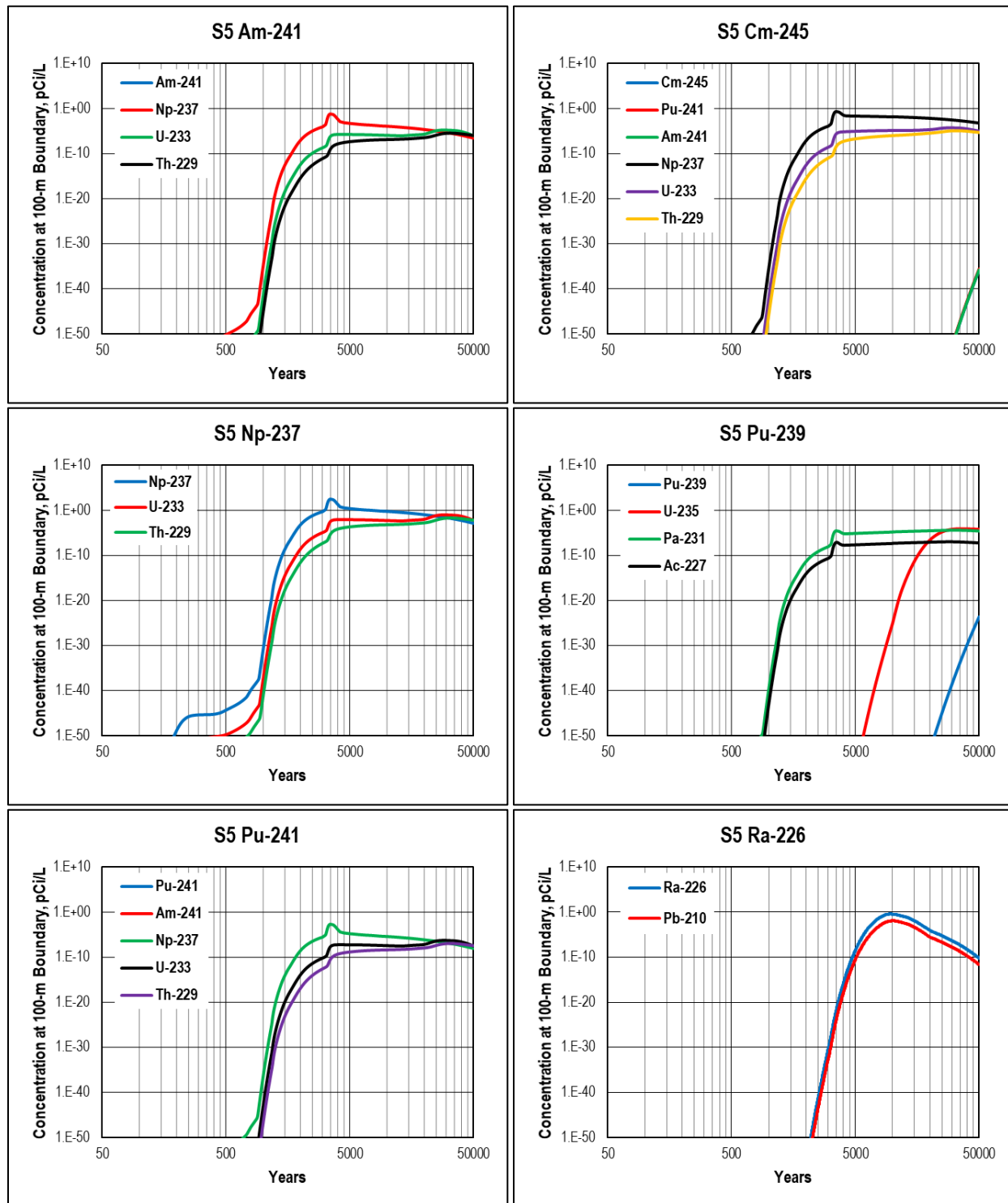


Figure E-25. Sensitivity Case 5 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parents Am-241 through Ra-226 and Daughter Radionuclides

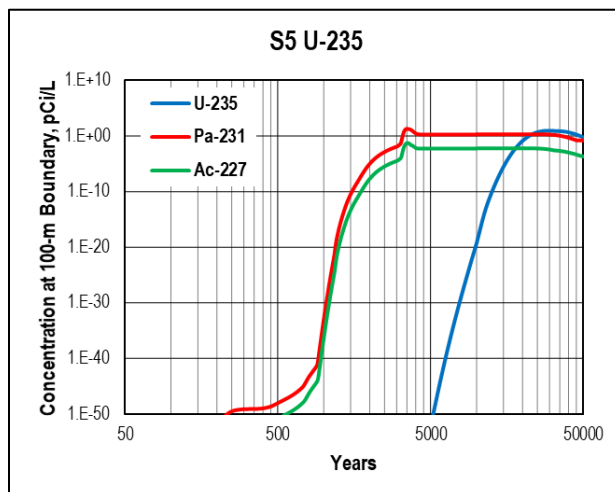


Figure E-26. Sensitivity Case 5 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parent U-235 and Daughter Radionuclides

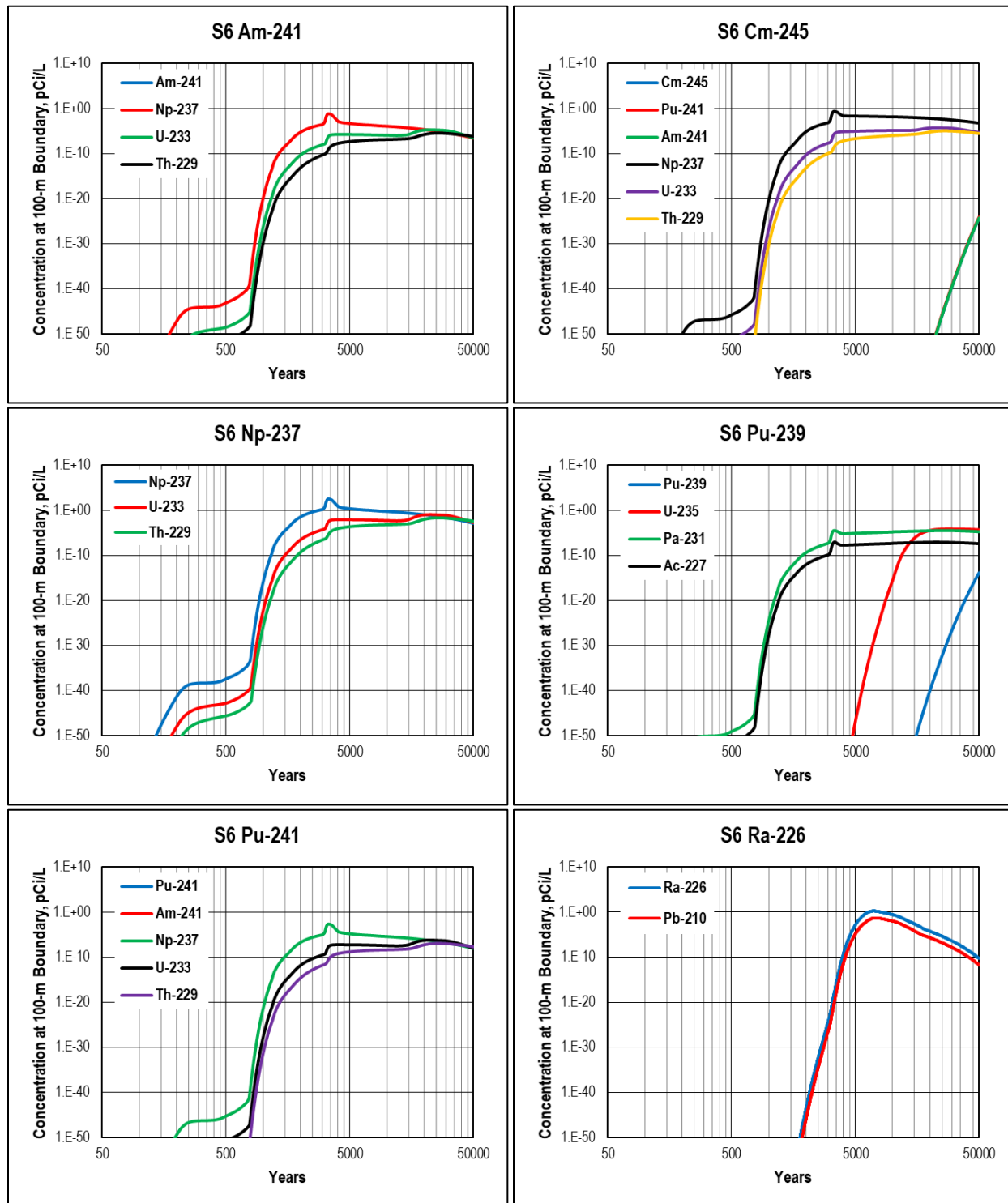


Figure E-27. Sensitivity Case 6 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parents Am-241 through Ra-226 and Daughter Radionuclides

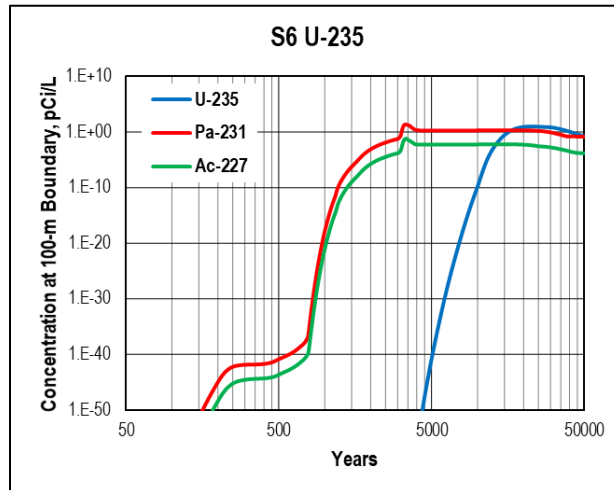


Figure E-28. Sensitivity Case 6 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parent U-235 and Daughter Radionuclides

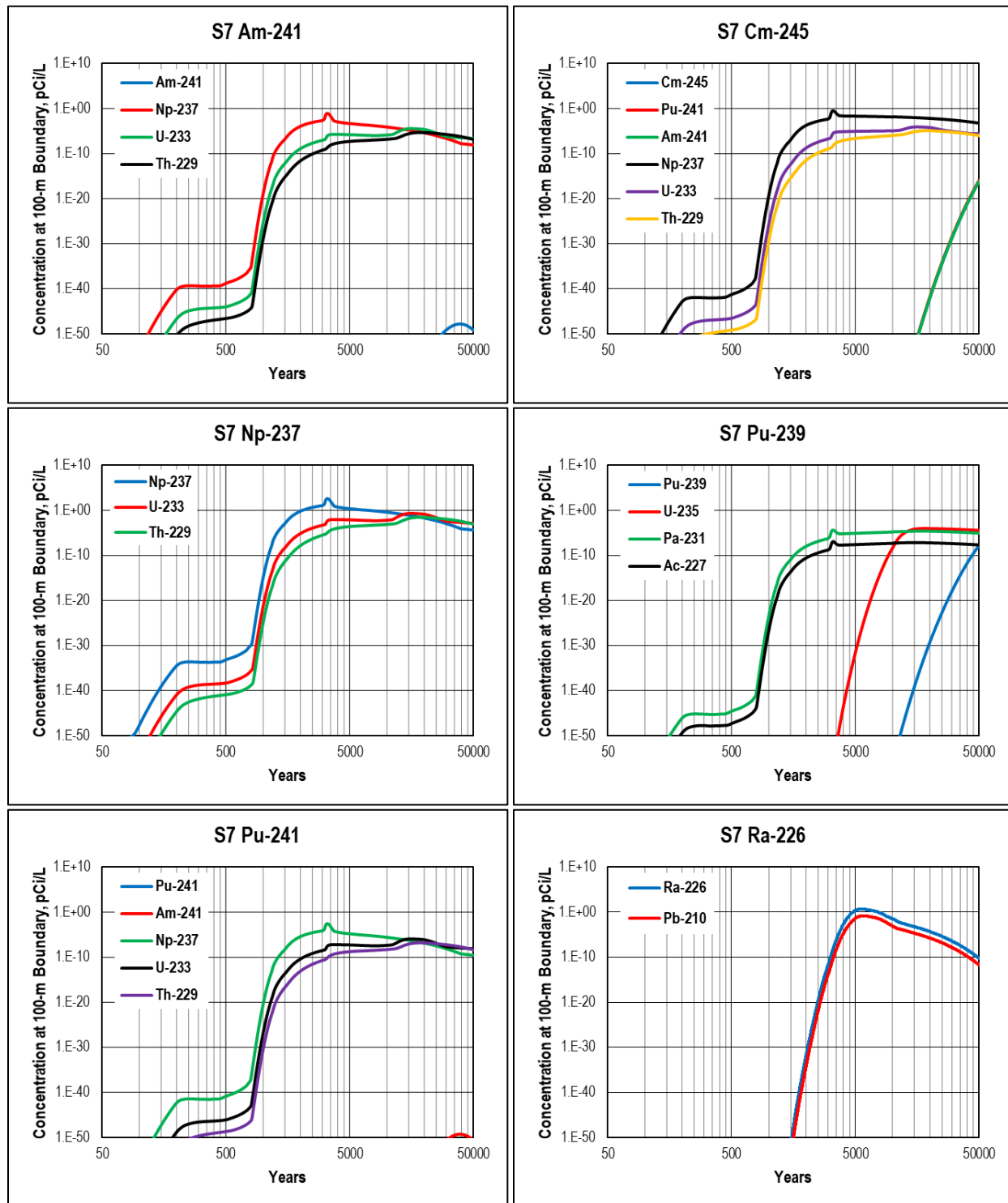


Figure E-29. Sensitivity Case 7 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parents Am-241 through Ra-226 and Daughter Radionuclides

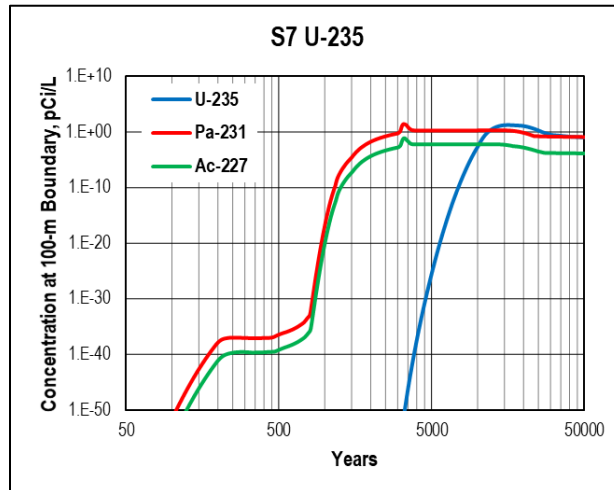


Figure E-30. Sensitivity Case 7 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Low-Activity Waste Vault at 100-meter POA for Decay Chain Parent U-235 and Daughter Radionuclides

E.1.3 Maximum Concentration Contours of I-129

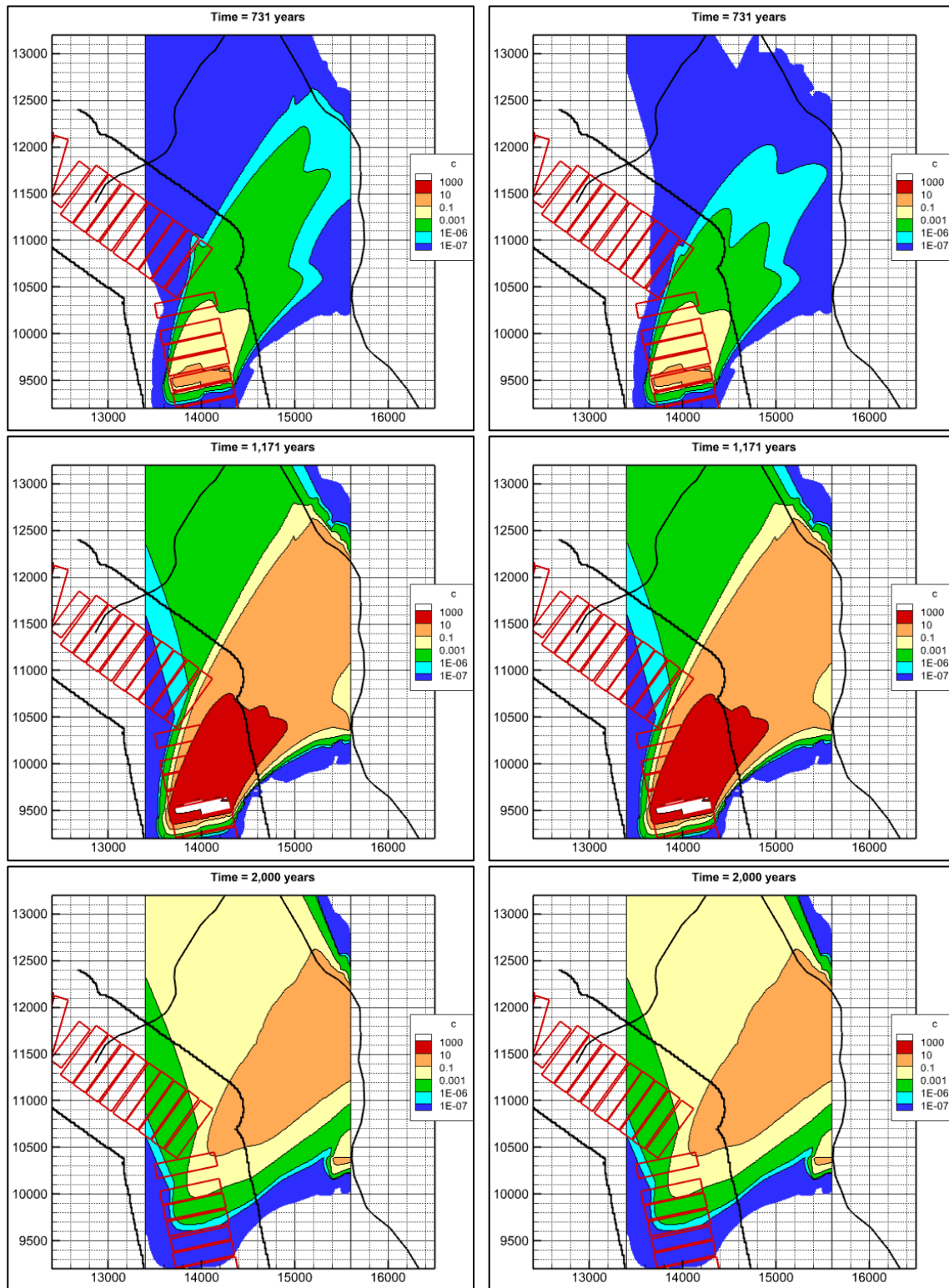


Figure E-31. Maximum Concentration (pCi L⁻¹ Ci⁻¹ parent buried) Contours of I-129 for the Best Estimate Case (left) and Best Estimate Case 2 (right) for Low-Activity Waste Vault

