

**Contract No:**

This document was prepared in conjunction with work accomplished under Contract No. 89303321CEM000080 with the U.S. Department of Energy (DOE) Office of Environmental Management (EM).

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## APPENDIX F: SUPPORTING INFORMATION: SENSITIVITY ANALYSIS AND UNCERTAINTY QUANTIFICATION

### F.1 SENSITIVITY ANALYSIS: NAVAL REACTOR COMPONENT DISPOSAL AREA WASTE DISPOSAL TIMING

As a supplement to Chapter 6, Section 6.1.1.3, Table F-1 through Table F-24 provide tabular results of the sensitivity analysis calculations for waste disposal timing (Sensitivity Case S6) in NR07E (Cases 3 and 4) and NR26E (Cases 1 through 4). The title of each table identifies the DU, sensitivity case, and performance measure. Section F.1.1 (Table F-1 through Table F-8) presents results for NR07E and Section F.1.2 (Table F-9 through Table F-24) presents results for NR26E. In each table, radionuclides are sorted from highest to lowest nominal concentration or dose factor. Nominal values are when waste disposal occurs at the start of operations; timeline values are when waste disposal occurs at the end of operations. The differences ( $\Delta$  values) in the last column of each table equal the timeline concentration or dose factor minus the nominal concentration or dose factor, where DF and CF are shorthand designations for dose factor and concentration factor, respectively.

#### F.1.1 NR07E

##### F.1.1.1. All Pathways

Table F-1. NR07E Case 3: Maximum All-Pathways Dose Factor at 100-meter POA and Time of Maximum

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(DF)$                           |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129S  | 3.59E-01                               | 1,171 | 2.48E-01                               | 1,171 | -1.11E-01                              |
| Tc-99S  | 1.24E-01                               | 1,171 | 1.05E-01                               | 1,171 | -1.90E-02                              |
| Cl-36S  | 1.17E-06                               | 1,171 | 6.80E-07                               | 1,171 | -4.90E-07                              |
| Np-237S | 3.25E-09                               | 1,171 | 1.51E-09                               | 1,171 | -1.74E-09                              |
| U-235S  | 2.38E-10                               | 1,171 | 1.10E-10                               | 1,171 | -1.28E-10                              |
| Am-241S | 4.73E-13                               | 1,171 | 2.19E-13                               | 1,171 | -2.54E-13                              |
| Pu-241S | 1.55E-14                               | 1,171 | 7.16E-15                               | 1,171 | -8.34E-15                              |
| C-14S   | 1.31E-14                               | 1,171 | 6.86E-15                               | 1,171 | -6.24E-15                              |
| Be-10S  | 1.09E-17                               | 1,171 | 4.33E-18                               | 1,171 | -6.57E-18                              |
| Ni-59S  | 6.69E-25                               | 1,171 | 2.40E-25                               | 1,171 | -4.29E-25                              |
| Ni-63S  | 3.86E-28                               | 1,171 | 1.58E-28                               | 1,171 | -2.28E-28                              |

**Table F-2. NR07E Case 4: Maximum All-Pathways Dose Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(\text{DF})$                    |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129S  | 5.54E-02                               | 1,171 | 3.82E-02                               | 1,171 | -1.72E-02                              |
| Tc-99S  | 1.91E-02                               | 1,171 | 1.62E-02                               | 1,171 | -2.96E-03                              |
| Cl-36S  | 1.80E-07                               | 1,171 | 1.05E-07                               | 1,171 | -7.54E-08                              |
| Np-237S | 5.01E-10                               | 1,171 | 2.32E-10                               | 1,171 | -2.69E-10                              |
| U-235S  | 3.66E-11                               | 1,171 | 1.69E-11                               | 1,171 | -1.97E-11                              |
| Am-241S | 7.28E-14                               | 1,171 | 3.37E-14                               | 1,171 | -3.92E-14                              |
| Pu-241S | 2.39E-15                               | 1,171 | 1.10E-15                               | 1,171 | -1.28E-15                              |
| C-14S   | 2.01E-15                               | 1,171 | 1.06E-15                               | 1,171 | -9.54E-16                              |
| Be-10S  | 1.68E-18                               | 1,171 | 6.68E-19                               | 1,171 | -1.01E-18                              |
| Ni-59S  | 1.03E-25                               | 1,171 | 3.70E-26                               | 1,171 | -6.61E-26                              |
| Ni-63S  | 6.11E-29                               | 1,171 | 2.48E-29                               | 1,171 | -3.63E-29                              |

