# Ingestion Pathway Consequences of a Major Release from SRTC



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## DISCLAIMER

**Abstract**

The food ingestion consequences due to radioactive particulates of an accidental release, scenario 1-RD-3, are evaluated for SRTC. The sizes of land areas requiring the protective action of food interdiction are calculated. The consequences of the particulate portion of the release are evaluated with the HOTSPOT model and an EXCEL spreadsheet for particulates.

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TABLES

# Ingestion Pathway Consequences of a Major Release from SRTC (U)

## Introduction

Accidental releases of radionuclides from nuclear facilities may cause contamination of food and forage. Numerous pathways exist for deposited radionuclides to reach man. The major pathways considered by recent Food and Drug Administration guidance are analyzed in this report.

## Approach

The methodology for determining the limiting radionuclide group, and Derived Response Level (DRL), for ingestion pathways is outlined below.

1. Determine the source terms (radionuclide-specific and total airborne releases).

2. If tritium is present in the source term, evaluate the consequences of the tritium release using UFOTRI. These results will be summarized in a separate report.

3. Calculate the concentrations of each radionuclide in foodstuffs for a unit deposition of the particulate mix.

4. For radionuclides with Food and Drug Administration (FDA) Derived Intervention Levels (DILs) (FDA 1998), divide the DIL by the foodstuff concentration from a unit deposition. The Derived Response Level, or DRL, is the deposition that gives a DIL for a specific nuclide (group) and pathway.

5. Run the dispersion/deposition model HOTSPOT (Homann 1994) to determine areas impacted.

## Background

The FDA (1998) places selected radionuclides into five groups. These groups are:

- Sr-90
- I-131
- Cs-134 + Cs-137
- Pu-238 + Pu-239 + Am-241
- Ru-103 + Ru-106

Notes for Table 2 and Appendix D of FDA (1998) provide guidance on how to utilize these groups. The Derived Intervention Level (DIL) for each radionuclide group is applied independently (i.e., there is no additivity between groups). If multiple radionuclides are present in a group, the DIL applies to the sum of the concentrations of

those radionuclides. The DILs are applied to the wet weight of foods (as prepared for consumption).

These groups were developed to aid analyses at a variety of nuclear facilities. Nuclear waste storage facilities and nuclear fuel reprocessing facilities are expected to have Sr-90, Cs-137, Pu-239, and Pu-238 as major contributors (p. 51 of FDA 1998).

FDA recommends that DILs from the five groups be applied immediately following an accident. Early evaluation of other radionuclides that may have been released is not required. However, an evaluation should be performed as soon as possible to ensure the DILs are appropriate; presumably, this would include evaluating DILs for the five groups as well as those for radionuclides not in the groups.

The five radionuclide groups are not sufficient to cover accidents at all types of facilities or locations. FDA (1998) notes the example of transportation accidents that may release radionuclides not in the radionuclide groups. Although such releases are not specifically addressed (in the five groups), FDA recommends that an evaluation of the radiation dose from ingestion of these other radionuclides be performed to determine if protective action guides will be exceeded. Appendix E of FDA (1998) presents DILs for 15 additional radionuclides.

Some source terms at SRS are postulated to be dominated by tritiated water vapor. DILs for tritium in water vapor and organically bound forms were derived in WSRC-TR-99-00064 using methodology consistent with FDA (1998). The tritium-specific model UFOTRI will be used to evaluate tritium releases, and the results presented in a separate report (see WSRC-TR-99-00117).

As noted in WSRC-TR-98-0392, the new FDA guidelines appear to be much more restrictive than the old guidelines. This results in greater ranges and larger areas impacted for a given release.

## Analysis

### Derivation of the Total Release

The respirable source terms for a hypothetical SRTC release scenario 1-RD-3 are found in Attachments 2, 3, and 5 of S-EHA-A-00001, Rev. 1, Appendix B, Calculation 1. These respirable source terms are derived from a detailed analysis involving consideration of physical forms and dispersing mechanisms. An overall damage ratio (DR) is applied to the overall source term from the Attachments in S-EHA-A-00001, Rev. 1, Appendix B, Calculation 1 (see sheet 8 of 30 for the DR specification). To determine the total release, it is necessary to "back out" the respirable fraction (RF) from the respirable release source terms. This is done in calculation S-CLC-A-00104 and summarized in Table 1. The activities in Table 1 do not include a correction for a DR less than unity, and the Pu-239/241 and Pu-242 activities are for mixes.

**Table 1. Airborne releases for SRTC scenario 1-RD-3, with mixes and DR not applied**

| Nuclide | Pre-DR airborne release (Ci) |
|---|---|
| Am241 | 1.21E-02 |
| Am243 | 9.68E-04 |
| Ba133 | 5.38E-13 |
| Ce144 | 1.90E-05 |
| Cf249 | 1.27E-05 |
| Cf252 | 1.59E-02 |
| Cm244 | 2.03E-02 |
| Cm246 | 1.00E-03 |
| Co60 | 7.19E-01 |
| Cs137 | 1.19E+00 |
| H3 | 2.14E+04 |
| Np237 | 4.20E-05 |
| Pm147 | 2.52E-08 |
| Pu238 | 5.10E-02 |
| Pu239 | 1.78E-05 |
| Pu239/241mix | 4.56E-01 |
| Pu240 | 9.72E-07 |
| Pu241 | 2.91E-01 |
| Pu242mix | 1.28E-02 |
| Sr90 | 1.18E+00 |
| Tc99 | 3.60E-13 |
| Th232 | 1.93E-06 |
| Tl204 | 9.00E-10 |
| U235 | 1.78E-06 |
| U238 | 2.15E-04 |

Reference: SourceSRTC.xls, worksheet "Nonresp + resp", column F

Two additional steps are applied to the potential release activities in Table 1. First, the Pu-239/241 and Pu-242 mixes must be separated into their constituents. The makeups of these mixes are in Tables 2 and 3.

**Table 2. Pu 239/241 mix activity fractions**

| nuclide | activity fraction |
|---|---|
| Pu 238 | 0.0073 |
| Pu239 | 0.2029 |
| Pu240 | 0.0462 |
| Pu241 | 0.6761 |
| Pu242 | 0.0003 |
| Am241 | 0.0675 |

Reference: S-CLC-A-00080 Rev. 0, Sheet 4 of 26

**Table 3. Pu 242 mix activity fractions**

| nuclide | activity fraction |
|---|---|
| Pu 238 | 0.0786 |
| Pu239 | 0.00024 |
| Pu240 | 0.01184 |
| Pu241 | 0.88886 |
| Pu242 | 0.00074 |
| Am241 | 0.01977 |

Reference: S-CLC-A-00080 Rev. 0, Sheet 4 of 26

The final step is to apply a damage ratio (DR) of 0.75, consistent with the DR assumed for respirable releases in the SRTC EPHA. These total releases are shown in Table 4.

**Table 4. Total airborne releases for SRTC scenario 1-RD-3, unmixed and with DR applied**

| Nuclide | DR=0.75, unmixed total release (Ci) |
|---|---|
| Am241 | 3.23E-02 |
| Am243 | 7.26E-04 |
| Ba133 | 4.04E-13 |
| Ce144 | 1.42E-05 |
| Cf249 | 9.53E-06 |
| Cf252 | 1.19E-02 |
| Cm244 | 1.53E-02 |
| Cm246 | 7.50E-04 |
| Co60 | 5.40E-01 |
| Cs137 | 8.91E-01 |
| H3 | 1.61E+04 |
| Np237 | 3.15E-05 |
| Pm147 | 1.89E-08 |
| Pu238 | 4.15E-02 |
| Pu239 | 6.94E-02 |
| Pu240 | 1.59E-02 |
| Pu241 | 4.58E-01 |
| Pu242 | 1.10E-04 |
| Sr90 | 8.84E-01 |
| Tc99 | 2.70E-13 |
| Th232 | 1.45E-06 |
| Tl204 | 6.75E-10 |
| U235 | 1.34E-06 |
| U238 | 1.62E-04 |

Reference: SourceSRTC.xls, Worksheet "Nonresp + resp", columns L to N

Details of these spreadsheet calculations are presented in Attachment A.

Because tritium behaves differently in the environment than particulates, tritium and particulates are analyzed as two separate groups using two different models. The analysis of the tritium release will be described in a separate report.

**Evaluation of the deposition needed to exceed a DIL**

To determine the deposition that results in a DIL of a particular radionuclide group in a given foodstuff for a particular pathway, the concentration of radionuclides in foodstuffs is calculated for a unit deposition of particulates (1 Ci $m^{-2}$). Dividing the DIL by the concentration per unit deposition gives the deposition that results in a DIL.

Assuming that all radionuclides deposit similarly, the relative concentrations of the deposited particulate material will be the same as that released. The areal concentrations of the individual radionuclides present for this unit deposition are given in Table 5.

**Table 5. Areal concentrations of particulates per unit deposition of the mix**

| Nuclide | Areal concentration per unit deposition of particulates $(Ci\ m^{-2})_{nuclide}$ per $(Ci\ m^{-2})_{mix}$ |
|---|---|
| Am241 | 1.09E-02 |
| Am243 | 2.45E-04 |
| Ba133 | 1.36E-13 |
| Ce144 | 4.80E-06 |
| Cf249 | 3.22E-06 |
| Cf252 | 4.03E-03 |
| Cm244 | 5.15E-03 |
| Cm246 | 2.53E-04 |
| Co60 | 1.82E-01 |
| Cs137 | 3.01E-01 |
| Np237 | 1.06E-05 |
| Pm147 | 6.38E-09 |
| Pu238 | 1.40E-02 |
| Pu239 | 2.34E-02 |
| Pu240 | 5.37E-03 |
| Pu241 | 1.55E-01 |
| Pu242 | 3.70E-05 |
| Sr90 | 2.99E-01 |
| Tc99 | 9.12E-14 |
| Th232 | 4.90E-07 |
| Tl204 | 2.28E-10 |
| U235 | 4.52E-07 |
| U238 | 5.45E-05 |

Reference: SourceSRTC.xls, Worksheet "Nonresp + resp", column R

Details of these spreadsheet calculations are presented in Attachment A.

Three of the five FDA radionuclide groups have one or more members present in the SRTC release scenario. These groups are Sr-90, Cs, and the Pu-238 + Pu-239 + Am-241 group. In addition, 4 of the additional 15 radionuclides with DILs determined in FDA (1998) are present (Ce-144, Cm-244, Np-237, and Pu-241). Evaluation of radionuclide concentrations in foods in the following analysis is limited to radionuclides with FDA DILs, although the total release of all particulate radionuclides is used to describe the unit release.

The concentrations in various foodstuffs due to this unit deposition may now be evaluated. The concentration of a particular radionuclide in a foodstuff is equal to the radionuclide-specific deposition times the (radionuclide-specific) overall transfer factor. Division of the DIL by the concentration in the foodstuff resulting from a unit deposition gives the deposition needed for a DIL. This process is presented in Tables 6 and 7 for the dairy pathway. Details of the spreadsheet calculations are presented in Attachment B.

Transfer factors for plutonium and americium are derived in WSRC-TR-99-00005, Ingestion Pathway Transfer Factors for Plutonium and Americium. Transfer factors for additional radionuclides are presented in S-CLC-G-00179.

**Table 6. Radionuclide Group concentrations in milk per unit deposition of the mix**

| Nuclide | Areal concentration per unit deposition of particulates $Ci/m^2$ | Overall transfer factor $T_{milk}$ ($m^2$ $L^{-1}$) | Radionuclide Group concentration (Ci $L^{-1}$) per unit deposition of mix | Radionuclide Group or individual radionuclide |
|---|---|---|---|---|
| Am241 | 1.09E-02 | 1.21E-05 | 4.66E-07 | Pu-238 + Pu-239 + Am-241 |
| Pu238 | 1.40E-02 | 8.90E-06 | | |
| Pu239 | 2.34E-02 | 8.90E-06 | | |
| Ce144 | 4.80E-06 | 2.43E-04 | 1.17E-09 | Ce144 |
| Cm244 | 5.15E-03 | 1.62E-05 | 8.33E-08 | Cm244 |
| Cs137 | 3.01E-01 | 6.39E-02 | 1.92E-02 | Cs137 |
| Np237 | 1.06E-05 | 4.04E-05 | 4.30E-10 | Np237 |
| Pu241 | 1.55E-01 | 8.90E-06 | 1.38E-06 | Pu241 |
| Sr90 | 2.99E-01 | 2.26E-02 | 6.76E-03 | Sr90 |

Reference: SourceSRTC.xls, Worksheet "Dairy", columns L and Q

**Table 7. Derived Response Levels, dairy pathway**

| Radionuclide Group | Radionuclide Group concentration (Ci $L^{-1}$) per unit deposition | DIL (Bq $L^{-1}$) | Deposition of mix corresponding to 1 DIL (Ci $m^{-2}$) |
|---|---|---|---|
| Pu-238 + Pu-239 + Am-241 | 4.66E-07 | 2 | 1.16E-04 |
| Ce144 | 1.17E-09 | 500 | 1.16E+01 |
| Cm244 | 8.33E-08 | 2 | 6.49E-04 |
| Cs137 | 1.92E-02 | 1200 | 1.69E-06 |
| Np237 | 4.30E-10 | 4 | 2.51E-01 |
| Pu-241 | 1.38E-06 | 120 | 2.36E-03 |
| Sr90 | 6.76E-03 | 160 | 6.40E-07 |

Reference: SourceSRTC.xls, Worksheet "Dairy", columns Q to S

For this release, $Sr^{90}$ is the most limiting radionuclide, with concentrations in milk reaching a DIL when the total deposition is equal to 6.40E-07 Ci $m^{-2}$ of the particulate mix. Other radionuclides require higher depositions before the concentration in milk reaches their respective DILs.

Depositions needed to reach a DIL are calculated in a similar manner for other pathways. Results are presented in Table 8. Details of these spreadsheet calculations are presented in Attachments B to Q.

**Table 8. Derived Response Levels for ingestion pathways**

| Pathway | Deposition of mix (Ci $m^{-2}$)corresponding to 1 DIL of nuclide group | | | | | | |
|---|---|---|---|---|---|---|---|
| | Pu-238 + Pu-239 + Am-241 | Ce144 | Cm244 | Cs137 | Np237 | Pu-241 | Sr90 |
| Milk | 1.16E-04 | 1.16E+01 | 6.49E-04 | 1.69E-06 | 2.51E-01 | 2.36E-03 | **6.40E-07** |
| Egg contents | 2.61E-05 | 9.43E+02 | NA | 8.13E-06 | NA | 1.27E-03 | **2.19E-06** |
| Beef | 8.88E-06 | 1.88E+01 | 7.00E-05 | 2.87E-07 | 1.35E-03 | 2.80E-04 | **2.41E-07** |
| Veal | 4.68E-07 | NA | NA | 2.25E-07 | NA | 8.78E-06 | **6.06E-08** |
| Sheep | 5.78E-06 | 8.58E+00 | NA | 3.87E-07 | NA | 1.36E-04 | **2.21E-07** |
| Lamb | 2.42E-07 | NA | NA | 1.58E-07 | NA | 4.87E-06 | **3.16E-08** |
| Pork | 3.65E-06 | 9.21E+00 | NA | 1.47E-07 | NA | 8.58E-05 | **1.19E-07** |
| Poultry | 3.47E-06 | 8.04E+00 | NA | 1.23E-07 | NA | 7.99E-05 | **2.07E-06** |
| Fish | **3.73E-08** | 9.38E-02 | 3.50E-07 | 5.39E-08 | 3.39E-04 | 6.99E-07 | 2.41E-07 |
| Produce-direct deposition | **3.91E-09** | 9.85E-03 | 3.67E-08 | 3.77E-07 | 3.55E-05 | 7.34E-08 | 5.07E-08 |
| Produce - root uptake | 1.07E-02 | 1.84E+02 | 2.67E-02 | 4.59E-04 | 5.38E-01 | 5.63E-01 | **9.46E-06** |
| Produce-soil adhesion | **2.19E-04** | 5.51E+02 | 2.06E-03 | 2.11E-02 | 1.99E+00 | 4.11E-03 | 2.84E-03 |
| Grain-direct deposition | **3.91E-09** | 9.85E-03 | 3.67E-08 | 3.77E-07 | 3.55E-05 | 7.34E-08 | 5.07E-08 |
| Grain-root uptake | 3.13E-02 | 3.05E+01 | 1.63E-01 | 4.23E-04 | 1.22E+00 | 7.94E-01 | **2.25E-05** |
| Grain-soil adhesion | **9.10E-05** | 2.29E+02 | 8.54E-04 | 8.77E-03 | 8.27E-01 | 1.71E-03 | 1.18E-03 |
| Beverage | **1.12E-06** | 2.81E+00 | 1.05E-05 | 1.08E-04 | 1.02E-02 | 2.10E-05 | 1.45E-05 |

Reference: SourceSRTC.xls, individual pathway worksheets

Limiting depositions are **bolded** for each pathway in Table 8.

Limiting depositions for each pathway are ranked in Table 9 from most limiting (smallest DRL) to least limiting (largest DRL).

**Table 9. Limiting DRLs for each pathway**

| Pathway | DRL Ci $m^{-2}$ |
|---|---|
| Produce-direct deposition | 3.91E-09 |
| Grain-direct deposition | 3.91E-09 |
| Lamb | 3.16E-08 |
| Fish | 3.73E-08 |
| Veal | 6.06E-08 |
| Pork | 1.19E-07 |
| Sheep | 2.21E-07 |
| Beef | 2.41E-07 |
| Milk | 6.40E-07 |
| Beverage | 1.12E-06 |
| Poultry | 2.07E-06 |
| Egg contents | 2.19E-06 |
| Produce - root uptake | 9.46E-06 |
| Grain-root uptake | 2.25E-05 |
| Grain-soil adhesion | 9.10E-05 |
| Produce-soil adhesion | 2.19E-04 |

**Determination of range and area of consequences**

The HOTSPOT computer code was selected to evaluate the consequences of particulate releases (WSRC-TR-98-00392). In the following calculations, a source term equal to the total particulate activity (2.96 Ci) is used, and the range and area affected for different meteorological parameters and DRLs found. HOTSPOT Parameters used for the SRTC release are listed in Table 10. Pasquill-Briggs parameterization is used in the HOTSPOT code.

**Table 10. HOTSPOT input parameters for SRTC releases**

| Parameter | Average Meteorology | 95% Adverse Meteorology |
|---|---|---|
| Release height | Ground | Ground |
| Wind speed | 2.5 m/s | 1.7 m/s |
| Surface roughness | 100 cm | 100 cm |
| Stability class | C | E |
| Deposition velocity | 0.1/1/10 cm/sec | 0.1/1/10 cm/sec |
| Release duration | 60 min | 60 min |
| Inversion layer | 500 m | 200 m |

Meteorological data was taken from the SRTC EPHA (S-EHA-A-00001, Rev.1).

## Results

The following four tables summarize ingestion pathway consequences for average and adverse meteorology. If a contour (DRL) is not exceeded and/or the area affected is insignificant, "N/E" is entered for the value. The site boundary is 0.67 km from the release.

**Table 11. Ranges until deposition less than DRL, average meteorology, SRTC**

| Pathway | DRL Ci $m^{-2}$ | 0.1 cm $s^{-1}$ km | 1 cm $s^{-1}$ km | 10 cm $s^{-1}$ km |
|---|---|---|---|---|
| Produce-direct deposition | 3.91E-09 | 1.5 | 21 | >100 |
| Grain-direct deposition | 3.91E-09 | 1.5 | 21 | >100 |
| Lamb | 3.16E-08 | 0.45 | 1.5 | 6 |
| Fish | 3.73E-08 | 0.40 | 1.5 | 5 |
| Veal | 6.06E-08 | 0.30 | 1.0 | 2.5 |
| Pork | 1.19E-07 | 0.20 | 0.7 | 1.8 |
| Sheep | 2.21E-07 | 0.18 | 0.5 | 1.3 |
| Beef | 2.41E-07 | 0.15 | 0.5 | 1.2 |
| Milk | 6.40E-07 | 0.10 | 0.3 | 0.8 |
| Beverage | 1.12E-06 | 0.075 | 0.25 | 0.55 |
| Poultry | 2.07E-06 | 0.055 | 0.15 | 0.4 |
| Egg contents | 2.19E-06 | 0.055 | 0.15 | 0.4 |
| Produce - root uptake | 9.46E-06 | 0.025 | 0.08 | 0.2 |
| Grain-root uptake | 2.25E-05 | 0.018 | 0.05 | 0.15 |
| Grain-soil adhesion | 9.10E-05 | N/E | 0.025 | 0.07 |
| Produce-soil adhesion | 2.19E-04 | N/E | 0.017 | 0.05 |

"N/E" indicates the DRL was not exceeded.

**Table 12. Areas above DRL, average meteorology, SRTC**

| Pathway | DRL Ci $m^{-2}$ | 0.1 cm $s^{-1}$ $km^2$ | 1 cm $s^{-1}$ $km^2$ | 10 cm $s^{-1}$ $km^2$ |
|---|---|---|---|---|
| Produce-direct deposition | 3.91E-09 | 4.4E-01 | 3.0E+01 | >6.8E+02 |
| Grain-direct deposition | 3.91E-09 | 4.4E-01 | 3.0E+01 | >6.8E+02 |
| Lamb | 3.16E-08 | 5.3E-02 | 5.1E-01 | 5.3E+00 |
| Fish | 3.73E-08 | 4.5E-02 | 4.3E-01 | 3.7E+00 |
| Veal | 6.06E-08 | 2.8E-02 | 2.7E-01 | 1.5E+00 |
| Pork | 1.19E-07 | 1.4E-02 | 1.3E-01 | 6.7E-01 |
| Sheep | 2.21E-07 | 7.5E-03 | 7.2E-02 | 3.8E-01 |
| Beef | 2.41E-07 | 6.5E-03 | 6.6E-02 | 3.5E-01 |
| Milk | 6.40E-07 | N/E | 2.5E-02 | 1.4E-01 |
| Beverage | 1.12E-06 | N/E | 1.4E-02 | 8.2E-02 |
| Poultry | 2.07E-06 | N/E | 7.7E-03 | 4.6E-02 |
| Egg contents | 2.19E-06 | N/E | 7.3E-03 | 4.4E-02 |
| Produce - root uptake | 9.46E-06 | N/E | N/E | 1.1E-02 |
| Grain-root uptake | 2.25E-05 | N/E | N/E | 4.8E-03 |
| Grain-soil adhesion | 9.10E-05 | N/E | N/E | N/E |
| Produce-soil adhesion | 2.19E-04 | N/E | N/E | N/E |

"N/E" indicates the area affected is insignificant.

**Table 13. Ranges until deposition less than DRL, 95% adverse meteorology, SRTC**

| Pathway | DRL Ci $m^{-2}$ | 0.1 cm $s^{-1}$ km | 1 cm $s^{-1}$ km | 10 cm $s^{-1}$ km |
|---|---|---|---|---|
| Produce-direct deposition | 3.91E-09 | 15 | >100 | 20 |
| Grain-direct deposition | 3.91E-09 | 15 | >100 | 20 |
| Lamb | 3.16E-08 | 2 | 10 | 4.5 |
| Fish | 3.73E-08 | 1.7 | 8 | 4.0 |
| Veal | 6.06E-08 | 1.1 | 5 | 3.0 |
| Pork | 1.19E-07 | 0.8 | 3 | 2.0 |
| Sheep | 2.21E-07 | 0.5 | 2 | 1.5 |
| Beef | 2.41E-07 | 0.5 | 2 | 1.5 |
| Milk | 6.40E-07 | 0.3 | 1.0 | 0.9 |
| Beverage | 1.12E-06 | 0.2 | 0.7 | 0.7 |
| Poultry | 2.07E-06 | 0.15 | 0.5 | 0.5 |
| Egg contents | 2.19E-06 | 0.15 | 0.5 | 0.5 |
| Produce - root uptake | 9.46E-06 | 0.07 | 0.2 | 0.3 |
| Grain-root uptake | 2.25E-05 | 0.05 | 0.15 | 0.2 |
| Grain-soil adhesion | 9.10E-05 | 0.02 | 0.07 | 0.1 |
| Produce-soil adhesion | 2.19E-04 | 0.015 | 0.045 | 0.08 |

**Table 14. Areas above DRL, 95% adverse meteorology, SRTC**

| Pathway | DRL Ci $m^{-2}$ | 0.1 cm $s^{-1}$ $km^2$ | 1 cm $s^{-1}$ $km^2$ | 10 cm $s^{-1}$ $km^2$ |
|---|---|---|---|---|
| Produce-direct deposition | 3.91E-09 | 8.3E+00 | >4.5E+02 | 2.4E+01 |
| Grain-direct deposition | 3.91E-09 | 8.3E+00 | >4.5E+02 | 2.4E+01 |
| Lamb | 3.16E-08 | 3.4E-01 | 5.9E+00 | 1.9E+00 |
| Fish | 3.73E-08 | 2.9E-01 | 4.0E+00 | 1.6E+00 |
| Veal | 6.06E-08 | 1.6E-01 | 2.1E+00 | 9.9E-01 |
| Pork | 1.19E-07 | 7.1E-02 | 8.6E-01 | 5.2E-01 |
| Sheep | 2.21E-07 | 3.5E-02 | 4.0E-01 | 3.0E-01 |
| Beef | 2.41E-07 | 3.2E-02 | 3.6E-01 | 2.7E-01 |
| Milk | 6.40E-07 | 1.1E-02 | 1.1E-01 | 1.1E-01 |
| Beverage | 1.12E-06 | 6.0E-03 | 6.0E-02 | 7.0E-02 |
| Poultry | 2.07E-06 | 3.1E-03 | 3.1E-02 | 4.2E-02 |
| Egg contents | 2.19E-06 | 2.9E-03 | 2.8E-02 | 4.0E-02 |
| Produce - root uptake | 9.46E-06 | N/E | 6.1E-03 | 1.2E-02 |
| Grain-root uptake | 2.25E-05 | N/E | 2.6E-03 | 6.1E-03 |
| Grain-soil adhesion | 9.10E-05 | N/E | N/E | 2.0E-03 |
| Produce-soil adhesion | 2.19E-04 | N/E | N/E | N/E |

"N/E" indicates the area affected is insignificant.

Data output sheets for particulate dispersion/deposition calculations are provided in Attachments R to W.

## References

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**Attachments**

Attachment A
Source term and areal concentrations spreadsheet calculations

Attachment B
Contamination of dairy products spreadsheet calculations

Attachment C
Contamination of egg contents spreadsheet calculations

Attachment D
Contamination of beef spreadsheet calculations

Attachment E
Contamination of veal spreadsheet calculations

Attachment F
Contamination of sheep spreadsheet calculations

Attachment G
Contamination of lamb spreadsheet calculations

Attachment H
Contamination of pork spreadsheet calculations

Attachment I
Contamination of poultry spreadsheet calculations

Attachment J
Contamination of fish spreadsheet calculations

Attachment K
External contamination of produce from direct deposition spreadsheet calculations

Attachment L
Internal contamination of produce from root uptake spreadsheet calculations

Attachment M
External contamination of leafy vegetables during harvest spreadsheet calculations

Attachment N
External contamination of grain spreadsheet calculations

Attachment O
Internal contamination of grain by root uptake spreadsheet calculations

Attachment P
External contamination of grain during harvest spreadsheet calculations

Attachment Q
Contamination of beverages spreadsheet calculations

Attachment R
HOTSPOT results - average meteorology, 0.1 cm $s^{-1}$

Attachment S
HOTSPOT results - average meteorology, 1.0 cm $s^{-1}$

Attachment T
HOTSPOT results - average meteorology, 10 cm $s^{-1}$

Attachment U
HOTSPOT results - adverse meteorology, 0.1 cm $s^{-1}$

Attachment V
HOTSPOT results - adverse meteorology, 1.0 cm $s^{-1}$

Attachment W
HOTSPOT results - adverse meteorology, 10 cm $s^{-1}$

## Attachment A

Source term and areal concentrations spreadsheet calculations

SourceSRTC.xls

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 3 | | | | | | | deconvolute mixes | |
| 4 | | | nonresp+resp SRTC | | | | | |
| 5 | | | JTALFR2_No_RF.xls | | | mixed | unmix | unmix |
| 6 | | | Sheet "Final Total" | | | total | Pu239/241 | |
| 7 | | | 5arf | 52arf | 71arf | release | | Pu242 |
| 8 | Element | At. No. | | | | Ci | Ci | Ci |
| 9 | | | | | | | | |
| 10 | Am | 241 | 2.85E-03 | 1.86E-03 | 7.40E-03 | 1.21E-02 | 3.08E-02 | 2.52E-04 |
| 11 | Am | 243 | 2.53E-04 | 6.59E-05 | 6.49E-04 | 9.68E-04 | | |
| 12 | Ba | 133 | 2.69E-13 | | 2.69E-13 | 5.38E-13 | | |
| 13 | Ce | 144 | 1.01E-06 | 7.75E-06 | 1.02E-05 | 1.90E-05 | | |
| 14 | Cf | 249 | 2.99E-06 | | 9.72E-06 | 1.27E-05 | | |
| 15 | Cf | 252 | 7.85E-03 | 1.78E-03 | 6.29E-03 | 1.59E-02 | | |
| 16 | Cm | 244 | 6.43E-03 | 1.00E-02 | 3.91E-03 | 2.03E-02 | | |
| 17 | Cm | 246 | 3.71E-04 | 5.04E-05 | 5.79E-04 | 1.00E-03 | | |
| 18 | Co | 60 | 3.30E-01 | 2.75E-02 | 3.62E-01 | 7.19E-01 | | |
| 19 | Cs | 137 | 6.53E-02 | 4.88E-01 | 6.35E-01 | 1.19E+00 | | |
| 20 | H | 3 | 1.07E+04 | 9.66E+00 | 1.07E+04 | 2.14E+04 | | |
| 21 | Np | 237 | 1.12E-05 | 2.33E-08 | 3.08E-05 | 4.20E-05 | | |
| 22 | Pm | 147 | 1.26E-08 | | 1.26E-08 | 2.52E-08 | | |
| 23 | Pu | 238 | 1.37E-02 | 1.00E-03 | 3.63E-02 | 5.10E-02 | 3.33E-03 | 1.00E-03 |
| 24 | Pu | 239 | 8.88E-06 | | 8.88E-06 | 1.78E-05 | 9.25E-02 | 3.06E-06 |
| 25 | Pu mix | 239/241 | 8.07E-02 | 4.40E-02 | 3.31E-01 | 4.56E-01 | | |
| 26 | Pu | 240 | 9.72E-07 | | 0.00E+00 | 9.72E-07 | 2.11E-02 | 1.51E-04 |
| 27 | Pu | 241 | 6.82E-02 | | 2.23E-01 | 2.91E-01 | 3.08E-01 | 1.14E-02 |
| 28 | Pu mix | 242 | 3.10E-03 | | 9.67E-03 | 1.28E-02 | | |
| 29 | Sr | 90 | 6.06E-02 | 4.86E-01 | 6.32E-01 | 1.18E+00 | | |
| 30 | Tc | 99 | 1.80E-13 | | 1.80E-13 | 3.60E-13 | | |
| 31 | Th | 232 | 1.03E-06 | 7.28E-09 | 8.97E-07 | 1.93E-06 | | |
| 32 | Tl | 204 | 4.50E-10 | | 4.50E-10 | 9.00E-10 | | |
| 33 | U | 235 | 4.42E-07 | 2.27E-08 | 1.32E-06 | 1.78E-06 | | |
| 34 | U | 238 | 3.74E-05 | 1.94E-06 | 1.76E-04 | 2.15E-04 | | |
| 35 | Pu | 242 | | | | | 1.37E-04 | 9.45E-06 |