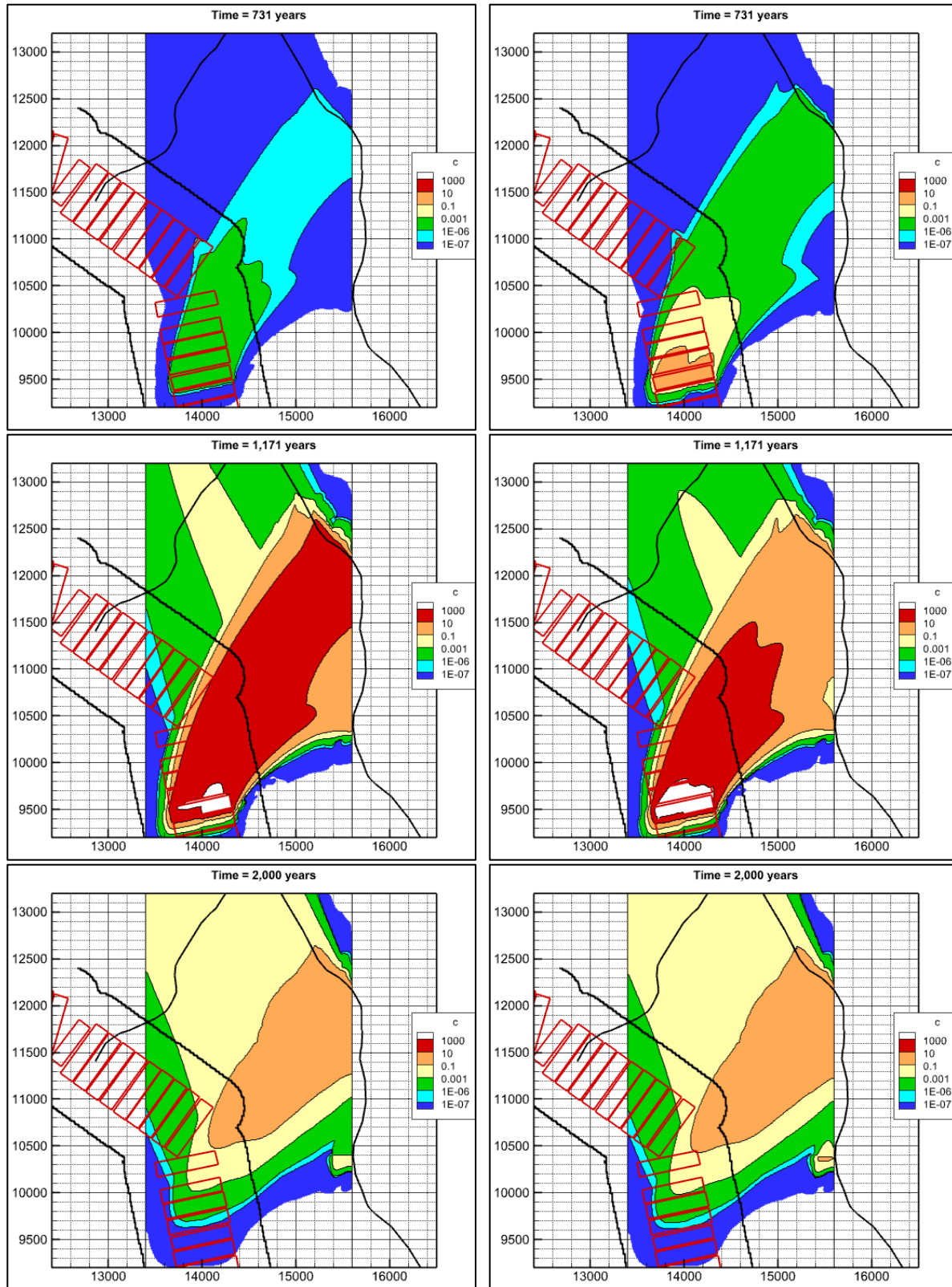


Figure E-32. Maximum Concentration (pCi L⁻¹ Ci⁻¹ parent buried) Contours of I-129 for Sensitivity Case 1 (left) and Sensitivity Case 2 (right) for Low-Activity Waste Vault

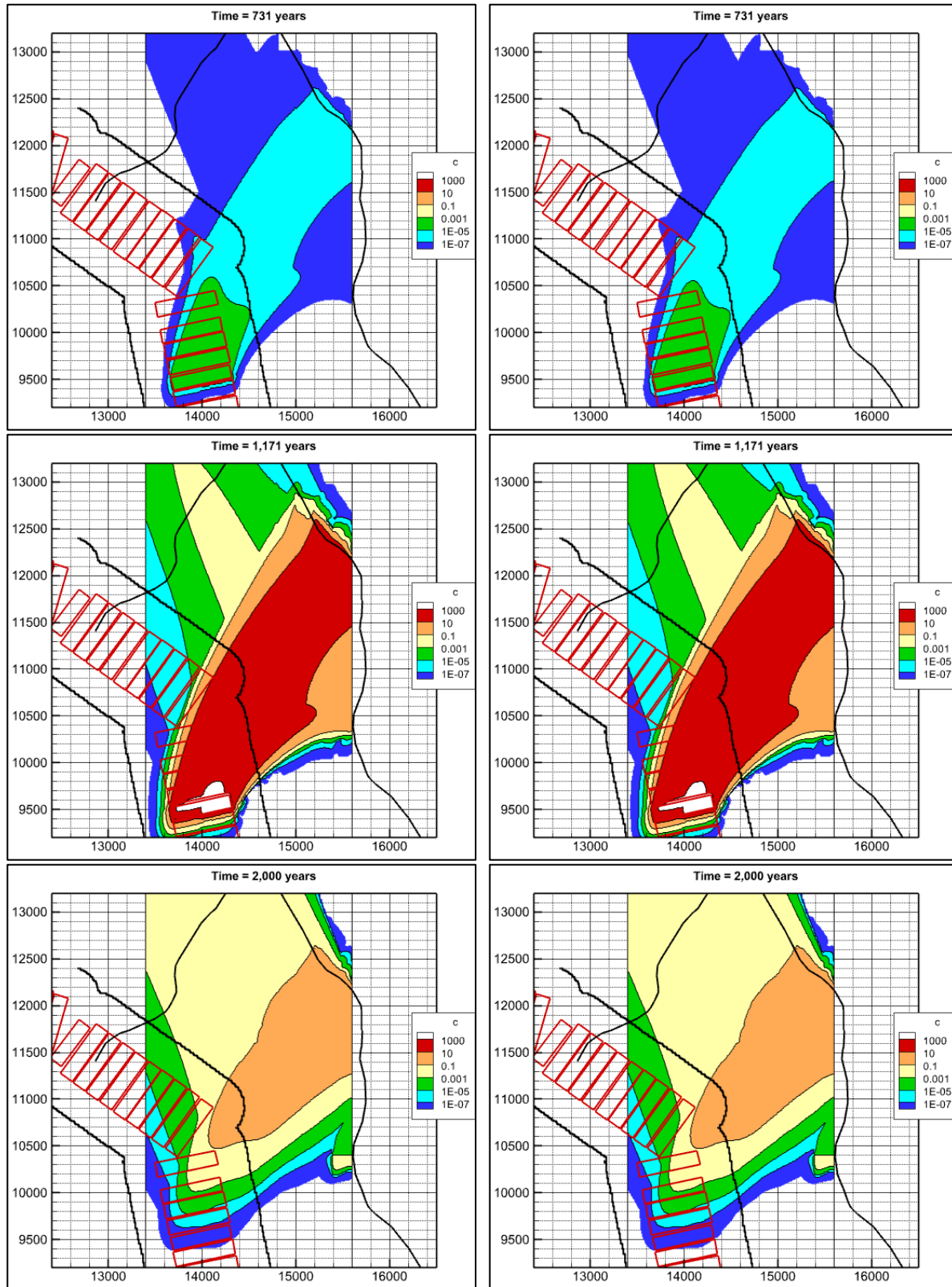


Figure E-33. Maximum Concentration (pCi L⁻¹ Ci⁻¹ parent buried) Contours of I-129 for Sensitivity Case 3 (left) and Sensitivity Case 4 (right) for Low-Activity Waste Vault

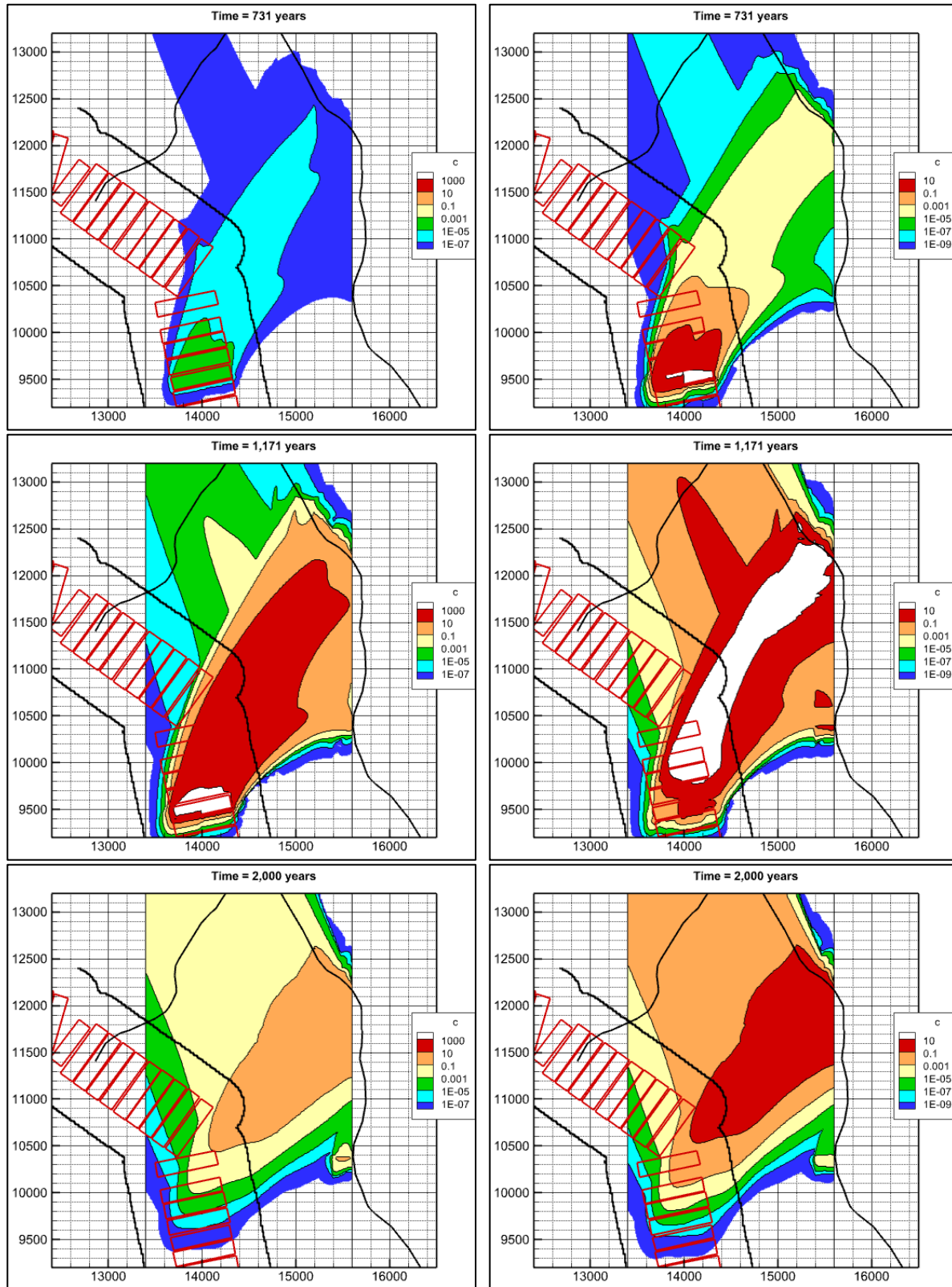


Figure E-34. Maximum Concentration (pCi L⁻¹ Ci⁻¹ parent buried) Contours of I-129 for Sensitivity Case 5 (left) and Sensitivity Case 6 (right) for Low-Activity Waste Vault

E.2 INTERMEDIATE-LEVEL VAULT

Supplemental transport model results for the ILV from Chapter 5, Section 5.3.2 are provided in Section E.2.1 to compare concentrations at the 100-meter POA for the nominal PA case, best estimate case, and various sensitivity cases (Figure E-35 through Figure E-46). Second, Figure E-47 through Figure E-64 in Section E.2.2 display concentrations at the 100-meter POA for decay-chain daughter and parent radionuclides. Third, Figure E-65 through Figure E-68 in Section E.2.3 show maximum concentration contours for I-129. Only contour plots for I-129 from the remaining sensitivity runs are shown because I-129 is identified as the only radionuclide that impacts disposal limits for the ILV. All concentration units, whether noted or not in the y-axis labels, are pCi L⁻¹ per Ci parent buried.

E.2.1 Case Comparisons of Parent Radionuclide Concentrations

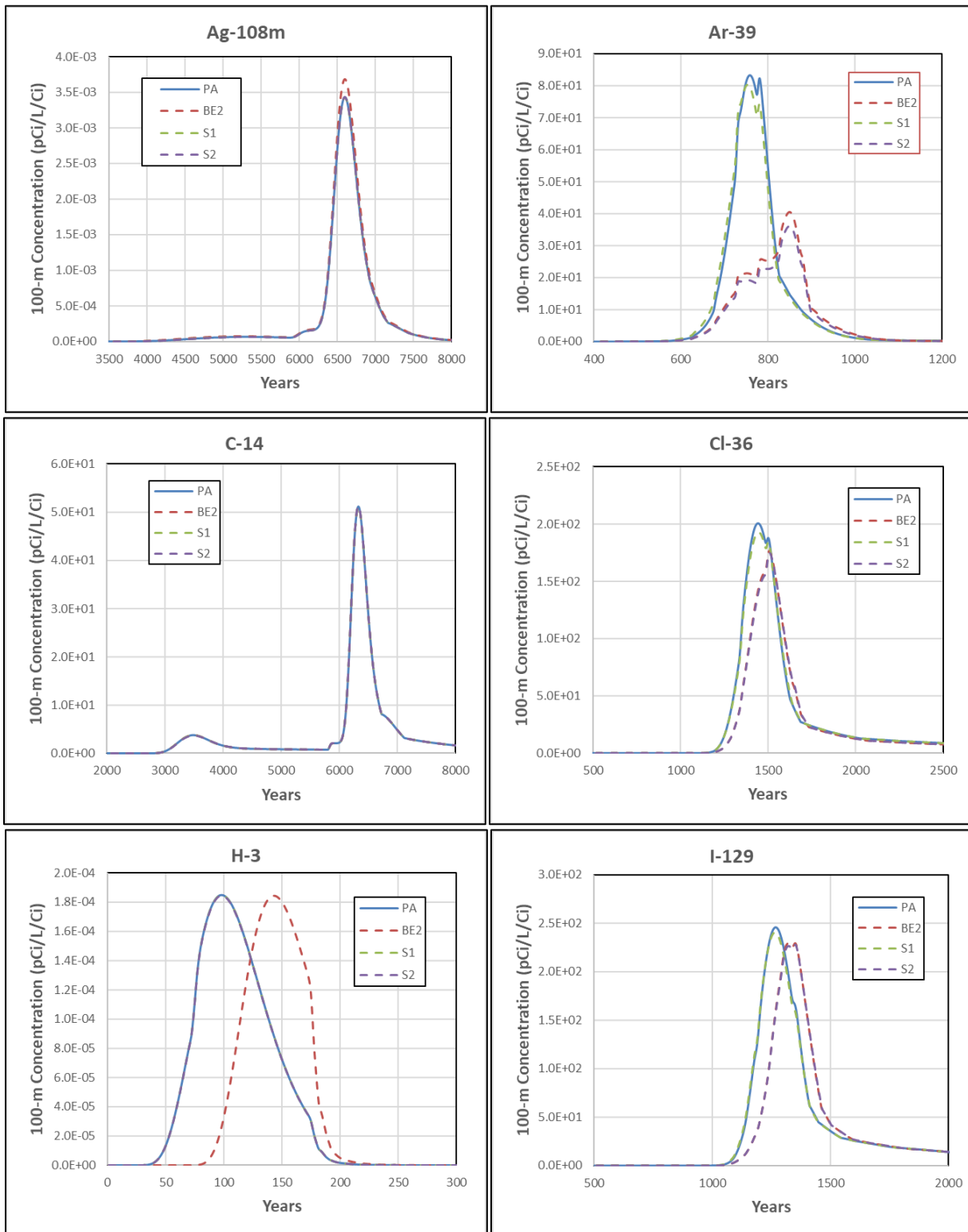


Figure E-35. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclides Ag-108m through I-129

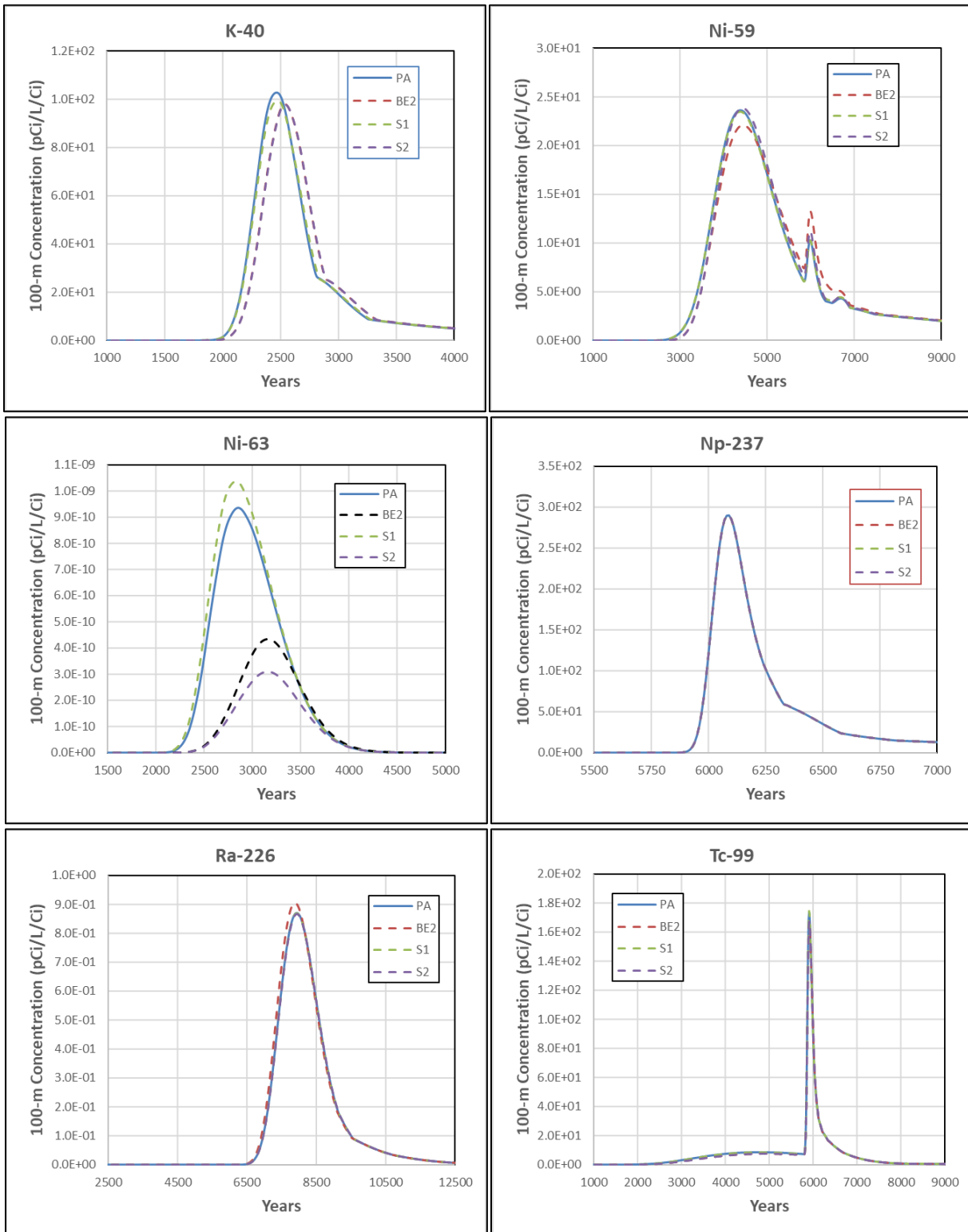


Figure E-36. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclides K-40 through Tc-99