### F.1.1.2. Beta-Gamma

**Table F-3. NR07E Case 3: Maximum Beta-Gamma Dose Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(\text{DF})$                    |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129S  | 6.14E+00                               | 1,171 | 4.23E+00                               | 1,171 | -1.91E+00                              |
| Tc-99S  | 1.88E-01                               | 1,171 | 1.59E-01                               | 1,171 | -2.89E-02                              |
| Cl-36S  | 1.30E-06                               | 1,171 | 7.56E-07                               | 1,171 | -5.44E-07                              |
| Np-237S | 2.16E-10                               | 1,171 | 1.00E-10                               | 1,171 | -1.16E-10                              |
| U-235S  | 2.58E-13                               | 1,171 | 1.16E-13                               | 1,171 | -1.42E-13                              |
| Am-241S | 3.15E-14                               | 1,171 | 1.45E-14                               | 1,171 | -1.70E-14                              |
| C-14S   | 1.30E-14                               | 1,171 | 6.84E-15                               | 1,171 | -6.16E-15                              |
| Pu-241S | 1.03E-15                               | 1,171 | 4.76E-16                               | 1,171 | -5.54E-16                              |
| Be-10S  | 1.85E-17                               | 1,171 | 7.37E-18                               | 1,171 | -1.11E-17                              |
| Ni-59S  | 6.45E-23                               | 1,171 | 2.31E-23                               | 1,171 | -4.14E-23                              |
| Ni-63S  | 8.99E-26                               | 1,171 | 3.67E-26                               | 1,171 | -5.32E-26                              |

**Table F-4. NR07E Case 4: Maximum Beta-Gamma Dose Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(\text{DF})$                    |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129S  | 9.46E-01                               | 1,171 | 6.52E-01                               | 1,171 | -2.94E-01                              |
| Tc-99S  | 2.90E-02                               | 1,171 | 2.45E-02                               | 1,171 | -4.48E-03                              |
| Cl-36S  | 2.00E-07                               | 1,171 | 1.16E-07                               | 1,171 | -8.38E-08                              |
| Np-237S | 3.33E-11                               | 1,171 | 1.54E-11                               | 1,171 | -1.79E-11                              |
| U-235S  | 3.98E-14                               | 1,171 | 1.79E-14                               | 1,171 | -2.19E-14                              |
| Am-241S | 4.84E-15                               | 1,171 | 2.24E-15                               | 1,171 | -2.61E-15                              |
| C-14S   | 2.01E-15                               | 1,171 | 1.05E-15                               | 1,171 | -9.52E-16                              |
| Pu-241S | 1.59E-16                               | 1,171 | 7.33E-17                               | 1,171 | -8.54E-17                              |
| Be-10S  | 2.85E-18                               | 1,171 | 1.14E-18                               | 1,171 | -1.72E-18                              |
| Ni-59S  | 9.94E-24                               | 1,171 | 3.56E-24                               | 1,171 | -6.37E-24                              |
| Ni-63S  | 1.42E-26                               | 1,171 | 5.76E-27                               | 1,171 | -8.45E-27                              |

### F.1.1.3. Gross Alpha

**Table F-5. NR07E Case 3: Maximum Gross Alpha Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                              |       | Timeline                             |       | $\Delta(\text{CF})$                  |
|---------|--------------------------------------|-------|--------------------------------------|-------|--------------------------------------|
|         | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> |
| Np-237S | 1.62E-08                             | 1,171 | 7.51E-09                             | 1,171 | -8.69E-09                            |
| U-235S  | 2.70E-10                             | 1,171 | 1.25E-10                             | 1,171 | -1.45E-10                            |
| Am-241S | 2.36E-12                             | 1,171 | 1.09E-12                             | 1,171 | -1.27E-12                            |
| Pu-241S | 7.73E-14                             | 1,171 | 3.57E-14                             | 1,171 | -4.16E-14                            |