Nonresp + resp

SourceSRTC.xls

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 3 | | | | | | | deconvolute mixes | |
| 4 | | | nonresp+resp SRTC | | | | | |
| 5 | | | JTALFR2_No_RF.xls | | | mixed | unmix | unmix |
| 6 | | | Sheet "Final Total" | | | total | Pu239/241 | |
| 7 | | | 5arf | 52arf | 71arf | release | | Pu242 |
| 8 | Element | At. No. | | | | Ci | Ci | Ci |
| 9 | | | | | | | | |
| 10 | Am | 241 | 0.00285 | 0.001864192 | 0.0074 | =C10+D10+E10 | =C43*F25 | =F28*C52 |
| 11 | Am | 243 | 0.000253 | 0.000065869 | 0.000649 | =C11+D11+E11 | | |
| 12 | Ba | 133 | 0.000000000000269 | | 0.000000000000269 | =C12+D12+E12 | | |
| 13 | Ce | 144 | 0.00000101 | 0.0000077517 | 0.0000102 | =C13+D13+E13 | | |
| 14 | Cf | 249 | 0.00000299 | | 0.00000972 | =C14+D14+E14 | | |
| 15 | Cf | 252 | 0.00785 | 0.00178078 | 0.00629 | =C15+D15+E15 | | |
| 16 | Cm | 244 | 0.00643 | 0.0099980265 | 0.00391 | =C16+D16+E16 | | |
| 17 | Cm | 246 | 0.000371 | 0.00005042268 | 0.000579 | =C17+D17+E17 | | |
| 18 | Co | 60 | 0.33 | 0.027459 | 0.362 | =C18+D18+E18 | | |
| 19 | Cs | 137 | 0.0653 | 0.48821616 | 0.635 | =C19+D19+E19 | | |
| 20 | H | 3 | 10700 | 9.66 | 10700 | =C20+D20+E20 | | |
| 21 | Np | 237 | 0.0000112 | 0.0000000233355 | 0.0000308 | =C21+D21+E21 | | |
| 22 | Pm | 147 | 0.0000000126 | | 0.0000000126 | =C22+D22+E22 | | |
| 23 | Pu | 238 | 0.0137 | 0.00100206 | 0.0363 | =C23+D23+E23 | =C38*+$F$25 | =$F$28*C47 |
| 24 | Pu | 239 | 0.00000888 | | 0.00000888 | =C24+D24+E24 | =C39*+$F$25 | =$F$28*C48 |
| 25 | Pu mix | 239/241 | 0.0807 | 0.04399136 | 0.331 | =C25+D25+E25 | | |
| 26 | Pu | 240 | 0.000000972 | | 0 | =C26+D26+E26 | =$F$25*C40 | =$F$28*C49 |
| 27 | Pu | 241 | 0.0682 | | 0.223 | =C27+D27+E27 | =$F$25*C41 | =$F$28*C50 |
| 28 | Pu mix | 242 | 0.0031 | | 0.00967 | =C28+D28+E28 | | |
| 29 | Sr | 90 | 0.0606 | 0.4860486 | 0.632 | =C29+D29+E29 | | |
| 30 | Tc | 99 | 0.00000000000018 | | 0.00000000000018 | =C30+D30+E30 | | |
| 31 | Th | 232 | 0.00000103 | 0.000000007282 | 0.000000897 | =C31+D31+E31 | | |
| 32 | Tl | 204 | 0.00000000045 | | 0.00000000045 | =C32+D32+E32 | | |
| 33 | U | 235 | 0.000000442 | 0.00000002268 | 0.00000132 | =C33+D33+E33 | | |
| 34 | U | 238 | 0.0000374 | 0.00000194112 | 0.000176 | =C34+D34+E34 | | |
| 35 | Pu | 242 | | | | | =F25*C42 | =$F$28*C51 |

Nonresp + resp

| | A | B | C |
|---|---|---|---|
| 36 | Pu 239/241 mix activity fractions | | |
| 37 | nuclide | | activity frac |
| 38 | Pu | 238 | 0.0073 |
| 39 | Pu | 239 | 0.2029 |
| 40 | Pu | 240 | 0.0462 |
| 41 | Pu | 241 | 0.6761 |
| 42 | Pu | 242 | 0.0003 |
| 43 | Am | 241 | 0.0675 |
| 44 | | | |
| 45 | Pu 242 mix activity fractions | | |
| 46 | nuclide | | activity frac |
| 47 | Pu | 238 | 0.0786 |
| 48 | Pu | 239 | 0.00024 |
| 49 | Pu | 240 | 0.01184 |
| 50 | Pu | 241 | 0.88886 |
| 51 | Pu | 242 | 0.00074 |
| 52 | Am | 241 | 0.01977 |

| | A | B | C |
|---|---|---|---|
| 36 | Pu 239/241 mix activity fractions | | |
| 37 | nuclide | | activity frac |
| 38 | Pu | 238 | 0.0073 |
| 39 | Pu | 239 | 0.2029 |
| 40 | Pu | 240 | 0.0462 |
| 41 | Pu | 241 | 0.6761 |
| 42 | Pu | 242 | 0.0003 |
| 43 | Am | 241 | 0.0675 |
| 44 | | | |
| 45 | Pu 242 mix activity fractions | | |
| 46 | nuclide | | activity frac |
| 47 | Pu | 238 | 0.0786 |
| 48 | Pu | 239 | 0.00024 |
| 49 | Pu | 240 | 0.01184 |
| 50 | Pu | 241 | 0.88886 |
| 51 | Pu | 242 | 0.00074 |
| 52 | Am | 241 | 0.01977 |

SourceSRTC.xls

| | J | K | L | M | N | P | R |
|---|---|---|---|---|---|---|---|
| 3 | | | | | | | Areal Conc |
| 4 | | | pre-DR | | DR'd | | per unit |
| 5 | | | unmixed | | unmixed | | deposition |
| 6 | | | total | | total | particulate | of |
| 7 | | | release | | release | release | particulates |
| 8 | Element | At. No. | Ci | DR=0.75 | Ci | Ci | Ci/m2 |
| 9 | | | | | | | |
| 10 | Am | 241 | 4.31E-02 | 0.75 | 3.23E-02 | 3.23E-02 | 1.09E-02 |
| 11 | Am | 243 | 9.68E-04 | 0.75 | 7.26E-04 | 7.26E-04 | 2.45E-04 |
| 12 | Ba | 133 | 5.38E-13 | 0.75 | 4.04E-13 | 4.04E-13 | 1.36E-13 |
| 13 | Ce | 144 | 1.90E-05 | 0.75 | 1.42E-05 | 1.42E-05 | 4.80E-06 |
| 14 | Cf | 249 | 1.27E-05 | 0.75 | 9.53E-06 | 9.53E-06 | 3.22E-06 |
| 15 | Cf | 252 | 1.59E-02 | 0.75 | 1.19E-02 | 1.19E-02 | 4.03E-03 |
| 16 | Cm | 244 | 2.03E-02 | 0.75 | 1.53E-02 | 1.53E-02 | 5.15E-03 |
| 17 | Cm | 246 | 1.00E-03 | 0.75 | 7.50E-04 | 7.50E-04 | 2.53E-04 |
| 18 | Co | 60 | 7.19E-01 | 0.75 | 5.40E-01 | 5.40E-01 | 1.82E-01 |
| 19 | Cs | 137 | 1.19E+00 | 0.75 | 8.91E-01 | 8.91E-01 | 3.01E-01 |
| 20 | H | 3 | 2.14E+04 | 0.75 | 1.61E+04 | | 0.00E+00 |
| 21 | Np | 237 | 4.20E-05 | 0.75 | 3.15E-05 | 3.15E-05 | 1.06E-05 |
| 22 | Pm | 147 | 2.52E-08 | 0.75 | 1.89E-08 | 1.89E-08 | 6.38E-09 |
| 23 | Pu | 238 | 5.53E-02 | 0.75 | 4.15E-02 | 4.15E-02 | 1.40E-02 |
| 24 | Pu | 239 | 9.25E-02 | 0.75 | 6.94E-02 | 6.94E-02 | 2.34E-02 |
| 25 | | | | | | | 0.00E+00 |
| 26 | Pu | 240 | 2.12E-02 | 0.75 | 1.59E-02 | 1.59E-02 | 5.37E-03 |
| 27 | Pu | 241 | 6.11E-01 | 0.75 | 4.58E-01 | 4.58E-01 | 1.55E-01 |
| 28 | Pu pure | 242 | 1.46E-04 | 0.75 | 1.10E-04 | 1.10E-04 | 3.70E-05 |
| 29 | Sr | 90 | 1.18E+00 | 0.75 | 8.84E-01 | 8.84E-01 | 2.99E-01 |
| 30 | Tc | 99 | 3.60E-13 | 0.75 | 2.70E-13 | 2.70E-13 | 9.12E-14 |
| 31 | Th | 232 | 1.93E-06 | 0.75 | 1.45E-06 | 1.45E-06 | 4.90E-07 |
| 32 | Tl | 204 | 9.00E-10 | 0.75 | 6.75E-10 | 6.75E-10 | 2.28E-10 |
| 33 | U | 235 | 1.78E-06 | 0.75 | 1.34E-06 | 1.34E-06 | 4.52E-07 |
| 34 | U | 238 | 2.15E-04 | 0.75 | 1.62E-04 | 1.62E-04 | 5.45E-05 |
| 35 | | | | | | 2.96E+00 | 1.00E+00 |
| 36 | | | | | | | |

Nonresp + resp

SourceSRTC.xls

| | J | K | L | M | N | P | R |
|---|---|---|---|---|---|---|---|
| 3 | | | | | | | Areal Conc |
| 4 | | | pre-DR | | DR'd | | per unit |
| 5 | | | unmixed | | unmixed | | deposition |
| 6 | | | total | | total | particulate | of |
| 7 | | | release | | release | release | particulates |
| 8 | Element | At. No. | Ci | DR=0.75 | Ci | Ci | Ci/m2 |
| 9 | | | | | | | |
| 10 | Am | 241 | =F10+G10+H10 | 0.75 | =L10*M10 | =N10 | =P10/$P$35 |
| 11 | Am | 243 | =F11+G11+H11 | 0.75 | =L11*M11 | =N11 | =P11/$P$35 |
| 12 | Ba | 133 | =F12+G12+H12 | 0.75 | =L12*M12 | =N12 | =P12/$P$35 |
| 13 | Ce | 144 | =F13+G13+H13 | 0.75 | =L13*M13 | =N13 | =P13/$P$35 |
| 14 | Cf | 249 | =F14+G14+H14 | 0.75 | =L14*M14 | =N14 | =P14/$P$35 |
| 15 | Cf | 252 | =F15+G15+H15 | 0.75 | =L15*M15 | =N15 | =P15/$P$35 |
| 16 | Cm | 244 | =F16+G16+H16 | 0.75 | =L16*M16 | =N16 | =P16/$P$35 |
| 17 | Cm | 246 | =F17+G17+H17 | 0.75 | =L17*M17 | =N17 | =P17/$P$35 |
| 18 | Co | 60 | =F18+G18+H18 | 0.75 | =L18*M18 | =N18 | =P18/$P$35 |
| 19 | Cs | 137 | =F19+G19+H19 | 0.75 | =L19*M19 | =N19 | =P19/$P$35 |
| 20 | H | 3 | =F20+G20+H20 | 0.75 | =L20*M20 | | =P20/$P$35 |
| 21 | Np | 237 | =F21+G21+H21 | 0.75 | =L21*M21 | =N21 | =P21/$P$35 |
| 22 | Pm | 147 | =F22+G22+H22 | 0.75 | =L22*M22 | =N22 | =P22/$P$35 |
| 23 | Pu | 238 | =F23+G23+H23 | 0.75 | =L23*M23 | =N23 | =P23/$P$35 |
| 24 | Pu | 239 | =F24+G24+H24 | 0.75 | =L24*M24 | =N24 | =P24/$P$35 |
| 25 | | | | | | | =P25/$P$35 |
| 26 | Pu | 240 | =F26+G26+H26 | 0.75 | =L26*M26 | =N26 | =P26/$P$35 |
| 27 | Pu | 241 | =F27+G27+H27 | 0.75 | =L27*M27 | =N27 | =P27/$P$35 |
| 28 | Pu pure | 242 | =G35+H35 | 0.75 | =L28*M28 | =N28 | =P28/$P$35 |
| 29 | Sr | 90 | =F29+G29+H29 | 0.75 | =L29*M29 | =N29 | =P29/$P$35 |
| 30 | Tc | 99 | =F30+G30+H30 | 0.75 | =L30*M30 | =N30 | =P30/$P$35 |
| 31 | Th | 232 | =F31+G31+H31 | 0.75 | =L31*M31 | =N31 | =P31/$P$35 |
| 32 | Tl | 204 | =F32+G32+H32 | 0.75 | =L32*M32 | =N32 | =P32/$P$35 |
| 33 | U | 235 | =F33+G33+H33 | 0.75 | =L33*M33 | =N33 | =P33/$P$35 |
| 34 | U | 238 | =F34+G34+H34 | 0.75 | =L34*M34 | =N34 | =P34/$P$35 |
| 35 | | | | | | =SUM(P10:P34) | =SUM(R10:R34) |
| 36 | | | | | | | |

Nonresp + resp

## Attachment B

Contamination of dairy products spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column L) were verified in S-CLC-G-00179 and are not included in this attachment.

SourceSRTC.xls

| | A | B | L | M | N |
|---|---|---|---|---|---|
| 2 | Dairy | | | | |
| 3 | Consumption of direct deposition on pasture | | | | |
| 4 | | | | | |
| 5 | | | | DEP | |
| 6 | | | Tmilk | Unit | T x DEP |
| 7 | | | | Release | Ci/L |
| 8 | Element | At. No. | m2/L | | |
| 9 | | | | Ci/m2 | |
| 10 | Am | 241 | 1.21E-05 | 1.09E-02 | 1.33E-07 |
| 11 | Am | 243 | 1.21E-05 | 2.45E-04 | 2.97E-09 |
| 12 | Ba | 133 | 3.88E-03 | 1.36E-13 | 5.29E-16 |
| 13 | Ce | 144 | 2.43E-04 | 4.80E-06 | 1.17E-09 |
| 14 | Cf | 249 | 1.62E-05 | 3.22E-06 | 5.21E-11 |
| 15 | Cf | 252 | 1.62E-05 | 4.03E-03 | 6.52E-08 |
| 16 | Cm | 244 | 1.62E-05 | 5.15E-03 | 8.33E-08 |
| 17 | Cm | 246 | 1.62E-05 | 2.53E-04 | 4.10E-09 |
| 18 | Co | 60 | 2.43E-03 | 1.82E-01 | 4.42E-04 |
| 19 | Cs | 137 | 6.39E-02 | 3.01E-01 | 1.92E-02 |
| 20 | H | 3 | 1.21E-01 | | |
| 21 | Np | 237 | 4.04E-05 | 1.06E-05 | 4.30E-10 |
| 22 | Pm | 147 | 4.85E-04 | 6.38E-09 | 3.10E-12 |
| 23 | Pu | 238 | 8.90E-06 | 1.40E-02 | 1.25E-07 |
| 24 | Pu | 239 | 8.90E-06 | 2.34E-02 | 2.08E-07 |
| 25 | Pu | 239/241 | 8.90E-06 | | |
| 26 | Pu | 240 | 8.90E-06 | 5.37E-03 | 4.78E-08 |
| 27 | Pu | 241 | 8.90E-06 | 1.55E-01 | 1.38E-06 |
| 28 | Pu | 242 | 8.90E-06 | 3.70E-05 | 3.29E-10 |
| 29 | Sr | 90 | 2.26E-02 | 2.99E-01 | 6.76E-03 |
| 30 | Tc | 99 | 1.86E-04 | 9.12E-14 | 1.70E-17 |
| 31 | Th | 232 | 4.04E-05 | 4.90E-07 | 1.98E-11 |
| 32 | Tl | 204 | 2.43E-02 | 2.28E-10 | 5.53E-12 |
| 33 | U | 235 | 3.24E-03 | 4.52E-07 | 1.46E-09 |
| 34 | U | 238 | 3.24E-03 | 5.45E-05 | 1.76E-07 |

Dairy

SourceSRTC.xls

| | A | B | L | M | N |
|---|---|---|---|---|---|
| 2 | Dairy | | | | |
| 3 | Consumption of direct | | | | |
| 4 | | | | | |
| 5 | | | | DEP | |
| 6 | | | Tmilk | Unit | T x DEP |
| 7 | | | | Release | Ci/L |
| 8 | Element | At. No. | m2/L | | |
| 9 | | | | Ci/m2 | |
| 10 | Am | 241 | =D10*F10*J10/H10 | 0.0109232464571752 | =L10*M10 |
| 11 | Am | 243 | =D11*F11*J11/H11 | 0.0002451494535873 | =L11*M11 |
| 12 | Ba | 133 | =D12*F12*J12/H12 | 1.36268860796229E-1 | =L12*M12 |
| 13 | Ce | 144 | =D13*F13*J13/H13 | 4.80276813710009E-0 | =L13*M13 |
| 14 | Cf | 249 | =D14*F14*J14/H14 | 3.21928851434957E-0 | =L14*M14 |
| 15 | Cf | 252 | =D15*F15*J15/H15 | 0.0040325400624300 | =L15*M15 |
| 16 | Cm | 244 | =D16*F16*J16/H16 | 0.0051513749107779 | =L16*M16 |
| 17 | Cm | 246 | =D17*F17*J17/H17 | 0.0002533949050526 | =L17*M17 |
| 18 | Co | 60 | =D18*F18*J18/H18 | 0.182230219924896 | =L18*M18 |
| 19 | Cs | 137 | =D19*F19*J19/H19 | 0.30103669732548 | =L19*M19 |
| 20 | H | 3 | =D20*F20*J20/H20 | | |
| 21 | Np | 237 | =D21*F21*J21/H21 | 0.0000106440001030 | =L21*M21 |
| 22 | Pm | 147 | =D22*F22*J22/H22 | 6.38285370272298E-0 | =L22*M22 |
| 23 | Pu | 238 | =D23*F23*J23/H23 | 0.0140150063721576 | =L23*M23 |
| 24 | Pu | 239 | =D24*F24*J24/H24 | 0.0234242123520532 | =L24*M24 |
| 25 | Pu | 239/241 | =D25*F25*J25/H25 | | |
| 26 | Pu | 240 | =D26*F26*J26/H26 | 0.0053709965290181 | =L26*M26 |
| 27 | Pu | 241 | =D27*F27*J27/H27 | 0.154668619624854 | =L27*M27 |
| 28 | Pu | 242 | =D28*F28*J28/H28 | 0.0000370198442961 | =L28*M28 |
| 29 | Sr | 90 | =D29*F29*J29/H29 | 0.298537364314256 | =L29*M29 |
| 30 | Tc | 99 | =D30*F30*J30/H30 | 9.1183624324614E-14 | =L30*M30 |
| 31 | Th | 232 | =D31*F31*J31/H31 | 4.89930120071842E-0 | =L31*M31 |
| 32 | Tl | 204 | =D32*F32*J32/H32 | 2.27959060811535E-1 | =L32*M32 |
| 33 | U | 235 | =D33*F33*J33/H33 | 4.52037751832367E-0 | =L33*M33 |
| 34 | U | 238 | =D34*F34*J34/H34 | 0.0000545432882992 | =L34*M34 |

Dairy

SourceSRTC.xls

| | P | Q | R | S |
|---|---|---|---|---|
| 2 | | | | |
| 3 | Groups | Group sum | Group DIL Bq/L | Total Dep for DIL Ci/m2 |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | Ci/L | | |
| 8 | | | | |
| 9 | | | | |
| 10 | Am241 | | | |
| 11 | Pu238 | 4.66E-07 | 2 | 1.16E-04 |
| 12 | Pu239 | | | |
| 13 | Ce144 | 1.17E-09 | 500 | 1.16E+01 |
| 14 | | | | |
| 15 | | | | |
| 16 | Cm244 | 8.33E-08 | 2 | 6.49E-04 |
| 17 | | | | |
| 18 | | | | |
| 19 | Cs137 | 1.92E-02 | 1200 | 1.69E-06 |
| 20 | | | | |
| 21 | Np237 | 4.30E-10 | 4 | 2.51E-01 |
| 22 | | | | |
| 23 | | | | |
| 24 | | | | |
| 25 | | | | |
| 26 | | | | |
| 27 | Pu241 | 1.38E-06 | 120 | 2.36E-03 |
| 28 | | | | |
| 29 | Sr90 | 6.76E-03 | 160 | 6.40E-07 |
| 30 | | | | |
| 31 | | | | |
| 32 | | | | |
| 33 | | | | |
| 34 | | | | |

Dairy

SourceSRTC.xls

| | P | Q | R | S |
|---|---|---|---|---|
| 2 | | | | |
| 3 | Groups | Group sum | Group DIL | Total Dep for DIL Ci/m2 |
| 4 | | | | |
| 5 | | | Bq/L | |
| 6 | | | | |
| 7 | | Ci/L | | |
| 8 | | | | |
| 9 | | | | |
| 10 | Am241 | | | |
| 11 | Pu238 | =N10+N23+N24 | 2 | =R11/(37000000000*Q11) |
| 12 | Pu239 | | | |
| 13 | Ce144 | =N13 | 500 | =R13/(37000000000*Q13) |
| 14 | | | | |
| 15 | | | | |
| 16 | Cm244 | =N16 | 2 | =R16/(37000000000*Q16) |
| 17 | | | | |
| 18 | | | | |
| 19 | Cs137 | =N19 | 1200 | =R19/(37000000000*Q19) |
| 20 | | | | |
| 21 | Np237 | =N21 | 4 | =R21/(37000000000*Q21) |
| 22 | | | | |
| 23 | | | | |
| 24 | | | | |
| 25 | | | | |
| 26 | | | | |
| 27 | Pu241 | =N27 | 120 | =R27/(37000000000*Q27) |
| 28 | | | | |
| 29 | Sr90 | =N29 | 160 | =R29/(37000000000*Q29) |
| 30 | | | | |
| 31 | | | | |
| 32 | | | | |
| 33 | | | | |
| 34 | | | | |

Dairy

## Attachment C

Contamination of egg contents spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column L) were verified in S-CLC-G-00179 and are not included in this attachment.

SourceSRTC.xls

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Egg contents | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | Bq/kg | Ci/m2 |
| 5 | | | | DEP | | | | | |
| 6 | | | Teggs | Unit Release | T x DEP | | | | |
| 7 | | | | | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | m2/kg | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | 1.33E-04 | 1.09E-02 | 1.45E-06 | Am241 | | | |
| 11 | Am | 243 | 1.33E-04 | 2.45E-04 | 3.25E-08 | Pu238 | 2.07E-08 | 2 | 2.61E-05 |
| 12 | Ba | 133 | 2.98E-02 | 1.36E-13 | 4.06E-15 | Pu239 | | | |
| 13 | Ce | 144 | 2.98E-06 | 4.80E-06 | 1.43E-11 | Ce144 | 1.43E-11 | 500 | 9.43E+02 |
| 14 | Cf | 249 | | 3.22E-06 | 0.00E+00 | | | | |
| 15 | Cf | 252 | | 4.03E-03 | 0.00E+00 | | | | |
| 16 | Cm | 244 | | 5.15E-03 | 0.00E+00 | Cm244 | 0.00E+00 | 2 | #DIV/0! |
| 17 | Cm | 246 | | 2.53E-04 | 0.00E+00 | | | | |
| 18 | Co | 60 | 3.31E-03 | 1.82E-01 | 6.04E-04 | | | | |
| 19 | Cs | 137 | 1.33E-02 | 3.01E-01 | 3.99E-03 | Cs137 | 3.99E-03 | 1200 | 8.13E-06 |
| 20 | H | 3 | | | | | | | |
| 21 | Np | 237 | | 1.06E-05 | 0.00E+00 | Np237 | 0.00E+00 | 4 | #DIV/0! |
| 22 | Pm | 147 | 6.63E-04 | 6.38E-09 | 4.23E-12 | | | | |
| 23 | Pu | 238 | 1.66E-05 | 1.40E-02 | 2.32E-07 | | | | |
| 24 | Pu | 239 | 1.66E-05 | 2.34E-02 | 3.88E-07 | | | | |
| 25 | Pu | 239/241 | 1.66E-05 | | | | | | |
| 26 | Pu | 240 | 1.66E-05 | 5.37E-03 | 8.90E-08 | | | | |
| 27 | Pu | 241 | 1.66E-05 | 1.55E-01 | 2.56E-06 | Pu241 | 2.56E-06 | 120 | 1.27E-03 |
| 28 | Pu | 242 | 1.66E-05 | 3.70E-05 | 6.13E-10 | | | | |
| 29 | Sr | 90 | 6.63E-03 | 2.99E-01 | 1.98E-03 | Sr90 | 1.98E-03 | 160 | 2.19E-06 |
| 30 | Tc | 99 | 9.94E-02 | 9.12E-14 | 9.07E-15 | | | | |
| 31 | Th | 232 | | 4.90E-07 | 0.00E+00 | | | | |
| 32 | Tl | 204 | | 2.28E-10 | 0.00E+00 | | | | |
| 33 | U | 235 | 3.31E-02 | 4.52E-07 | 1.50E-08 | | | | |
| 34 | U | 238 | 3.31E-02 | 5.45E-05 | 1.81E-06 | | | | |

Egg contents

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Egg contents | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | DEP | | | | Bq/kg | Ci/m2 |
| 5 | | | Teggs | Unit Release | T x DEP | | | | |
| 6 | | | | | Ci/kg | | Ci/kg | | |
| 7 | Element | At. No. | m2/kg | | | | | | |
| 8 | | | | Ci/m2 | | | | | |
| 9 | Am | 241 | =D10*F10*J10/H10 | 0.0109232464571752 | =L10*M10 | Am241 | | | |
| 10 | Am | 243 | =D11*F11*J11/H11 | 0.0002451494535873 | =L11*M11 | Pu238 | =N10+N23+N24 | 2 | =R11/(37000000000*Q11) |
| 11 | Ba | 133 | =D12*F12*J12/H12 | 1.36268860796229E- | =L12*M12 | Pu239 | | | |
| 12 | Ce | 144 | =D13*F13*J13/H13 | 4.80276813710009E- | =L13*M13 | Ce144 | =N13 | 500 | =R13/(37000000000*Q13) |
| 13 | Cf | 249 | | 3.21926851434957E- | =L14*M14 | | | | |
| 14 | Cf | 252 | | 0.0040325400624300 | =L15*M15 | | | | |
| 15 | Cm | 244 | | 0.0051513749107779 | =L16*M16 | Cm244 | =N16 | 2 | =R16/(37000000000*Q16) |
| 16 | Cm | 246 | | 0.0002533949050526 | =L17*M17 | | | | |
| 17 | Co | 60 | =D18*F18*J18/H18 | 0.182230219924896 | =L18*M18 | | | | |
| 18 | Cs | 137 | =D19*F19*J19/H19 | 0.30103669732548 | =L19*M19 | Cs137 | =N19 | 1200 | =R19/(37000000000*Q19) |
| 19 | H | 3 | | | | | | | |
| 20 | Np | 237 | | 0.0000106440001030 | =L21*M21 | Np237 | =N21 | 4 | =R21/(37000000000*Q21) |
| 21 | Pm | 147 | =D22*F22*J22/H22 | 6.38285370272298E- | =L22*M22 | | | | |
| 22 | Pu | 238 | =D23*F23*J23/H23 | 0.0140150063721576 | =L23*M23 | | | | |
| 23 | Pu | 239 | =D24*F24*J24/H24 | 0.0234242123520532 | =L24*M24 | | | | |
| 24 | Pu | 239/241 | =D25*F25*J25/H25 | | | | | | |
| 25 | Pu | 240 | =D26*F26*J26/H26 | 0.0053709965290181 | =L26*M26 | | | | |
| 26 | Pu | 241 | =D27*F27*J27/H27 | 0.154668619624854 | =L27*M27 | Pu241 | =N27 | 120 | =R27/(37000000000*Q27) |
| 27 | Pu | 242 | =D28*F28*J28/H28 | 0.0000370198442961 | =L28*M28 | | | | |
| 28 | Sr | 90 | =D29*F29*J29/H29 | 0.298537364314256 | =L29*M29 | Sr90 | =N29 | 160 | =R29/(37000000000*Q29) |
| 29 | Tc | 99 | =D30*F30*J30/H30 | 9.1183624324614E-1 | =L30*M30 | | | | |
| 30 | Th | 232 | | 4.89930120071842E- | =L31*M31 | | | | |
| 31 | Tl | 204 | | 2.27959060811535E- | =L32*M32 | | | | |
| 32 | U | 235 | =D33*F33*J33/H33 | 4.52037751832367E- | =L33*M33 | | | | |
| 33 | U | 238 | =D34*F34*J34/H34 | 0.0000545432882992 | =L34*M34 | | | | |

## Attachment D

Contamination of beef spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column L) were verified in S-CLC-G-00179 and are not included in this attachment.