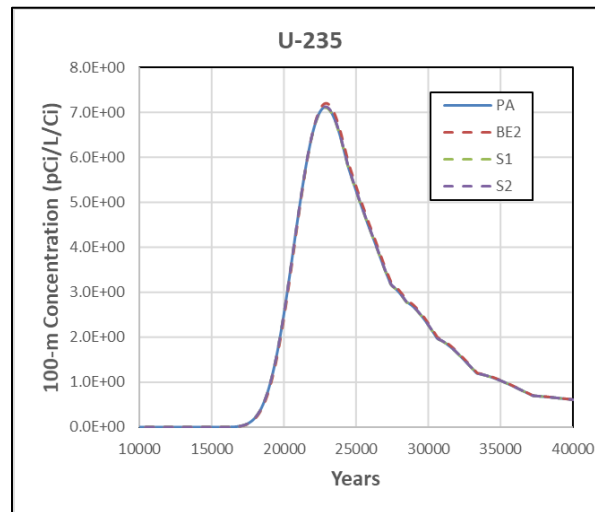


Figure E-37. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclide U-235

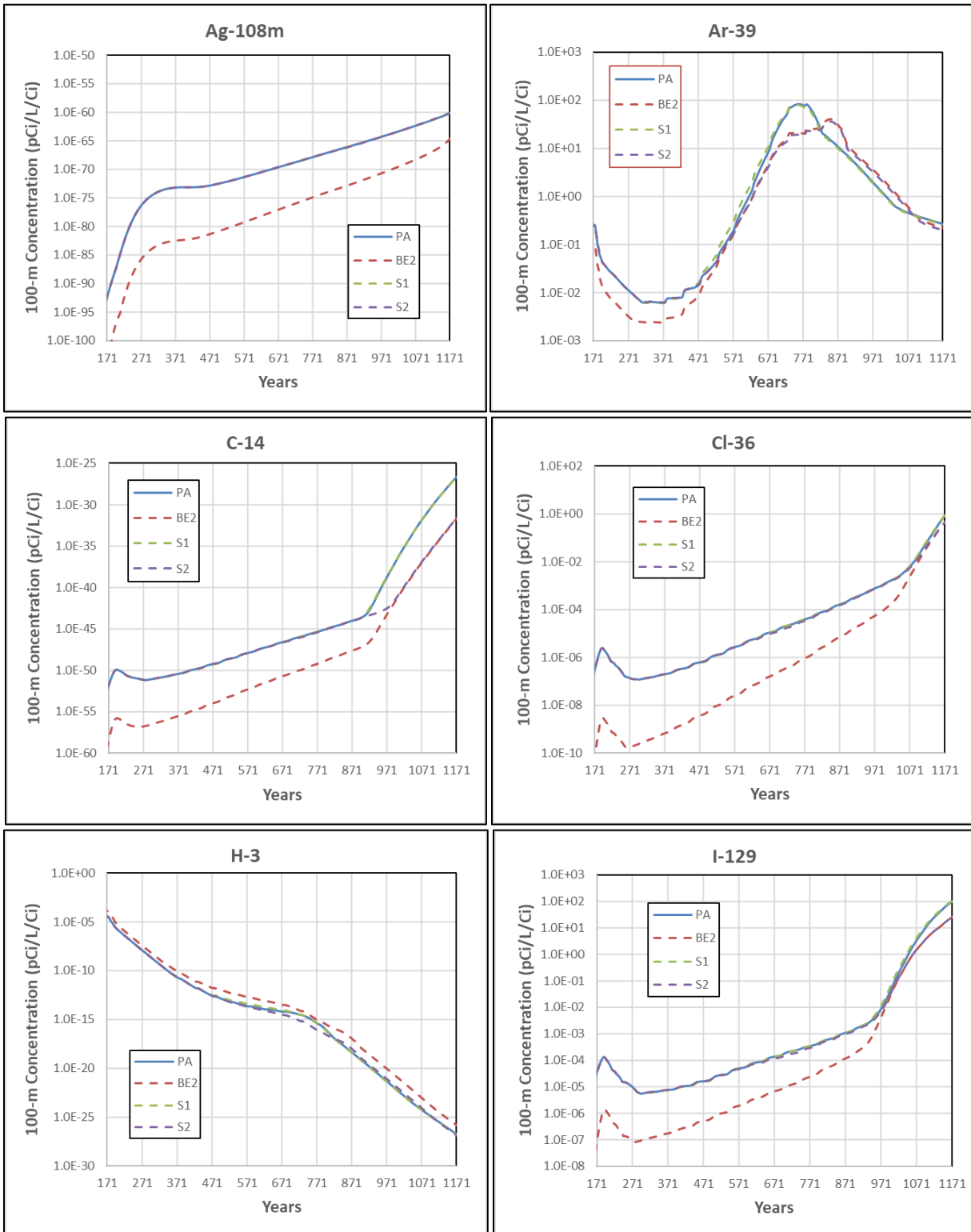


Figure E-38. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclides Ag-108m through I-129 During Compliance Period

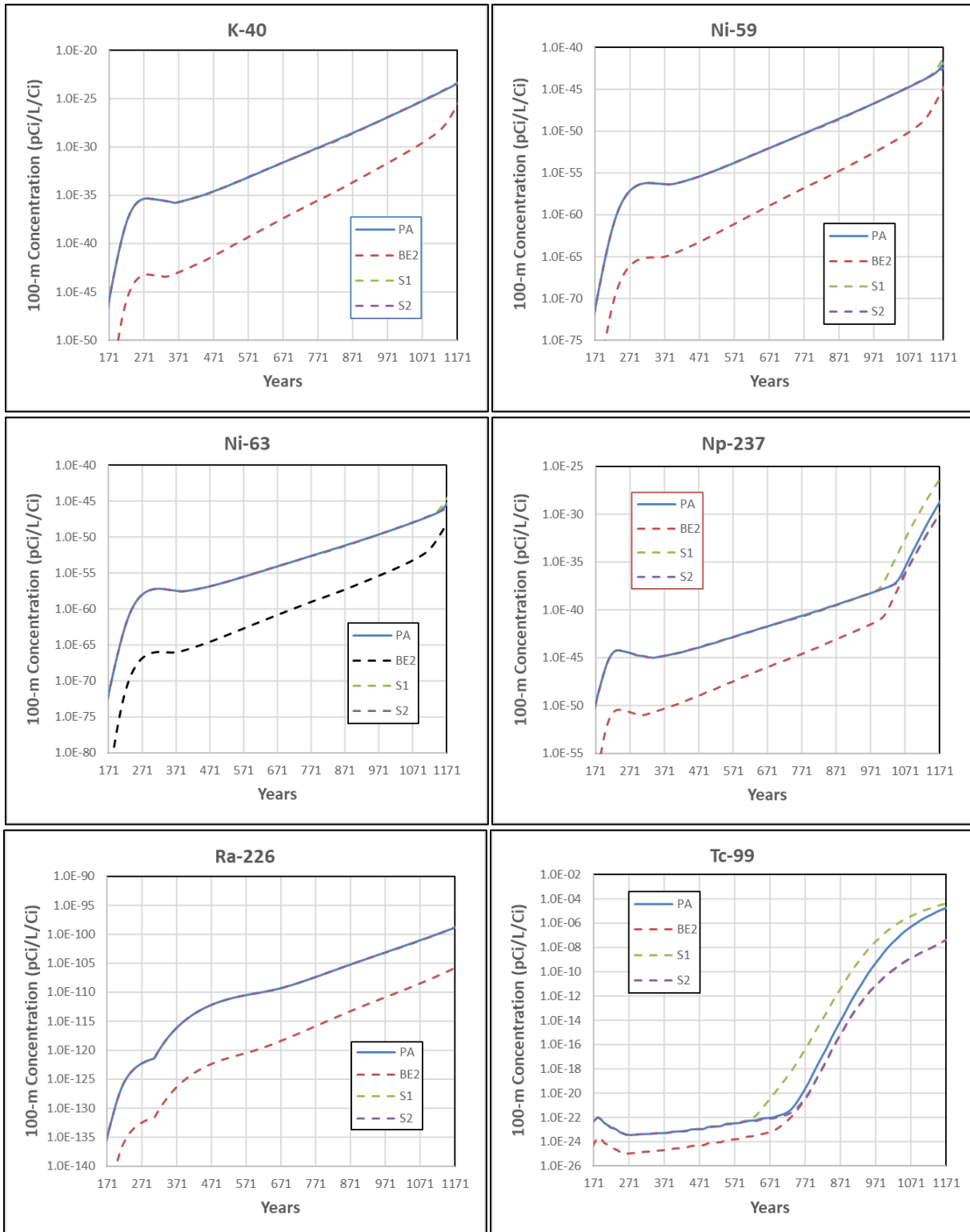


Figure E-39. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclides K-40 through Tc-99 During Compliance Period

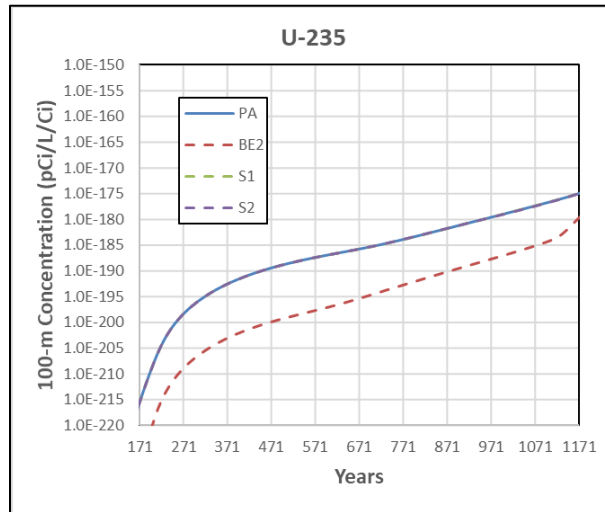


Figure E-40. Comparison of Nominal PA Case, Best Estimate 2 (BE2) Case, Sensitivity Case 1 (S1), and Sensitivity Case 2 (S2) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclide U-235 During Compliance Period

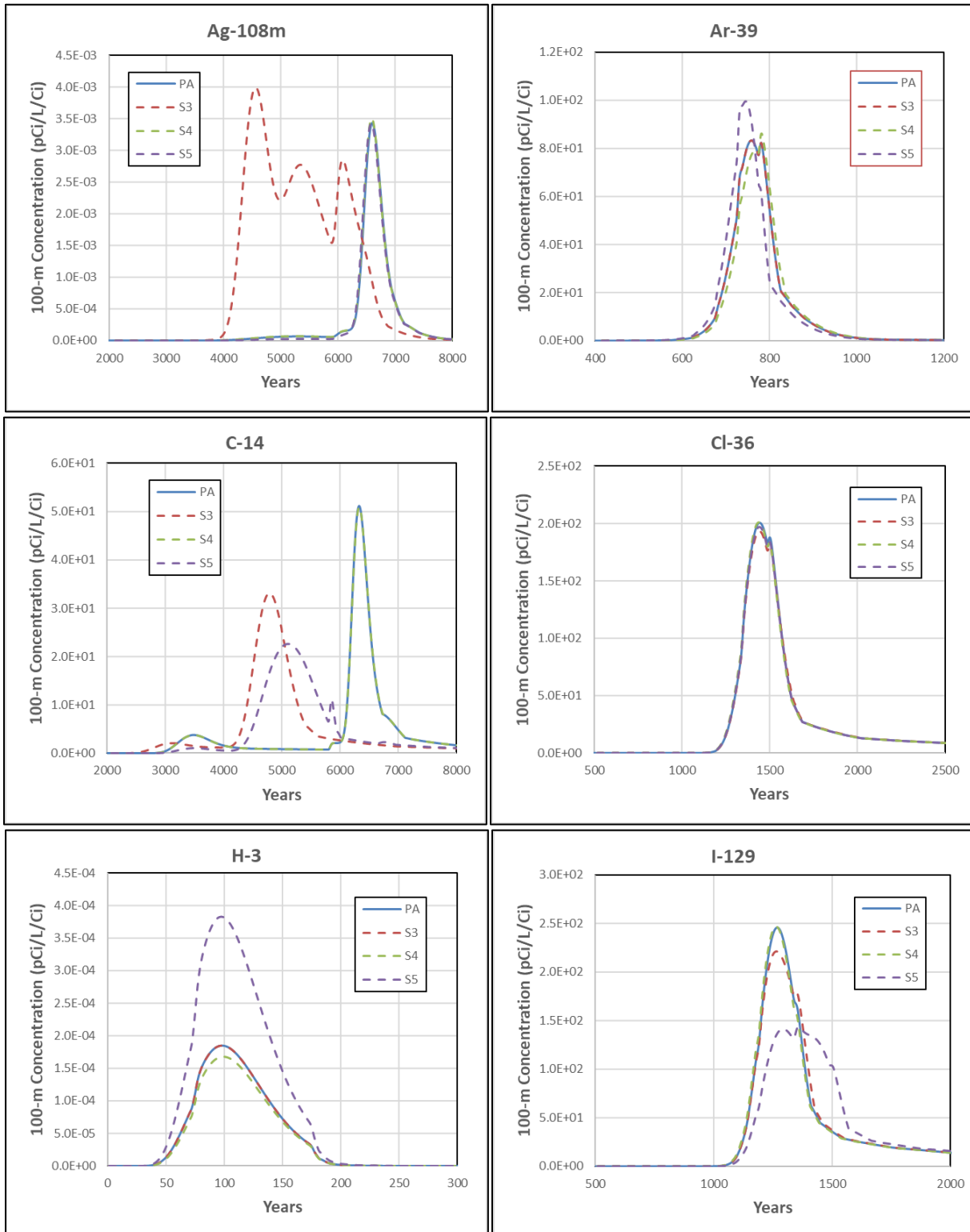


Figure E-41. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclides Ag-108m through I-129

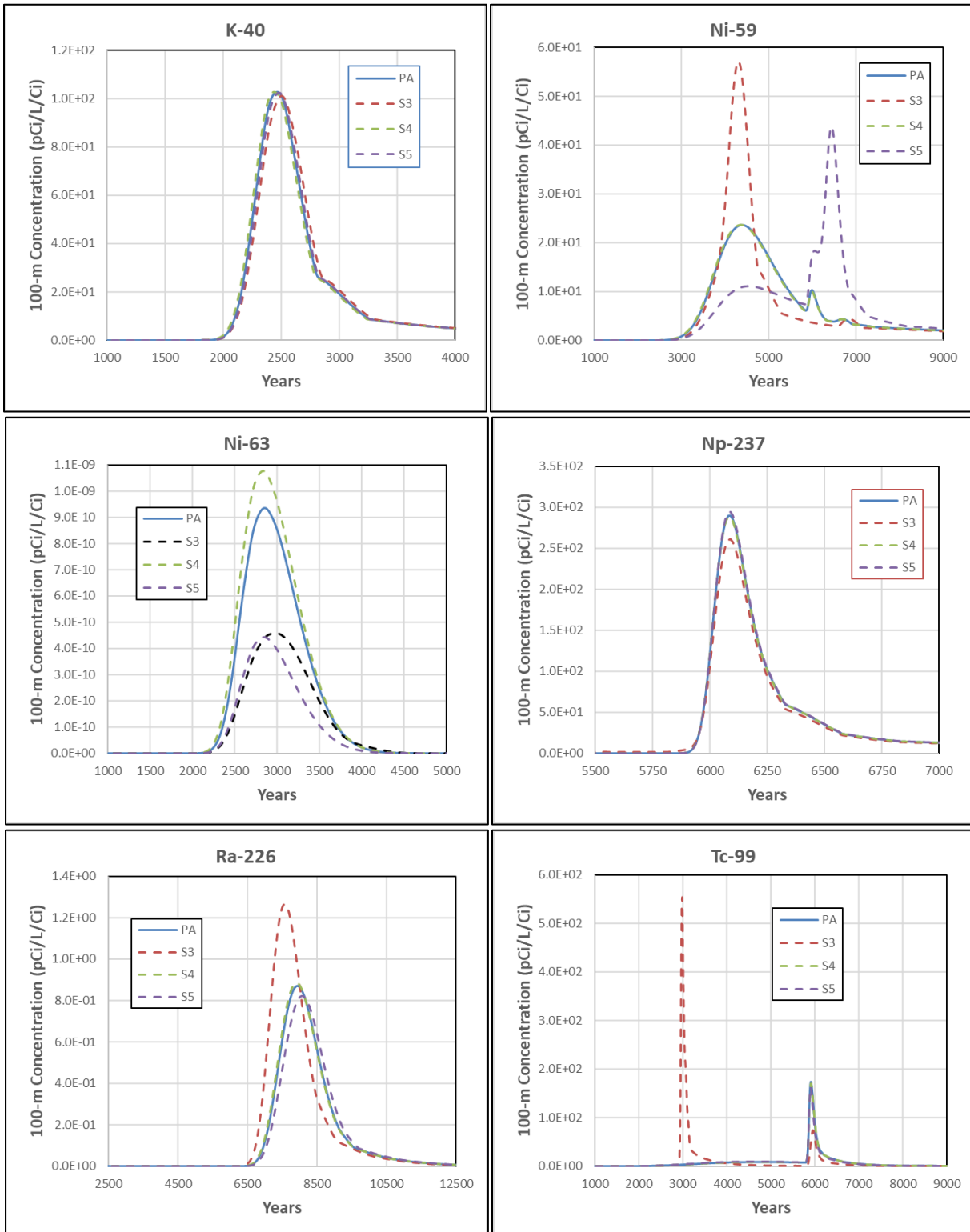


Figure E-42. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclides K-40 through Tc-99