**Table F-6. NR07E Case 4: Maximum Gross Alpha Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                              |       | Timeline                             |       | $\Delta(\text{CF})$                  |
|---------|--------------------------------------|-------|--------------------------------------|-------|--------------------------------------|
|         | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> |
| Np-237S | 2.50E-09                             | 1,171 | 1.16E-09                             | 1,171 | -1.34E-09                            |
| U-235S  | 4.17E-11                             | 1,171 | 1.92E-11                             | 1,171 | -2.24E-11                            |
| Am-241S | 3.63E-13                             | 1,171 | 1.68E-13                             | 1,171 | -1.95E-13                            |
| Pu-241S | 1.19E-14                             | 1,171 | 5.50E-15                             | 1,171 | -6.40E-15                            |

### F.1.1.4. Uranium

**Table F-7. NR07E Case 3: Maximum Uranium Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                             |       | Timeline                            |       | $\Delta(\text{CF})$                 |
|---------|-------------------------------------|-------|-------------------------------------|-------|-------------------------------------|
|         | μg L <sup>-1</sup> Ci <sup>-1</sup> | Year  | μg L <sup>-1</sup> Ci <sup>-1</sup> | Year  | μg L <sup>-1</sup> Ci <sup>-1</sup> |
| Np-237S | 1.12E-18                            | 1,171 | 5.01E-19                            | 1,171 | -6.19E-19                           |
| Am-241S | 1.63E-22                            | 1,171 | 7.27E-23                            | 1,171 | -9.03E-23                           |
| Pu-241S | 5.35E-24                            | 1,171 | 2.38E-24                            | 1,171 | -2.97E-24                           |
| U-235S  | 6.37E-87                            | 1,171 | 1.23E-87                            | 1,171 | -5.14E-87                           |

**Table F-8. NR07E Case 4: Maximum Uranium Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                             |       | Timeline                            |       | $\Delta(\text{CF})$                 |
|---------|-------------------------------------|-------|-------------------------------------|-------|-------------------------------------|
|         | μg L <sup>-1</sup> Ci <sup>-1</sup> | Year  | μg L <sup>-1</sup> Ci <sup>-1</sup> | Year  | μg L <sup>-1</sup> Ci <sup>-1</sup> |
| Np-237S | 1.73E-19                            | 1,171 | 7.73E-20                            | 1,171 | -9.60E-20                           |
| Am-241S | 2.51E-23                            | 1,171 | 1.12E-23                            | 1,171 | -1.39E-23                           |
| Pu-241S | 8.24E-25                            | 1,171 | 3.67E-25                            | 1,171 | -4.57E-25                           |
| U-235S  | 9.82E-88                            | 1,171 | 1.89E-88                            | 1,171 | -7.92E-88                           |

## F.1.2 NR26E

### F.1.2.1. All Pathways

**Table F-9. NR26E Case 1: Maximum All-Pathways Dose Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(\text{DF})$                    |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129   | 4.66E+01                               | 956   | 4.66E+01                               | 956   | 3.97E-05                               |
| Tc-99   | 1.69E+00                               | 184   | 1.70E+00                               | 184   | 4.98E-04                               |
| Cl-36   | 3.87E-01                               | 1,171 | 3.87E-01                               | 1,171 | 7.44E-05                               |
| Np-237  | 1.54E-01                               | 1,171 | 1.54E-01                               | 1,171 | 1.48E-05                               |
| U-235   | 1.21E-03                               | 1171  | 2.58E-04                               | 1,171 | -9.51E-04                              |
| Am-241  | 3.98E-06                               | 1,171 | 8.65E-07                               | 1,171 | -3.11E-06                              |
| C-14    | 1.26E-06                               | 1,171 | 1.27E-06                               | 1,171 | 1.05E-08                               |
| H-3     | 1.07E-06                               | 171   | 4.42E-05                               | 171   | 4.31E-05                               |
| Pu-241  | 1.02E-07                               | 1,171 | 1.29E-08                               | 1,171 | -8.91E-08                              |
| Ni-59   | 1.68E-14                               | 1,171 | 1.68E-14                               | 1,171 | 9.12E-18                               |
| Ni-63   | 1.10E-17                               | 1,171 | 1.76E-17                               | 1,171 | 6.60E-18                               |
| Sr-90   | 3.69E-18                               | 260   | 1.86E-17                               | 260   | 1.49E-17                               |