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Beef | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL Bq/kg | Total Dep for DIL Ci/m2 |
| 4 | | | | DEP Unit Release | T x DEP | | | | |
| 5 | | | Tbeef | | Ci/kg | | Ci/kg | | |
| 6 | Element | At. No. | m2/kg | Ci/m2 | | | | | |
| 7 | Am | 241 | 3.00E-04 | 1.09E-02 | 3.28E-06 | Am241 | | | |
| 8 | Am | 243 | 3.00E-04 | 2.45E-04 | 7.35E-08 | Pu238 | 6.08E-06 | 2 | 8.88E-06 |
| 9 | Ba | 133 | 1.50E-03 | 1.36E-13 | 2.04E-16 | Pu239 | | | |
| 10 | Ce | 144 | 1.50E-04 | 4.80E-06 | 7.20E-10 | Ce144 | 7.20E-10 | 500 | 1.88E+01 |
| 11 | Cf | 249 | 4.50E-04 | 3.22E-06 | 1.45E-09 | | | | |
| 12 | Cf | 252 | 4.50E-04 | 4.03E-03 | 1.81E-06 | | | | |
| 13 | Cm | 244 | 1.50E-04 | 5.15E-03 | 7.73E-07 | Cm244 | 7.73E-07 | 2 | 7.00E-05 |
| 14 | Cm | 248 | 1.50E-04 | 2.53E-04 | 3.80E-08 | | | | |
| 15 | Co | 60 | 7.50E-02 | 1.82E-01 | 1.37E-02 | | | | |
| 16 | Cs | 137 | 3.75E-01 | 3.01E-01 | 1.13E-01 | Cs137 | 1.13E-01 | 1200 | 2.67E-07 |
| 17 | H | 3 | | | | | | | |
| 18 | Np | 237 | 7.50E-03 | 1.06E-05 | 7.98E-08 | Np237 | 7.98E-08 | 4 | 1.35E-03 |
| 19 | Pm | 147 | 1.50E-02 | 6.38E-09 | 9.57E-11 | | | | |
| 20 | Pu | 238 | 7.50E-05 | 1.40E-02 | 1.05E-06 | | | | |
| 21 | Pu | 239 | 7.50E-05 | 2.34E-02 | 1.76E-06 | | | | |
| 22 | Pu | 239/241 | 7.50E-05 | | | | | | |
| 23 | Pu | 240 | 7.50E-05 | 5.37E-03 | 4.03E-07 | | | | |
| 24 | Pu | 241 | 7.50E-05 | 1.55E-01 | 1.16E-05 | Pu241 | 1.16E-05 | 120 | 2.80E-04 |
| 25 | Pu | 242 | 7.50E-05 | 3.70E-05 | 2.78E-09 | | | | |
| 26 | Sr | 90 | 6.00E-02 | 2.99E-01 | 1.79E-02 | Sr90 | 1.79E-02 | 160 | 2.41E-07 |
| 27 | Tc | 99 | 7.50E-06 | 9.12E-14 | 6.84E-19 | | | | |
| 28 | Th | 232 | 7.50E-04 | 4.90E-07 | 3.67E-10 | | | | |
| 29 | Tl | 204 | 1.50E-01 | 2.28E-10 | 3.42E-11 | | | | |
| 30 | U | 235 | 2.25E-03 | 4.52E-07 | 1.02E-09 | | | | |
| 31 | U | 238 | 2.25E-03 | 5.45E-05 | 1.23E-07 | | | | |

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Beef | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | Bq/kg | |
| 5 | | | | DEP | | | | | |
| 6 | | | Tbeef | Unit | T x DEP | | | | |
| 7 | | | | Release | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | m2/kg | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | =D10*F10*J10/H10 | 0.0109232464571752 | =L10*M10 | Am241 | | | |
| 11 | Am | 243 | =D11*F11*J11/H11 | 0.0002451494535873 | =L11*M11 | Pu238 | =N10+N23+N24 | 2 | =R11/(37000000000*Q11) |
| 12 | Ba | 133 | =D12*F12*J12/H12 | 1.36268860796229E- | =L12*M12 | Pu239 | | | |
| 13 | Ce | 144 | =D13*F13*J13/H13 | 4.80276813710009E- | =L13*M13 | Ce144 | =N13 | 500 | =R13/(37000000000*Q13) |
| 14 | Cf | 249 | =D14*F14*J14/H14 | 3.21928851434957E- | =L14*M14 | | | | |
| 15 | Cf | 252 | =D15*F15*J15/H15 | 0.0040325400624300 | =L15*M15 | | | | |
| 16 | Cm | 244 | =D16*F16*J16/H16 | 0.0051513749107779 | =L16*M16 | Cm244 | =N16 | 2 | =R16/(37000000000*Q16) |
| 17 | Cm | 246 | =D17*F17*J17/H17 | 0.0002533949050526 | =L17*M17 | | | | |
| 18 | Co | 60 | =D18*F18*J18/H18 | 0.182230219924896 | =L18*M18 | | | | |
| 19 | Cs | 137 | =D19*F19*J19/H19 | 0.30103669732548 | =L19*M19 | Cs137 | =N19 | 1200 | =R19/(37000000000*Q19) |
| 20 | H | 3 | | | | | | | |
| 21 | Np | 237 | =D21*F21*J21/H21 | 0.0000106440001030 | =L21*M21 | Np237 | =N21 | 4 | =R21/(37000000000*Q21) |
| 22 | Pm | 147 | =D22*F22*J22/H22 | 6.38285370272298E- | =L22*M22 | | | | |
| 23 | Pu | 238 | =D23*F23*J23/H23 | 0.0140150063721576 | =L23*M23 | | | | |
| 24 | Pu | 239 | =D24*F24*J24/H24 | 0.0234242123520532 | =L24*M24 | | | | |
| 25 | Pu | 239/241 | =D25*F25*J25/H25 | | | | | | |
| 26 | Pu | 240 | =D26*F26*J26/H26 | 0.0053709965290181 | =L26*M26 | | | | |
| 27 | Pu | 241 | =D27*F27*J27/H27 | 0.154668619624854 | =L27*M27 | Pu241 | =N27 | 120 | =R27/(37000000000*Q27) |
| 28 | Pu | 242 | =D28*F28*J28/H28 | 0.0000370198442961 | =L28*M28 | | | | |
| 29 | Sr | 90 | =D29*F29*J29/H29 | 0.298537364314256 | =L29*M29 | Sr90 | =N29 | 160 | =R29/(37000000000*Q29) |
| 30 | Tc | 99 | =D30*F30*J30/H30 | 9.1183624324614E-1 | =L30*M30 | | | | |
| 31 | Th | 232 | =D31*F31*J31/H31 | 4.89930120071842E- | =L31*M31 | | | | |
| 32 | Tl | 204 | =D32*F32*J32/H32 | 2.27959060811535E- | =L32*M32 | | | | |
| 33 | U | 235 | =D33*F33*J33/H33 | 4.52037751832367E- | =L33*M33 | | | | |
| 34 | U | 238 | =D34*F34*J34/H34 | 0.0000545432882992 | =L34*M34 | | | | |

## Attachment E

Contamination of veal spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column L) were verified in S-CLC-G-00179 and are not included in this attachment.

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Veal | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | Bq/kg | |
| 5 | | | | DEP | | | | | |
| 6 | | | Tveal | Unit | T x DEP | | | | |
| 7 | | | | Release | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | m2/kg | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | 2.39E-03 | 1.09E-02 | 2.61E-05 | Am241 | | | |
| 11 | Am | 243 | 2.39E-03 | 2.45E-04 | 5.86E-07 | Pu238 | 1.16E-04 | 2 | 4.68E-07 |
| 12 | Ba | 133 | | 1.36E-13 | 0.00E+00 | Pu239 | | | |
| 13 | Ce | 144 | | 4.80E-06 | 0.00E+00 | Ce144 | 0.00E+00 | 500 | #DIV/0! |
| 14 | Cf | 249 | | 3.22E-06 | 0.00E+00 | | | | |
| 15 | Cf | 252 | | 4.03E-03 | 0.00E+00 | | | | |
| 16 | Cm | 244 | | 5.15E-03 | 0.00E+00 | Cm244 | 0.00E+00 | 2 | #DIV/0! |
| 17 | Cm | 246 | | 2.53E-04 | 0.00E+00 | | | | |
| 18 | Co | 60 | | 1.82E-01 | 0.00E+00 | | | | |
| 19 | Cs | 137 | 4.78E-01 | 3.01E-01 | 1.44E-01 | Cs137 | 1.44E-01 | 1200 | 2.25E-07 |
| 20 | H | 3 | | | | | | | |
| 21 | Np | 237 | | 1.06E-05 | 0.00E+00 | Np237 | 0.00E+00 | 4 | #DIV/0! |
| 22 | Pm | 147 | | 6.38E-09 | 0.00E+00 | | | | |
| 23 | Pu | 238 | 2.39E-03 | 1.40E-02 | 3.35E-05 | | | | |
| 24 | Pu | 239 | 2.39E-03 | 2.34E-02 | 5.60E-05 | | | | |
| 25 | Pu | 239/241 | 2.39E-03 | | | | | | |
| 26 | Pu | 240 | 2.39E-03 | 5.37E-03 | 1.28E-05 | | | | |
| 27 | Pu | 241 | 2.39E-03 | 1.55E-01 | 3.69E-04 | Pu241 | 3.69E-04 | 120 | 8.78E-06 |
| 28 | Pu | 242 | 2.39E-03 | 3.70E-05 | 8.84E-08 | | | | |
| 29 | Sr | 90 | 2.39E-01 | 2.99E-01 | 7.13E-02 | Sr90 | 7.13E-02 | 160 | 6.06E-08 |
| 30 | Tc | 99 | | 9.12E-14 | 0.00E+00 | | | | |
| 31 | Th | 232 | | 4.90E-07 | 0.00E+00 | | | | |
| 32 | Tl | 204 | | 2.28E-10 | 0.00E+00 | | | | |
| 33 | U | 235 | | 4.52E-07 | 0.00E+00 | | | | |
| 34 | U | 238 | | 5.45E-05 | 0.00E+00 | | | | |

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Veal | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | DEP | | | | Bq/kg | Ci/m2 |
| 5 | | | Tveal | Unit Release | T x DEP | | Ci/kg | | |
| 6 | Element | At. No. | m2/kg | Ci/m2 | | | | | |
| 7 | Am | 241 | =D10*F10*J10/H10 | 0.0109232464571752 | =L10*M10 | Am241 | | | |
| 8 | Am | 243 | =D11*F11*J11/H11 | 0.000245149453587 3 | =L11*M11 | Pu238 | =N10+N23+N24 | 2 | =R11/(37000000000*Q11) |
| 9 | Ba | 133 | | 1.36268860798229E- | =L12*M12 | Pu239 | | | |
| 10 | Ce | 144 | | 4.80276813710009E- | =L13*M13 | Ce144 | =N13 | 500 | =R13/(37000000000*Q13) |
| 11 | Cf | 249 | | 3.21928851434957E- | =L14*M14 | | | | |
| 12 | Cf | 252 | | 0.004032540062430 0 | =L15*M15 | | | | |
| 13 | Cm | 244 | | 0.005151374910778 9 | =L16*M16 | Cm244 | =N16 | 2 | =R16/(37000000000*Q16) |
| 14 | Cm | 246 | | 0.000253394905052 6 | =L17*M17 | | | | |
| 15 | Co | 60 | | 0.182230219924896 | =L18*M18 | | | | |
| 16 | Cs | 137 | =D19*F19*J19/H19 | 0.30103669732548 | =L19*M19 | Cs137 | =N19 | 1200 | =R19/(37000000000*Q19) |
| 17 | H | 3 | | | | | | | |
| 18 | Np | 237 | | 0.000010644000103 0 | =L21*M21 | Np237 | =N21 | 4 | =R21/(37000000000*Q21) |
| 19 | Pm | 147 | | 6.382853702722 98E- | =L22*M22 | | | | |
| 20 | Pu | 238 | =D23*F23*J23/H23 | 0.014015006372157 6 | =L23*M23 | | | | |
| 21 | Pu | 239 | =D24*F24*J24/H24 | 0.023424212352053 2 | =L24*M24 | | | | |
| 22 | Pu | 239/241 | =D25*F25*J25/H25 | | | | | | |
| 23 | Pu | 240 | =D26*F26*J26/H26 | 0.005370996529018 1 | =L26*M26 | | | | |
| 24 | Pu | 241 | =D27*F27*J27/H27 | 0.154668619624854 | =L27*M27 | Pu241 | =N27 | 120 | =R27/(37000000000*Q27) |
| 25 | Pu | 242 | =D28*F28*J28/H28 | 0.000037019844296 1 | =L28*M28 | | | | |
| 26 | Sr | 90 | =D29*F29*J29/H29 | 0.298537364314256 | =L29*M29 | Sr90 | =N29 | 160 | =R29/(37000000000*Q29) |
| 27 | Tc | 99 | | 9.1183624324614E-1 | =L30*M30 | | | | |
| 28 | Th | 232 | | 4.899301200718 42E- | =L31*M31 | | | | |
| 29 | Tl | 204 | | 2.279590608115 35E- | =L32*M32 | | | | |
| 30 | U | 235 | | 4.520377518323 67E- | =L33*M33 | | | | |
| 31 | U | 238 | | 0.000054543288299 2 | =L34*M34 | | | | |

## Attachment F

Contamination of sheep spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column L) were verified in S-CLC-G-00179 and are not included in this attachment.

SourceSRTC.xls

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Sheep | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for |
| 4 | | | | DEP | | | | Bq/kg | DIL |
| 5 | | | Tsheep | Unit | T x DEP | | | | Ci/m2 |
| 6 | | | | Release | Ci/kg | | Ci/kg | | |
| 7 | Element | At. No. | m2/kg | | | | | | |
| 8 | | | | Ci/m2 | | | | | |
| 9 | Am | 241 | 3.28E-04 | 1.09E-02 | 3.58E-06 | Am241 | | | |
| 10 | Am | 243 | 3.28E-04 | 2.45E-04 | 8.04E-08 | Pu238 | 9.35E-06 | 2 | 5.78E-06 |
| 11 | Ba | 133 | | 1.36E-13 | 0.00E+00 | Pu239 | | | |
| 12 | Ce | 144 | 3.28E-04 | 4.80E-06 | 1.57E-09 | Ce144 | 1.57E-09 | 500 | 8.58E+00 |
| 13 | Cf | 249 | | 3.22E-06 | 0.00E+00 | | | | |
| 14 | Cf | 252 | | 4.03E-03 | 0.00E+00 | | | | |
| 15 | Cm | 244 | | 5.15E-03 | 0.00E+00 | Cm244 | 0.00E+00 | 2 | #DIV/0! |
| 16 | Cm | 246 | | 2.53E-04 | 0.00E+00 | | | | |
| 17 | Co | 60 | 1.02E-01 | 1.82E-01 | 1.85E-02 | | | | |
| 18 | Cs | 137 | 2.79E-01 | 3.01E-01 | 8.39E-02 | Cs137 | 8.39E-02 | 1200 | 3.87E-07 |
| 19 | H | 3 | | | | | | | |
| 20 | Np | 237 | | 1.06E-05 | 0.00E+00 | Np237 | 0.00E+00 | 4 | #DIV/0! |
| 21 | Pm | 147 | | 6.38E-09 | 0.00E+00 | | | | |
| 22 | Pu | 238 | 1.54E-04 | 1.40E-02 | 2.16E-06 | | | | |
| 23 | Pu | 239 | 1.54E-04 | 2.34E-02 | 3.61E-06 | | | | |
| 24 | Pu | 239/241 | 1.54E-04 | | | | | | |
| 25 | Pu | 240 | 1.54E-04 | 5.37E-03 | 8.27E-07 | | | | |
| 26 | Pu | 241 | 1.54E-04 | 1.55E-01 | 2.38E-05 | Pu241 | 2.38E-05 | 120 | 1.36E-04 |
| 27 | Pu | 242 | 1.54E-04 | 3.70E-05 | 5.70E-09 | | | | |
| 28 | Sr | 90 | 6.56E-02 | 2.99E-01 | 1.96E-02 | Sr90 | 1.96E-02 | 160 | 2.21E-07 |
| 29 | Tc | 99 | | 9.12E-14 | 0.00E+00 | | | | |
| 30 | Th | 232 | | 4.90E-07 | 0.00E+00 | | | | |
| 31 | Tl | 204 | | 2.28E-10 | 0.00E+00 | | | | |
| 32 | U | 235 | | 4.52E-07 | 0.00E+00 | | | | |
| 33 | U | 238 | | 5.45E-05 | 0.00E+00 | | | | |
| 34 | | | | | | | | | |

Sheep

F1

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Sheep | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | DEP | | | | Bq/kg | Ci/m2 |
| 5 | | | Tsheep | Unit Release | T x DEP | | | | |
| 6 | | | | | | | Ci/kg | | |
| 7 | Element | At. No. | m2/kg | | | | | | |
| 8 | | | | Ci/m2 | | | | | |
| 9 | Am | 241 | =D10*F10*J10/H10 | 0.0109232464571752 | =L10*M10 | Am241 | | | |
| 10 | Am | 243 | =D11*F11*J11/H11 | 0.000245149453587 3 | =L11*M11 | Pu238 | =N10+N23+N24 | 2 | =R11/(37000000000*Q11) |
| 11 | Ba | 133 | | 1.36268860796229E- | =L12*M12 | Pu239 | | | |
| 12 | Ce | 144 | =D13*F13*J13/H13 | 4.80276813710009E- | =L13*M13 | Ce144 | =N13 | 500 | =R13/(37000000000*Q13) |
| 13 | Cf | 249 | | 3.21928851434957E- | =L14*M14 | | | | |
| 14 | Cf | 252 | | 0.0040325400624300 | =L15*M15 | | | | |
| 15 | Cm | 244 | | 0.0051513749107779 | =L16*M16 | Cm244 | =N16 | 2 | =R16/(37000000000*Q16) |
| 16 | Cm | 246 | | 0.0002533949050526 | =L17*M17 | | | | |
| 17 | Co | 60 | =D18*F18*J18/H18 | 0.182230219924896 | =L18*M18 | | | | |
| 18 | Cs | 137 | =D19*F19*J19/H19 | 0.30103669732548 | =L19*M19 | Cs137 | =N19 | 1200 | =R19/(37000000000*Q19) |
| 19 | H | 3 | | | | | | | |
| 20 | Np | 237 | | 0.0000106440001030 | =L21*M21 | Np237 | =N21 | 4 | =R21/(37000000000*Q21) |
| 21 | Pm | 147 | | 6.38285370272298E- | =L22*M22 | | | | |
| 22 | Pu | 238 | =D23*F23*J23/H23 | 0.0140150063721576 | =L23*M23 | | | | |
| 23 | Pu | 239 | =D24*F24*J24/H24 | 0.0234242123520532 | =L24*M24 | | | | |
| 24 | Pu | 239/241 | =D25*F25*J25/H25 | | | | | | |
| 25 | Pu | 240 | =D26*F26*J26/H26 | 0.0053709965290181 | =L26*M26 | | | | |
| 26 | Pu | 241 | =D27*F27*J27/H27 | 0.154668619624854 | =L27*M27 | Pu241 | =N27 | 120 | =R27/(37000000000*Q27) |
| 27 | Pu | 242 | =D28*F28*J28/H28 | 0.0000370198442961 | =L28*M28 | | | | |
| 28 | Sr | 90 | =D29*F29*J29/H29 | 0.298537364314256 | =L29*M29 | Sr90 | =N29 | 160 | =R29/(37000000000*Q29) |
| 29 | Tc | 99 | | 9.1183624324614E-1 | =L30*M30 | | | | |
| 30 | Th | 232 | | 4.89930120071842E- | =L31*M31 | | | | |
| 31 | Tl | 204 | | 2.27959060811535E- | =L32*M32 | | | | |
| 32 | U | 235 | | 4.52037751832367E- | =L33*M33 | | | | |
| 33 | U | 238 | | 0.0000545432882992 | =L34*M34 | | | | |

## Attachment G

Contamination of lamb spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column L) were verified in S-CLC-G-00179 and are not included in this attachment.

SourceSRTC.xls

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Lamb | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL Bq/kg | Total Dep for DIL Ci/m2 |
| 4 | | | | DEP | | | | | |
| 5 | | | Tlamb | Unit | T x DEP | | | | |
| 6 | | | | Release | Ci/kg | | Ci/kg | | |
| 7 | Element | At. No. | m2/kg | | | | | | |
| 8 | | | | Ci/m2 | | | | | |
| 9 | Am | 241 | 5.69E-03 | 1.09E-02 | 6.22E-05 | Am241 | | | |
| 10 | Am | 243 | 5.69E-03 | 2.45E-04 | 1.40E-06 | Pu238 | 2.23E-04 | 2 | 2.42E-07 |
| 11 | Ba | 133 | | 1.36E-13 | 0.00E+00 | Pu239 | | | |
| 12 | Ce | 144 | | 4.80E-06 | 0.00E+00 | Ce144 | 0.00E+00 | 500 | #DIV/0! |
| 13 | Cf | 249 | | 3.22E-06 | 0.00E+00 | | | | |
| 14 | Cf | 252 | | 4.03E-03 | 0.00E+00 | | | | |
| 15 | Cm | 244 | | 5.15E-03 | 0.00E+00 | Cm244 | 0.00E+00 | 2 | #DIV/0! |
| 16 | Cm | 246 | | 2.53E-04 | 0.00E+00 | | | | |
| 17 | Co | 60 | | 1.82E-01 | 0.00E+00 | | | | |
| 18 | Cs | 137 | 6.81E-01 | 3.01E-01 | 2.05E-01 | Cs137 | 2.05E-01 | 1200 | 1.58E-07 |
| 19 | H | 3 | | | | | | | |
| 20 | Np | 237 | | 1.06E-05 | 0.00E+00 | Np237 | 0.00E+00 | 4 | #DIV/0! |
| 21 | Pm | 147 | | 6.38E-09 | 0.00E+00 | | | | |
| 22 | Pu | 238 | 4.31E-03 | 1.40E-02 | 6.03E-05 | | | | |
| 23 | Pu | 239 | 4.31E-03 | 2.34E-02 | 1.01E-04 | | | | |
| 24 | Pu | 239/241 | 4.31E-03 | | | | | | |
| 25 | Pu | 240 | 4.31E-03 | 5.37E-03 | 2.31E-05 | | | | |
| 26 | Pu | 241 | 4.31E-03 | 1.55E-01 | 6.66E-04 | Pu241 | 6.66E-04 | 120 | 4.87E-06 |
| 27 | Pu | 242 | 4.31E-03 | 3.70E-05 | 1.59E-07 | | | | |
| 28 | Sr | 90 | 4.58E-01 | 2.99E-01 | 1.37E-01 | Sr90 | 1.37E-01 | 160 | 3.16E-08 |
| 29 | Tc | 99 | | 9.12E-14 | 0.00E+00 | | | | |
| 30 | Th | 232 | | 4.90E-07 | 0.00E+00 | | | | |
| 31 | Tl | 204 | | 2.28E-10 | 0.00E+00 | | | | |
| 32 | U | 235 | | 4.52E-07 | 0.00E+00 | | | | |
| 33 | U | 238 | | 5.45E-05 | 0.00E+00 | | | | |

Lamb

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Lamb | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | DEP | | | | Bq/kg | |
| 5 | | | Tlamb | Unit Release | T x DEP | | | | Ci/m2 |
| 6 | | | | | Ci/kg | | | | |
| 7 | Element | At. No. | m2/kg | | | | Ci/kg | | |
| 8 | | | | Ci/m2 | | | | | |
| 9 | Am | 241 | =D10*F10*J10/H10 | 0.0109232464571752 | =L10*M10 | Am241 | | | |
| 10 | Am | 243 | =D11*F11*J11/H11 | 0.0002451494535873 | =L11*M11 | Pu238 | =N10+N23+N24 | 2 | =R11/(37000000000*Q11) |
| 11 | Ba | 133 | | 1.36268860796229E- | =L12*M12 | Pu239 | | | |
| 12 | Ce | 144 | | 4.80276813710009E- | =L13*M13 | Ce144 | =N13 | 500 | =R13/(37000000000*Q13) |
| 13 | Cf | 249 | | 3.21928851434957E- | =L14*M14 | | | | |
| 14 | Cf | 252 | | 0.0040325400624300 | =L15*M15 | | | | |
| 15 | Cm | 244 | | 0.0051513749107779 | =L16*M16 | Cm244 | =N16 | 2 | =R16/(37000000000*Q16) |
| 16 | Cm | 246 | | 0.0002533949050526 | =L17*M17 | | | | |
| 17 | Co | 60 | | 0.182230219924896 | =L18*M18 | | | | |
| 18 | Cs | 137 | =D19*F19*J19/H19 | 0.30103669732548 | =L19*M19 | Cs137 | =N19 | 1200 | =R19/(37000000000*Q19) |
| 19 | H | 3 | | | | | | | |
| 20 | Np | 237 | | 0.0000106440001030 | =L21*M21 | Np237 | =N21 | 4 | =R21/(37000000000*Q21) |
| 21 | Pm | 147 | | 6.38285370272298E- | =L22*M22 | | | | |
| 22 | Pu | 238 | =D23*F23*J23/H23 | 0.0140150063721576 | =L23*M23 | | | | |
| 23 | Pu | 239 | =D24*F24*J24/H24 | 0.0234242123520532 | =L24*M24 | | | | |
| 24 | Pu | 239/241 | =D25*F25*J25/H25 | | | | | | |
| 25 | Pu | 240 | =D26*F26*J26/H26 | 0.0053709965290181 | =L26*M26 | | | | |
| 26 | Pu | 241 | =D27*F27*J27/H27 | 0.154668619624854 | =L27*M27 | Pu241 | =N27 | 120 | =R27/(37000000000*Q27) |
| 27 | Pu | 242 | =D28*F28*J28/H28 | 0.0000370198442961 | =L28*M28 | | | | |
| 28 | Sr | 90 | =D29*F29*J29/H29 | 0.298537364314256 | =L29*M29 | Sr90 | =N29 | 160 | =R29/(37000000000*Q29) |
| 29 | Tc | 99 | | 9.1183624324614E-1 | =L30*M30 | | | | |
| 30 | Th | 232 | | 4.89930120071842E- | =L31*M31 | | | | |
| 31 | Tl | 204 | | 2.27959060811535E- | =L32*M32 | | | | |
| 32 | U | 235 | | 4.52037751832367E- | =L33*M33 | | | | |
| 33 | U | 238 | | 0.0000545432882992 | =L34*M34 | | | | |

## Attachment H

Contamination of pork spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column L) were verified in S-CLC-G-00179 and are not included in this attachment.

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Pork | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group Dtl. | Total Dep for Dtl |
| 4 | | | | DEP | | | | Bq/kg | Ci/m2 |
| 5 | | | Tpork | Unit | T x DEP | | | | |
| 6 | | | | Release | Ci/kg | | | | |
| 7 | Element | At. No. | m2/kg | | | | Ci/kg | | |
| 8 | | | | Ci/m2 | | | | | |
| 9 | Am | 241 | 5.19E-04 | 1.09E-02 | 5.67E-06 | Am241 | | | |
| 10 | Am | 243 | 5.19E-04 | 2.45E-04 | 1.27E-07 | Pu238 | 1.48E-05 | 2 | 3.65E-06 |
| 11 | Ba | 133 | 0.00E+00 | 1.36E-13 | 0.00E+00 | Pu239 | | | |
| 12 | Ce | 144 | 3.06E-04 | 4.80E-06 | 1.47E-09 | Ce144 | 1.47E-09 | 500 | 9.21E+00 |
| 13 | Cf | 249 | | 3.22E-06 | 0.00E+00 | | | | |
| 14 | Cf | 252 | | 4.03E-03 | 0.00E+00 | | | | |
| 15 | Cm | 244 | | 5.15E-03 | 0.00E+00 | Cm244 | 0.00E+00 | 2 | #DIV/0! |
| 16 | Cm | 246 | | 2.53E-04 | 0.00E+00 | | | | |
| 17 | Co | 60 | 6.11E-03 | 1.82E-01 | 1.11E-03 | | | | |
| 18 | Cs | 137 | 7.33E-01 | 3.01E-01 | 2.21E-01 | Cs137 | 2.21E-01 | 1200 | 1.47E-07 |
| 19 | H | 3 | | | | | | | |
| 20 | Np | 237 | | 1.06E-05 | 0.00E+00 | Np237 | 0.00E+00 | 4 | #DIV/0! |
| 21 | Pm | 147 | | 6.38E-09 | 0.00E+00 | | | | |
| 22 | Pu | 238 | 2.44E-04 | 1.40E-02 | 3.43E-06 | | | | |
| 23 | Pu | 239 | 2.44E-04 | 2.34E-02 | 5.73E-06 | | | | |
| 24 | Pu | 239/241 | 2.44E-04 | | | | | | |
| 25 | Pu | 240 | 2.44E-04 | 5.37E-03 | 1.31E-06 | | | | |
| 26 | Pu | 241 | 2.44E-04 | 1.55E-01 | 3.78E-05 | Pu241 | 3.78E-05 | 120 | 8.58E-05 |
| 27 | Pu | 242 | 2.44E-04 | 3.70E-05 | 9.05E-09 | | | | |
| 28 | Sr | 90 | 1.22E-01 | 2.99E-01 | 3.65E-02 | Sr90 | 3.65E-02 | 160 | 1.19E-07 |
| 29 | Tc | 99 | 4.58E-04 | 9.12E-14 | 4.18E-17 | | | | |
| 30 | Th | 232 | | 4.90E-07 | 0.00E+00 | | | | |
| 31 | Tl | 204 | | 2.28E-10 | 0.00E+00 | | | | |
| 32 | U | 235 | 1.89E-01 | 4.52E-07 | 8.56E-08 | | | | |
| 33 | U | 238 | 1.89E-01 | 5.45E-05 | 1.03E-05 | | | | |
| 34 | | | | | | | | | |

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Pork | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | Bq/kg | |
| 5 | | | | DEP | | | | | |
| 6 | | | Tpork | Unit | T x DEP | | | | Ci/m2 |
| 7 | | | | Release | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | m2/kg | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | =D10*F10*J10/H10 | 0.0109232464571752 | =L10*M10 | Am241 | | | |
| 11 | Am | 243 | =D11*F11*J11/H11 | 0.0002451494535873 | =L11*M11 | Pu238 | =N10+N23+N24 | 2 | =R11/(37000000000*Q11) |
| 12 | Ba | 133 | =D12*F12*J12/H12 | 1.36268860796229E- | =L12*M12 | Pu239 | | | |
| 13 | Ce | 144 | =D13*F13*J13/H13 | 4.80276813710009E- | =L13*M13 | Ce144 | =N13 | 500 | =R13/(37000000000*Q13) |
| 14 | Cf | 249 | | 3.21928651434957E- | =L14*M14 | | | | |
| 15 | Cf | 252 | | 0.0040325400624300 | =L15*M15 | | | | |
| 16 | Cm | 244 | | 0.0051513749107779 | =L16*M16 | Cm244 | =N16 | 2 | =R16/(37000000000*Q16) |
| 17 | Cm | 246 | | 0.0002533949050526 | =L17*M17 | | | | |
| 18 | Co | 60 | =D18*F18*J18/H18 | 0.182230219924896 | =L18*M18 | | | | |
| 19 | Cs | 137 | =D19*F19*J19/H19 | 0.30103669732548 | =L19*M19 | Cs137 | =N19 | 1200 | =R19/(37000000000*Q19) |
| 20 | H | 3 | | | | | | | |
| 21 | Np | 237 | | 0.0000106440001030 | =L21*M21 | Np237 | =N21 | 4 | =R21/(37000000000*Q21) |
| 22 | Pm | 147 | | 6.38285370272298E- | =L22*M22 | | | | |
| 23 | Pu | 238 | =D23*F23*J23/H23 | 0.0140150063721576 | =L23*M23 | | | | |
| 24 | Pu | 239 | =D24*F24*J24/H24 | 0.0234242123520532 | =L24*M24 | | | | |
| 25 | Pu | 239/241 | =D25*F25*J25/H25 | | | | | | |
| 26 | Pu | 240 | =D26*F26*J26/H26 | 0.0053709965290181 | =L26*M26 | | | | |
| 27 | Pu | 241 | =D27*F27*J27/H27 | 0.154668619624854 | =L27*M27 | Pu241 | =N27 | 120 | =R27/(37000000000*Q27) |
| 28 | Pu | 242 | =D28*F28*J28/H28 | 0.0000370198442961 | =L28*M28 | | | | |
| 29 | Sr | 90 | =D29*F29*J29/H29 | 0.298537364314256 | =L29*M29 | Sr90 | =N29 | 160 | =R29/(37000000000*Q29) |
| 30 | Tc | 99 | =D30*F30*J30/H30 | 9.1183624324614E-1 | =L30*M30 | | | | |
| 31 | Th | 232 | | 4.89930120071842E- | =L31*M31 | | | | |
| 32 | Tl | 204 | | 2.27959060811535E- | =L32*M32 | | | | |
| 33 | U | 235 | =D33*F33*J33/H33 | 4.520377518323 67E- | =L33*M33 | | | | |
| 34 | U | 238 | =D34*F34*J34/H34 | 0.0000545432882992 | =L34*M34 | | | | |

## Attachment I

Contamination of poultry spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column L) were verified in S-CLC-G-00179 and are not included in this attachment.