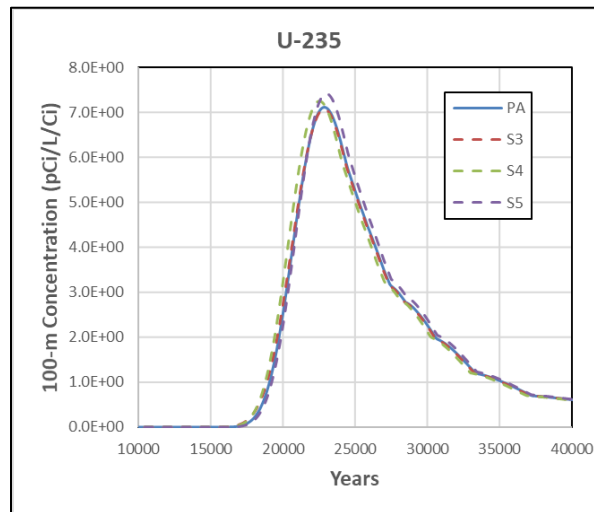


Figure E-43. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclide U-235

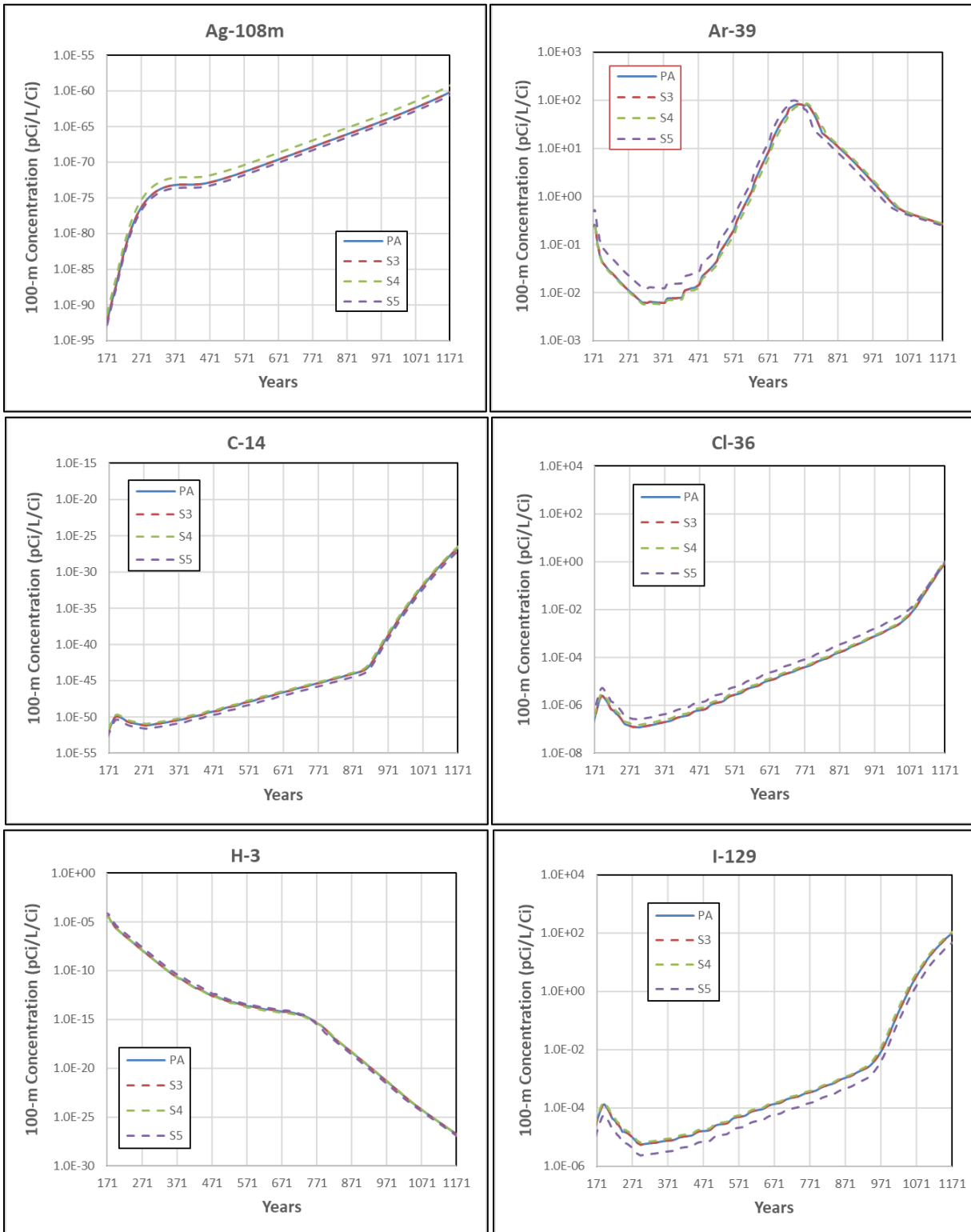


Figure E-44. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations ($\text{pCi L}^{-1} \text{Ci}^{-1}$ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclides Ag-108m through I-129 During Compliance Period

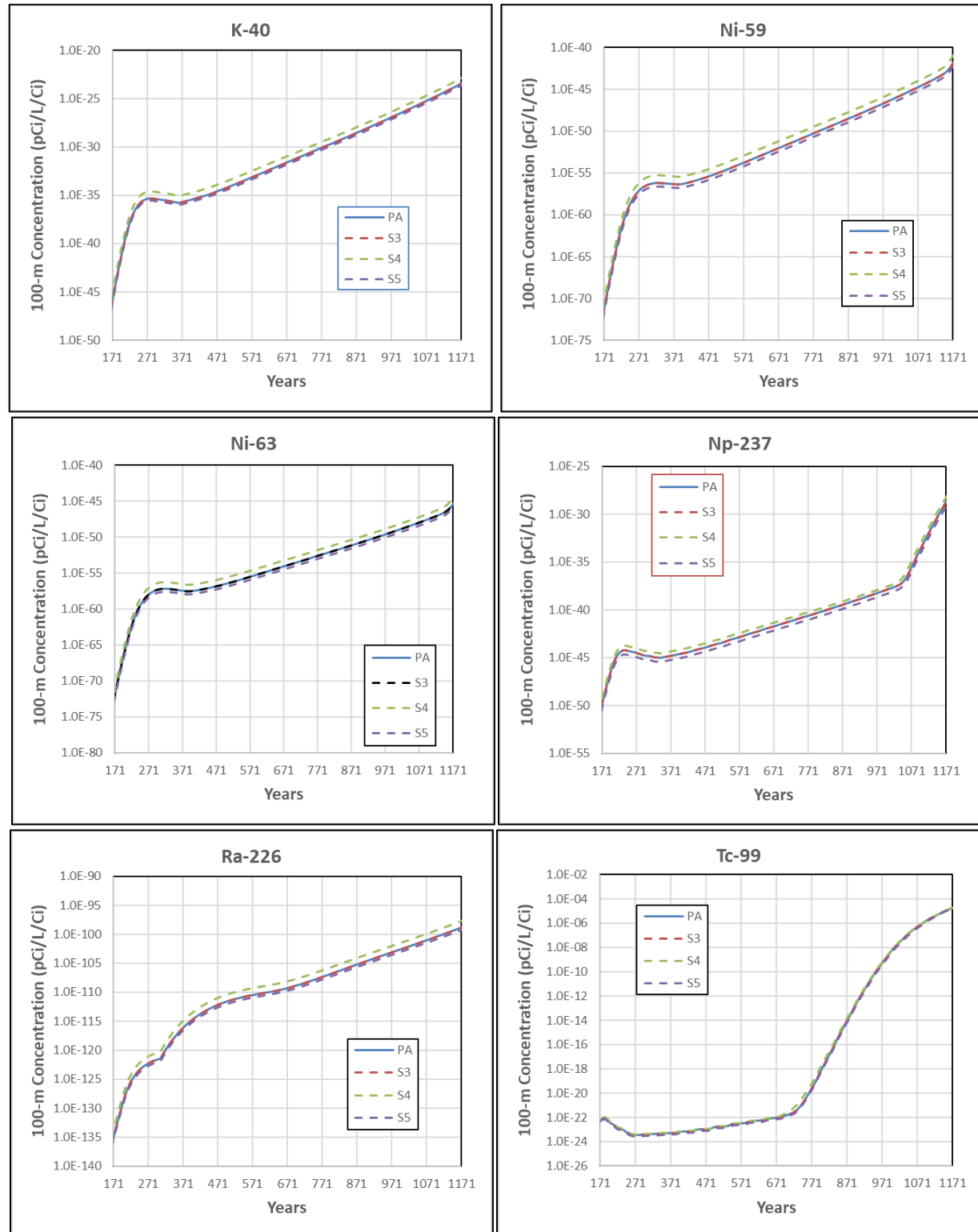


Figure E-45. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclides K-40 through Tc-99 During Compliance Period

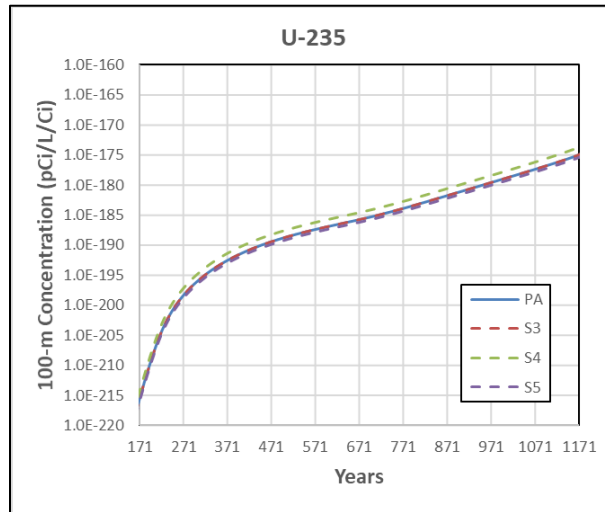


Figure E-46. Comparison of Nominal PA Case, Sensitivity Case 3 (S3), Sensitivity Case 4 (S4), and Sensitivity Case 5 (S5) Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Parent Radionuclide U-235 During Compliance Period

E.2.2 Concentrations for Decay Chain Daughter and Parent Radionuclides

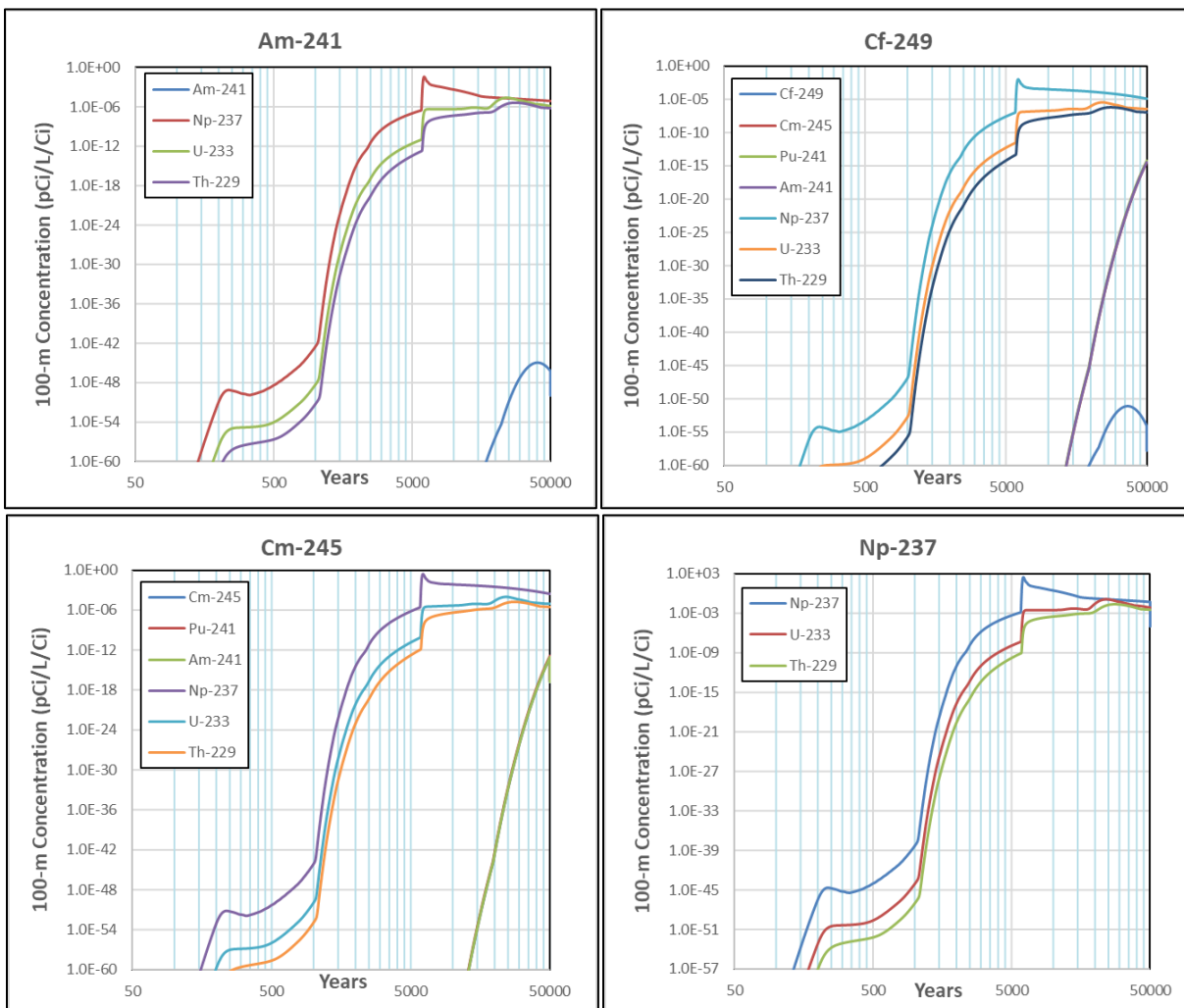


Figure E-47. Best Estimate Case Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Am-241 through Np-237 and Daughter Radionuclides

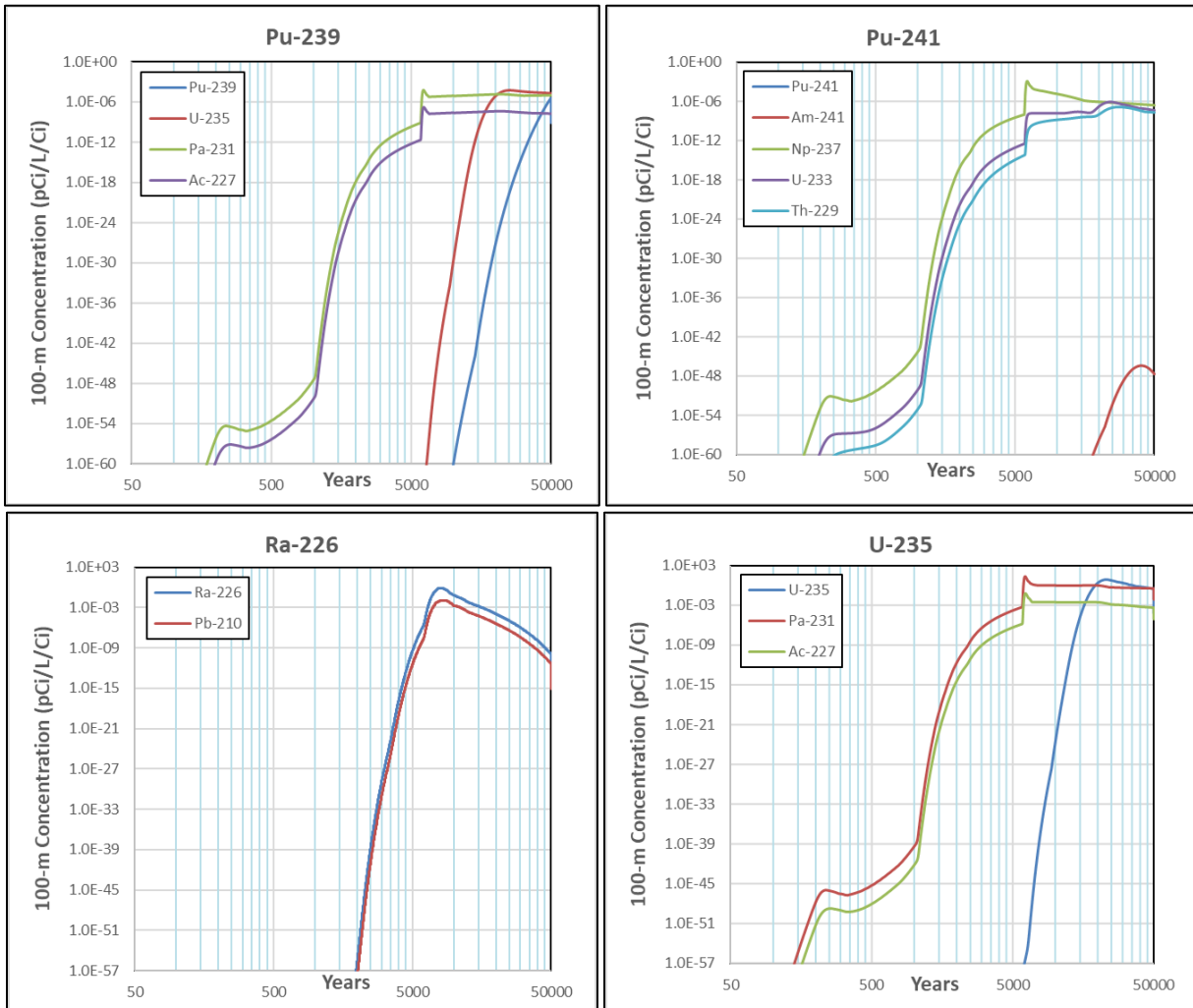


Figure E-48. Best Estimate Case Concentrations ($\text{pCi L}^{-1} \text{Ci}^{-1}$ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Pu-239 through U-235 and Daughter Radionuclides