**Table F-10. NR26E Case 2: Maximum All-Pathways Dose Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(\text{DF})$                    |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129   | 1.54E+01                               | 1171  | 4.67E+00                               | 1,171 | -1.08E+01                              |
| Tc-99   | 1.24E+00                               | 1,146 | 1.26E+00                               | 1,171 | 1.69E-02                               |
| Cl-36   | 1.80E-04                               | 1,171 | 2.22E-05                               | 1,171 | -1.57E-04                              |
| Np-237  | 9.27E-08                               | 1,171 | 3.96E-09                               | 1,171 | -8.87E-08                              |
| U-235   | 6.57E-09                               | 1,171 | 2.79E-10                               | 1,171 | -6.29E-09                              |
| Am-241  | 1.33E-11                               | 1,171 | 5.65E-13                               | 1,171 | -1.27E-11                              |
| C-14    | 3.05E-12                               | 1,171 | 2.27E-13                               | 1,171 | -2.82E-12                              |
| Pu-241  | 4.35E-13                               | 1,171 | 1.85E-14                               | 1,171 | -4.16E-13                              |
| H-3     | 8.09E-22                               | 834   | 1.43E-21                               | 895   | 6.23E-22                               |
| Ni-59   | 2.23E-24                               | 1,171 | 2.87E-26                               | 1,171 | -2.20E-24                              |
| Ni-63   | 1.39E-27                               | 1,171 | 2.83E-29                               | 1,171 | -1.36E-27                              |
| Sr-90   | 1.13E-27                               | 1,171 | 1.15E-28                               | 1,171 | -1.01E-27                              |

**Table F-11. NR26E Case 3: Maximum All-Pathways Dose Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(\text{DF})$                    |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129S  | 3.47E-02                               | 1,171 | 6.51E-03                               | 1,171 | -2.82E-02                              |
| Tc-99S  | 1.02E-02                               | 1,171 | 5.17E-03                               | 1,171 | -5.08E-03                              |
| Cl-36S  | 2.30E-07                               | 1,171 | 2.05E-08                               | 1,171 | -2.10E-07                              |
| Np-237S | 8.37E-11                               | 1,171 | 2.67E-12                               | 1,171 | -8.10E-11                              |
| U-235S  | 6.08E-12                               | 1,171 | 1.92E-13                               | 1,171 | -5.89E-12                              |
| Am-241S | 1.21E-14                               | 1171  | 3.85E-16                               | 1,171 | -1.18E-14                              |
| C-14S   | 3.80E-15                               | 1,171 | 2.14E-16                               | 1,171 | -3.59E-15                              |
| Pu-241S | 3.98E-16                               | 1,171 | 1.26E-17                               | 1,171 | -3.85E-16                              |
| Be-10S  | 8.60E-20                               | 1,171 | 1.36E-21                               | 1,171 | -8.47E-20                              |
| Ni-59S  | 1.87E-27                               | 1,171 | 1.81E-29                               | 1,171 | -1.86E-27                              |
| Ni-63S  | 1.14E-30                               | 1,171 | 1.75E-32                               | 1,171 | -1.12E-30                              |

**Table F-12. NR26E Case 4: Maximum All-Pathways Dose Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(\text{DF})$                    |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129S  | 5.35E-03                               | 1,171 | 1.00E-03                               | 1,171 | -4.34E-03                              |
| Tc-99S  | 1.58E-03                               | 1,171 | 7.96E-04                               | 1,171 | -7.83E-04                              |
| Cl-36S  | 3.55E-08                               | 1,171 | 3.16E-09                               | 1,171 | -3.23E-08                              |
| Np-237S | 1.29E-11                               | 1,171 | 4.12E-13                               | 1,171 | -1.25E-11                              |
| U-235S  | 9.36E-13                               | 1,171 | 2.96E-14                               | 1,171 | -9.07E-13                              |
| Am-241S | 1.87E-15                               | 1,171 | 5.93E-17                               | 1,171 | -1.81E-15                              |
| C-14S   | 5.85E-16                               | 1,171 | 3.30E-17                               | 1,171 | -5.52E-16                              |
| Pu-241S | 6.12E-17                               | 1,171 | 1.94E-18                               | 1,171 | -5.93E-17                              |
| Be-10S  | 1.33E-20                               | 1,171 | 2.09E-22                               | 1,171 | -1.30E-20                              |
| Ni-59S  | 2.89E-28                               | 1171  | 2.79E-30                               | 1,171 | -2.86E-28                              |
| Ni-63S  | 1.80E-31                               | 1,171 | 2.74E-33                               | 1,171 | -1.77E-31                              |