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Poultry | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | DEP | | | | Bq/kg | |
| 5 | | | Tpoultry | Unit Release | T x DEP | | | | Ci/m2 |
| 6 | | | | | Ci/kg | | Ci/kg | | |
| 7 | Element | At. No. | m2/kg | | | | | | |
| 8 | | | | Ci/m2 | | | | | |
| 9 | Am | 241 | 5.25E-04 | 1.09E-02 | 5.73E-06 | Am241 | | | |
| 10 | Am | 243 | 5.25E-04 | 2.45E-04 | 1.29E-07 | Pu238 | 1.56E-05 | 2 | 3.47E-06 |
| 11 | Ba | 133 | 7.88E-04 | 1.36E-13 | 1.07E-16 | Pu239 | | | |
| 12 | Ce | 144 | 3.50E-04 | 4.80E-06 | 1.68E-09 | Ce144 | 1.68E-09 | 500 | 8.04E+00 |
| 13 | Cf | 249 | | 3.22E-06 | 0.00E+00 | | | | |
| 14 | Cf | 252 | | 4.03E-03 | 0.00E+00 | | | | |
| 15 | Cm | 244 | | 5.15E-03 | 0.00E+00 | Cm244 | 0.00E+00 | 2 | #DIV/0! |
| 16 | Cm | 246 | | 2.53E-04 | 0.00E+00 | | | | |
| 17 | Co | 60 | 1.75E-01 | 1.82E-01 | 3.19E-02 | | | | |
| 18 | Cs | 137 | 8.75E-01 | 3.01E-01 | 2.63E-01 | Cs137 | 2.63E-01 | 1200 | 1.23E-07 |
| 19 | H | 3 | | | | | | | |
| 20 | Np | 237 | | 1.06E-05 | 0.00E+00 | Np237 | 0.00E+00 | 4 | #DIV/0! |
| 21 | Pm | 147 | 1.75E-04 | 6.38E-09 | 1.12E-12 | | | | |
| 22 | Pu | 238 | 2.63E-04 | 1.40E-02 | 3.68E-06 | | | | |
| 23 | Pu | 239 | 2.63E-04 | 2.34E-02 | 6.15E-06 | | | | |
| 24 | Pu | 239/241 | 2.63E-04 | | | | | | |
| 25 | Pu | 240 | 2.63E-04 | 5.37E-03 | 1.41E-06 | | | | |
| 26 | Pu | 241 | 2.63E-04 | 1.55E-01 | 4.06E-05 | Pu241 | 4.06E-05 | 120 | 7.99E-05 |
| 27 | Pu | 242 | 2.63E-04 | 3.70E-05 | 9.72E-09 | | | | |
| 28 | Sr | 90 | 7.00E-03 | 2.99E-01 | 2.09E-03 | Sr90 | 2.09E-03 | 160 | 2.07E-06 |
| 29 | Tc | 99 | 2.63E-03 | 9.12E-14 | 2.39E-16 | | | | |
| 30 | Th | 232 | | 4.90E-07 | 0.00E+00 | | | | |
| 31 | Tl | 204 | | 2.28E-10 | 0.00E+00 | | | | |
| 32 | U | 235 | 8.75E-02 | 4.52E-07 | 3.96E-08 | | | | |
| 33 | U | 238 | 8.75E-02 | 5.45E-05 | 4.77E-06 | | | | |

| | A | B | L | M | N | P | Q | R | S |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Poultry | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | Bq/kg | Ci/m2 |
| 5 | | | | DEP | | | | | |
| 6 | | | Tpoultry | Unit Release | T x DEP | | | | |
| 7 | | | | | | | Ci/kg | | |
| 8 | Element | At. No. | m2/kg | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | =D10*F10*J10/H10 | 0.0109232464571752 | =L10*M10 | Am241 | | | |
| 11 | Am | 243 | =D11*F11*J11/H11 | 0.0002451494535873 | =L11*M11 | Pu238 | =N10+N23+N24 | 2 | =R11/(37000000000*Q11) |
| 12 | Ba | 133 | =D12*F12*J12/H12 | 1.36268860796229E- | =L12*M12 | Pu239 | | | |
| 13 | Ce | 144 | =D13*F13*J13/H13 | 4.80276813710009E- | =L13*M13 | Ce144 | =N13 | 500 | =R13/(37000000000*Q13) |
| 14 | Cf | 249 | | 3.21928851434957E- | =L14*M14 | | | | |
| 15 | Cf | 252 | | 0.0040325400624300 | =L15*M15 | | | | |
| 16 | Cm | 244 | | 0.0051513749107779 | =L16*M16 | Cm244 | =N16 | 2 | =R16/(37000000000*Q16) |
| 17 | Cm | 246 | | 0.0002533949050526 | =L17*M17 | | | | |
| 18 | Co | 60 | =D18*F18*J18/H18 | 0.182230219924896 | =L18*M18 | | | | |
| 19 | Cs | 137 | =D19*F19*J19/H19 | 0.30103669732548 | =L19*M19 | Cs137 | =N19 | 1200 | =R19/(37000000000*Q19) |
| 20 | H | 3 | | | | | | | |
| 21 | Np | 237 | | 0.0000106440001030 | =L21*M21 | Np237 | =N21 | 4 | =R21/(37000000000*Q21) |
| 22 | Pm | 147 | =D22*F22*J22/H22 | 6.38285370272298E- | =L22*M22 | | | | |
| 23 | Pu | 238 | =D23*F23*J23/H23 | 0.0140150063721576 | =L23*M23 | | | | |
| 24 | Pu | 239 | =D24*F24*J24/H24 | 0.0234242123520532 | =L24*M24 | | | | |
| 25 | Pu | 239/241 | =D25*F25*J25/H25 | | | | | | |
| 26 | Pu | 240 | =D26*F26*J26/H26 | 0.0053709965290181 | =L26*M26 | | | | |
| 27 | Pu | 241 | =D27*F27*J27/H27 | 0.154668619624854 | =L27*M27 | Pu241 | =N27 | 120 | =R27/(37000000000*Q27) |
| 28 | Pu | 242 | =D28*F28*J28/H28 | 0.0000370198442961 | =L28*M28 | | | | |
| 29 | Sr | 90 | =D29*F29*J29/H29 | 0.298537364314256 | =L29*M29 | Sr90 | =N29 | 160 | =R29/(37000000000*Q29) |
| 30 | Tc | 99 | =D30*F30*J30/H30 | 9.1183624324614E-1 | =L30*M30 | | | | |
| 31 | Th | 232 | | 4.89930120071842E- | =L31*M31 | | | | |
| 32 | Tl | 204 | | 2.27959060811535E- | =L32*M32 | | | | |
| 33 | U | 235 | =D33*F33*J33/H33 | 4.52037751832367E- | =L33*M33 | | | | |
| 34 | U | 238 | =D34*F34*J34/H34 | 0.0000545432882992 | =L34*M34 | | | | |

**Attachment J**
Contamination of fish spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column I) were verified in S-CLC-G-00179 and are not included in this attachment.

| | B | C | I | J | K | M | N | O | P |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Fish | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | Bq/kg | |
| 5 | | | | DEP | | | | | |
| 6 | | | T | Unit | T x DEP | | | | |
| 7 | | | fish | Release | Ci/kg | | Ci/kg | | Ci/m2 |
| 8 | Element | At. No. | m2/kg | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | 0.03 | 1.09E-02 | 3.28E-04 | Am241 | | | |
| 11 | Am | 243 | 0.03 | 2.45E-04 | 7.35E-06 | Pu238 | 1.45E-03 | 2 | 3.73E-08 |
| 12 | Ba | 133 | 0.004 | 1.36E-13 | 5.45E-16 | Pu239 | | | |
| 13 | Ce | 144 | 0.03 | 4.80E-06 | 1.44E-07 | Ce144 | 1.44E-07 | 500 | 9.38E-02 |
| 14 | Cf | 249 | 0.025 | 3.22E-06 | 8.05E-08 | | | | |
| 15 | Cf | 252 | 0.025 | 4.03E-03 | 1.01E-04 | | | | |
| 16 | Cm | 244 | 0.03 | 5.15E-03 | 1.55E-04 | Cm244 | 1.55E-04 | 2 | 3.50E-07 |
| 17 | Cm | 246 | 0.03 | 2.53E-04 | 7.60E-06 | | | | |
| 18 | Co | 60 | 0.3 | 1.82E-01 | 5.47E-02 | | | | |
| 19 | Cs | 137 | 2 | 3.01E-01 | 6.02E-01 | Cs137 | 6.02E-01 | 1200 | 5.39E-08 |
| 20 | H | 3 | 0.001 | | | | | | |
| 21 | Np | 237 | 0.03 | 1.06E-05 | 3.19E-07 | Np237 | 3.19E-07 | 4 | 3.39E-04 |
| 22 | Pm | 147 | 0.03 | 6.38E-09 | 1.91E-10 | | | | |
| 23 | Pu | 238 | 0.03 | 1.40E-02 | 4.20E-04 | | | | |
| 24 | Pu | 239 | 0.03 | 2.34E-02 | 7.03E-04 | | | | |
| 25 | Pu | 239/241 | 0.03 | | | | | | |
| 26 | Pu | 240 | 0.03 | 5.37E-03 | 1.61E-04 | | | | |
| 27 | Pu | 241 | 0.03 | 1.55E-01 | 4.64E-03 | Pu241 | 4.64E-03 | 120 | 6.99E-07 |
| 28 | Pu | 242 | 0.03 | 3.70E-05 | 1.11E-06 | | | | |
| 29 | Sr | 90 | 0.06 | 2.99E-01 | 1.79E-02 | Sr90 | 1.79E-02 | 160 | 2.41E-07 |
| 30 | Tc | 99 | 0.02 | 9.12E-14 | 1.82E-15 | | | | |
| 31 | Th | 232 | 0.1 | 4.90E-07 | 4.90E-08 | | | | |
| 32 | Tl | 204 | 10 | 2.28E-10 | 2.28E-09 | | | | |
| 33 | U | 235 | 0.01 | 4.52E-07 | 4.52E-09 | | | | |
| 34 | U | 238 | 0.01 | 5.45E-05 | 5.45E-07 | | | | |

| | B | C | I | J | K | M | N | O | P |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Fish | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DtL | Total Dep for DtL |
| 4 | | | | | | | | | |
| 5 | | | | DEP | | | | Bq/kg | |
| 6 | | | T | Unit | T x DEP | | | | Ci/m2 |
| 7 | | | fish | Release | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | m2/kg | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | =E10*G10 | 0.0109232464571752 | =I10*J10 | Am241 | | | |
| 11 | Am | 243 | =E11*G11 | 0.0002451494535873 | =I11*J11 | Pu238 | =K10+K23+K24 | 2 | =O11/(37000000000*N11) |
| 12 | Ba | 133 | =E12*G12 | 1.362688607962296E- | =I12*J12 | Pu239 | | | |
| 13 | Ce | 144 | =E13*G13 | 4.802768137100096E- | =I13*J13 | Ce144 | =K13 | 500 | =O13/(37000000000*N13) |
| 14 | Cf | 249 | =E14*G14 | 3.219288514349576E- | =I14*J14 | | | | |
| 15 | Cf | 252 | =E15*G15 | 0.0040325400624300 | =I15*J15 | | | | |
| 16 | Cm | 244 | =E16*G16 | 0.0051513749107779 | =I16*J16 | Cm244 | =K16 | 2 | =O16/(37000000000*N16) |
| 17 | Cm | 246 | =E17*G17 | 0.0002533949050526 | =I17*J17 | | | | |
| 18 | Co | 60 | =E18*G18 | 0.182230219924896 | =I18*J18 | | | | |
| 19 | Cs | 137 | =E19*G19 | 0.30103669732548 | =I19*J19 | Cs137 | =K19 | 1200 | =O19/(37000000000*N19) |
| 20 | H | 3 | =E20*G20 | | | | | | |
| 21 | Np | 237 | =E21*G21 | 0.0000106440001030 | =I21*J21 | Np237 | =K21 | 4 | =O21/(37000000000*N21) |
| 22 | Pm | 147 | =E22*G22 | 6.382853702722986E- | =I22*J22 | | | | |
| 23 | Pu | 238 | =E23*G23 | 0.0140150063721576 | =I23*J23 | | | | |
| 24 | Pu | 239 | =E24*G24 | 0.0234242123520532 | =I24*J24 | | | | |
| 25 | Pu | 239/241 | =E25*G25 | | | | | | |
| 26 | Pu | 240 | =E26*G26 | 0.0053709965290181 | =I26*J26 | | | | |
| 27 | Pu | 241 | =E27*G27 | 0.154668619624854 | =I27*J27 | Pu241 | =K27 | 120 | =O27/(37000000000*N27) |
| 28 | Pu | 242 | =E28*G28 | 0.0000370198442961 | =I28*J28 | | | | |
| 29 | Sr | 90 | =E29*G29 | 0.298537364314256 | =I29*J29 | Sr90 | =K29 | 160 | =O29/(37000000000*N29) |
| 30 | Tc | 99 | =E30*G30 | 9.1183624324614E-1 | =I30*J30 | | | | |
| 31 | Th | 232 | =E31*G31 | 4.899301200718426- | =I31*J31 | | | | |
| 32 | Tl | 204 | =E32*G32 | 2.279590608115356- | =I32*J32 | | | | |
| 33 | U | 235 | =E33*G33 | 4.520377518323676- | =I33*J33 | | | | |
| 34 | U | 238 | =E34*G34 | 0.0000545432882992 | =I34*J34 | | | | |

## Attachment K

External contamination of produce from direct deposition spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column H) were verified in S-CLC-G-00179 and are not included in this attachment.

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Produce-direct deposition | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | | |
| 5 | | | m2/kg | DEP Unit | T x DEP | | | Bq/kg | Ci/m2 |
| 6 | | | | Release | Ci/kg | | Ci/kg | | |
| 7 | Element | At. No. | T | | | | | | |
| 8 | | | | Ci/m2 | | | | | |
| 9 | Am | 241 | 0.285714 | 1.09E-02 | 3.12E-03 | Am241 | | | |
| 10 | Am | 243 | 0.285714 | 2.45E-04 | 7.00E-05 | Pu238 | 1.38E-02 | 2 | 3.91E-09 |
| 11 | Be | 133 | 0.285714 | 1.36E-13 | 3.89E-14 | Pu239 | | | |
| 12 | Ce | 144 | 0.285714 | 4.80E-06 | 1.37E-06 | Ce144 | 1.37E-06 | 500 | 9.85E-03 |
| 13 | Cf | 249 | 0.285714 | 3.22E-06 | 9.20E-07 | | | | |
| 14 | Cf | 252 | 0.285714 | 4.03E-03 | 1.15E-03 | | | | |
| 15 | Cm | 244 | 0.285714 | 5.15E-03 | 1.47E-03 | Cm244 | 1.47E-03 | 2 | 3.67E-08 |
| 16 | Cm | 246 | 0.285714 | 2.53E-04 | 7.24E-05 | | | | |
| 17 | Co | 60 | 0.285714 | 1.82E-01 | 5.21E-02 | | | | |
| 18 | Cs | 137 | 0.285714 | 3.01E-01 | 8.60E-02 | Cs137 | 8.60E-02 | 1200 | 3.77E-07 |
| 19 | H | 3 | 0.285714 | | | | | | |
| 20 | Np | 237 | 0.285714 | 1.06E-05 | 3.04E-06 | Np237 | 3.04E-06 | 4 | 3.55E-05 |
| 21 | Pm | 147 | 0.285714 | 6.38E-09 | 1.82E-09 | | | | |
| 22 | Pu | 238 | 0.285714 | 1.40E-02 | 4.00E-03 | | | | |
| 23 | Pu | 239 | 0.285714 | 2.34E-02 | 6.69E-03 | | | | |
| 24 | Pu | 239/241 | 0.285714 | | | | | | |
| 25 | Pu | 240 | 0.285714 | 5.37E-03 | 1.53E-03 | | | | |
| 26 | Pu | 241 | 0.285714 | 1.55E-01 | 4.42E-02 | Pu241 | 4.42E-02 | 120 | 7.34E-06 |
| 27 | Pu | 242 | 0.285714 | 3.70E-05 | 1.06E-05 | | | | |
| 28 | Sr | 90 | 0.285714 | 2.99E-01 | 8.53E-02 | Sr90 | 8.53E-02 | 160 | 5.07E-06 |
| 29 | Tc | 99 | 0.285714 | 9.12E-14 | 2.61E-14 | | | | |
| 30 | Th | 232 | 0.285714 | 4.90E-07 | 1.40E-07 | | | | |
| 31 | Tl | 204 | 0.285714 | 2.28E-10 | 6.51E-11 | | | | |
| 32 | U | 235 | 0.285714 | 4.52E-07 | 1.29E-07 | | | | |
| 33 | U | 238 | 0.285714 | 5.45E-05 | 1.56E-05 | | | | |
| 34 | | | | | | | | | |

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Produce-direct deposi | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | | |
| 5 | | | m2/kg | DEP | | | | Bq/kg | Ci/m2 |
| 6 | | | | Unit | T x DEP | | | | |
| 7 | | | | Release | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | T | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | =D10/E10 | 0.0109232464571752 | =H10*I10 | Am241 | | | |
| 11 | Am | 243 | =D11/E11 | 0.000245149453587 3 | =H11*I11 | Pu238 | =J10+J23+J24 | 2 | =N11/(37000000000*M11) |
| 12 | Ba | 133 | =D12/E12 | 1.362688607962296- | =H12*I12 | Pu239 | | | |
| 13 | Ce | 144 | =D13/E13 | 4.802768137100096- | =H13*I13 | Ce144 | =J13 | 500 | =N13/(37000000000*M13) |
| 14 | Cf | 249 | =D14/E14 | 3.219288514349576- | =H14*I14 | | | | |
| 15 | Cf | 252 | =D15/E15 | 0.004032540062430 0 | =H15*I15 | | | | |
| 16 | Cm | 244 | =D16/E16 | 0.005151374910777 9 | =H16*I16 | Cm244 | =J16 | 2 | =N16/(37000000000*M16) |
| 17 | Cm | 246 | =D17/E17 | 0.000253394905052 6 | =H17*I17 | | | | |
| 18 | Co | 60 | =D18/E18 | 0.182230219924896 | =H18*I18 | | | | |
| 19 | Cs | 137 | =D19/E19 | 0.30103669732548 | =H19*I19 | Cs137 | =J19 | 1200 | =N19/(37000000000*M19) |
| 20 | H | 3 | =D20/E20 | | | | | | |
| 21 | Np | 237 | =D21/E21 | 0.000010644000103 0 | =H21*I21 | Np237 | =J21 | 4 | =N21/(37000000000*M21) |
| 22 | Pm | 147 | =D22/E22 | 6.382853702722986- | =H22*I22 | | | | |
| 23 | Pu | 238 | =D23/E23 | 0.014015006372157 6 | =H23*I23 | | | | |
| 24 | Pu | 239 | =D24/E24 | 0.023424212352053 2 | =H24*I24 | | | | |
| 25 | Pu | 239/241 | =D25/E25 | | | | | | |
| 26 | Pu | 240 | =D26/E26 | 0.005370996529018 1 | =H26*I26 | | | | |
| 27 | Pu | 241 | =D27/E27 | 0.154668619624854 | =H27*I27 | Pu241 | =J27 | 120 | =N27/(37000000000*M27) |
| 28 | Pu | 242 | =D28/E28 | 0.000037019644296 1 | =H28*I28 | | | | |
| 29 | Sr | 90 | =D29/E29 | 0.298537364314256 | =H29*I29 | Sr90 | =J29 | 160 | =N29/(37000000000*M29) |
| 30 | Tc | 99 | =D30/E30 | 9.118362432461 4E-1 | =H30*I30 | | | | |
| 31 | Th | 232 | =D31/E31 | 4.899301200718 42E- | =H31*I31 | | | | |
| 32 | Tl | 204 | =D32/E32 | 2.279590608115 35E- | =H32*I32 | | | | |
| 33 | U | 235 | =D33/E33 | 4.520377518323 67E- | =H33*I33 | | | | |
| 34 | U | 238 | =D34/E34 | 0.000054543288299 2 | =H34*I34 | | | | |

## Attachment L

Internal contamination of produce from root uptake spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column H) were verified in S-CLC-G-00179 and are not included in this attachment.

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Produce-root uptake | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | Bq/kg | |
| 5 | | | | DEP | | | | | |
| 6 | | | m2/kg | Unit Release | T x DEP | | | | |
| 7 | | | | | | | Ci/kg | | Ci/m2 |
| 8 | Element | At. No. | T=B/280 | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | 3.37E-07 | 1.09E-02 | 3.68E-09 | Am241 | | | |
| 11 | Am | 243 | 3.37E-07 | 2.45E-04 | 8.26E-11 | Pu238 | 5.07E-09 | 2 | 1.07E-02 |
| 12 | Ba | 133 | 1.53E-05 | 1.36E-13 | 2.09E-18 | Pu239 | | | |
| 13 | Ce | 144 | 1.53E-05 | 4.80E-06 | 7.35E-11 | Ce144 | 7.35E-11 | 500 | 1.84E+02 |
| 14 | Cf | 249 | 0.00E+00 | 3.22E-06 | 0.00E+00 | | | | |
| 15 | Cf | 252 | 0.00E+00 | 4.03E-03 | 0.00E+00 | | | | |
| 16 | Cm | 244 | 3.93E-07 | 5.15E-03 | 2.02E-09 | Cm244 | 2.02E-09 | 2 | 2.67E-02 |
| 17 | Cm | 246 | 3.93E-07 | 2.53E-04 | 9.95E-11 | | | | |
| 18 | Co | 60 | 1.02E-04 | 1.82E-01 | 1.86E-05 | | | | |
| 19 | Cs | 137 | 2.35E-04 | 3.01E-01 | 7.07E-05 | Cs137 | 7.07E-05 | 1200 | 4.59E-04 |
| 20 | H | 3 | | | | | | | |
| 21 | Np | 237 | 1.89E-05 | 1.06E-05 | 2.01E-10 | Np237 | 2.01E-10 | 4 | 5.38E-01 |
| 22 | Pm | 147 | 0.00E+00 | 6.38E-09 | 0.00E+00 | | | | |
| 23 | Pu | 238 | 3.72E-08 | 1.40E-02 | 5.22E-10 | | | | |
| 24 | Pu | 239 | 3.72E-08 | 2.34E-02 | 8.72E-10 | | | | |
| 25 | Pu | 239/241 | 3.72E-08 | | | | | | |
| 26 | Pu | 240 | 3.72E-08 | 5.37E-03 | 2.00E-10 | | | | |
| 27 | Pu | 241 | 3.72E-08 | 1.55E-01 | 5.76E-09 | Pu241 | 5.76E-09 | 120 | 5.63E-01 |
| 28 | Pu | 242 | 3.72E-08 | 3.70E-05 | 1.38E-12 | | | | |
| 29 | Sr | 90 | 1.53E-03 | 2.99E-01 | 4.57E-04 | Sr90 | 4.57E-04 | 160 | 9.46E-06 |
| 30 | Tc | 99 | 1.02E-01 | 9.12E-14 | 9.30E-15 | | | | |
| 31 | Th | 232 | 9.18E-07 | 4.90E-07 | 4.50E-13 | | | | |
| 32 | Tl | 204 | 0.00E+00 | 2.28E-10 | 0.00E+00 | | | | |
| 33 | U | 235 | 4.23E-06 | 4.52E-07 | 1.91E-12 | | | | |
| 34 | U | 238 | 4.23E-06 | 5.45E-05 | 2.31E-10 | | | | |

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Produce-root uptake | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | | |
| 5 | | | | DEP | | | | Bq/kg | Ci/m2 |
| 6 | | | m2/kg | Unit | T x DEP | | | | |
| 7 | | | | Release | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | T=B/280 | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | =F10/280 | 0.0109232464571752 | =H10*I10 | Am241 | | | |
| 11 | Am | 243 | =F11/280 | 0.0002451494535873 | =H11*I11 | Pu238 | =J10+J23+J24 | 2 | =N11/(37000000000*M11) |
| 12 | Ba | 133 | =F12/280 | 1.362688607962296E- | =H12*I12 | Pu239 | | | |
| 13 | Ce | 144 | =F13/280 | 4.802768137100096E- | =H13*I13 | Ce144 | =J13 | 500 | =N13/(37000000000*M13) |
| 14 | Cf | 249 | =F14/280 | 3.219288514349576E- | =H14*I14 | | | | |
| 15 | Cf | 252 | =F15/280 | 0.0040325400624300 | =H15*I15 | | | | |
| 16 | Cm | 244 | =F16/280 | 0.0051513749107779 | =H16*I16 | Cm244 | =J16 | 2 | =N16/(37000000000*M16) |
| 17 | Cm | 246 | =F17/280 | 0.0002533949050526 | =H17*I17 | | | | |
| 18 | Co | 60 | =F18/280 | 0.1822302199248960 | =H18*I18 | | | | |
| 19 | Cs | 137 | =F19/280 | 0.30103668732548 | =H19*I19 | Cs137 | =J19 | 1200 | =N19/(37000000000*M19) |
| 20 | H | 3 | | | | | | | |
| 21 | Np | 237 | =F21/280 | 0.0000106440001030 | =H21*I21 | Np237 | =J21 | 4 | =N21/(37000000000*M21) |
| 22 | Pm | 147 | =F22/280 | 6.382853702722980E- | =H22*I22 | | | | |
| 23 | Pu | 238 | =F23/280 | 0.0140150063721576 | =H23*I23 | | | | |
| 24 | Pu | 239 | =F24/280 | 0.0234242123520532 | =H24*I24 | | | | |
| 25 | Pu | 239/241 | =F25/280 | | | | | | |
| 26 | Pu | 240 | =F26/280 | 0.0053709965290181 | =H26*I26 | | | | |
| 27 | Pu | 241 | =F27/280 | 0.1546686196248540 | =H27*I27 | Pu241 | =J27 | 120 | =N27/(37000000000*M27) |
| 28 | Pu | 242 | =F28/280 | 0.0000370198442961 | =H28*I28 | | | | |
| 29 | Sr | 90 | =F29/280 | 0.2985373643142560 | =H29*I29 | Sr90 | =J29 | 160 | =N29/(37000000000*M29) |
| 30 | Tc | 99 | =F30/280 | 9.1183624324614E-1 | =H30*I30 | | | | |
| 31 | Th | 232 | =F31/280 | 4.8993012007184 2E- | =H31*I31 | | | | |
| 32 | Tl | 204 | =F32/280 | 2.2795906081153 5E- | =H32*I32 | | | | |
| 33 | U | 235 | =F33/280 | 4.5203775183236 7E- | =H33*I33 | | | | |
| 34 | U | 238 | =F34/280 | 0.0000545432882992 | =H34*I34 | | | | |

## Attachment M

External contamination of leafy vegetables during harvest spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column H) were verified in S-CLC-G-00179 and are not included in this attachment.

SourceSRTC.xls

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Produce-soil adhesion | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | Bq/kg | |
| 5 | | | | DEP | | | | | |
| 6 | | | | Unit Release | T x DEP | | | | |
| 7 | | | | | | | Ci/kg | | Ci/m2 |
| 8 | Element | At. No. | T=DxF/260 | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | 5.10204E-06 | 1.09E-02 | 5.57E-08 | Am241 | | | |
| 11 | Am | 243 | 5.10204E-06 | 2.45E-04 | 1.25E-09 | Pu238 | 2.47E-07 | 2 | 2.19E-04 |
| 12 | Ba | 133 | 5.10204E-06 | 1.36E-13 | 6.95E-19 | Pu239 | | | |
| 13 | Ce | 144 | 5.10204E-06 | 4.80E-06 | 2.45E-11 | Ce144 | 2.45E-11 | 500 | 5.51E+02 |
| 14 | Cf | 249 | 5.10204E-06 | 3.22E-06 | 1.64E-11 | | | | |
| 15 | Cf | 252 | 5.10204E-06 | 4.03E-03 | 2.06E-08 | | | | |
| 16 | Cm | 244 | 5.10204E-06 | 5.15E-03 | 2.63E-08 | Cm244 | 2.63E-08 | 2 | 2.06E-03 |
| 17 | Cm | 246 | 5.10204E-06 | 2.53E-04 | 1.29E-09 | | | | |
| 18 | Co | 60 | 5.10204E-06 | 1.82E-01 | 9.30E-07 | | | | |
| 19 | Cs | 137 | 5.10204E-06 | 3.01E-01 | 1.54E-06 | Cs137 | 1.54E-06 | 1200 | 2.11E-02 |
| 20 | H | 3 | 5.10204E-06 | | | | | | |
| 21 | Np | 237 | 5.10204E-06 | 1.06E-05 | 5.43E-11 | Np237 | 5.43E-11 | 4 | 1.99E+00 |
| 22 | Pm | 147 | 5.10204E-06 | 6.38E-09 | 3.26E-14 | | | | |
| 23 | Pu | 238 | 5.10204E-06 | 1.40E-02 | 7.15E-08 | | | | |
| 24 | Pu | 239 | 5.10204E-06 | 2.34E-02 | 1.20E-07 | | | | |
| 25 | Pu | 239/241 | 5.10204E-06 | | | | | | |
| 26 | Pu | 240 | 5.10204E-06 | 5.37E-03 | 2.74E-08 | | | | |
| 27 | Pu | 241 | 5.10204E-06 | 1.55E-01 | 7.89E-07 | Pu241 | 7.89E-07 | 120 | 4.11E-03 |
| 28 | Pu | 242 | 5.10204E-06 | 3.70E-05 | 1.89E-10 | | | | |
| 29 | Sr | 90 | 5.10204E-06 | 2.99E-01 | 1.52E-06 | Sr90 | 1.52E-06 | 160 | 2.84E-03 |
| 30 | Tc | 99 | 5.10204E-06 | 9.12E-14 | 4.65E-19 | | | | |
| 31 | Th | 232 | 5.10204E-06 | 4.90E-07 | 2.50E-12 | | | | |
| 32 | Tl | 204 | 5.10204E-06 | 2.28E-10 | 1.16E-15 | | | | |
| 33 | U | 235 | 5.10204E-06 | 4.52E-07 | 2.31E-12 | | | | |
| 34 | U | 238 | 5.10204E-06 | 5.45E-05 | 2.78E-10 | | | | |

Produce-adhesion

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Produce-soil adhesion | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DtL | Total Dep for |
| 4 | | | | | | | | | |
| 5 | | | | DEP | | | | Bq/kg | DtL |
| 6 | | | | Unit | T x DEP | | | | Ci/m2 |
| 7 | | | | Release | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | T=DxF/280 | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | =D10*F10/280 | 0.0109232464571752 | =H10*I10 | Am241 | | | |
| 11 | Am | 243 | =D11*F11/280 | 0.0002451494535873 | =H11*I11 | Pu238 | =J10+J23+J24 | 2 | =N11/(37000000000*M11) |
| 12 | Ba | 133 | =D12*F12/280 | 1.36268860796229E- | =H12*I12 | Pu239 | | | |
| 13 | Ce | 144 | =D13*F13/280 | 4.80276813710009E- | =H13*I13 | Ce144 | =J13 | 500 | =N13/(37000000000*M13) |
| 14 | Cf | 249 | =D14*F14/280 | 3.21928851434957E- | =H14*I14 | | | | |
| 15 | Cf | 252 | =D15*F15/280 | 0.0040325400624300 | =H15*I15 | | | | |
| 16 | Cm | 244 | =D16*F16/280 | 0.0051513749107779 | =H16*I16 | Cm244 | =J16 | 2 | =N16/(37000000000*M16) |
| 17 | Cm | 246 | =D17*F17/280 | 0.0002533949050526 | =H17*I17 | | | | |
| 18 | Co | 60 | =D18*F18/280 | 0.182230219924896 | =H18*I18 | | | | |
| 19 | Cs | 137 | =D19*F19/280 | 0.30103669732548 | =H19*I19 | Cs137 | =J19 | 1200 | =N19/(37000000000*M19) |
| 20 | H | 3 | =D20*F20/280 | | | | | | |
| 21 | Np | 237 | =D21*F21/280 | 0.0000106440001030 | =H21*I21 | Np237 | =J21 | 4 | =N21/(37000000000*M21) |
| 22 | Pm | 147 | =D22*F22/280 | 6.38285370272296E- | =H22*I22 | | | | |
| 23 | Pu | 238 | =D23*F23/280 | 0.0140150063721576 | =H23*I23 | | | | |
| 24 | Pu | 239 | =D24*F24/280 | 0.0234242123520532 | =H24*I24 | | | | |
| 25 | Pu | 239/241 | =D25*F25/280 | | | | | | |
| 26 | Pu | 240 | =D26*F26/280 | 0.0053709965290181 | =H26*I26 | | | | |
| 27 | Pu | 241 | =D27*F27/280 | 0.154668619624854 | =H27*I27 | Pu241 | =J27 | 120 | =N27/(37000000000*M27) |
| 28 | Pu | 242 | =D28*F28/280 | 0.0000370198442961 | =H28*I28 | | | | |
| 29 | Sr | 90 | =D29*F29/280 | 0.298537364314256 | =H29*I29 | Sr90 | =J29 | 160 | =N29/(37000000000*M29) |
| 30 | Tc | 99 | =D30*F30/280 | 9.1183624324614E-1 | =H30*I30 | | | | |
| 31 | Th | 232 | =D31*F31/280 | 4.89930120071842E- | =H31*I31 | | | | |
| 32 | Tl | 204 | =D32*F32/280 | 2.27959060811535E- | =H32*I32 | | | | |
| 33 | U | 235 | =D33*F33/280 | 4.52037751832367E- | =H33*I33 | | | | |
| 34 | U | 238 | =D34*F34/280 | 0.0000545432882992 | =H34*I34 | | | | |

## Attachment N

External contamination of grain spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column H) were verified in S-CLC-G-00179 and are not included in this attachment.