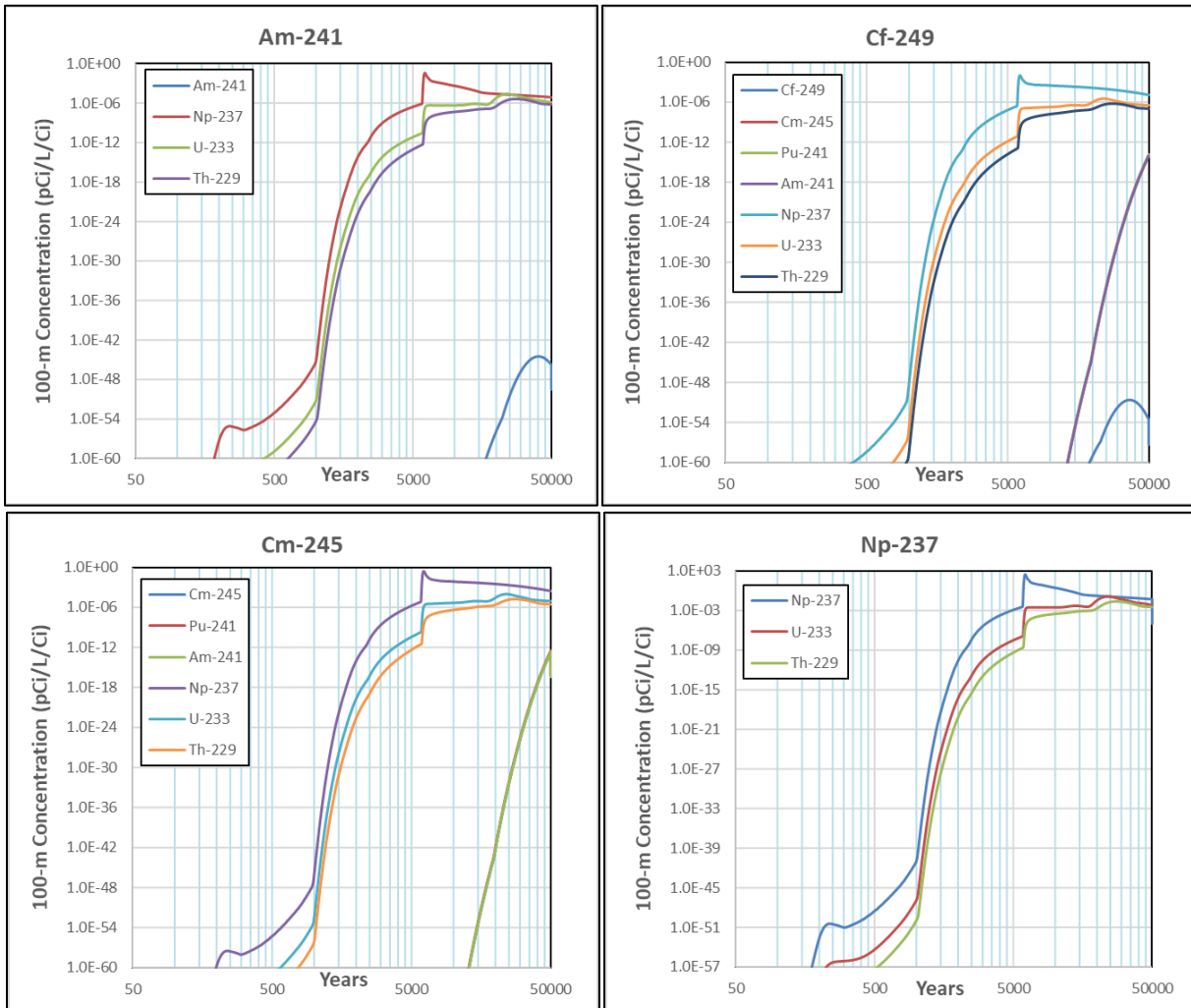


Figure E-49. Best Estimate Case 2 Concentrations ($\text{pCi L}^{-1} \text{Ci}^{-1}$ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Am-241 through Np-237 and Daughter Radionuclides

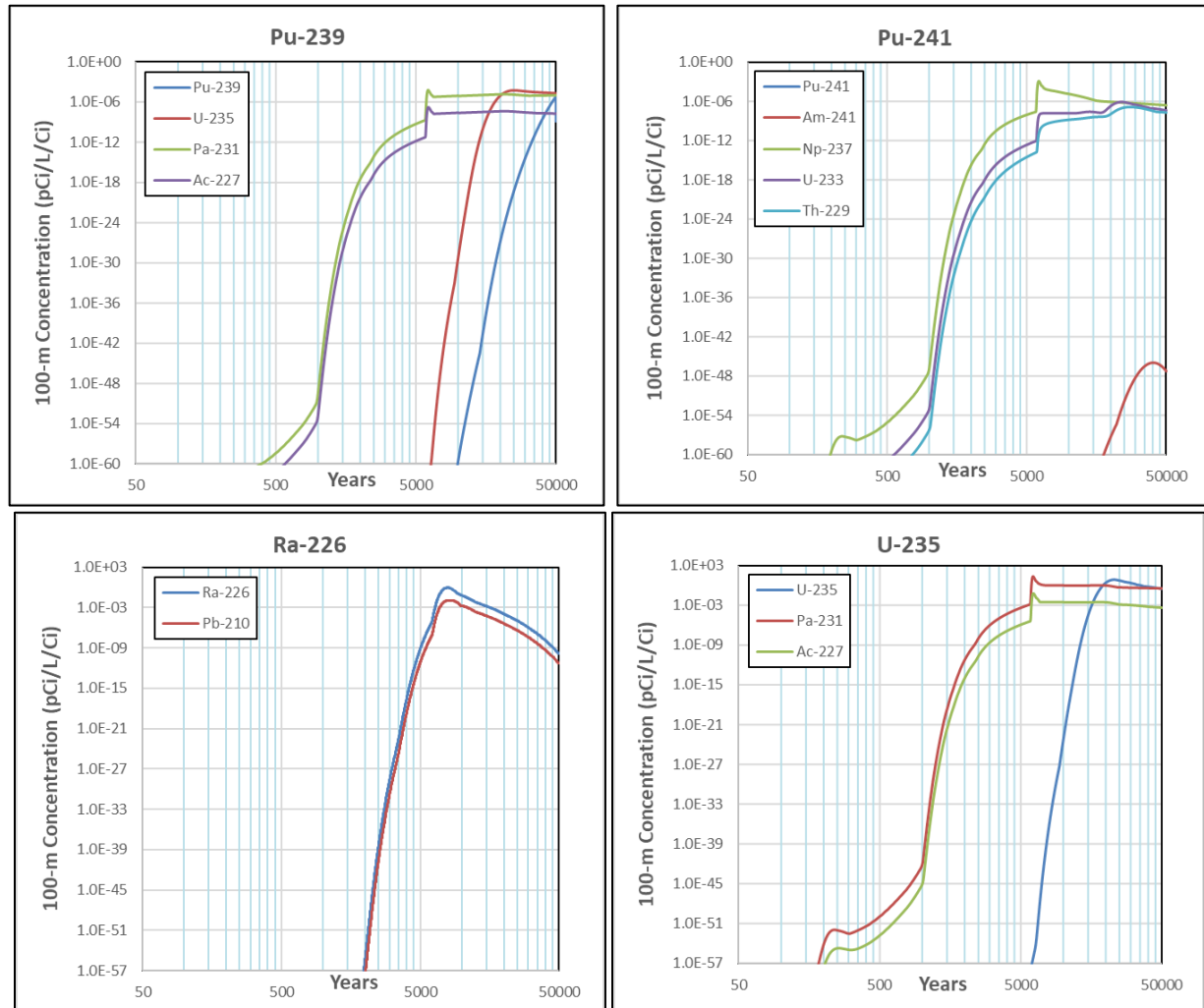


Figure E-50. Best Estimate Case 2 Concentrations ($\text{pCi L}^{-1} \text{Ci}^{-1}$ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Pu-239 through U-235 and Daughter Radionuclides

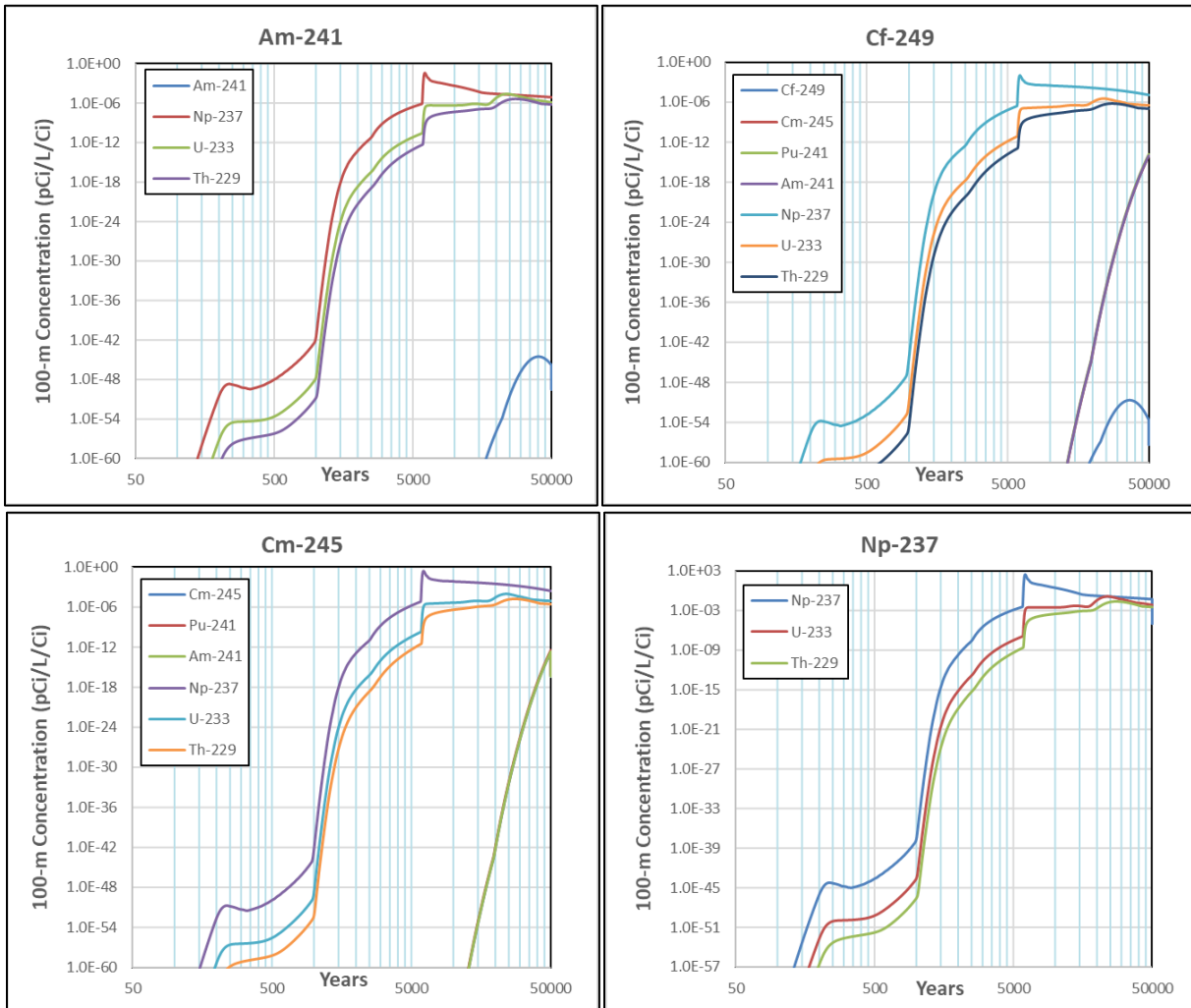


Figure E-51. Sensitivity Case 1 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Am-241 through Np-237 and Daughter Radionuclides

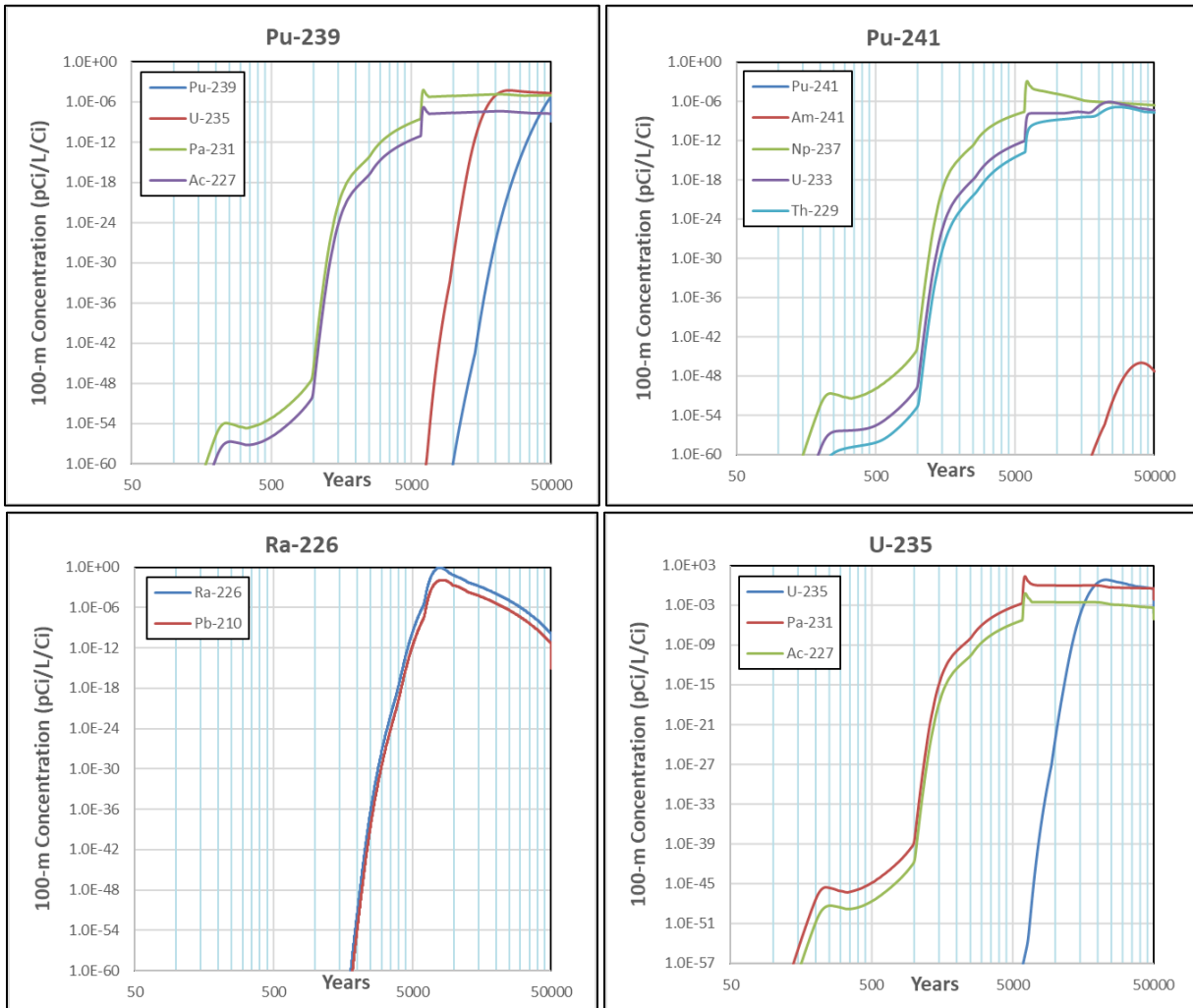


Figure E-52. Sensitivity Case 1 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Pu-239 through U-235 and Daughter Radionuclides

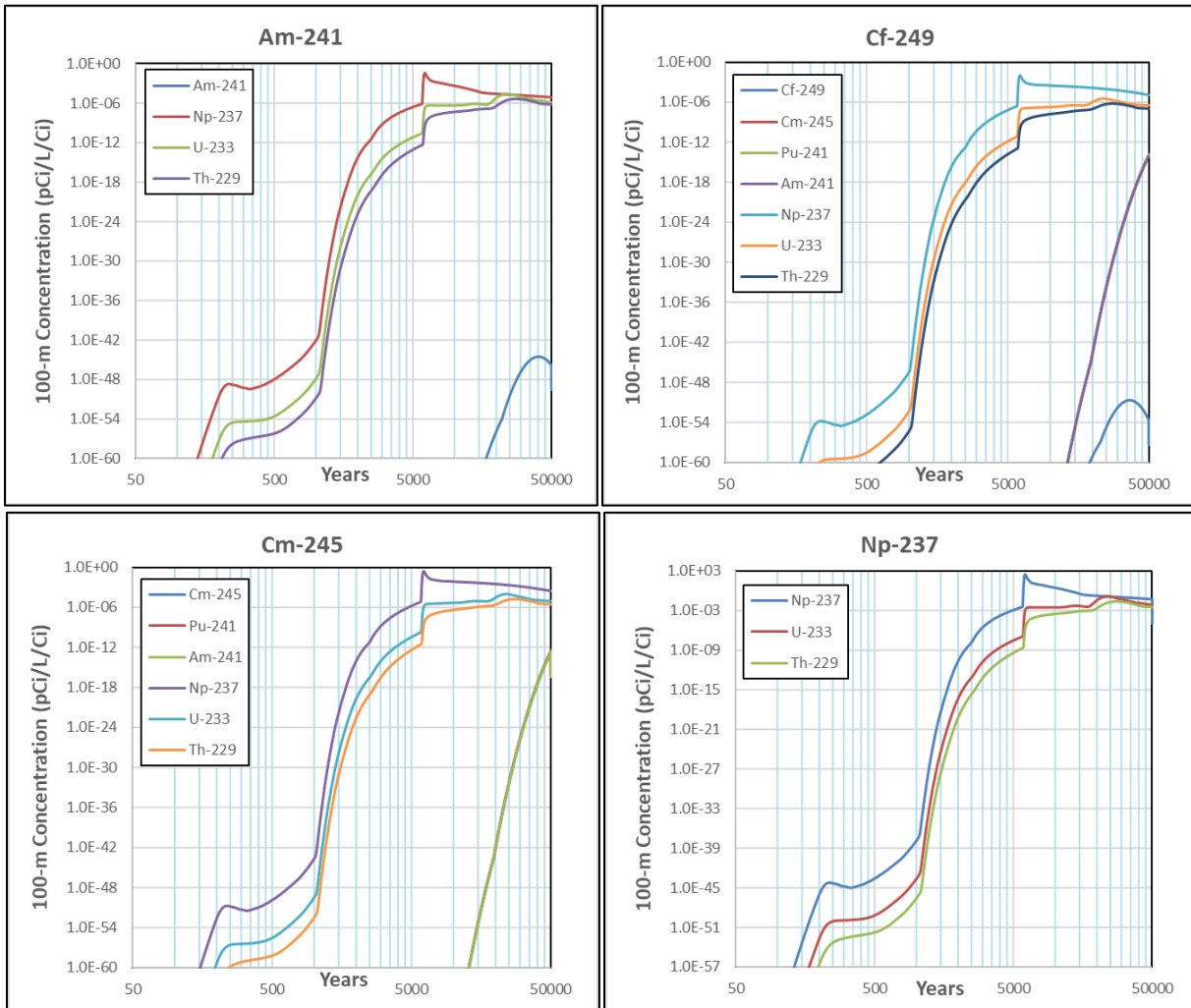


Figure E-53. Sensitivity Case 2 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Am-241 through Np-237 and Daughter Radionuclides