### F.1.2.2. Beta-Gamma

**Table F-13. NR26E Case 1: Maximum Beta-Gamma Dose Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(\text{DF})$                    |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129   | 7.97E+02                               | 956   | 7.97E+02                               | 956   | 6.78E-04                               |
| Tc-99   | 2.57E+00                               | 184   | 2.57E+00                               | 184   | 7.54E-04                               |
| Cl-36   | 4.30E-01                               | 1,171 | 4.30E-01                               | 1,171 | 8.27E-05                               |
| Np-237  | 1.02E-02                               | 1,171 | 1.02E-02                               | 1,171 | 9.83E-07                               |
| H-3     | 4.08E-03                               | 100   | 1.69E-01                               | 100   | 1.65E-01                               |
| U-235   | 2.45E-06                               | 1,171 | 5.02E-07                               | 1,171 | -1.94E-06                              |
| C-14    | 1.26E-06                               | 1,171 | 1.27E-06                               | 1,171 | 1.05E-08                               |
| Am-241  | 2.64E-07                               | 1,171 | 5.76E-08                               | 1,171 | -2.07E-07                              |
| Pu-241  | 6.78E-09                               | 1,171 | 8.59E-10                               | 1,171 | -5.92E-09                              |
| Ni-59   | 1.61E-12                               | 1,171 | 1.62E-12                               | 1,171 | 8.79E-16                               |
| Ni-63   | 2.56E-15                               | 1,171 | 4.10E-15                               | 1,171 | 1.53E-15                               |
| Sr-90   | 3.15E-17                               | 260   | 1.59E-16                               | 260   | 1.27E-16                               |

**Table F-14. NR26E Case 2: Maximum Beta-Gamma Dose Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(\text{DF})$                    |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129   | 2.64E+02                               | 1,171 | 7.98E+01                               | 1,171 | -1.84E+02                              |
| Tc-99   | 1.88E+00                               | 1,146 | 1.91E+00                               | 1,171 | 2.56E-02                               |
| Cl-36   | 2.00E-04                               | 1,171 | 2.47E-05                               | 1,171 | -1.75E-04                              |
| Np-237  | 6.16E-09                               | 1,171 | 2.64E-10                               | 1,171 | -5.90E-09                              |
| U-235   | 6.80E-12                               | 1,171 | 2.56E-13                               | 1,171 | -6.54E-12                              |
| C-14    | 3.04E-12                               | 1,171 | 2.27E-13                               | 1,171 | -2.81E-12                              |
| Am-241  | 8.83E-13                               | 1,171 | 3.76E-14                               | 1,171 | -8.45E-13                              |
| Pu-241  | 2.89E-14                               | 1,171 | 1.23E-15                               | 1,171 | -2.77E-14                              |
| H-3     | 3.54E-21                               | 834   | 6.26E-21                               | 895   | 2.72E-21                               |
| Ni-59   | 2.15E-22                               | 1,171 | 2.76E-24                               | 1,171 | -2.12E-22                              |
| Ni-63   | 3.23E-25                               | 1,171 | 6.57E-27                               | 1,171 | -3.17E-25                              |
| Sr-90   | 9.63E-27                               | 1,171 | 9.80E-28                               | 1,171 | -8.65E-27                              |

**Table F-15. NR26E Case 3: Maximum Beta-Gamma Dose Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(\text{DF})$                    |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129S  | 5.93E-01                               | 1,171 | 1.11E-01                               | 1,171 | -4.82E-01                              |
| Tc-99S  | 1.55E-02                               | 1,171 | 7.83E-03                               | 1,171 | -7.70E-03                              |
| Cl-36S  | 2.56E-07                               | 1,171 | 2.28E-08                               | 1,171 | -2.33E-07                              |
| Np-237S | 5.57E-12                               | 1,171 | 1.78E-13                               | 1,171 | -5.39E-12                              |
| U-235S  | 6.10E-15                               | 1,171 | 1.71E-16                               | 1,171 | -5.93E-15                              |
| C-14S   | 3.79E-15                               | 1,171 | 2.13E-16                               | 1,171 | -3.57E-15                              |
| Am-241S | 8.07E-16                               | 1,171 | 2.56E-17                               | 1,171 | -7.82E-16                              |
| Pu-241S | 2.64E-17                               | 1,171 | 8.39E-19                               | 1,171 | -2.56E-17                              |
| Be-10S  | 1.46E-19                               | 1,171 | 2.31E-21                               | 1,171 | -1.44E-19                              |
| Ni-59S  | 1.80E-25                               | 1,171 | 1.74E-27                               | 1,171 | -1.79E-25                              |
| Ni-63S  | 2.65E-28                               | 1,171 | 4.06E-30                               | 1,171 | -2.61E-28                              |