SourceSRTC.xls

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Grain-direct deposition | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | | |
| 5 | | | m2/kg | DEP Unit | | | | Bq/kg | Ci/m2 |
| 6 | | | | | T x DEP | | | | |
| 7 | | | | Release | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | T | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | 0.285714 | 1.09E-02 | 3.12E-03 | Am241 | | | |
| 11 | Am | 243 | 0.285714 | 2.45E-04 | 7.00E-05 | Pu238 | 1.38E-02 | 2 | 3.91E-09 |
| 12 | Ba | 133 | 0.285714 | 1.36E-13 | 3.89E-14 | Pu239 | | | |
| 13 | Ce | 144 | 0.285714 | 4.80E-06 | 1.37E-06 | Ce144 | 1.37E-06 | 500 | 9.85E-03 |
| 14 | Cf | 249 | 0.285714 | 3.22E-06 | 9.20E-07 | | | | |
| 15 | Cf | 252 | 0.285714 | 4.03E-03 | 1.15E-03 | | | | |
| 16 | Cm | 244 | 0.285714 | 5.15E-03 | 1.47E-03 | Cm244 | 1.47E-03 | 2 | 3.67E-08 |
| 17 | Cm | 246 | 0.285714 | 2.53E-04 | 7.24E-05 | | | | |
| 18 | Co | 60 | 0.285714 | 1.82E-01 | 5.21E-02 | | | | |
| 19 | Cs | 137 | 0.285714 | 3.01E-01 | 8.60E-02 | Cs137 | 8.60E-02 | 1200 | 3.77E-07 |
| 20 | H | 3 | 0.285714 | | | | | | |
| 21 | Np | 237 | 0.285714 | 1.06E-05 | 3.04E-06 | Np237 | 3.04E-06 | 4 | 3.55E-05 |
| 22 | Pm | 147 | 0.285714 | 6.38E-09 | 1.82E-09 | | | | |
| 23 | Pu | 238 | 0.285714 | 1.40E-02 | 4.00E-03 | | | | |
| 24 | Pu | 239 | 0.285714 | 2.34E-02 | 6.69E-03 | | | | |
| 25 | Pu | 239/241 | 0.285714 | | | | | | |
| 26 | Pu | 240 | 0.285714 | 5.37E-03 | 1.53E-03 | | | | |
| 27 | Pu | 241 | 0.285714 | 1.55E-01 | 4.42E-02 | Pu241 | 4.42E-02 | 120 | 7.34E-08 |
| 28 | Pu | 242 | 0.285714 | 3.70E-05 | 1.06E-05 | | | | |
| 29 | Sr | 90 | 0.285714 | 2.99E-01 | 8.53E-02 | Sr90 | 8.53E-02 | 160 | 5.07E-08 |
| 30 | Tc | 99 | 0.285714 | 9.12E-14 | 2.61E-14 | | | | |
| 31 | Th | 232 | 0.285714 | 4.90E-07 | 1.40E-07 | | | | |
| 32 | Tl | 204 | 0.285714 | 2.28E-10 | 6.51E-11 | | | | |
| 33 | U | 235 | 0.285714 | 4.52E-07 | 1.29E-07 | | | | |
| 34 | U | 238 | 0.285714 | 5.45E-05 | 1.56E-05 | | | | |

Grain-direct

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Grain-direct deposition | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | | |
| 5 | | | m2/kg | DEP Unit | | | | Bq/kg | Ci/m2 |
| 6 | | | | Release | T x DEP | | | | |
| 7 | | | | | | | Ci/kg | | |
| 8 | Element | At. No. | T | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | =D10/E10 | 0.0109232464571752 | =H10*I10 | Am241 | | | |
| 11 | Am | 243 | =D11/E11 | 0.0002451494535873 | =H11*I11 | Pu238 | =J10+J23+J24 | 2 | =N11/(37000000000*M11) |
| 12 | Ba | 133 | =D12/E12 | 1.362688607962 29E- | =H12*I12 | Pu239 | | | |
| 13 | Ce | 144 | =D13/E13 | 4.80276813710009E- | =H13*I13 | Ce144 | =J13 | 500 | =N13/(37000000000*M13) |
| 14 | Cf | 249 | =D14/E14 | 3.21928851434957E- | =H14*I14 | | | | |
| 15 | Cf | 252 | =D15/E15 | 0.0040325400624300 | =H15*I15 | | | | |
| 16 | Cm | 244 | =D16/E16 | 0.0051513749107779 | =H16*I16 | Cm244 | =J16 | 2 | =N16/(37000000000*M16) |
| 17 | Cm | 246 | =D17/E17 | 0.0002533949050526 | =H17*I17 | | | | |
| 18 | Co | 60 | =D18/E18 | 0.182230219924896 | =H18*I18 | | | | |
| 19 | Cs | 137 | =D19/E19 | 0.30103669732548 | =H19*I19 | Cs137 | =J19 | 1200 | =N19/(37000000000*M19) |
| 20 | H | 3 | =D20/E20 | | | | | | |
| 21 | Np | 237 | =D21/E21 | 0.0000106440001030 | =H21*I21 | Np237 | =J21 | 4 | =N21/(37000000000*M21) |
| 22 | Pm | 147 | =D22/E22 | 6.38285370272298E- | =H22*I22 | | | | |
| 23 | Pu | 238 | =D23/E23 | 0.0140150063721576 | =H23*I23 | | | | |
| 24 | Pu | 239 | =D24/E24 | 0.0234242123520532 | =H24*I24 | | | | |
| 25 | Pu | 239/241 | =D25/E25 | | | | | | |
| 26 | Pu | 240 | =D26/E26 | 0.0053709965290181 | =H26*I26 | | | | |
| 27 | Pu | 241 | =D27/E27 | 0.154668619624854 | =H27*I27 | Pu241 | =J27 | 120 | =N27/(37000000000*M27) |
| 28 | Pu | 242 | =D28/E28 | 0.0000370188442961 | =H28*I28 | | | | |
| 29 | Sr | 90 | =D29/E29 | 0.298537364314256 | =H29*I29 | Sr90 | =J29 | 160 | =N29/(37000000000*M29) |
| 30 | Tc | 99 | =D30/E30 | 9.1183624324614E-1 | =H30*I30 | | | | |
| 31 | Th | 232 | =D31/E31 | 4.89930120071842E- | =H31*I31 | | | | |
| 32 | Tl | 204 | =D32/E32 | 2.27959060811535E- | =H32*I32 | | | | |
| 33 | U | 235 | =D33/E33 | 4.52037751832367E- | =H33*I33 | | | | |
| 34 | U | 238 | =D34/E34 | 0.0000545432882992 | =H34*I34 | | | | |

## Attachment O

Internal contamination of grain by root uptake spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column H) were verified in S-CLC-G-00179 and are not included in this attachment.

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Grain-root uptake | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | Bq/kg | |
| 5 | | | | DEP | | | | | |
| 6 | | | m2/kg | Unit Release | T x DEP | | | | |
| 7 | | | | | Ci/kg | | Ci/kg | | Ci/m2 |
| 8 | Element | At. No. | T=B/280 | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | 6.76E-08 | 1.09E-02 | 7.38E-10 | Am241 | | | |
| 11 | Am | 243 | 6.76E-08 | 2.45E-04 | 1.66E-11 | Pu238 | 1.73E-09 | 2 | 3.13E-02 |
| 12 | Ba | 133 | 9.21E-05 | 1.36E-13 | 1.26E-17 | Pu239 | | | |
| 13 | Ce | 144 | 9.21E-05 | 4.80E-06 | 4.43E-10 | Ce144 | 4.43E-10 | 500 | 3.05E+01 |
| 14 | Cf | 249 | | 3.22E-06 | 0.00E+00 | | | | |
| 15 | Cf | 252 | | 4.03E-03 | 0.00E+00 | | | | |
| 16 | Cm | 244 | 6.45E-08 | 5.15E-03 | 3.32E-10 | Cm244 | 3.32E-10 | 2 | 1.63E-01 |
| 17 | Cm | 246 | 6.45E-08 | 2.53E-04 | 1.63E-11 | | | | |
| 18 | Co | 60 | 1.14E-05 | 1.82E-01 | 2.07E-06 | | | | |
| 19 | Cs | 137 | 2.55E-04 | 3.01E-01 | 7.67E-05 | Cs137 | 7.67E-05 | 1200 | 4.23E-04 |
| 20 | H | 3 | | | | | | | |
| 21 | Np | 237 | 8.29E-06 | 1.06E-05 | 8.83E-11 | Np237 | 8.83E-11 | 4 | 1.22E+00 |
| 22 | Pm | 147 | | 6.38E-09 | 0.00E+00 | | | | |
| 23 | Pu | 238 | 2.64E-06 | 1.40E-02 | 3.70E-10 | | | | |
| 24 | Pu | 239 | 2.64E-06 | 2.34E-02 | 6.19E-10 | | | | |
| 25 | Pu | 239/241 | 2.64E-06 | | | | | | |
| 26 | Pu | 240 | 2.64E-06 | 5.37E-03 | 1.42E-10 | | | | |
| 27 | Pu | 241 | 2.64E-06 | 1.55E-01 | 4.09E-09 | Pu241 | 4.09E-09 | 120 | 7.94E-01 |
| 28 | Pu | 242 | 2.64E-06 | 3.70E-05 | 9.78E-13 | | | | |
| 29 | Sr | 90 | 6.45E-04 | 2.99E-01 | 1.93E-04 | Sr90 | 1.93E-04 | 160 | 2.25E-05 |
| 30 | Tc | 99 | 2.24E-03 | 9.12E-14 | 2.04E-16 | | | | |
| 31 | Th | 232 | 1.04E-07 | 4.90E-07 | 5.12E-14 | | | | |
| 32 | Tl | 204 | 0.00E+00 | 2.28E-10 | 0.00E+00 | | | | |
| 33 | U | 235 | 3.99E-06 | 4.52E-07 | 1.80E-12 | | | | |
| 34 | U | 238 | 3.99E-06 | 5.45E-05 | 2.18E-10 | | | | |

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Grain-root uptake | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL | Total Dep for DIL |
| 4 | | | | | | | | | |
| 5 | | | | DEP | | | | Bq/kg | |
| 6 | | | m2/kg | Unit Release | T x DEP | | | | Ci/m2 |
| 7 | | | | | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | T=B/280 | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | =F10/280 | 0.0109232464571752 | =H10*I10 | Am241 | | | |
| 11 | Am | 243 | =F11/280 | 0.0002451494535873 | =H11*I11 | Pu238 | =J10+J23+J24 | 2 | =N11/(37000000000*M11) |
| 12 | Ba | 133 | =F12/280 | 1.36268860796229E- | =H12*I12 | Pu239 | | | |
| 13 | Ce | 144 | =F13/280 | 4.80276813710009E- | =H13*I13 | Ce144 | =J13 | 500 | =N13/(37000000000*M13) |
| 14 | Cf | 249 | | 3.21928851434957E- | =H14*I14 | | | | |
| 15 | Cf | 252 | | 0.0040325400624300 | =H15*I15 | | | | |
| 16 | Cm | 244 | =F16/280 | 0.0051513749107779 | =H16*I16 | Cm244 | =J16 | 2 | =N16/(37000000000*M16) |
| 17 | Cm | 246 | =F17/280 | 0.0002533949050526 | =H17*I17 | | | | |
| 18 | Co | 60 | =F18/280 | 0.182230219924896 | =H18*I18 | | | | |
| 19 | Cs | 137 | =F19/280 | 0.30103669732548 | =H19*I19 | Cs137 | =J19 | 1200 | =N19/(37000000000*M19) |
| 20 | H | 3 | | | | | | | |
| 21 | Np | 237 | =F21/280 | 0.0000106440001030 | =H21*I21 | Np237 | =J21 | 4 | =N21/(37000000000*M21) |
| 22 | Pm | 147 | | 6.38285370272298E- | =H22*I22 | | | | |
| 23 | Pu | 238 | =F23/280 | 0.0140150063721576 | =H23*I23 | | | | |
| 24 | Pu | 239 | =F24/280 | 0.0234242123520532 | =H24*I24 | | | | |
| 25 | Pu | 239/241 | =F25/280 | | | | | | |
| 26 | Pu | 240 | =F26/280 | 0.0053709965290181 | =H26*I26 | | | | |
| 27 | Pu | 241 | =F27/280 | 0.154668619624854 | =H27*I27 | Pu241 | =J27 | 120 | =N27/(37000000000*M27) |
| 28 | Pu | 242 | =F28/280 | 0.0000370198442961 | =H28*I28 | | | | |
| 29 | Sr | 90 | =F29/280 | 0.298537364314256 | =H29*I29 | Sr90 | =J29 | 160 | =N29/(37000000000*M29) |
| 30 | Tc | 99 | =F30/280 | 9.1183624324614E-1 | =H30*I30 | | | | |
| 31 | Th | 232 | =F31/280 | 4.89930120071842E- | =H31*I31 | | | | |
| 32 | Tl | 204 | =F32/280 | 2.27959060811535E- | =H32*I32 | | | | |
| 33 | U | 235 | =F33/280 | 4.52037751832367E- | =H33*I33 | | | | |
| 34 | U | 238 | =F34/280 | 0.0000545432882992 | =H34*I34 | | | | |

## Attachment P

External contamination of grain during harvest spreadsheet calculations

Cell references in the formulae for the overall transfer factor (Column H) were verified in S-CLC-G-00179 and are not included in this attachment.

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Grain-soil adhesion | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group DIL Bq/kg | Total Dep for DIL Ci/m2 |
| 4 | | | | DEP | | | | | |
| 5 | | | m2/kg | Unit Release | T x DEP Ci/kg | | | | |
| 6 | Element | At. No. | T=DxF/280 | | | | Ci/kg | | |
| 7 | | | | Ci/m2 | | | | | |
| 8 | Am | 241 | 1.22857E-05 | 1.09E-02 | 1.34E-07 | Am241 | | | |
| 9 | Am | 243 | 1.22857E-05 | 2.45E-04 | 3.01E-09 | Pu238 | 5.94E-07 | 2 | 9.10E-05 |
| 10 | Ba | 133 | 1.22857E-05 | 1.36E-13 | 1.67E-18 | Pu239 | | | |
| 11 | Ce | 144 | 1.22857E-05 | 4.80E-06 | 5.90E-11 | Ce144 | 5.90E-11 | 500 | 2.29E+02 |
| 12 | Cf | 249 | 1.22857E-05 | 3.22E-06 | 3.96E-11 | | | | |
| 13 | Cf | 252 | 1.22857E-05 | 4.03E-03 | 4.95E-08 | | | | |
| 14 | Cm | 244 | 1.22857E-05 | 5.15E-03 | 6.33E-08 | Cm244 | 6.33E-08 | 2 | 8.54E-04 |
| 15 | Cm | 246 | 1.22857E-05 | 2.53E-04 | 3.11E-09 | | | | |
| 16 | Co | 60 | 1.22857E-05 | 1.82E-01 | 2.24E-06 | | | | |
| 17 | Cs | 137 | 1.22857E-05 | 3.01E-01 | 3.70E-06 | Cs137 | 3.70E-06 | 1200 | 8.77E-03 |
| 18 | H | 3 | 1.22857E-05 | | | | | | |
| 19 | Np | 237 | 1.22857E-05 | 1.06E-05 | 1.31E-10 | Np237 | 1.31E-10 | 4 | 8.27E-01 |
| 20 | Pm | 147 | 1.22857E-05 | 6.36E-09 | 7.84E-14 | | | | |
| 21 | Pu | 238 | 1.22857E-05 | 1.40E-02 | 1.72E-07 | | | | |
| 22 | Pu | 239 | 1.22857E-05 | 2.34E-02 | 2.88E-07 | | | | |
| 23 | Pu | 239/241 | 1.22857E-05 | | | | | | |
| 24 | Pu | 240 | 1.22857E-05 | 5.37E-03 | 6.60E-08 | | | | |
| 25 | Pu | 241 | 1.22857E-05 | 1.55E-01 | 1.90E-06 | Pu241 | 1.90E-06 | 120 | 1.71E-03 |
| 26 | Pu | 242 | 1.22857E-05 | 3.70E-05 | 4.55E-10 | | | | |
| 27 | Sr | 90 | 1.22857E-05 | 2.99E-01 | 3.67E-06 | Sr90 | 3.67E-06 | 160 | 1.18E-03 |
| 28 | Tc | 99 | 1.22857E-05 | 9.12E-14 | 1.12E-18 | | | | |
| 29 | Th | 232 | 1.22857E-05 | 4.90E-07 | 6.02E-12 | | | | |
| 30 | Tl | 204 | 1.22857E-05 | 2.28E-10 | 2.80E-15 | | | | |
| 31 | U | 235 | 1.22857E-05 | 4.52E-07 | 5.55E-12 | | | | |
| 32 | U | 238 | 1.22857E-05 | 5.45E-05 | 6.70E-10 | | | | |

| | A | B | H | I | J | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|
| 2 | Grain-soil adhesion | | | | | | | | |
| 3 | | | | | | Groups | Group sum | Group Dil. | Total Dep for DIL |
| 4 | | | | | | | | | |
| 5 | | | | DEP | | | | Bq/kg | |
| 6 | | | m2/kg | Unit | T x DEP | | | | Ci/m2 |
| 7 | | | | Release | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | T=DxF/280 | | | | | | |
| 9 | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | =D10*F10/280 | 0.0109232464571752 | =H10*I10 | Am241 | | | |
| 11 | Am | 243 | =D11*F11/280 | 0.000245149453587 | =H11*I11 | Pu238 | =J10+J23+J24 | 2 | =N11/(37000000000*M11) |
| 12 | Ba | 133 | =D12*F12/280 | 1.36268880796229E- | =H12*I12 | Pu239 | | | |
| 13 | Ce | 144 | =D13*F13/280 | 4.80276813710009E- | =H13*I13 | Ce144 | =J13 | 500 | =N13/(37000000000*M13) |
| 14 | Cf | 249 | =D14*F14/280 | 3.21928851434957E- | =H14*I14 | | | | |
| 15 | Cf | 252 | =D15*F15/280 | 0.0040325400624300 | =H15*I15 | | | | |
| 16 | Cm | 244 | =D16*F16/280 | 0.0051513749107779 | =H16*I16 | Cm244 | =J16 | 2 | =N16/(37000000000*M16) |
| 17 | Cm | 246 | =D17*F17/280 | 0.0002533949050526 | =H17*I17 | | | | |
| 18 | Co | 60 | =D18*F18/280 | 0.182230219924896 | =H18*I18 | | | | |
| 19 | Cs | 137 | =D19*F19/280 | 0.30103669732548 | =H19*I19 | Cs137 | =J19 | 1200 | =N19/(37000000000*M19) |
| 20 | H | 3 | =D20*F20/280 | | | | | | |
| 21 | Np | 237 | =D21*F21/280 | 0.0000106440001030 | =H21*I21 | Np237 | =J21 | 4 | =N21/(37000000000*M21) |
| 22 | Pm | 147 | =D22*F22/280 | 6.38285370272298E- | =H22*I22 | | | | |
| 23 | Pu | 238 | =D23*F23/280 | 0.0140150063721576 | =H23*I23 | | | | |
| 24 | Pu | 239 | =D24*F24/280 | 0.0234242123520532 | =H24*I24 | | | | |
| 25 | Pu | 239/241 | =D25*F25/280 | | | | | | |
| 26 | Pu | 240 | =D26*F26/280 | 0.0053709965290181 | =H26*I26 | | | | |
| 27 | Pu | 241 | =D27*F27/280 | 0.154668619624854 | =H27*I27 | Pu241 | =J27 | 120 | =N27/(37000000000*M27) |
| 28 | Pu | 242 | =D28*F28/280 | 0.0000370198442961 | =H28*I28 | | | | |
| 29 | Sr | 90 | =D29*F29/280 | 0.296537364314256 | =H29*I29 | Sr90 | =J29 | 160 | =N29/(37000000000*M29) |
| 30 | Tc | 99 | =D30*F30/280 | 9.1183624324614E-1 | =H30*I30 | | | | |
| 31 | Th | 232 | =D31*F31/280 | 4.89930120071842E- | =H31*I31 | | | | |
| 32 | Tl | 204 | =D32*F32/280 | 2.27959060811535E- | =H32*I32 | | | | |
| 33 | U | 235 | =D33*F33/280 | 4.52037751832367E- | =H33*I33 | | | | |
| 34 | U | 238 | =D34*F34/280 | 0.000054543288299 2 | =H34*I34 | | | | |

## Attachment Q

Contamination of beverages spreadsheet calculations

SourceSRTC.xls

| | A | B | C | D | E | F | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | Beverage | | Assumed | | | | | | | |
| 3 | | | water | 1000 kg | | | Groups | Group | Group DIL | Total |
| 4 | | | depth of | per | | | | sum | | Dep for |
| 5 | | | 1 meter | m3 | DEP | | | | Bq/kg | DIL |
| 6 | | | | | Unit | T x DEP | | | | Ci/m2 |
| 7 | | | | | Release | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | | T (m2/L) | | | | | | |
| 9 | | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | | 0.001 | 1.09E-02 | 1.09E-05 | Am241 | | | |
| 11 | Am | 243 | | 0.001 | 2.45E-04 | 2.45E-07 | Pu238 | 4.84E-05 | 2 | 1.12E-06 |
| 12 | Ba | 133 | | 0.001 | 1.36E-13 | 1.36E-16 | Pu239 | | | |
| 13 | Ce | 144 | | 0.001 | 4.80E-06 | 4.80E-09 | Ce144 | 4.80E-09 | 500 | 2.61E+00 |
| 14 | Cf | 249 | | 0.001 | 3.22E-06 | 3.22E-09 | | | | |
| 15 | Cf | 252 | | 0.001 | 4.03E-03 | 4.03E-06 | | | | |
| 16 | Cm | 244 | | 0.001 | 5.15E-03 | 5.15E-06 | Cm244 | 5.15E-06 | 2 | 1.05E-05 |
| 17 | Cm | 246 | | 0.001 | 2.53E-04 | 2.53E-07 | | | | |
| 18 | Co | 60 | | 0.001 | 1.82E-01 | 1.82E-04 | | | | |
| 19 | Cs | 137 | | 0.001 | 3.01E-01 | 3.01E-04 | Cs137 | 3.01E-04 | 1200 | 1.08E-04 |
| 20 | H | 3 | | 0.001 | | | | | | |
| 21 | Np | 237 | | 0.001 | 1.06E-05 | 1.06E-08 | Np237 | 1.06E-08 | 4 | 1.02E-02 |
| 22 | Pm | 147 | | 0.001 | 6.38E-09 | 6.38E-12 | | | | |
| 23 | Pu | 238 | | 0.001 | 1.40E-02 | 1.40E-05 | | | | |
| 24 | Pu | 239 | | 0.001 | 2.34E-02 | 2.34E-05 | | | | |
| 25 | Pu | 239/241 | | 0.001 | | | | | | |
| 26 | Pu | 240 | | 0.001 | 5.37E-03 | 5.37E-06 | | | | |
| 27 | Pu | 241 | | 0.001 | 1.55E-01 | 1.55E-04 | Pu241 | 1.55E-04 | 120 | 2.10E-05 |
| 28 | Pu | 242 | | 0.001 | 3.70E-05 | 3.70E-08 | | | | |
| 29 | Sr | 90 | | 0.001 | 2.99E-01 | 2.99E-04 | Sr90 | 2.99E-04 | 160 | 1.45E-05 |
| 30 | Tc | 99 | | 0.001 | 9.12E-14 | 9.12E-17 | | | | |
| 31 | Th | 232 | | 0.001 | 4.90E-07 | 4.90E-10 | | | | |
| 32 | Tl | 204 | | 0.001 | 2.28E-10 | 2.28E-13 | | | | |
| 33 | U | 235 | | 0.001 | 4.52E-07 | 4.52E-10 | | | | |
| 34 | U | 238 | | 0.001 | 5.45E-05 | 5.45E-08 | | | | |

Q1

SourceSRTC.xls

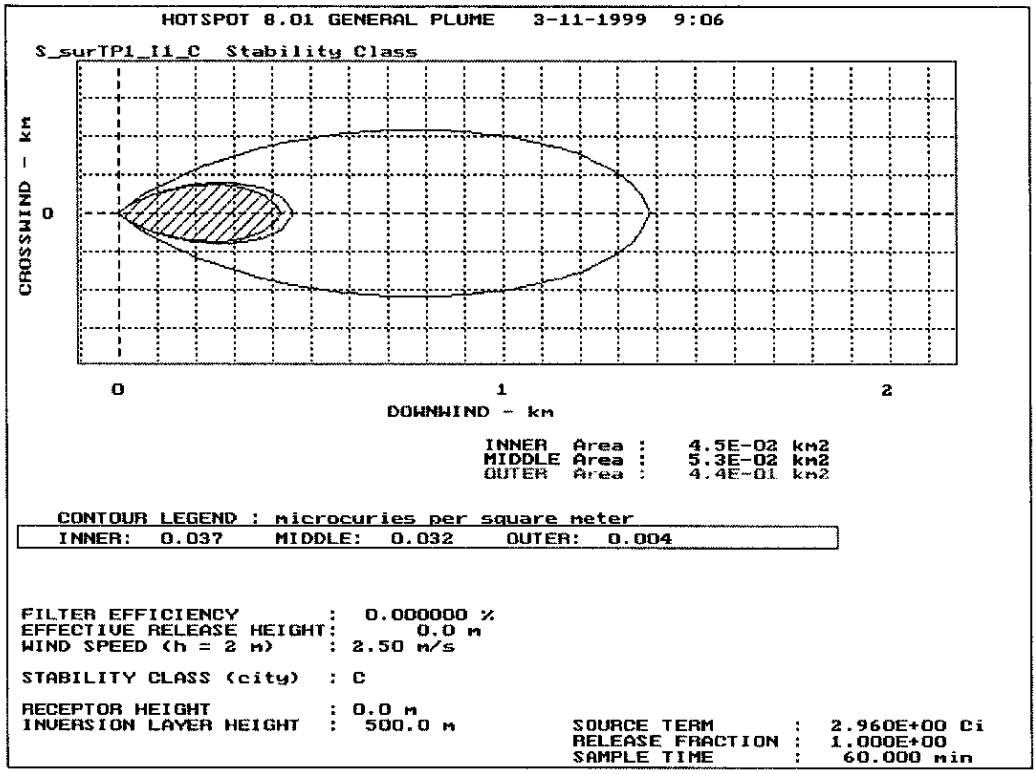
| | A | B | C | D | E | F | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|
| 2 | Beverage | | Assumed | | | | | | | |
| 3 | | | water | 1000 kg | | | Groups | Group | Group DIL | Total |
| 4 | | | depth of | per | | | | sum | | Dep for |
| 5 | | | 1 meter | m3 | DEP | | | | Bq/kg | DIL |
| 6 | | | | | Unit | T x DEP | | | | Ci/m2 |
| 7 | | | | | Release | Ci/kg | | Ci/kg | | |
| 8 | Element | At. No. | | T (m2/L) | | | | | | |
| 9 | | | | | Ci/m2 | | | | | |
| 10 | Am | 241 | | =1/1000 | 0.0109232464571752 | =D10*E10 | Am241 | | | |
| 11 | Am | 243 | | =1/1000 | 0.0002451494535873 | =D11*E11 | Pu238 | =F10+F23+F24 | 2 | =J11/(37000000000*I11) |
| 12 | Ba | 133 | | =1/1000 | 1.36268860796229E- | =D12*E12 | Pu239 | | | |
| 13 | Ce | 144 | | =1/1000 | 4.80276813710009E- | =D13*E13 | Ce144 | =F13 | 500 | =J13/(37000000000*I13) |
| 14 | Cf | 249 | | =1/1000 | 3.21928851434957E- | =D14*E14 | | | | |
| 15 | Cf | 252 | | =1/1000 | 0.0040325400624300 | =D15*E15 | | | | |
| 16 | Cm | 244 | | =1/1000 | 0.0051513749107779 | =D16*E16 | Cm244 | =F16 | 2 | =J16/(37000000000*I16) |
| 17 | Cm | 246 | | =1/1000 | 0.0002533949050526 | =D17*E17 | | | | |
| 18 | Co | 60 | | =1/1000 | 0.182230219924896 | =D18*E18 | | | | |
| 19 | Cs | 137 | | =1/1000 | 0.30103669732548 | =D19*E19 | Cs137 | =F19 | 1200 | =J19/(37000000000*I19) |
| 20 | H | 3 | | =1/1000 | | | | | | |
| 21 | Np | 237 | | =1/1000 | 0.000010644001030 | =D21*E21 | Np237 | =F21 | 4 | =J21/(37000000000*I21) |
| 22 | Pm | 147 | | =1/1000 | 6.38285370272298E- | =D22*E22 | | | | |
| 23 | Pu | 238 | | =1/1000 | 0.0140150063721576 | =D23*E23 | | | | |
| 24 | Pu | 239 | | =1/1000 | 0.0234242123520532 | =D24*E24 | | | | |
| 25 | Pu | | 239/241 | =1/1000 | | | | | | |
| 26 | Pu | 240 | | =1/1000 | 0.0053709965290181 | =D26*E26 | | | | |
| 27 | Pu | 241 | | =1/1000 | 0.154668619624854 | =D27*E27 | Pu241 | =F27 | 120 | =J27/(37000000000*I27) |
| 28 | Pu | 242 | | =1/1000 | 0.0000370198442981 | =D28*E28 | | | | |
| 29 | Sr | 90 | | =1/1000 | 0.298537364314256 | =D29*E29 | Sr90 | =F29 | 160 | =J29/(37000000000*I29) |
| 30 | Tc | 99 | | =1/1000 | 9.1183624324614E-1 | =D30*E30 | | | | |
| 31 | Th | 232 | | =1/1000 | 4.89930120071842E- | =D31*E31 | | | | |
| 32 | Tl | 204 | | =1/1000 | 2.27959060811535E- | =D32*E32 | | | | |
| 33 | U | 235 | | =1/1000 | 4.52037751832367E- | =D33*E33 | | | | |
| 34 | U | 238 | | =1/1000 | 0.0000545432882992 | =D34*E34 | | | | |