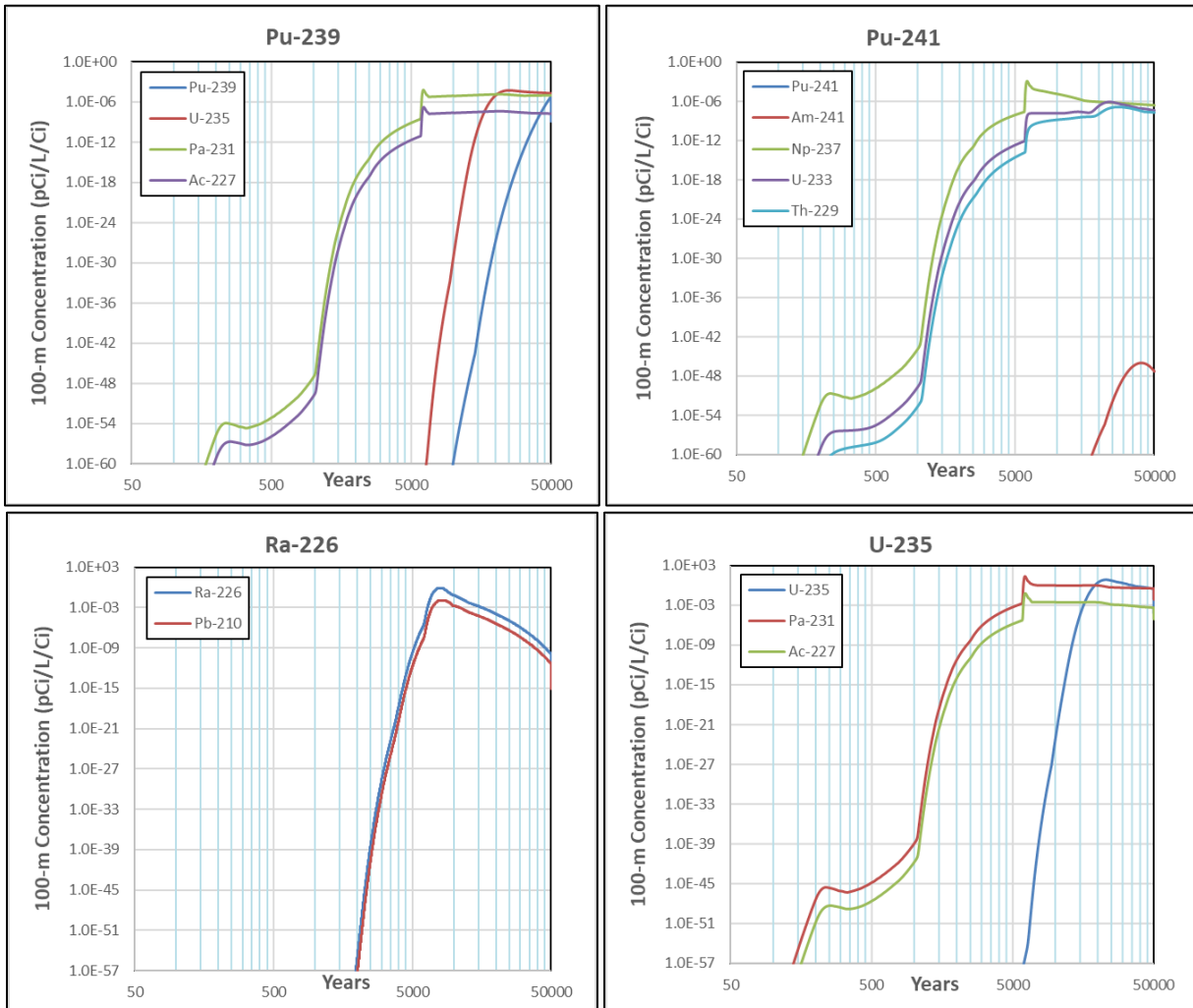


Figure E-54. Sensitivity Case 2 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Pu-239 through U-235 and Daughter Radionuclides

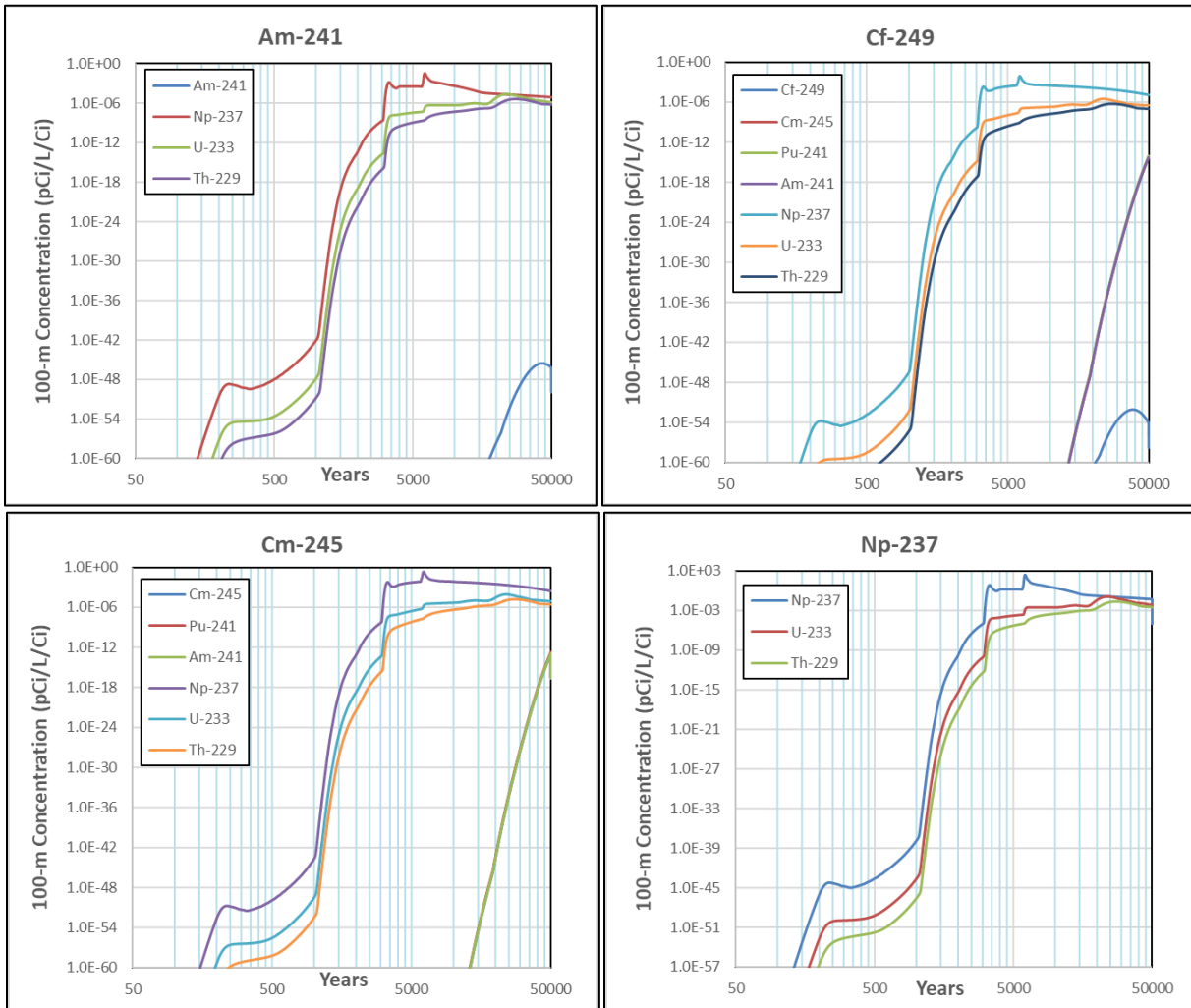


Figure E-55. Sensitivity Case 3 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Am-241 through Np-237 and Daughter Radionuclides

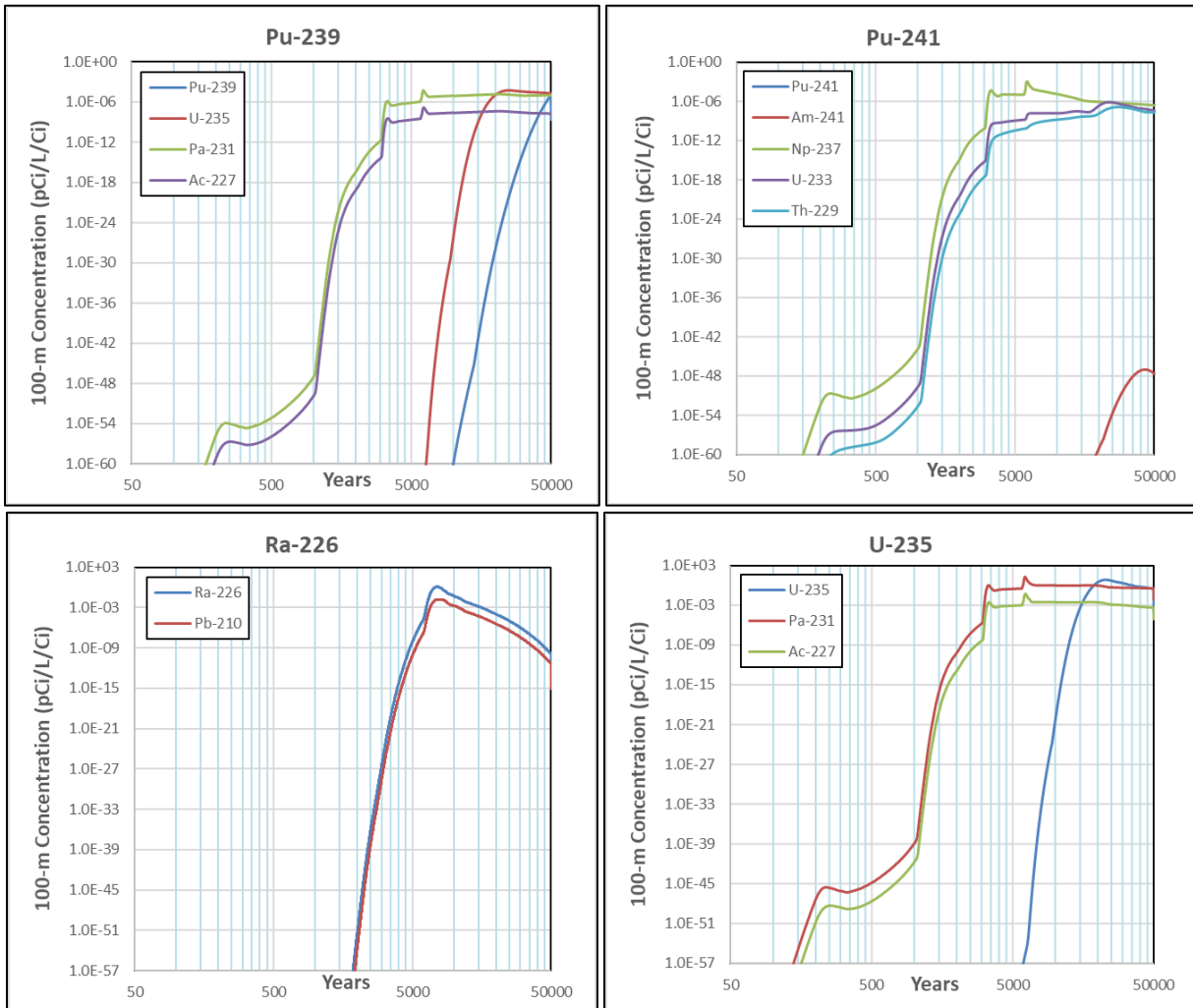


Figure E-56. Sensitivity Case 3 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Pu-239 through U-235 and Daughter Radionuclides

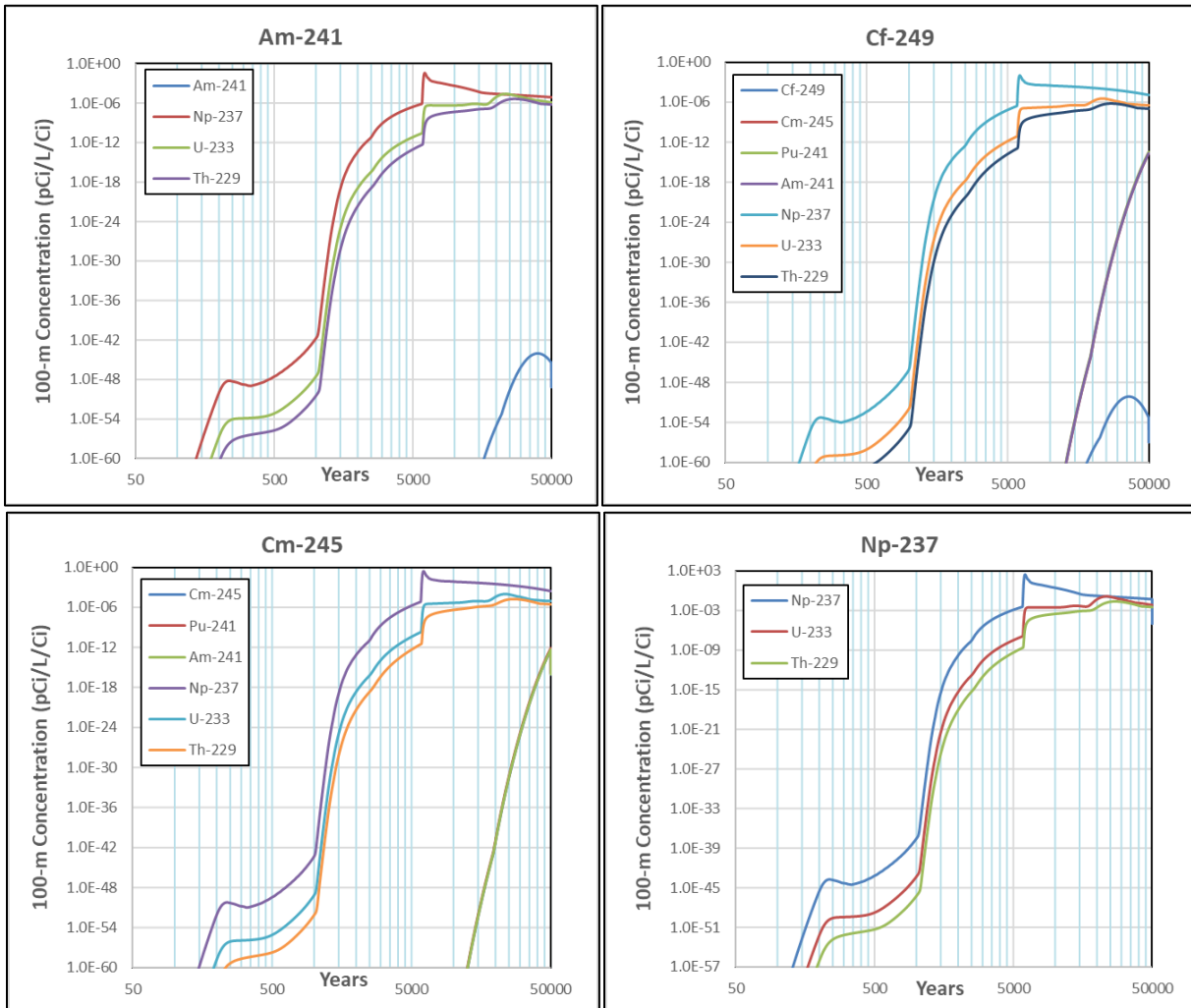


Figure E-57. Sensitivity Case 4 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Am-241 through Np-237 and Daughter Radionuclides

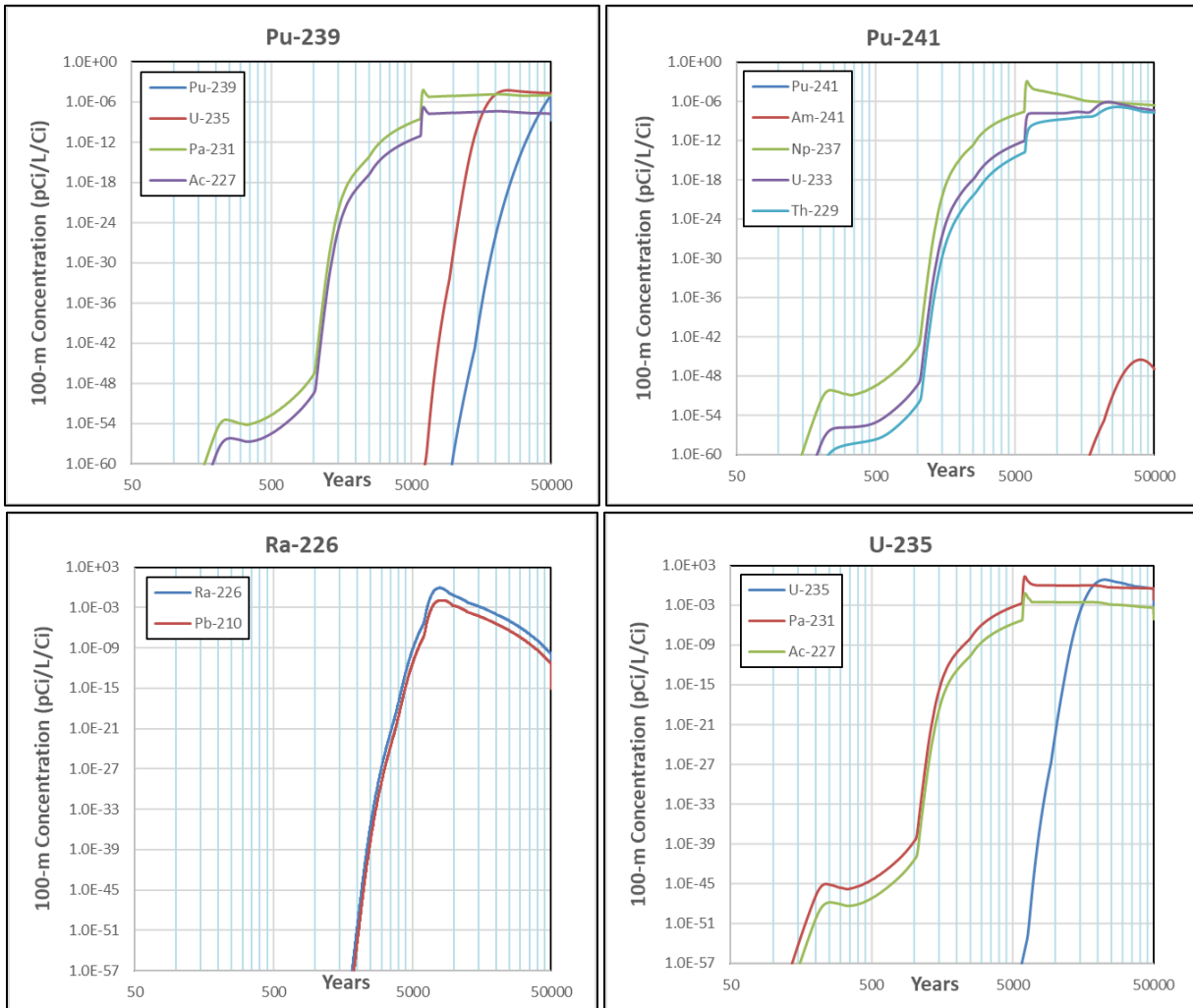


Figure E-58. Sensitivity Case 4 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Pu-239 through U-235 and Daughter Radionuclides