**Table F-16. NR26E Case 4: Maximum Beta-Gamma Dose Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                                |       | Timeline                               |       | $\Delta(\text{DF})$                    |
|---------|----------------------------------------|-------|----------------------------------------|-------|----------------------------------------|
|         | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> | Year  | mrem yr <sup>-1</sup> Ci <sup>-1</sup> |
| I-129S  | 9.14E-02                               | 1,171 | 1.72E-02                               | 1,171 | -7.43E-02                              |
| Tc-99S  | 2.39E-03                               | 1,171 | 1.21E-03                               | 1,171 | -1.19E-03                              |
| Cl-36S  | 3.94E-08                               | 1,171 | 3.51E-09                               | 1,171 | -3.59E-08                              |
| Np-237S | 8.58E-13                               | 1,171 | 2.74E-14                               | 1,171 | -8.30E-13                              |
| U-235S  | 9.40E-16                               | 1,171 | 2.63E-17                               | 1,171 | -9.13E-16                              |
| C-14S   | 5.84E-16                               | 1,171 | 3.29E-17                               | 1,171 | -5.51E-16                              |
| Am-241S | 1.24E-16                               | 1,171 | 3.95E-18                               | 1,171 | -1.20E-16                              |
| Pu-241S | 4.07E-18                               | 1,171 | 1.29E-19                               | 1,171 | -3.94E-18                              |
| Be-10S  | 2.26E-20                               | 1,171 | 3.56E-22                               | 1,171 | -2.22E-20                              |
| Ni-59S  | 2.78E-26                               | 1,171 | 2.69E-28                               | 1,171 | -2.75E-26                              |
| Ni-63S  | 4.19E-29                               | 1,171 | 6.38E-31                               | 1,171 | -4.12E-29                              |

### F.1.2.3. Gross Alpha

**Table F-17. NR26E Case 1: Maximum Gross Alpha Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                              |       | Timeline                             |       | $\Delta(\text{CF})$                  |
|---------|--------------------------------------|-------|--------------------------------------|-------|--------------------------------------|
|         | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> |
| Np-237  | 7.67E-01                             | 1,171 | 7.67E-01                             | 1,171 | 7.37E-05                             |
| U-235   | 1.38E-03                             | 1,171 | 2.94E-04                             | 1,171 | -1.08E-03                            |
| Am-241  | 1.98E-05                             | 1,171 | 4.32E-06                             | 1,171 | -1.55E-05                            |
| Pu-241  | 5.09E-07                             | 1,171 | 6.44E-08                             | 1,171 | -4.44E-07                            |

**Table F-18. NR26E Case 2: Maximum Gross Alpha Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                              |       | Timeline                             |       | $\Delta(\text{CF})$                  |
|---------|--------------------------------------|-------|--------------------------------------|-------|--------------------------------------|
|         | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> |
| Np-237  | 4.62E-07                             | 1,171 | 1.98E-08                             | 1,171 | -4.43E-07                            |
| U-235   | 7.47E-09                             | 1,171 | 3.17E-10                             | 1,171 | -7.16E-09                            |
| Am-241  | 6.62E-11                             | 1,171 | 2.82E-12                             | 1,171 | -6.34E-11                            |
| Pu-241  | 2.17E-12                             | 1,171 | 9.23E-14                             | 1,171 | -2.07E-12                            |

**Table F-19. NR26E Case 3: Maximum Gross Alpha Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                              |       | Timeline                             |       | $\Delta(\text{CF})$                  |
|---------|--------------------------------------|-------|--------------------------------------|-------|--------------------------------------|
|         | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> |
| Np-237S | 4.17E-10                             | 1,171 | 1.33E-11                             | 1,171 | -4.04E-10                            |
| U-235S  | 6.92E-12                             | 1,171 | 2.18E-13                             | 1,171 | -6.70E-12                            |
| Am-241S | 6.05E-14                             | 1,171 | 1.92E-15                             | 1,171 | -5.86E-14                            |
| Pu-241S | 1.98E-15                             | 1,171 | 6.29E-17                             | 1,171 | -1.92E-15                            |