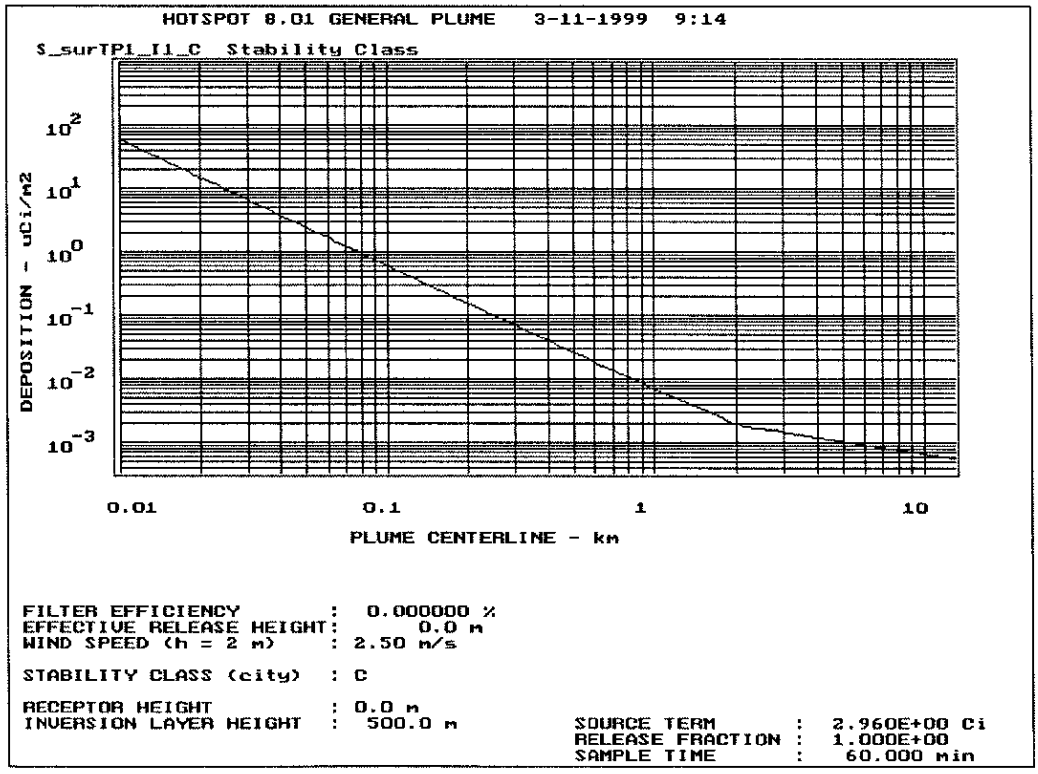
Beverage

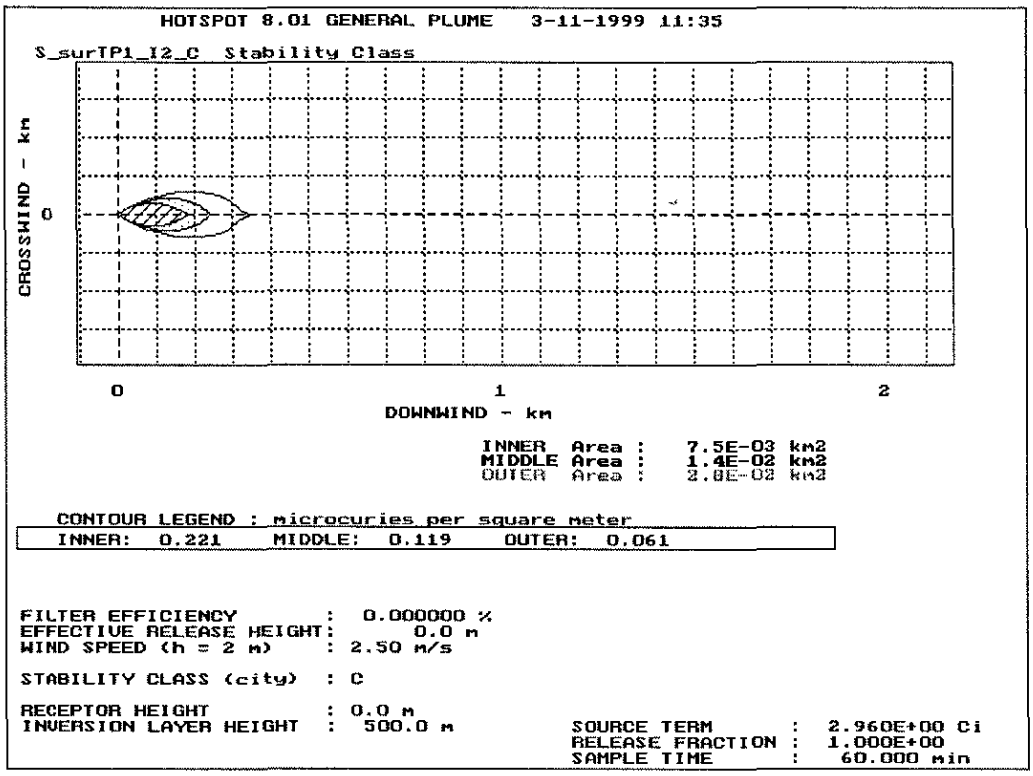
Q2

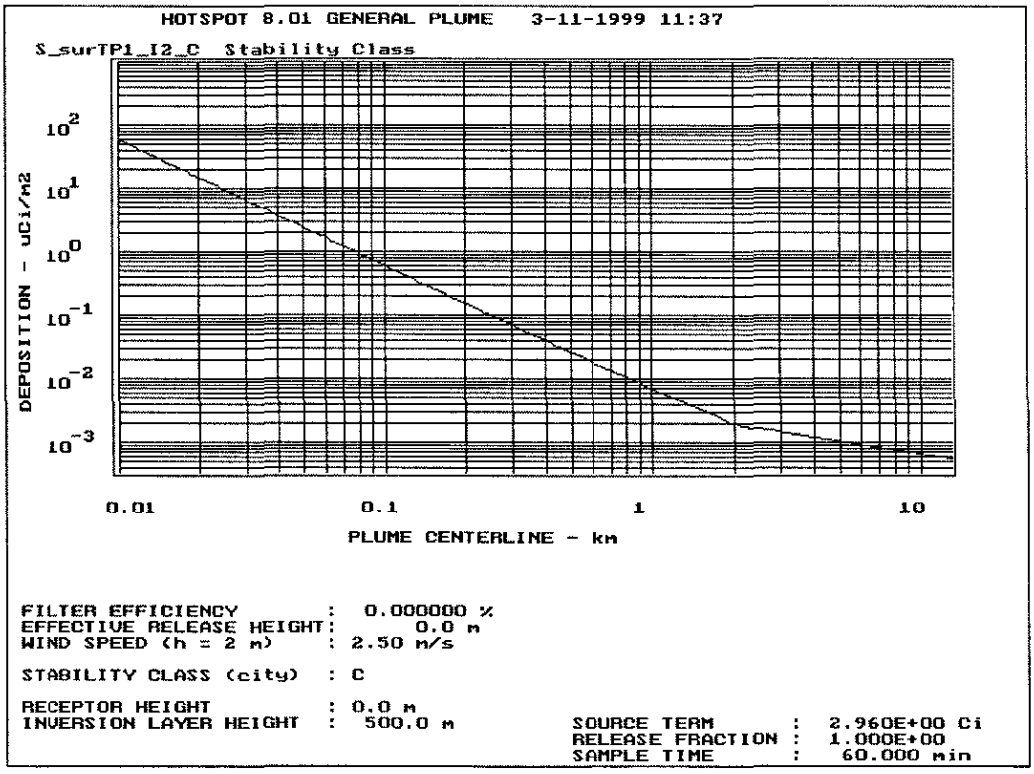
## Attachment R

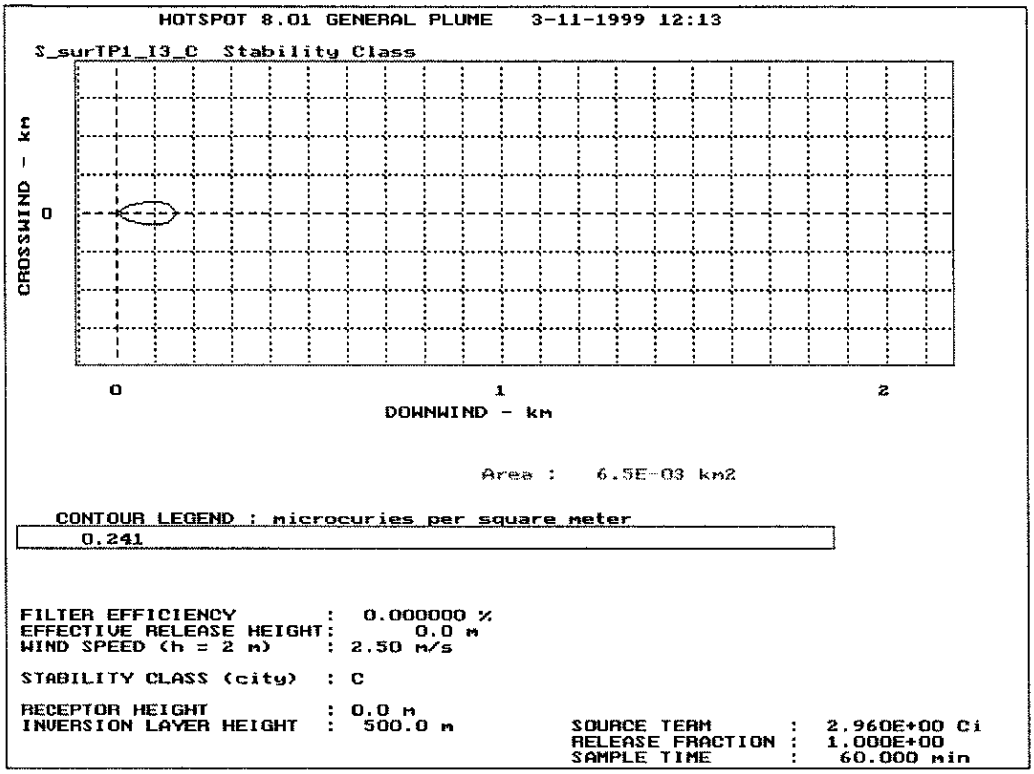
HOTSPOT results - average meteorology, 0.1 cm $s^{-1}$

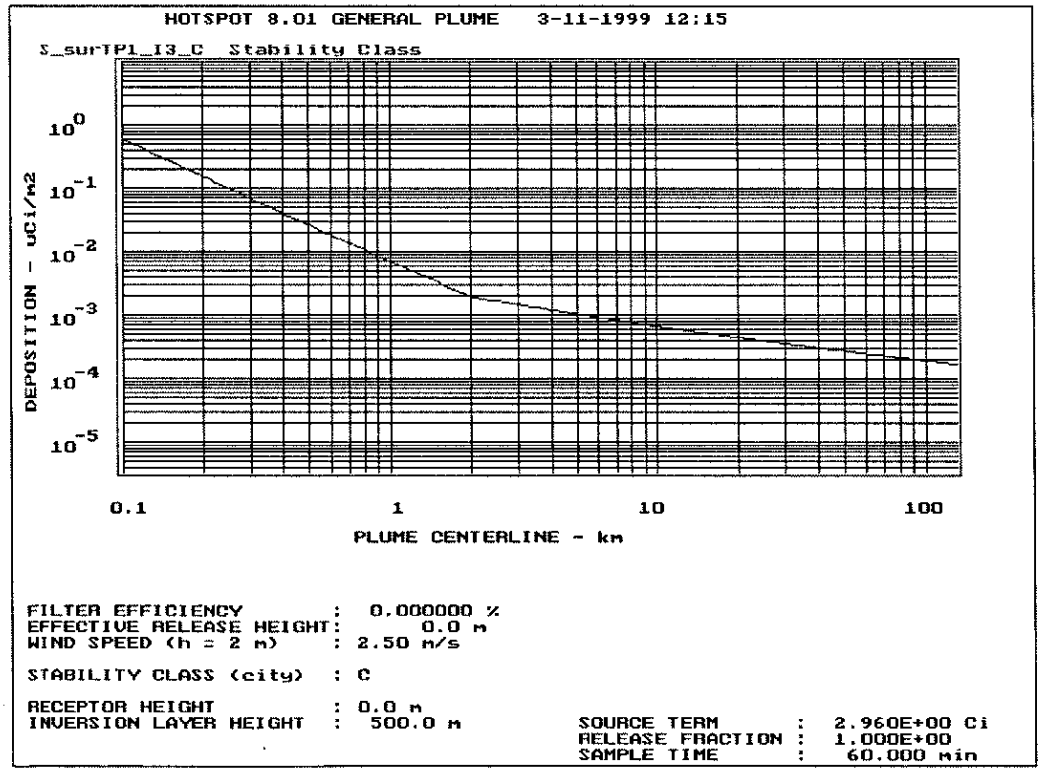

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 9:06
S_surTP1_Ii_C Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 4.5E-02 km2
MIDDLE Area : 5.3E-02 km2
OUTER Area : 4.4E-01 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.037 MIDDLE: 0.032 OUTER: 0.004
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

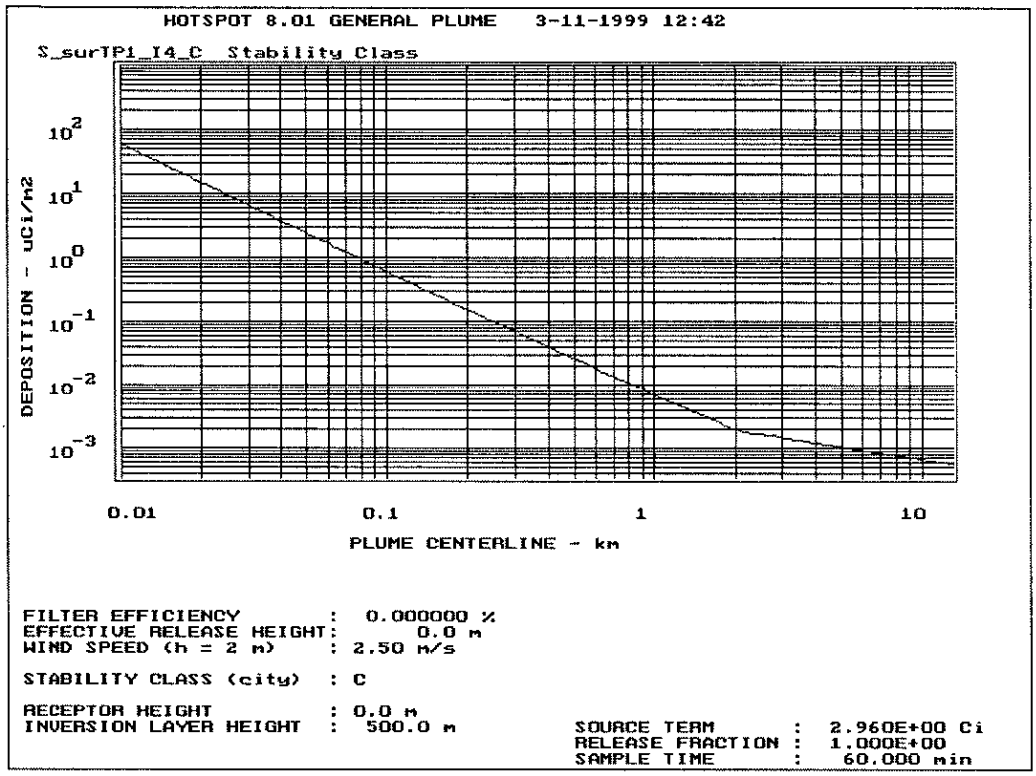

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 9:14
S_surTP1_Ii_C Stability Class
DEPOSITION - uCi/m2
10^2
10^1
10^0
10^-1
10^-2
10^-3
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

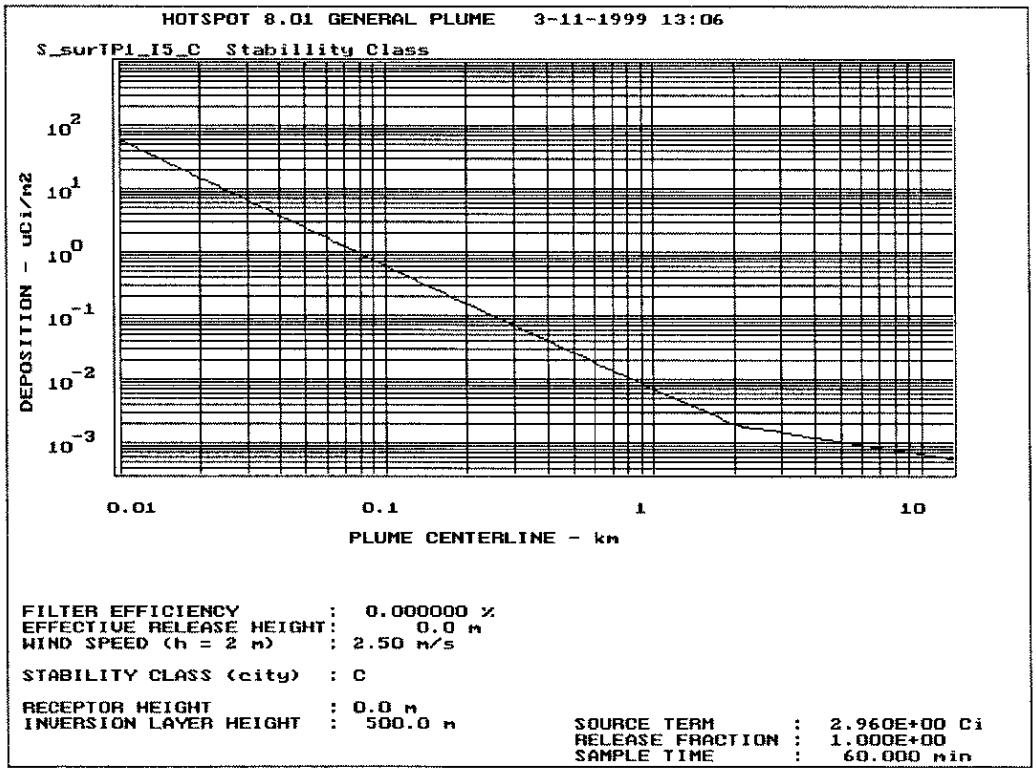

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:35
S_surTP1_I2_C Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 7.5E-03 km2
MIDDLE Area : 1.4E-02 km2
OUTER Area : 2.8E-02 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.221 MIDDLE: 0.119 OUTER: 0.061
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:37
S_surTP1_I2_C Stability Class
DEPOSITION - uCi/m2
10^2
10^1
10^0
10^-1
10^-2
10^-3
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:13
S_surTP1_I3_C Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
Area : 6.5E-03 km2
CONTOUR LEGEND : microcuries per square meter
0.241
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

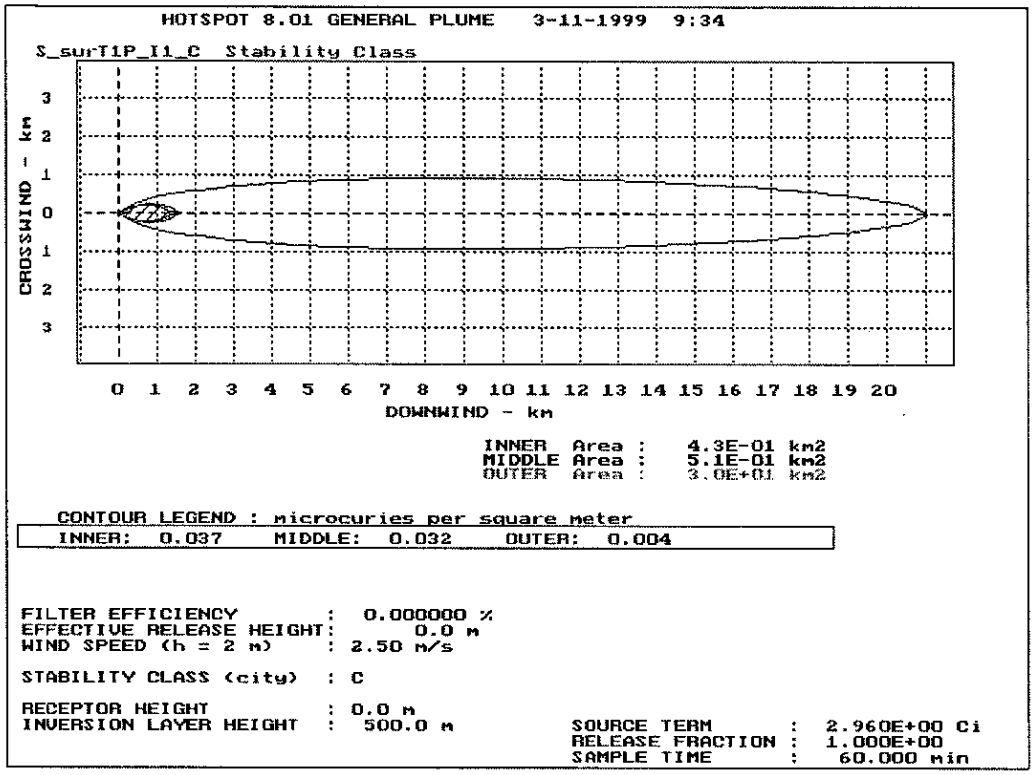

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:15
S_surTP1_I3_C Stability Class
DEPOSITION - uCi/m2
10^0
10^-1
10^-2
10^-3
10^-4
10^-5
0.1
1
10
100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

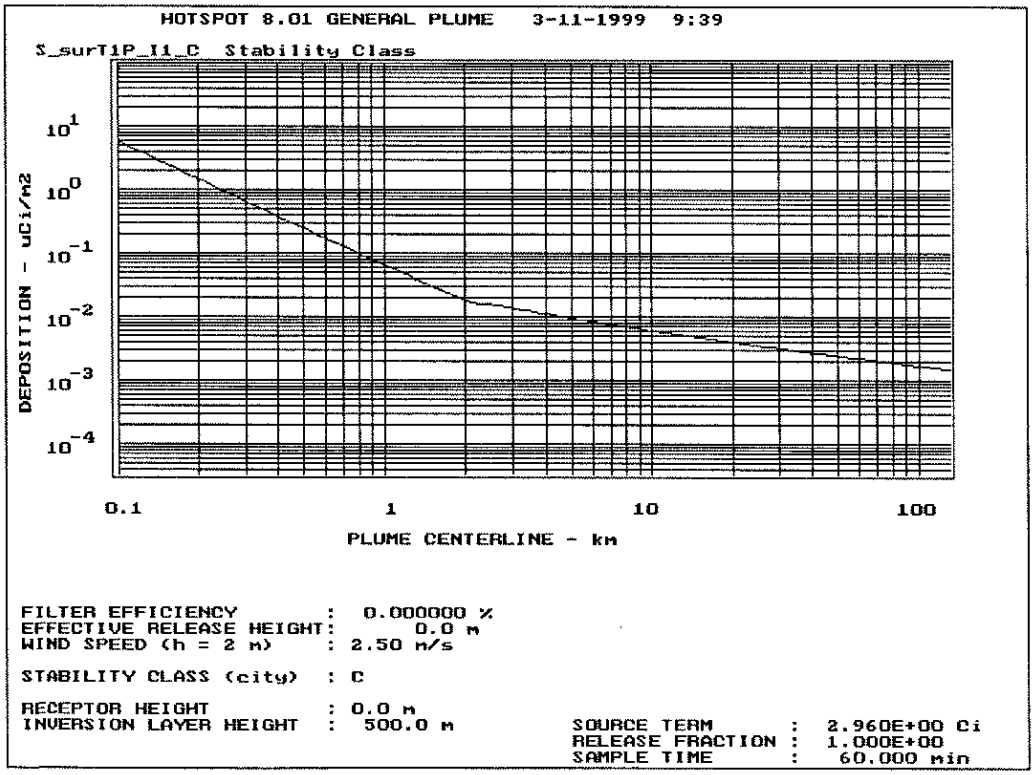

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:42
S_surTP1_I4_C Stability Class
DEPOSITION - uCi/m2
10^2
10^1
10^0
10^-1
10^-2
10^-3
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

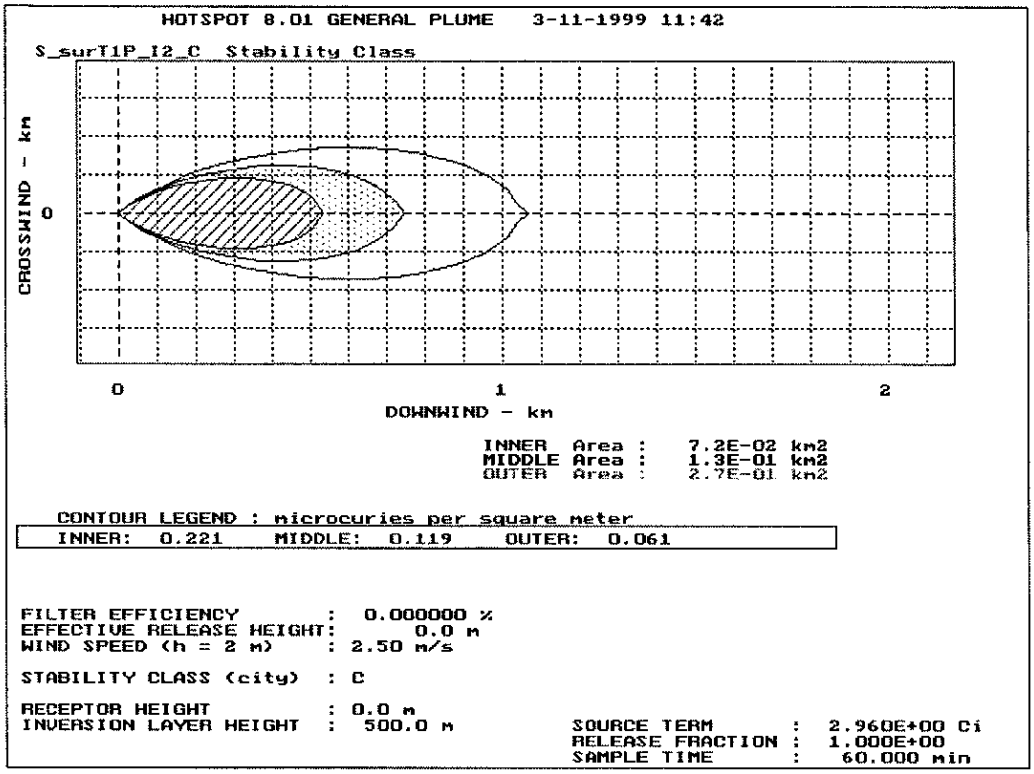

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 13:06
S_surTP1_I5_C Stabillity Class
DEPOSITION - uCi/m2
10^2
10^1
10^0
10^-1
10^-2
10^-3
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

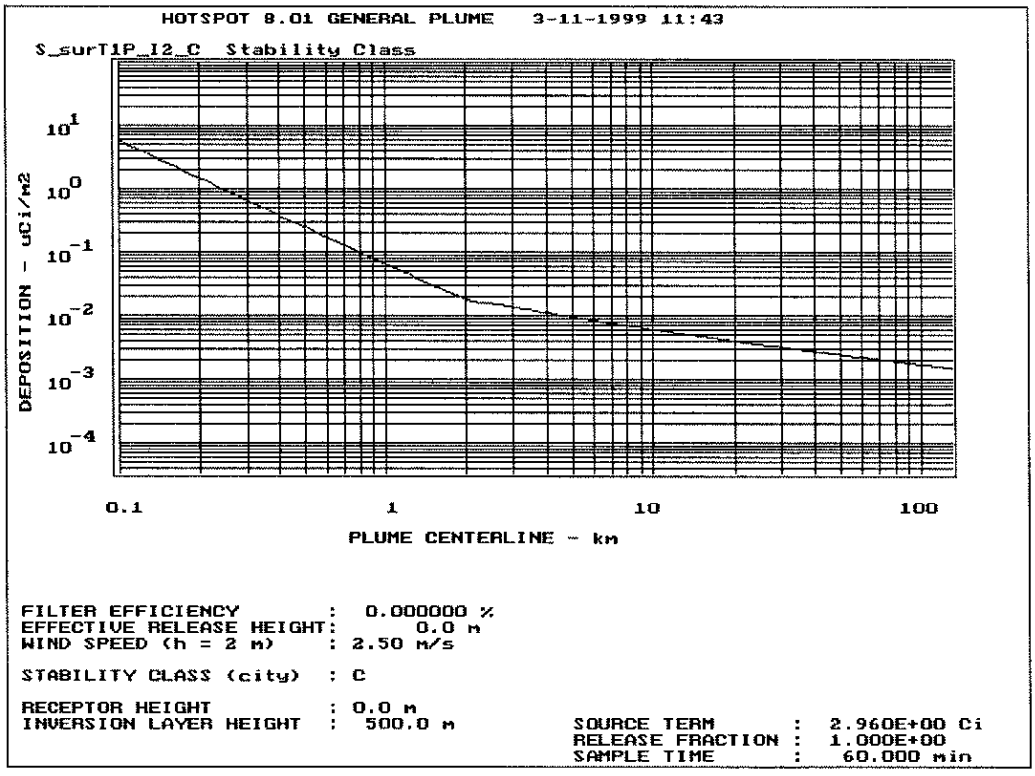
## Attachment S

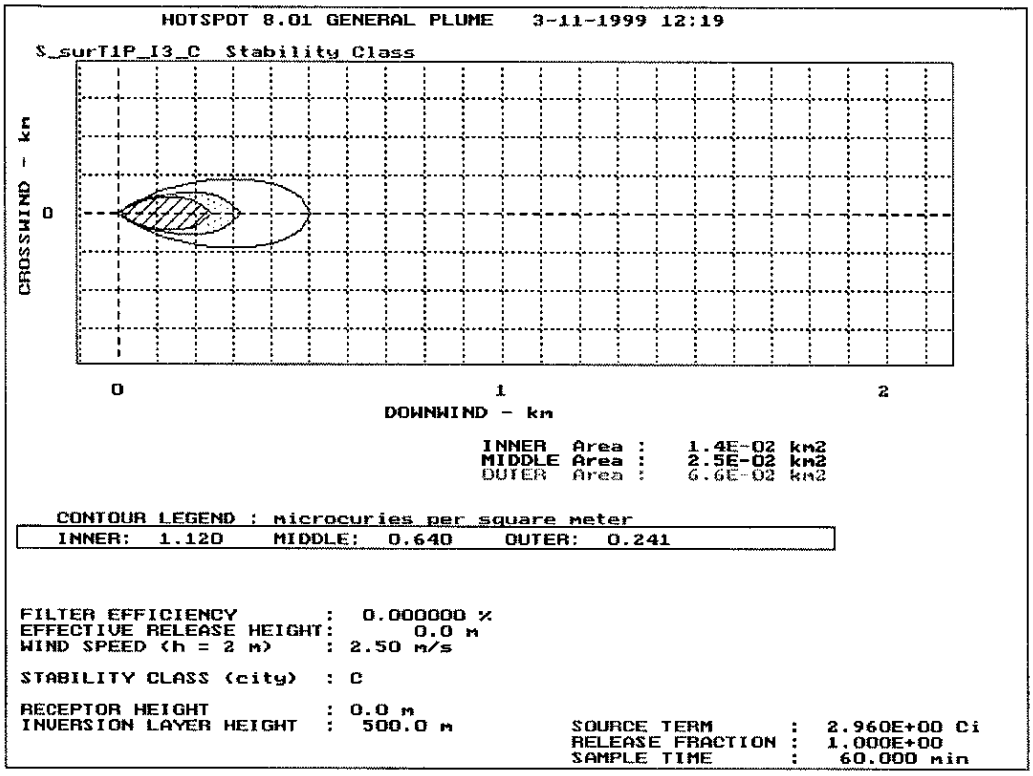
HOTSPOT results - average meteorology, 1.0 cm $s^{-1}$