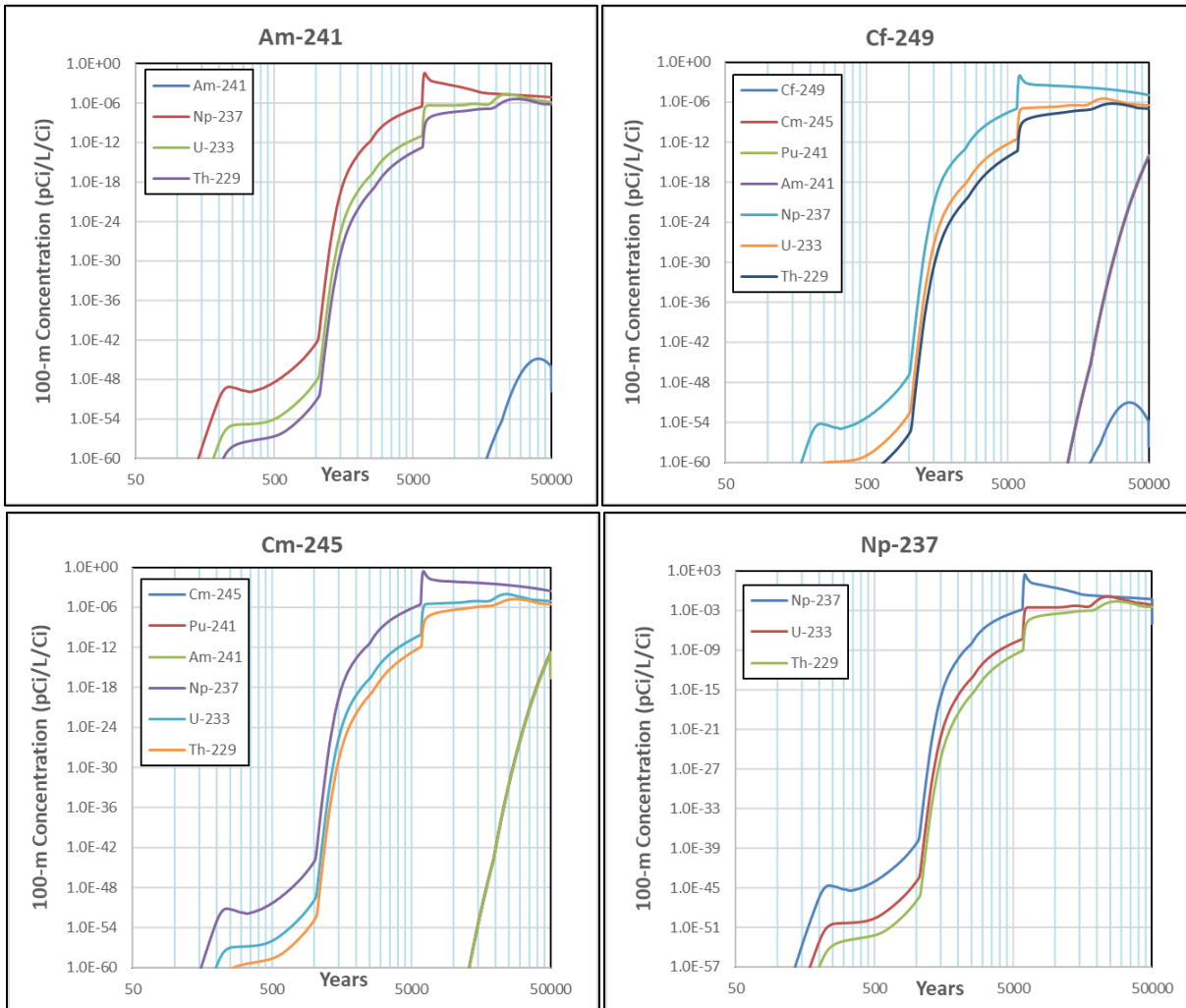


Figure E-59. Sensitivity Case 5 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Am-241 through Np-237 and Daughter Radionuclides

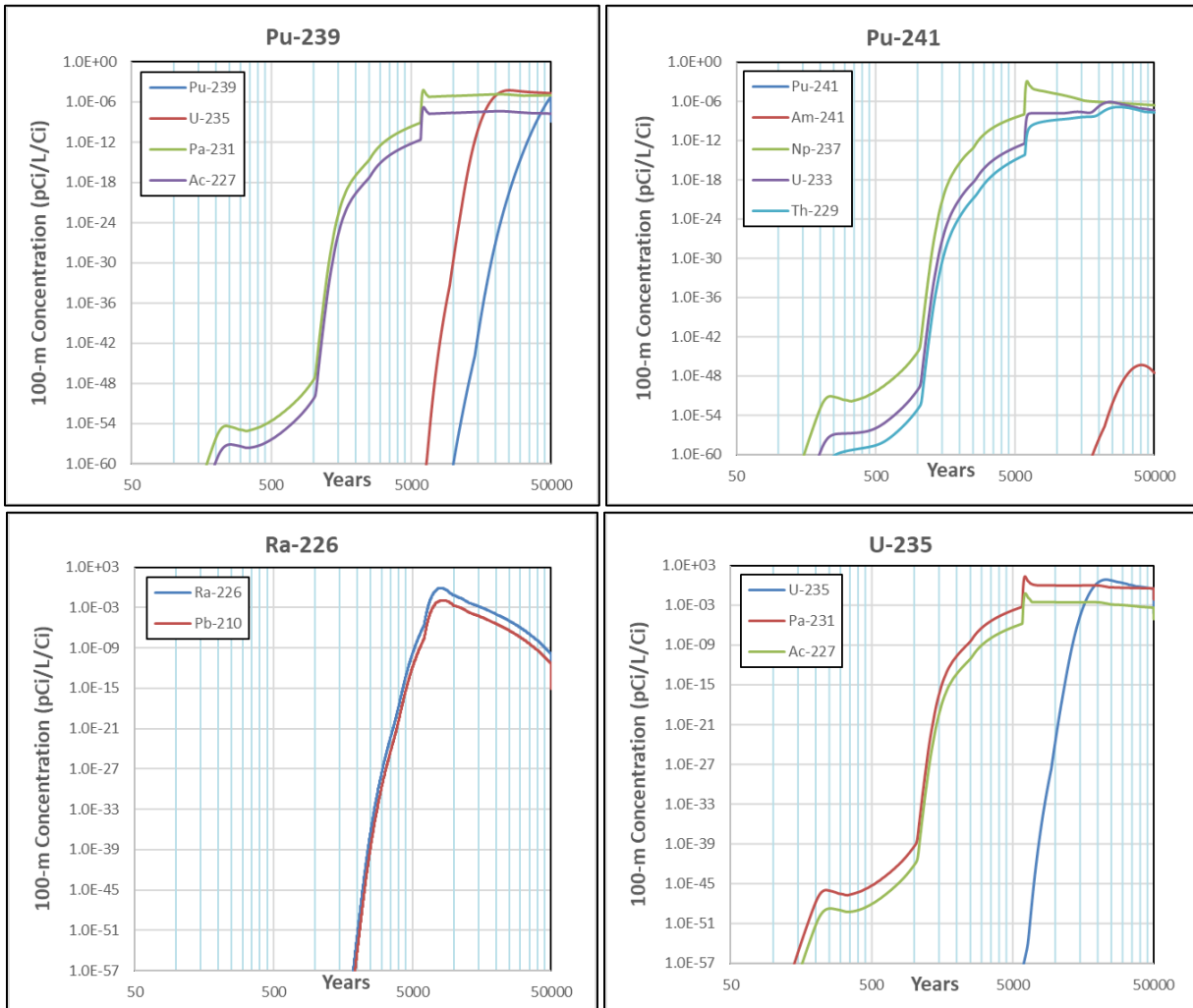


Figure E-60. Sensitivity Case 5 Concentrations ($\text{pCi L}^{-1} \text{Ci}^{-1}$ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Pu-239 through U-235 and Daughter Radionuclides

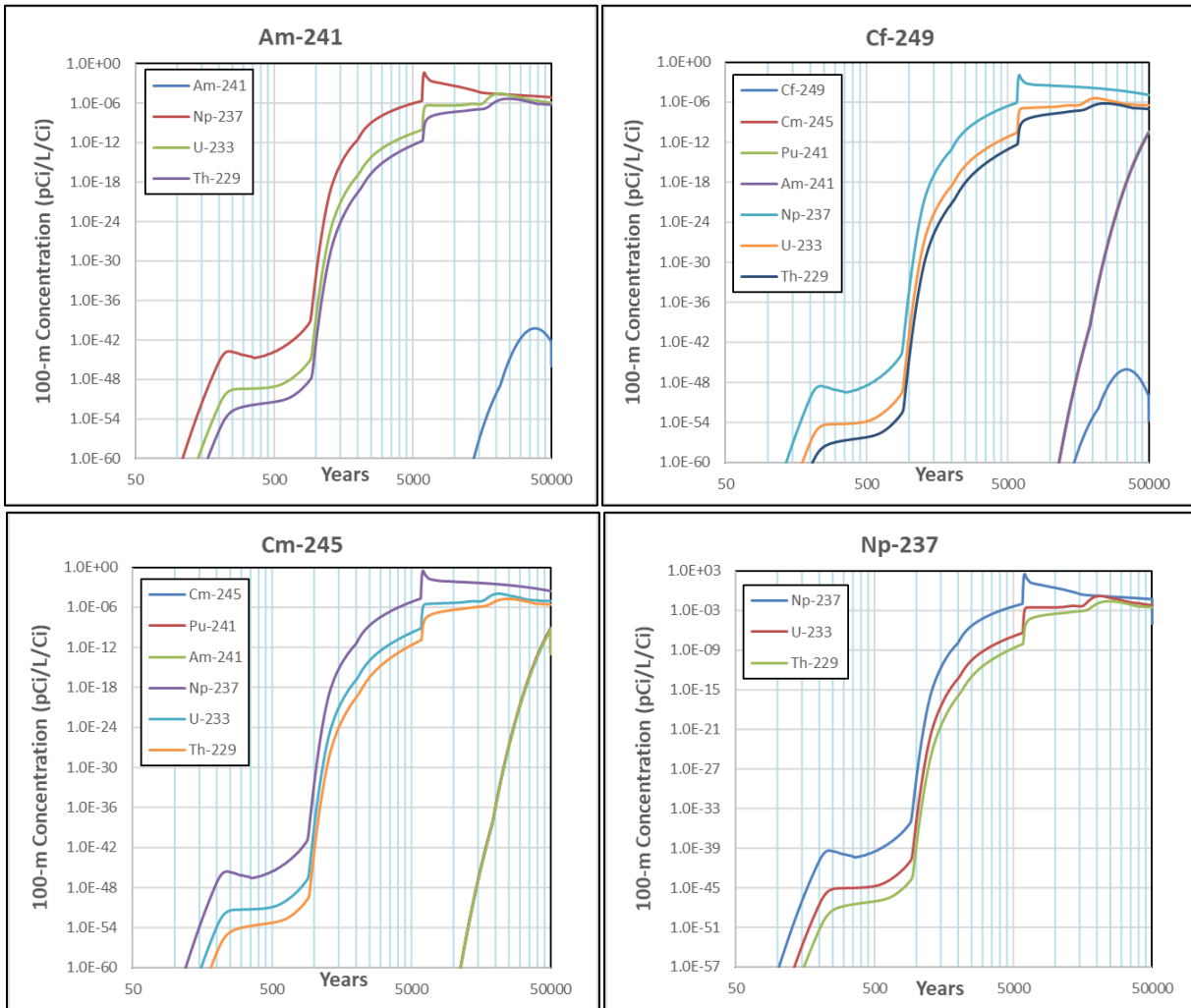


Figure E-61. Sensitivity Case 6 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Am-241 through Np-237 and Daughter Radionuclides

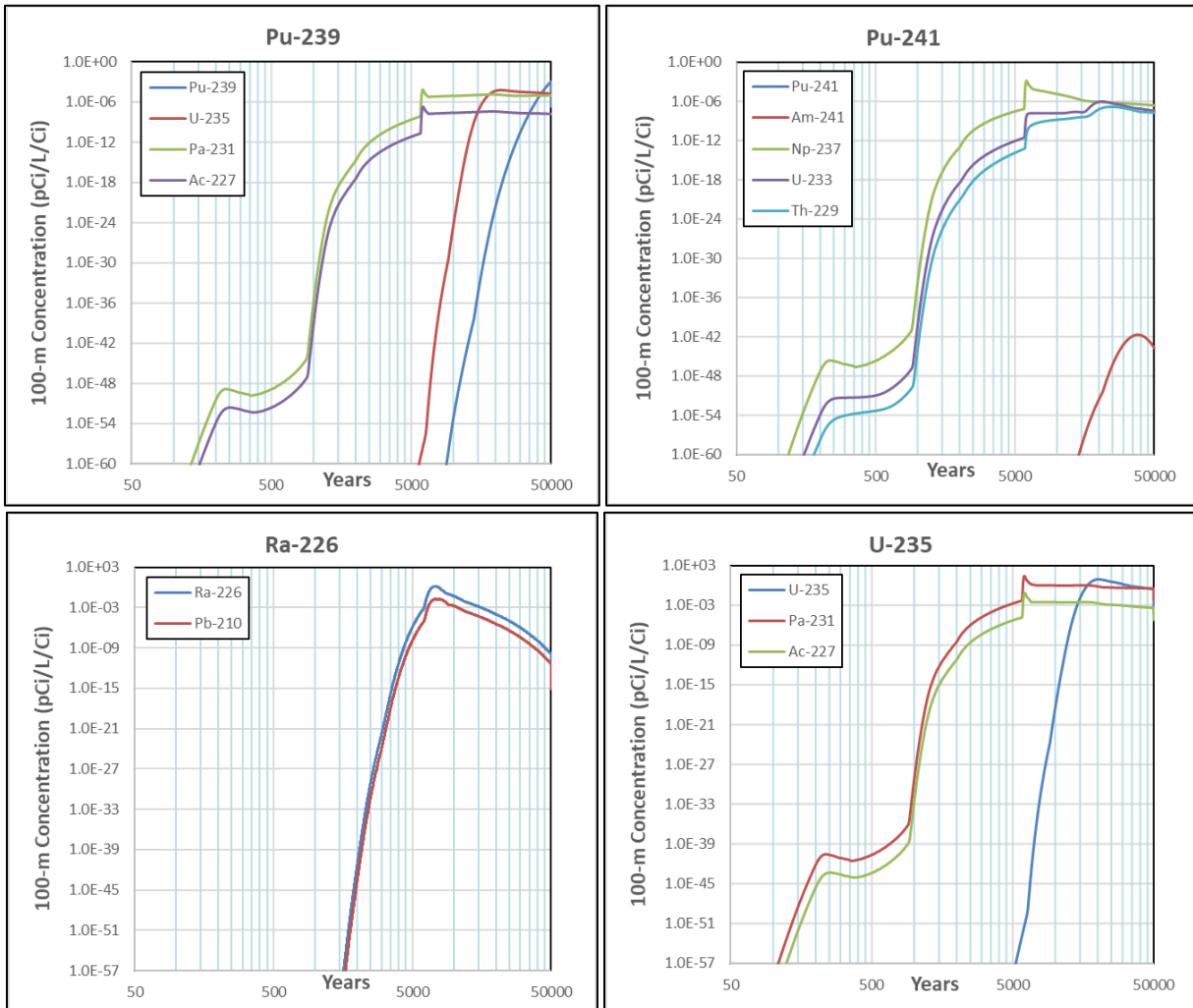


Figure E-62. Sensitivity Case 6 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Pu-239 through U-235 and Daughter Radionuclides

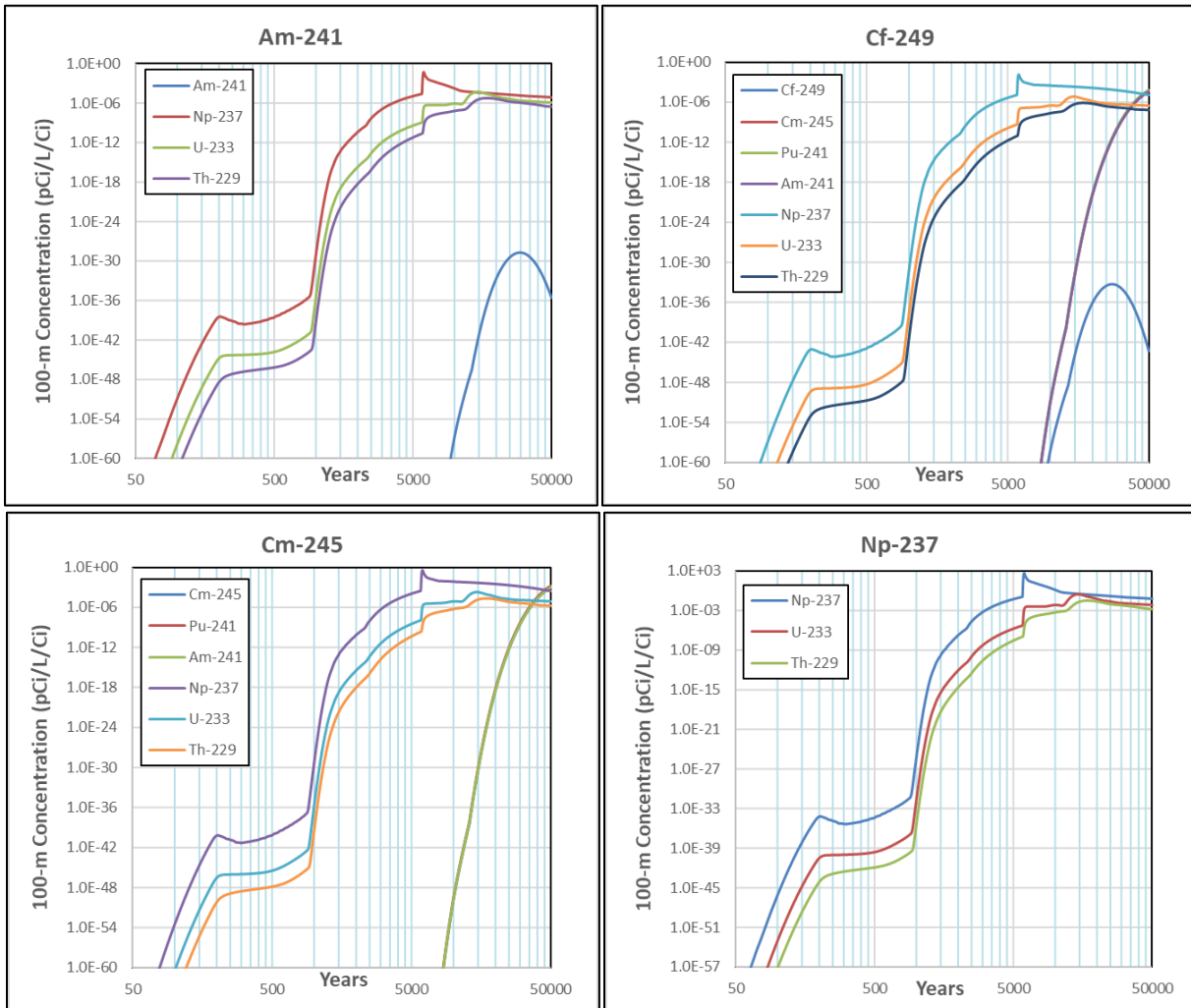


Figure E-63. Sensitivity Case 7 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Am-241 through Np-237 and Daughter Radionuclides