**Table F-20. NR26E Case 4: Maximum Gross Alpha Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                              |       | Timeline                             |       | $\Delta(\text{CF})$                  |
|---------|--------------------------------------|-------|--------------------------------------|-------|--------------------------------------|
|         | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> | Year  | pCi L <sup>-1</sup> Ci <sup>-1</sup> |
| Np-237S | 6.43E-11                             | 1,171 | 2.06E-12                             | 1,171 | -6.23E-11                            |
| U-235S  | 1.07E-12                             | 1,171 | 3.36E-14                             | 1,171 | -1.03E-12                            |
| Am-241S | 9.32E-15                             | 1,171 | 2.96E-16                             | 1,171 | -9.03E-15                            |
| Pu-241S | 3.05E-16                             | 1,171 | 9.69E-18                             | 1,171 | -2.96E-16                            |



#### F.1.2.4. Uranium

**Table F-21. NR26E Case 1: Maximum Uranium Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                             |       | Timeline                            |       | $\Delta(\text{CF})$                 |
|---------|-------------------------------------|-------|-------------------------------------|-------|-------------------------------------|
|         | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ | Year  | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ | Year  | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ |
| Np-237  | 1.62E-10                            | 1,171 | 1.62E-10                            | 1,171 | 1.65E-14                            |
| Am-241  | 4.10E-15                            | 1,171 | 8.22E-16                            | 1,171 | -3.28E-15                           |
| Pu-241  | 1.05E-16                            | 1,171 | 1.16E-17                            | 1,171 | -9.30E-17                           |
| U-235   | 1.36E-70                            | 1,171 | 1.36E-70                            | 1,171 | 1.86E-75                            |

**Table F-22. NR26E Case 2: Maximum Uranium Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                             |       | Timeline                            |       | $\Delta(\text{CF})$                 |
|---------|-------------------------------------|-------|-------------------------------------|-------|-------------------------------------|
|         | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ | Year  | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ | Year  | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ |
| Np-237  | 2.99E-17                            | 1,171 | 1.08E-18                            | 1,171 | -2.88E-17                           |
| Am-241  | 4.27E-21                            | 1,171 | 1.54E-22                            | 1,171 | -4.12E-21                           |
| Pu-241  | 1.40E-22                            | 1,171 | 5.04E-24                            | 1,171 | -1.35E-22                           |
| U-235   | 7.11E-100                           | 1,171 | 8.80E-104                           | 1,171 | -7.11E-100                          |

**Table F-23. NR26E Case 3: Maximum Uranium Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                             |       | Timeline                            |       | $\Delta(\text{CF})$                 |
|---------|-------------------------------------|-------|-------------------------------------|-------|-------------------------------------|
|         | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ | Year  | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ | Year  | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ |
| Np-237S | 2.58E-20                            | 1,171 | 7.01E-22                            | 1,171 | -2.51E-20                           |
| Am-241S | 3.74E-24                            | 1,171 | 1.01E-25                            | 1,171 | -3.64E-24                           |
| Pu-241S | 1.23E-25                            | 1,171 | 3.30E-27                            | 1,171 | -1.19E-25                           |
| U-235S  | 4.25E-103                           | 1,171 | 3.87E-107                           | 1,171 | -4.25E-103                          |

**Table F-24. NR26E Case 4: Maximum Uranium Concentration Factor at 100-meter POA and Time of Maximum**

| Nuclide | Nominal                             |       | Timeline                            |       | $\Delta(\text{CF})$                 |
|---------|-------------------------------------|-------|-------------------------------------|-------|-------------------------------------|
|         | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ | Year  | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ | Year  | $\mu\text{g L}^{-1} \text{Ci}^{-1}$ |
| Np-237S | 3.98E-21                            | 1,171 | 1.08E-22                            | 1,171 | -3.87E-21                           |
| Am-241S | 5.76E-25                            | 1,171 | 1.55E-26                            | 1,171 | -5.61E-25                           |
| Pu-241S | 1.89E-26                            | 1,171 | 5.09E-28                            | 1,171 | -1.84E-26                           |
| U-235S  | 6.54E-104                           | 1,171 | 5.97E-108                           | 1,171 | -6.54E-104                          |