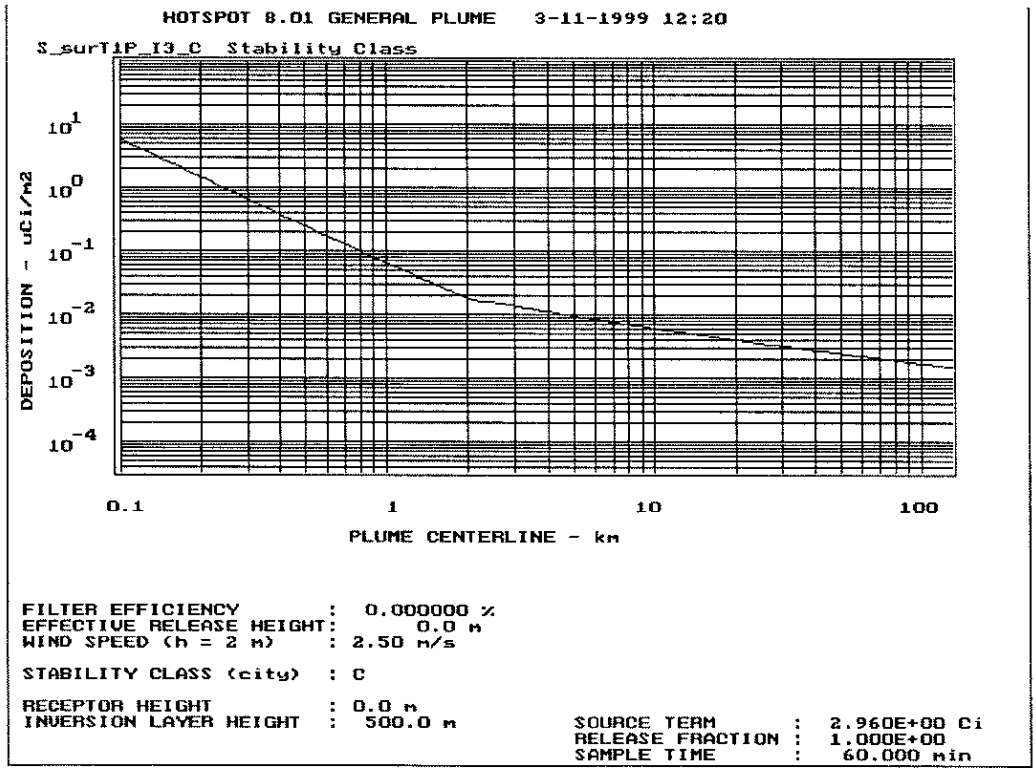

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 9:34
S_surT1P_I1_C Stability Class
CROSSWIND - km
3
2
1
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
DOWNWIND - km
INNER Area : 4.3E-01 km2
MIDDLE Area : 5.1E-01 km2
OUTER Area : 3.0E+01 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.037 MIDDLE: 0.032 OUTER: 0.004
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

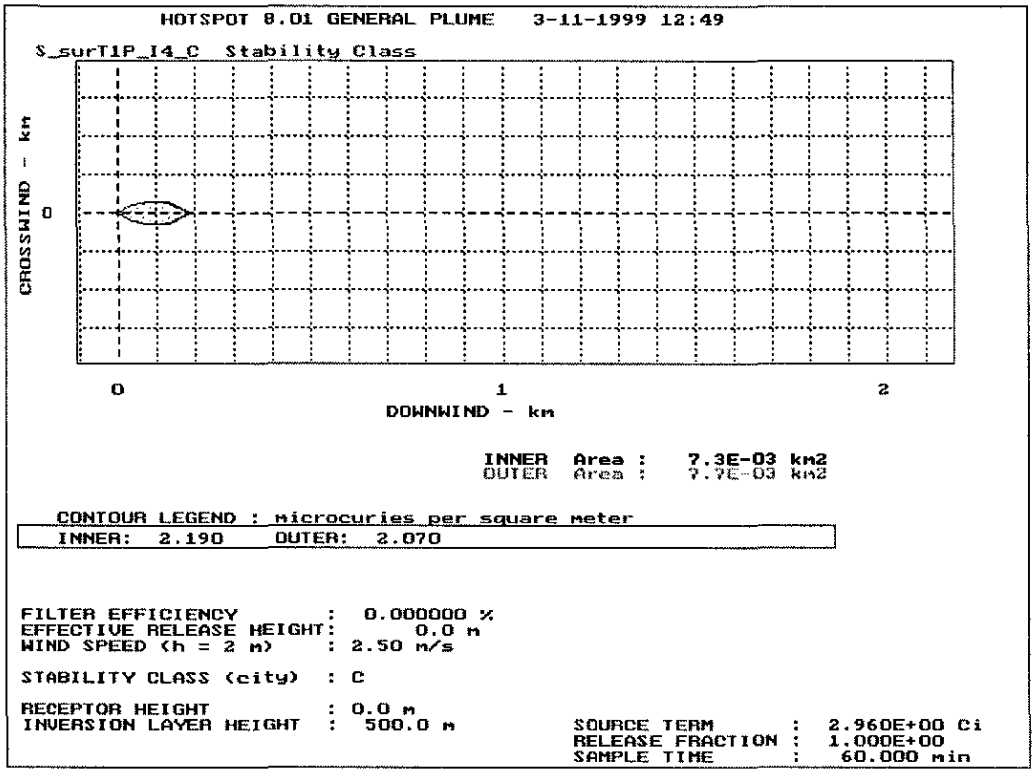

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 9:39
S_surT1P_I1_C Stability Class
DEPOSITION - uCi/m2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
0.1
1
10
100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

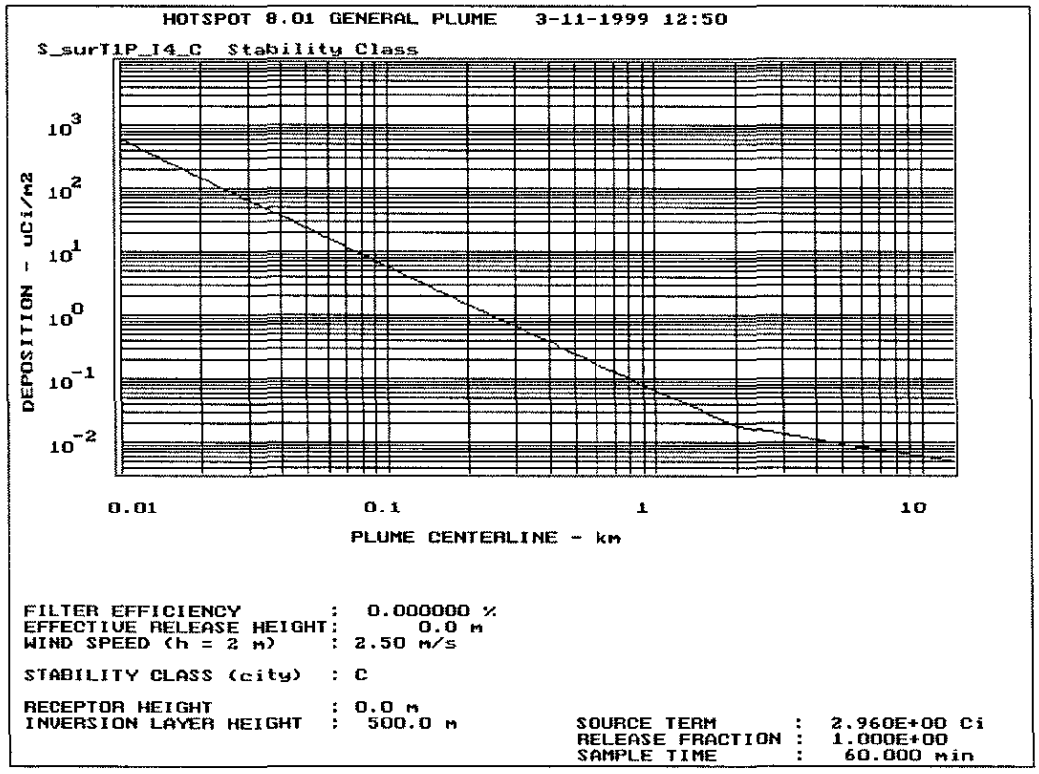

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:42
S_surT1P_I2_C Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 7.2E-02 km2
MIDDLE Area : 1.3E-01 km2
OUTER Area : 2.7E-01 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.221 MIDDLE: 0.119 OUTER: 0.061
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:43
S_surT1P_I2_C Stability Class
DEPOSITION - uCi/m2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
0.1
1
10
100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:19
S_surT1P_I3_C Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 1.4E-02 km2
MIDDLE Area : 2.5E-02 km2
OUTER Area : 6.6E-02 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 1.120 MIDDLE: 0.640 OUTER: 0.241
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

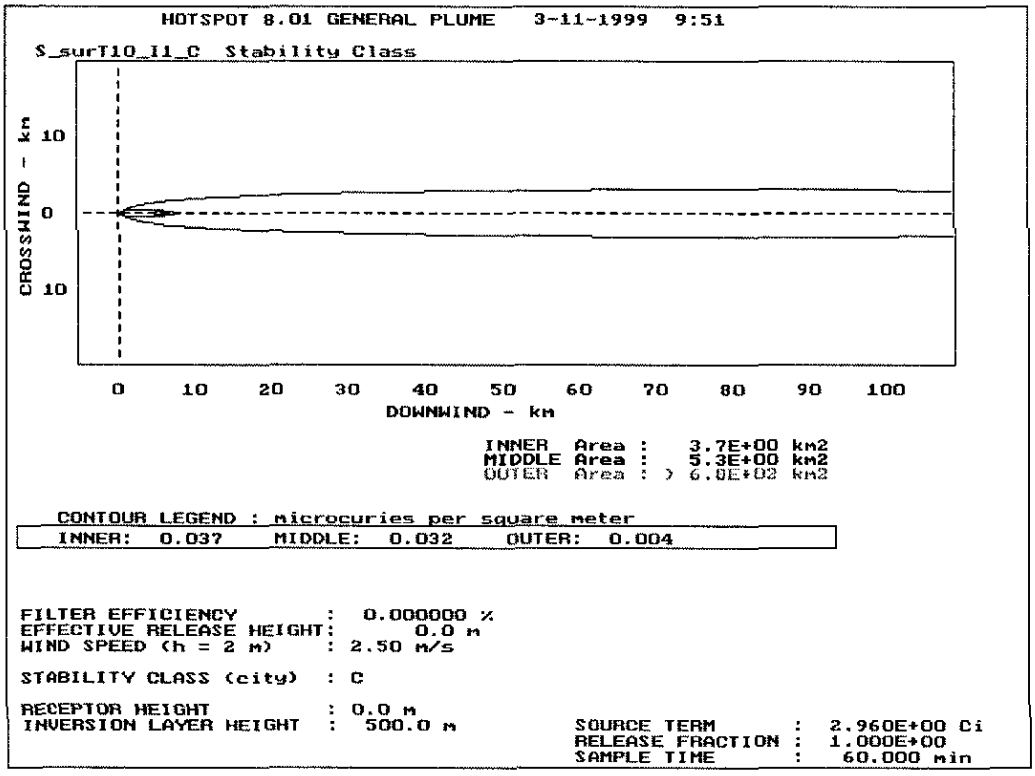

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:20
S_surT1P_I3_C Stability Class
DEPOSITION - uCi/m2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
0.1
1
10
100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

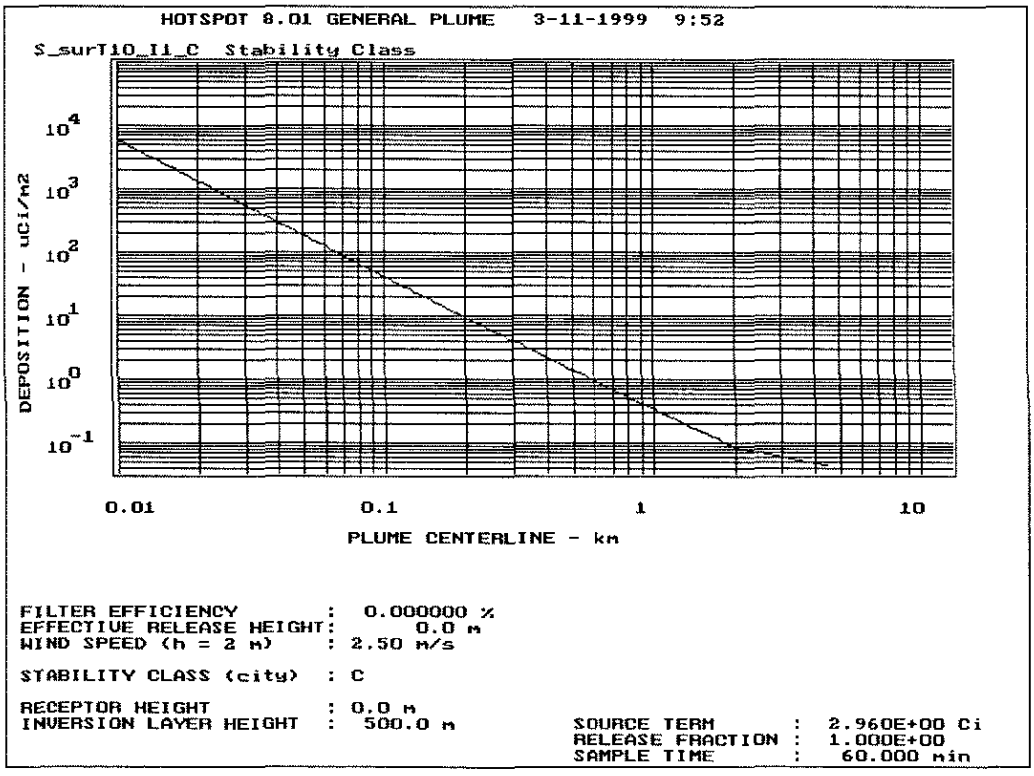

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:49
S_surT1P_I4_C Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 7.3E-03 km2
OUTER Area : 7.7E-03 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 2.190 OUTER: 2.070
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

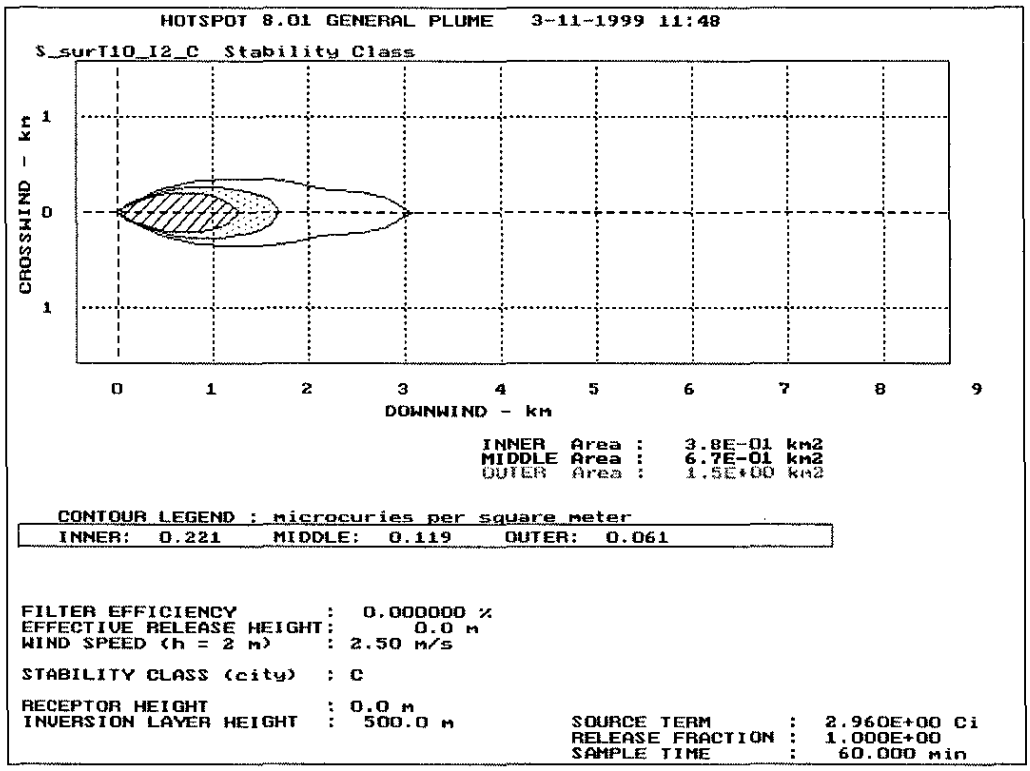

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:50
S_surT1P_I4_C Stability Class
DEPOSITION - uCi/m2
10^3
10^2
10^1
10^0
10^-1
10^-2
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

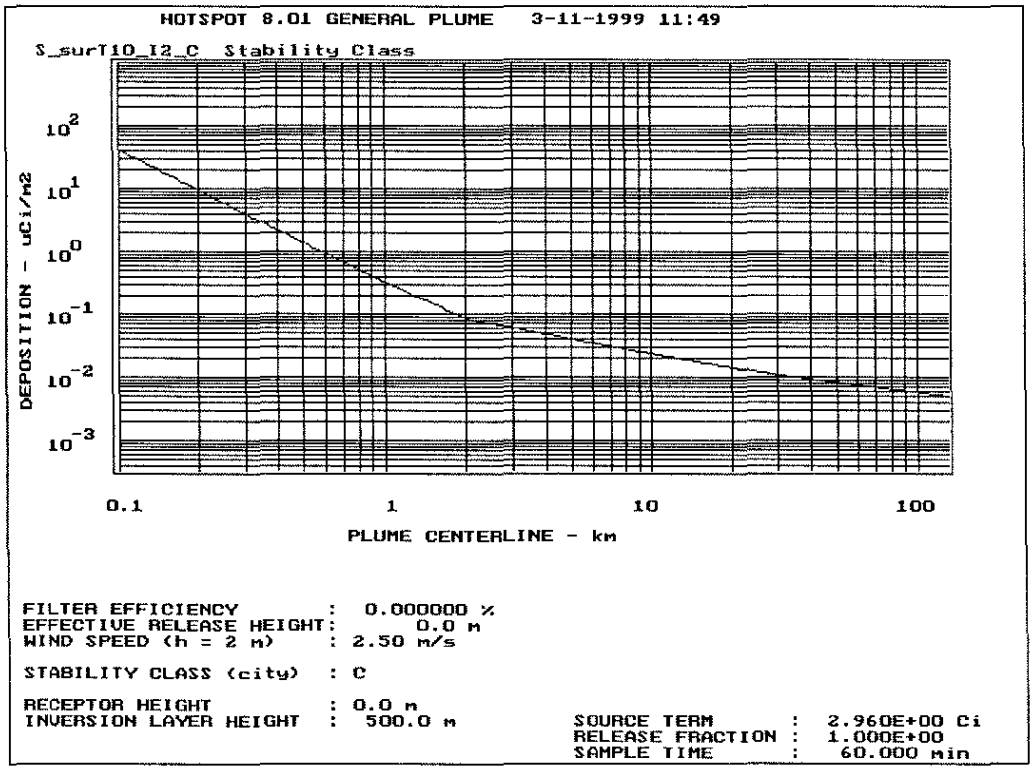
## Attachment T

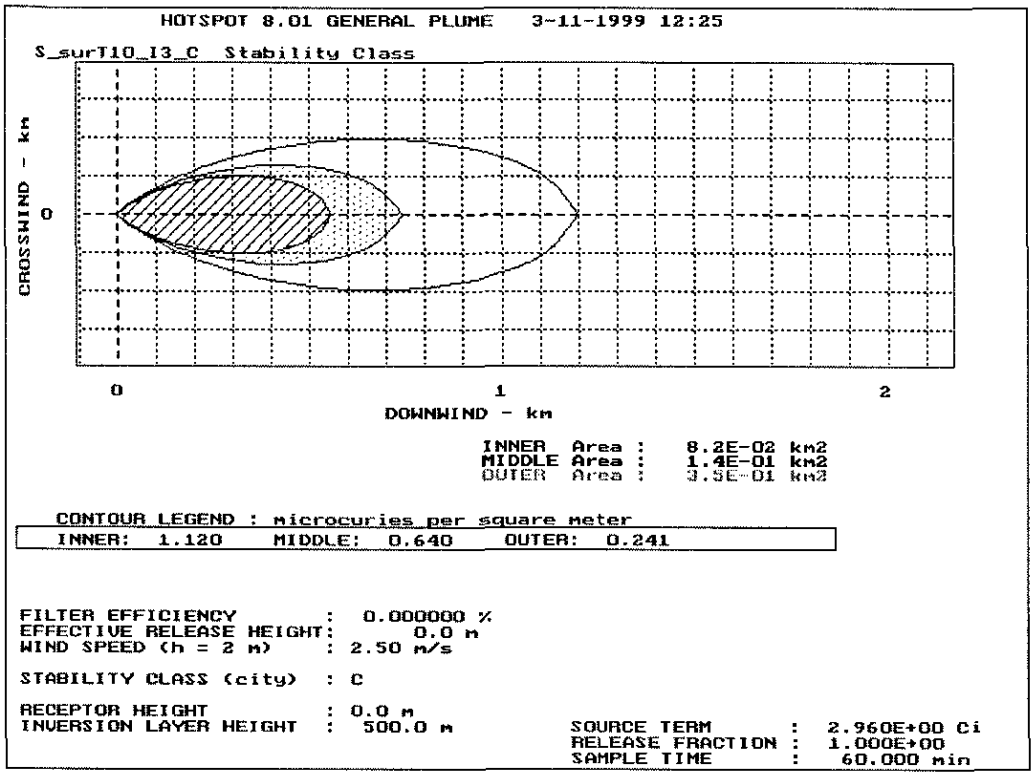
HOTSPOT results - average meteorology, 10 cm $s^{-1}$

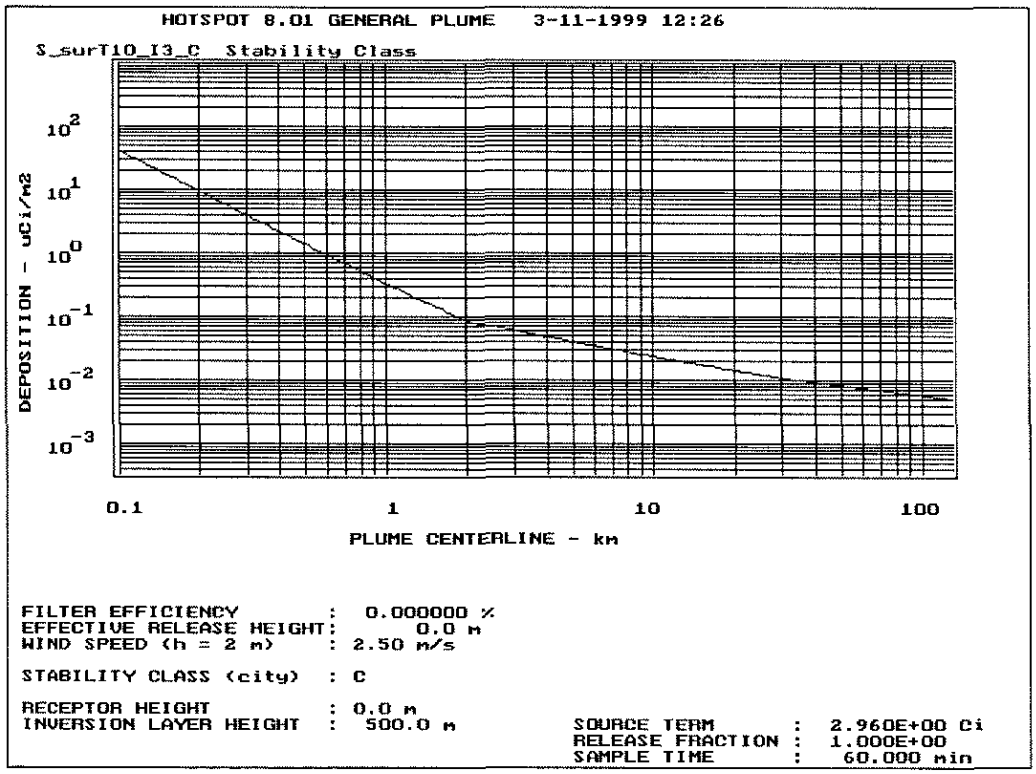

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 9:51
S_surT10_I1_C Stability Class
CROSSWIND - km
10
0
10
0 10 20 30 40 50 60 70 80 90 100
DOWNWIND - km
INNER Area : 3.7E+00 km2
MIDDLE Area : 5.3E+00 km2
OUTER Area : > 6.0E+02 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.037 MIDDLE: 0.032 OUTER: 0.004
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

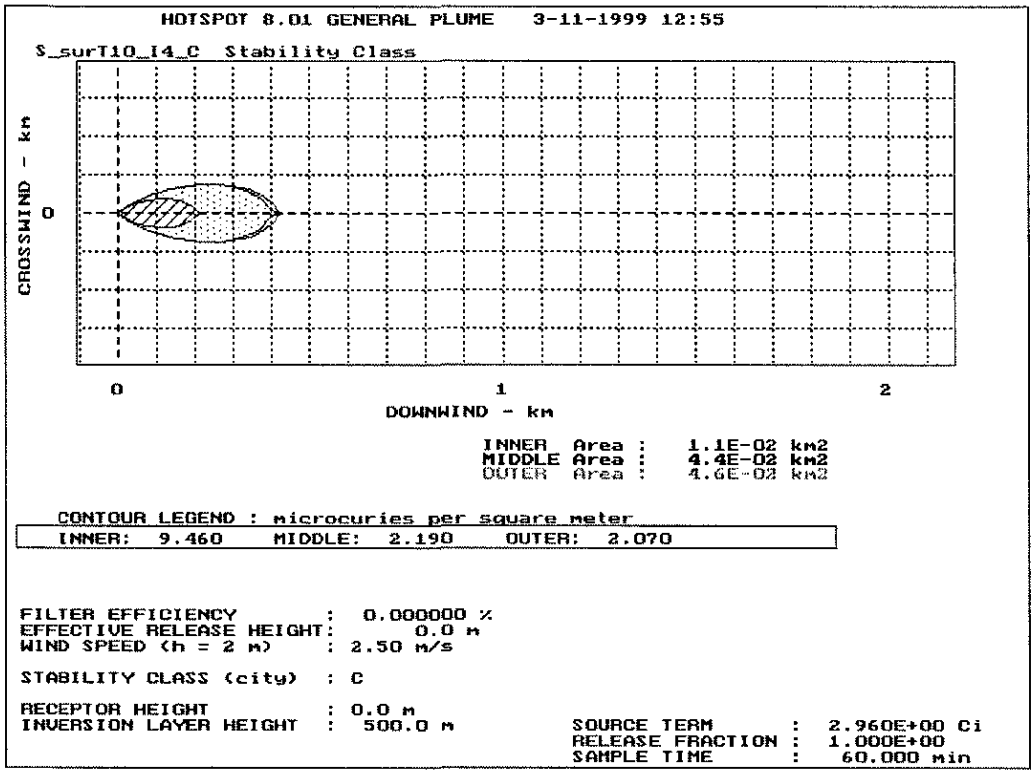

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 9:52
S_surT10_I1_C Stability Class
DEPOSITION - uCi/m2
10^4
10^3
10^2
10^1
10^0
10^-1
0.01 0.1 1 10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

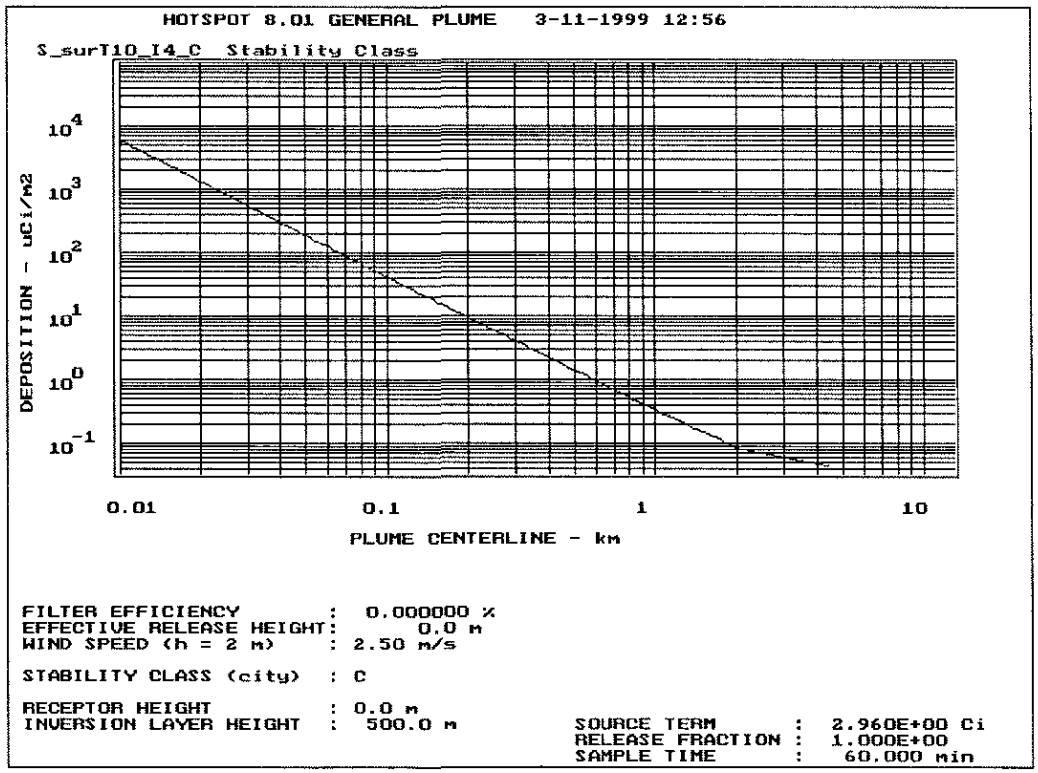

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:48
S_surT1O_I2_C Stability Class
CROSSWIND - km
1
0
1
0 1 2 3 4 5 6 7 8 9
DOWNWIND - km
INNER Area : 3.8E-01 km2
MIDDLE Area : 6.7E-01 km2
OUTER Area : 1.5E+00 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.221 MIDDLE: 0.119 OUTER: 0.061
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