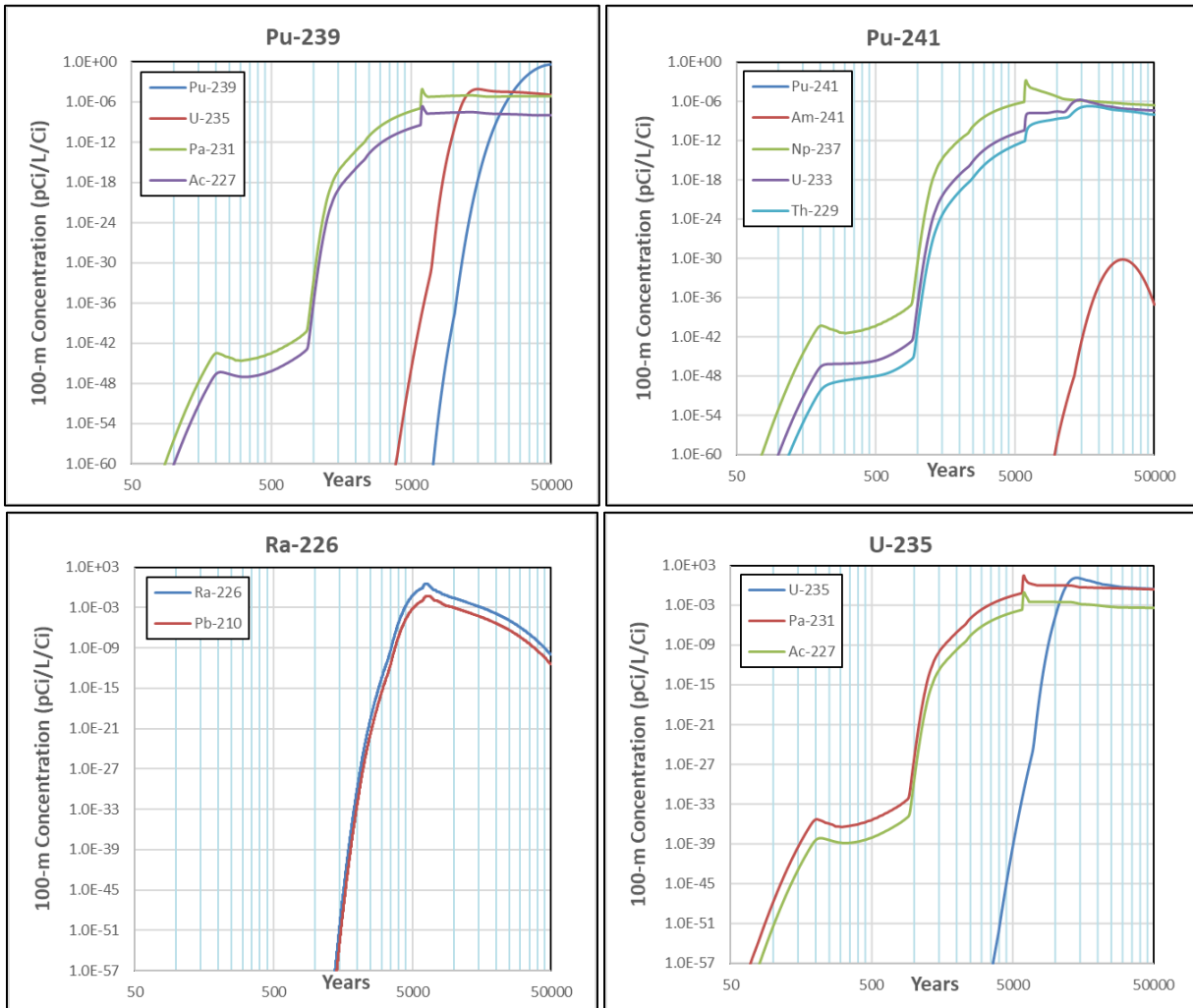


Figure E-64. Sensitivity Case 7 Concentrations (pCi L⁻¹ Ci⁻¹ parent buried) for Intermediate-Level Vault at 100-meter POA for Decay Chain Parents Pu-239 through U-235 and Daughter Radionuclides

E.2.3 Maximum Concentration Contours of I-129

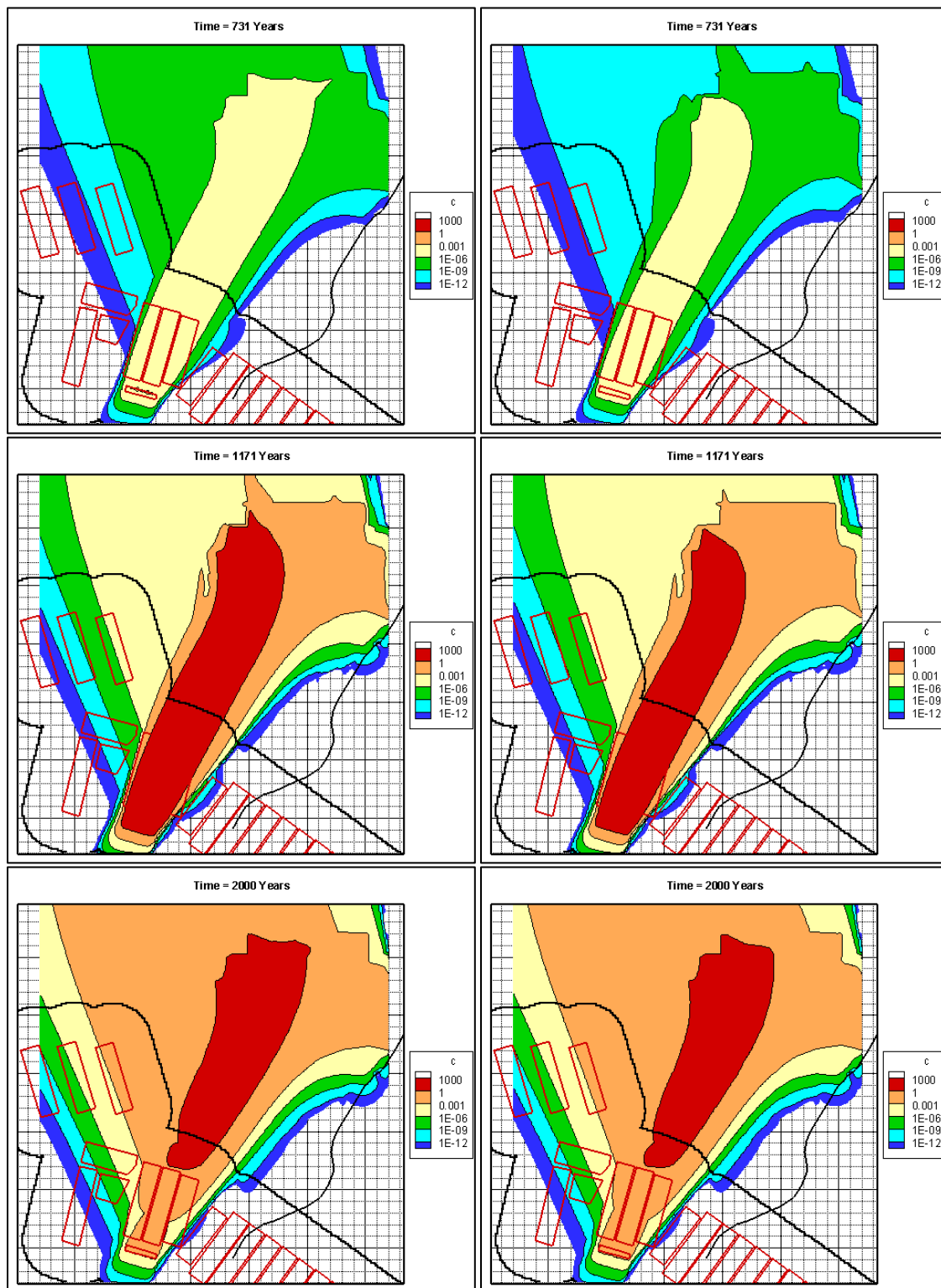


Figure E-65. Maximum Concentration ($\text{pCi L}^{-1} \text{Ci}^{-1}$ parent buried) Contours of I-129 for the Best Estimate Case (left) and Best Estimate Case 2 (right) for Intermediate-Level Vault

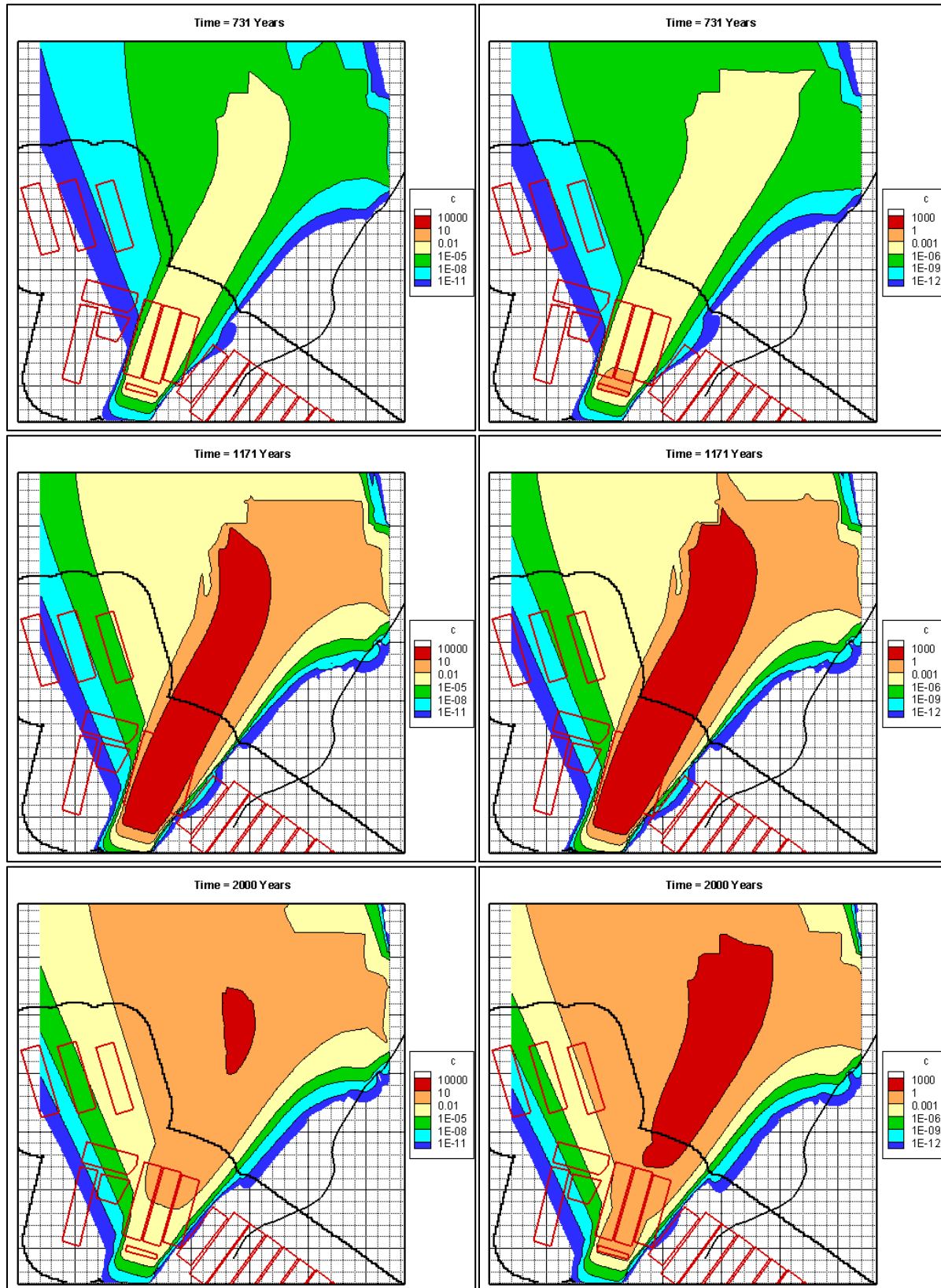


Figure E-66. Maximum Concentration (pCi L⁻¹ Ci⁻¹ parent buried) Contours of I-129 for Sensitivity Case 1 (left) and Sensitivity Case 2 (right) for Intermediate-Level Vault

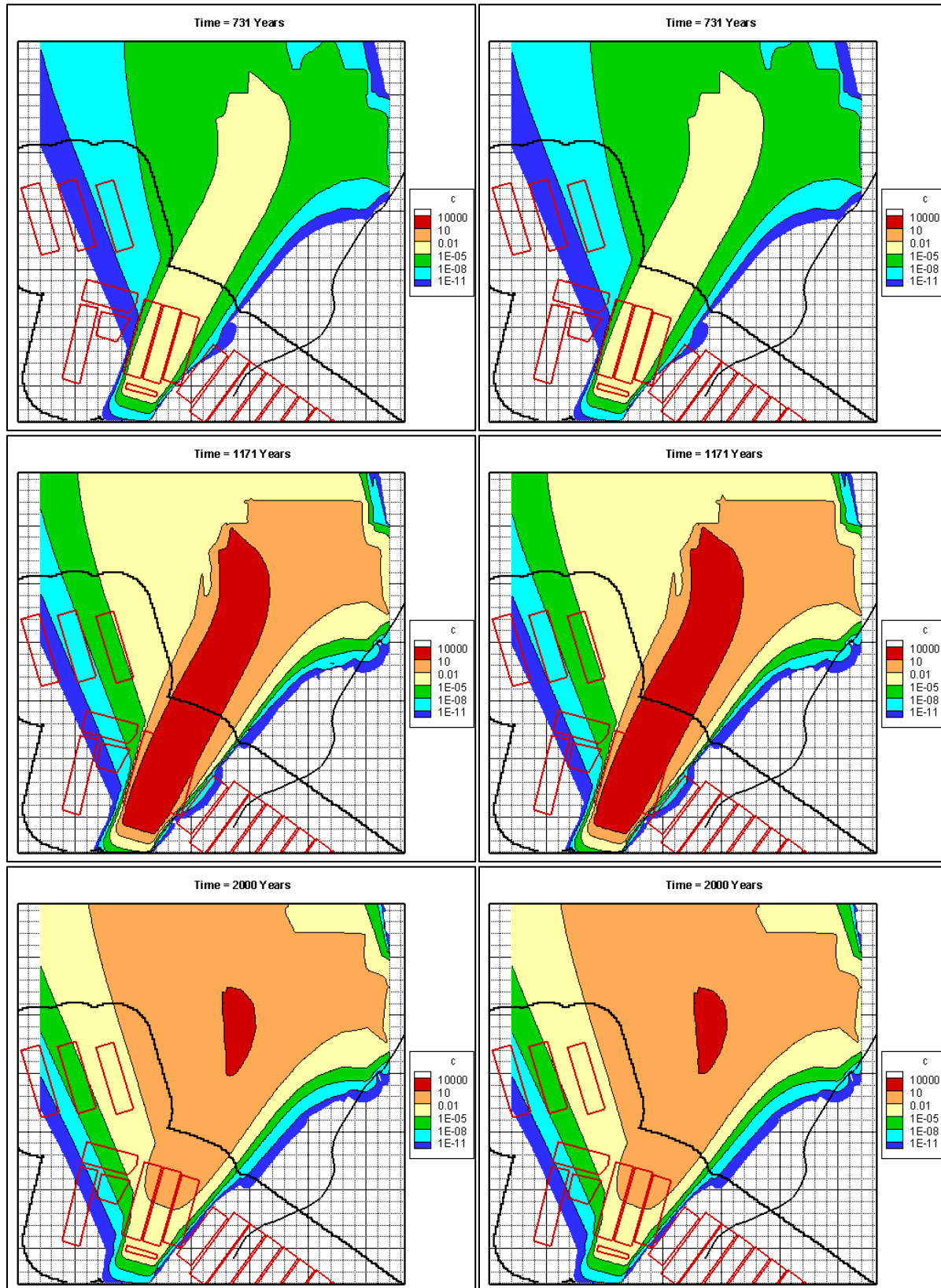


Figure E-67. Maximum Concentration (pCi L⁻¹ Ci⁻¹ parent buried) Contours of I-129 for Sensitivity Case 3 (left) and Sensitivity Case 4 (right) for Intermediate-Level Vault

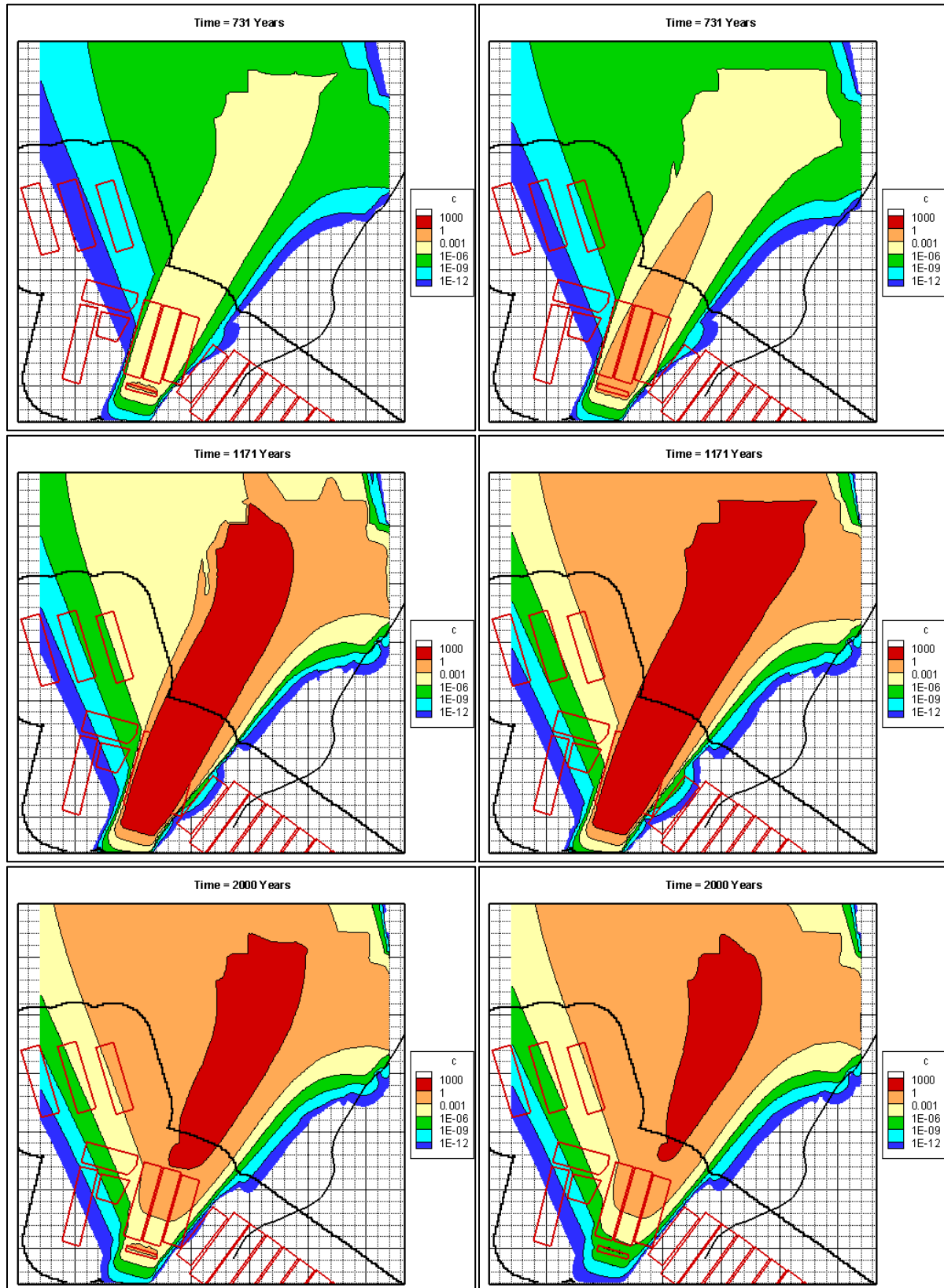


Figure E-68. Maximum Concentration (pCi L⁻¹ Ci⁻¹ parent buried) Contours of I-129 for Sensitivity Case 5 (left) and Sensitivity Case 6 (right) for Intermediate-Level Vault