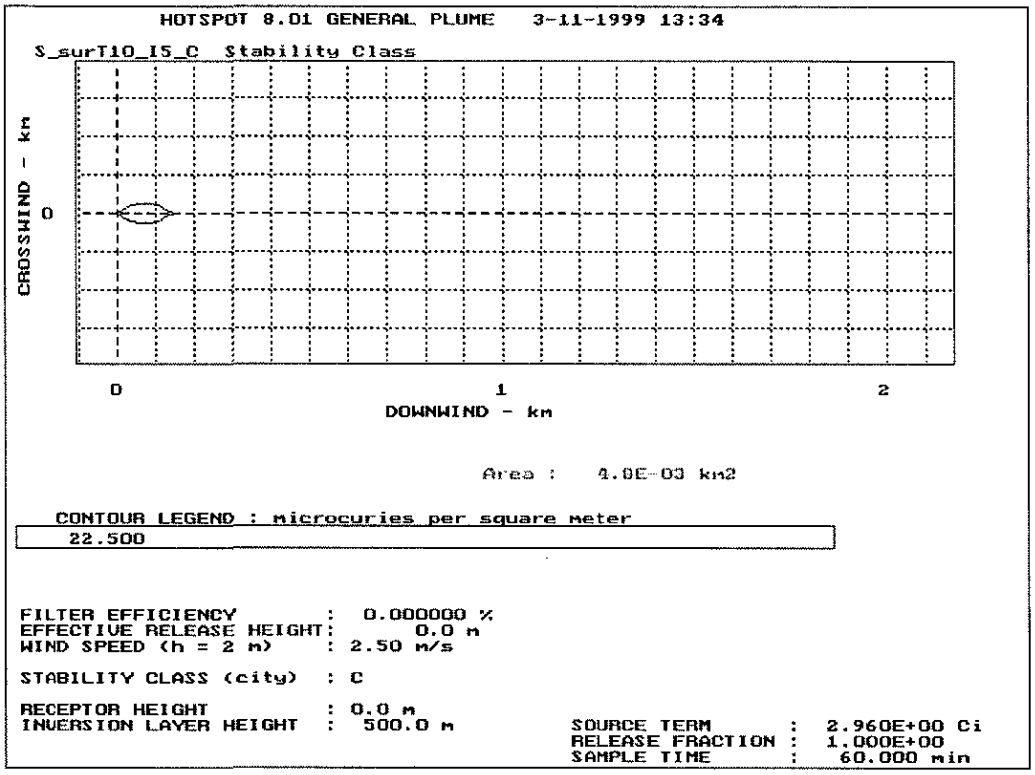

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:49
S_surT1O_I2_C Stability Class
DEPOSITION - uCi/m2
10^2
10^1
10^0
10^-1
10^-2
10^-3
0.1 1 10 100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

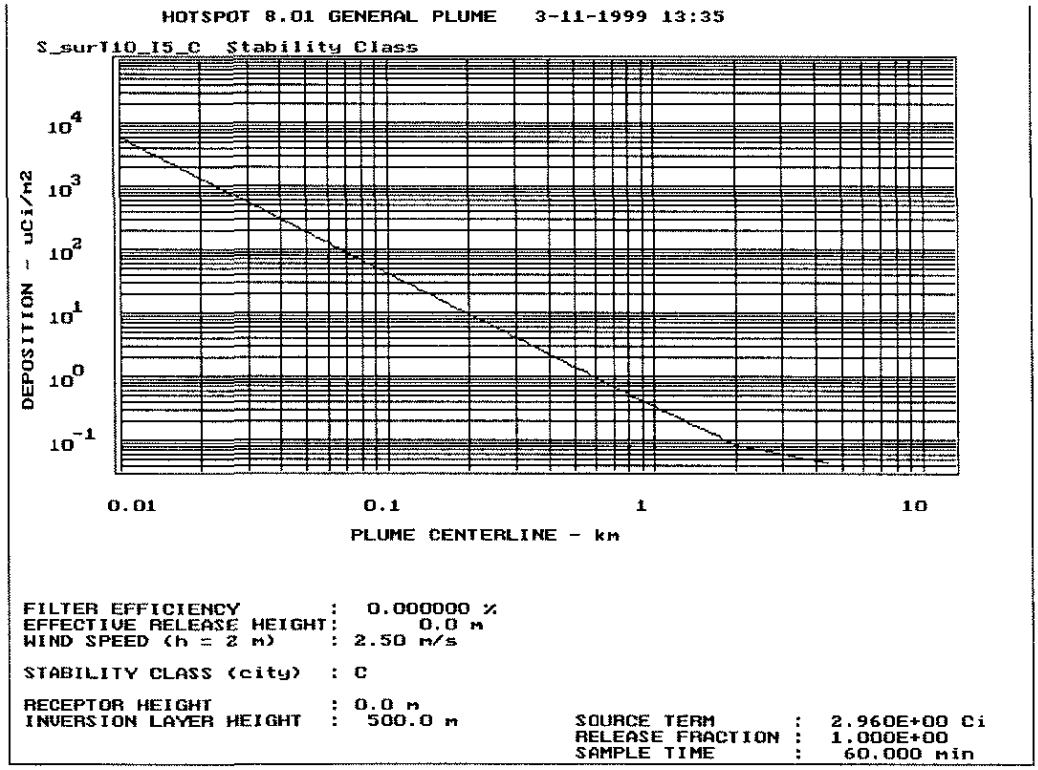

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:25
S_surT10_I3_C Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 8.2E-02 km2
MIDDLE Area : 1.4E-01 km2
OUTER Area : 3.5E-01 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 1.120 MIDDLE: 0.640 OUTER: 0.241
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:26
S_surT10_I3_C Stability Class
DEPOSITION - uCi/m2
10^2
10^1
10^0
10^-1
10^-2
10^-3
0.1
1
10
100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:55
S_surT10_I4_C Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 1.1E-02 km2
MIDDLE Area : 4.4E-02 km2
OUTER Area : 4.6E-02 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 9.460 MIDDLE: 2.190 OUTER: 2.070
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

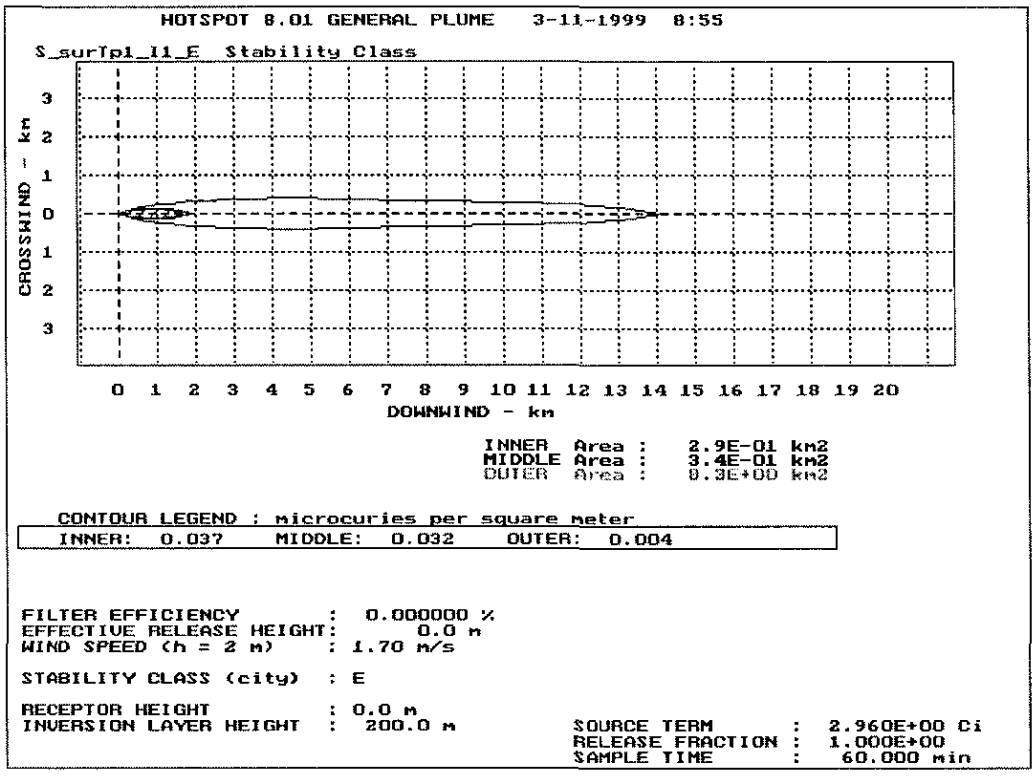

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:56
S_surT10_I4_C Stability Class
DEPOSITION - uCi/m2
10^4
10^3
10^2
10^1
10^0
10^-1
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

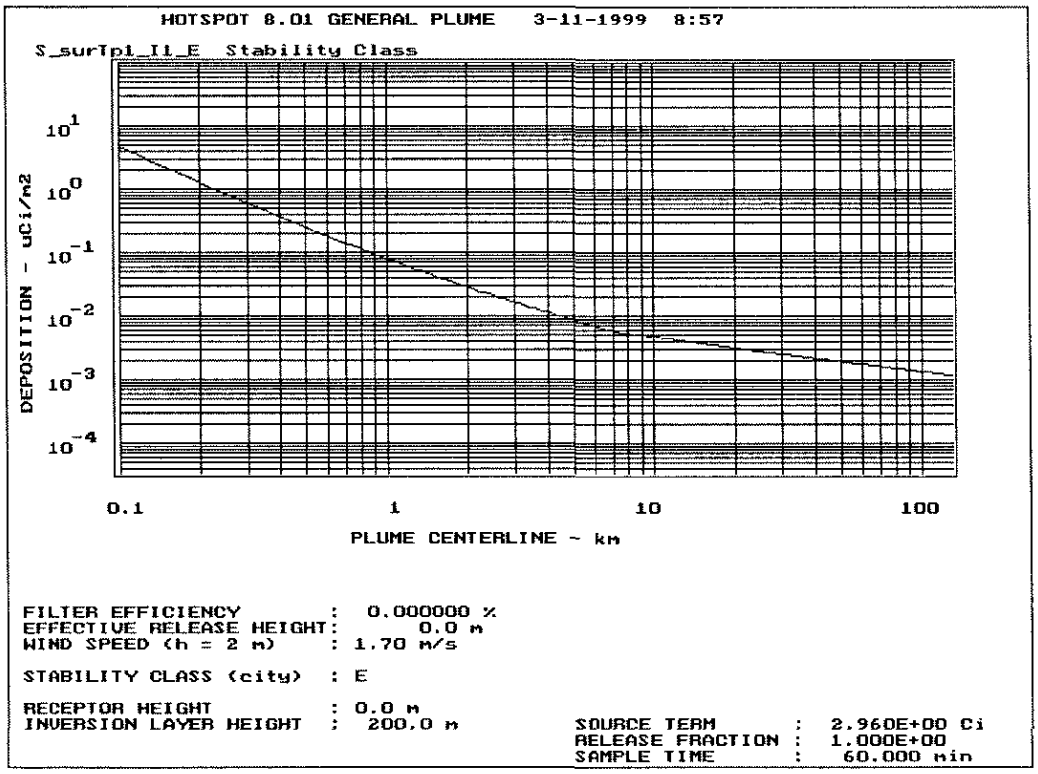

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 13:34
S_surT10_I5_C Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
Area : 4.0E-03 km2
CONTOUR LEGEND : microcuries per square meter
22.500
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

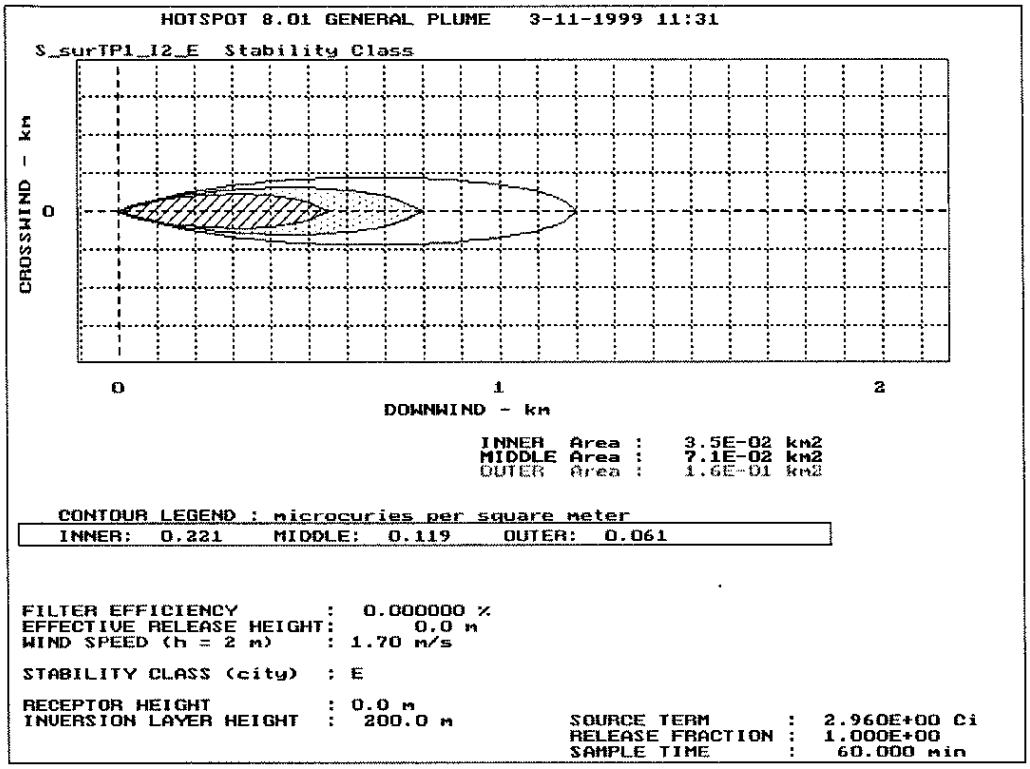

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 13:35
S_surT10_I5_C Stability Class
DEPOSITION - uCi/m2
10^4
10^3
10^2
10^1
10^0
10^-1
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 2.50 m/s
STABILITY CLASS (city) : C
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 500.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

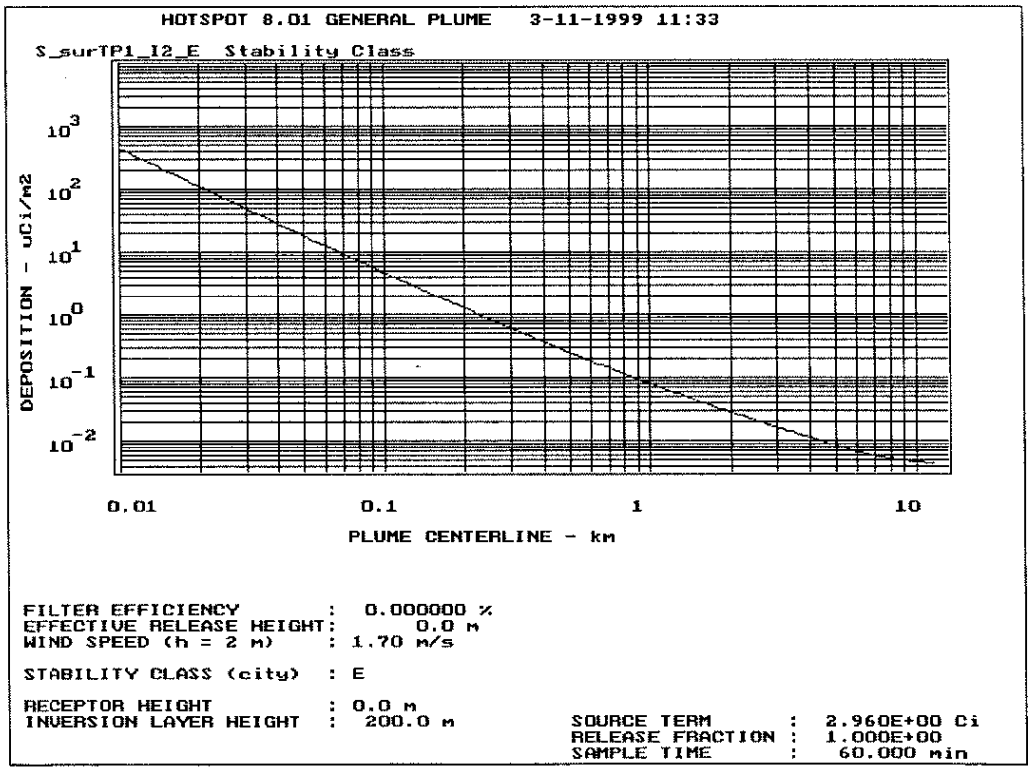
## Attachment U

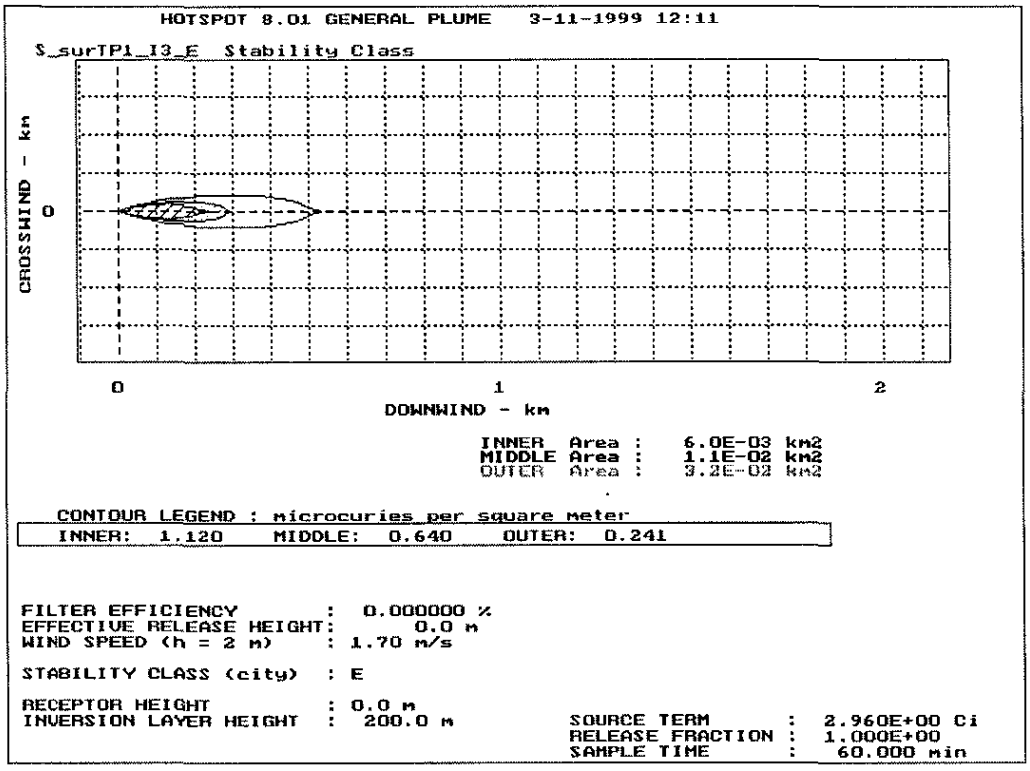
HOTSPOT results - adverse meteorology, 0.1 cm $s^{-1}$

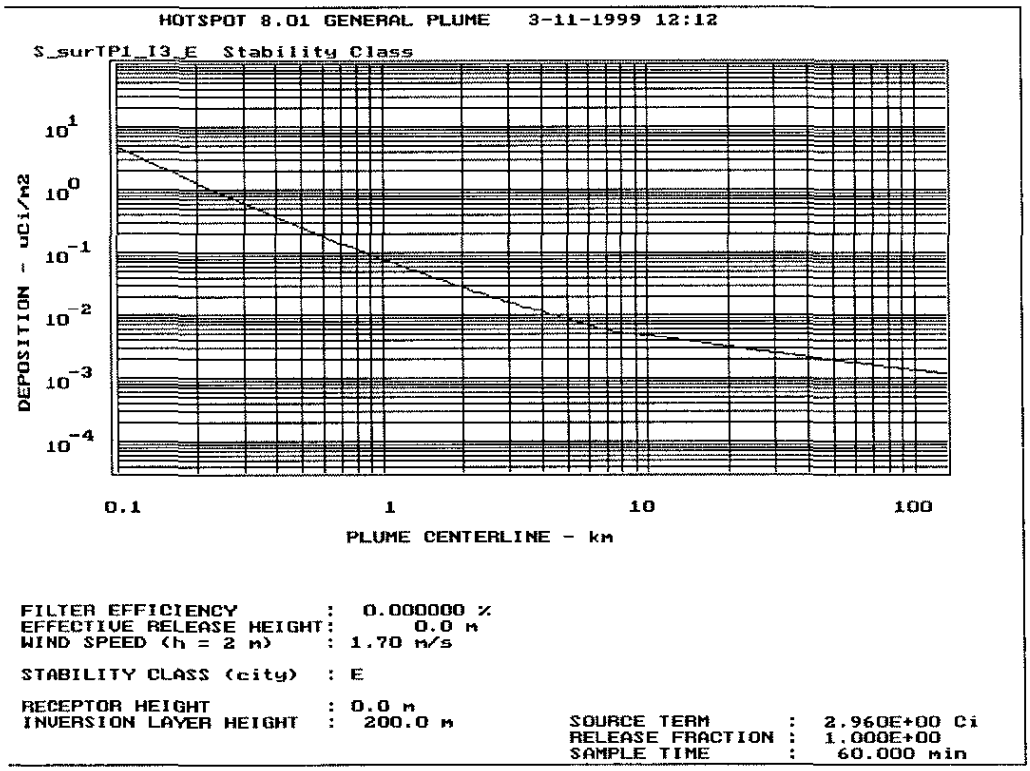

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 8:55
S_surTpi_II_E Stability Class
CROSSWIND - km
3
2
1
0
1
2
3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
DOWNWIND - km
INNER Area : 2.9E-01 km2
MIDDLE Area : 3.4E-01 km2
OUTER Area : 8.3E+00 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.037 MIDDLE: 0.032 OUTER: 0.004
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

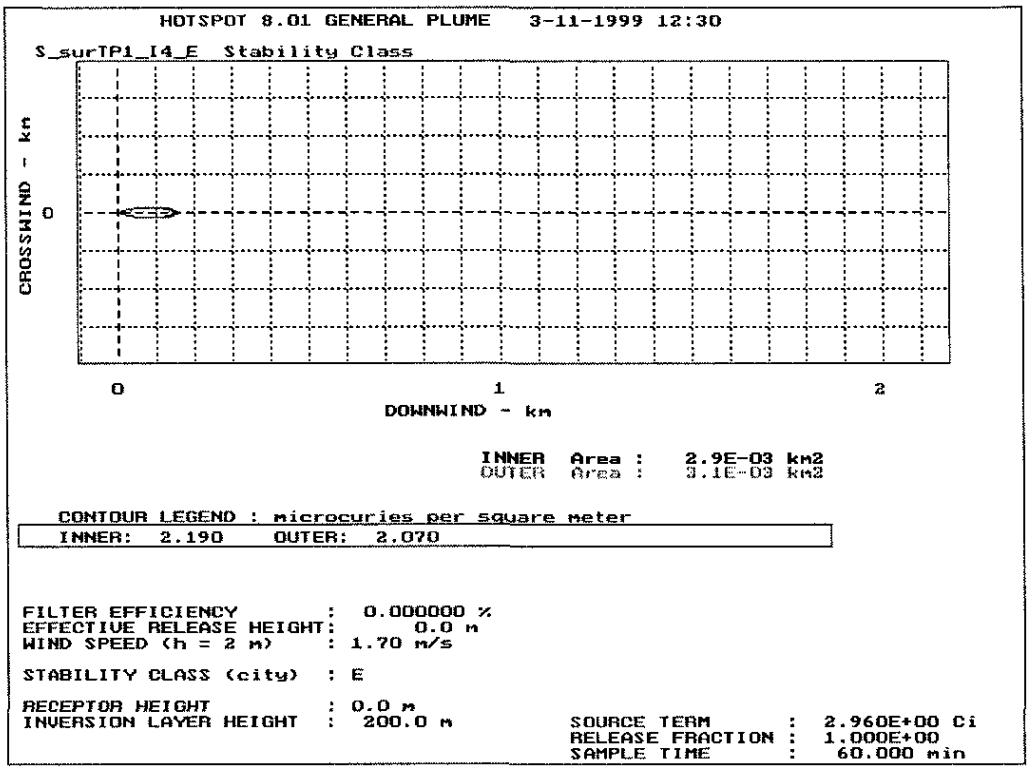

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 8:57
S_surTpi_II_E Stability Class
DEPOSITION - uCi/m2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
0.1
1
10
100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

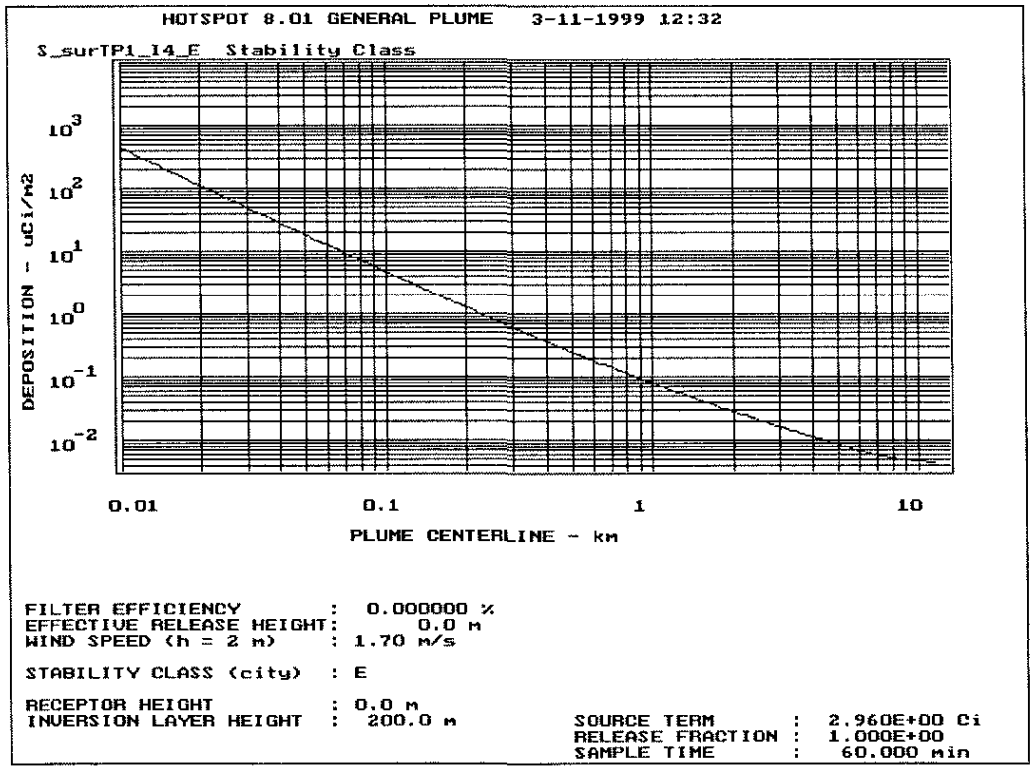

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:31
S_surTP1_I2_E Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 3.5E-02 km2
MIDDLE Area : 7.1E-02 km2
OUTER Area : 1.6E-01 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.221 MIDDLE: 0.119 OUTER: 0.061
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:33
S_surTP1_I2_E Stability Class
DEPOSITION - uCi/m2
10^3
10^2
10^1
10^0
10^-1
10^-2
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:11
S_surTP1_I3_E Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 6.0E-03 km2
MIDDLE Area : 1.1E-02 km2
OUTER Area : 3.2E-02 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 1.120 MIDDLE: 0.640 OUTER: 0.241
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

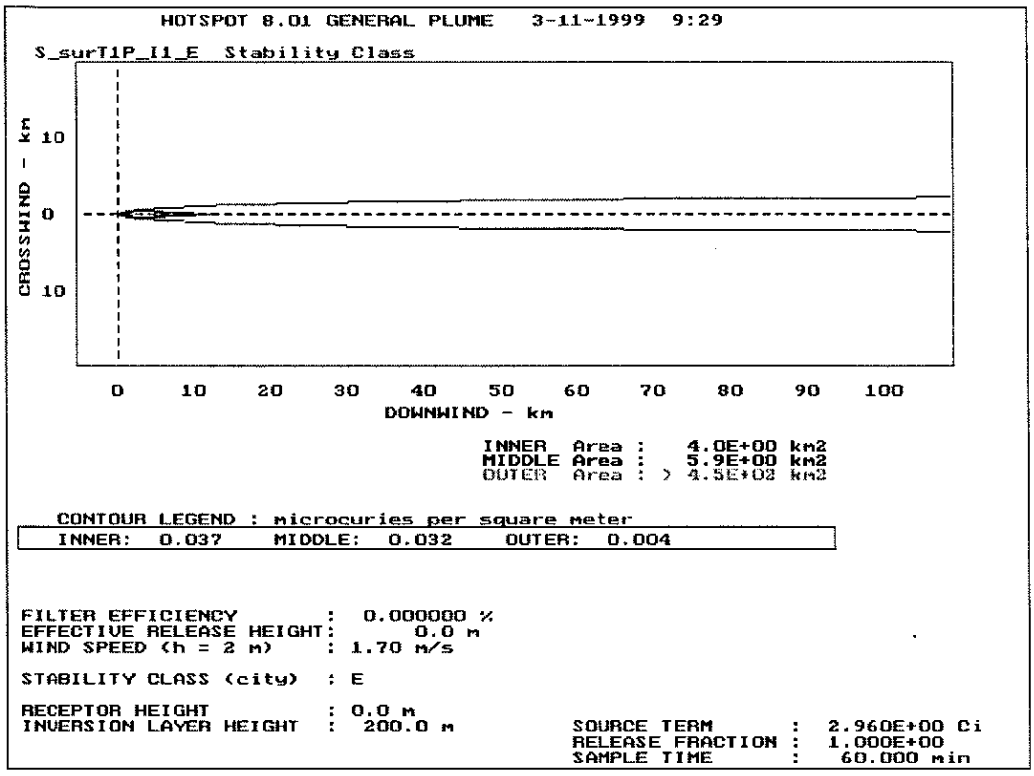

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:12
S_surTP1_I3_E Stability Class
DEPOSITION - uCi/m2
10^1
10^0
10^-1
10^-2
10^-3
10^-4
0.1
1
10
100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

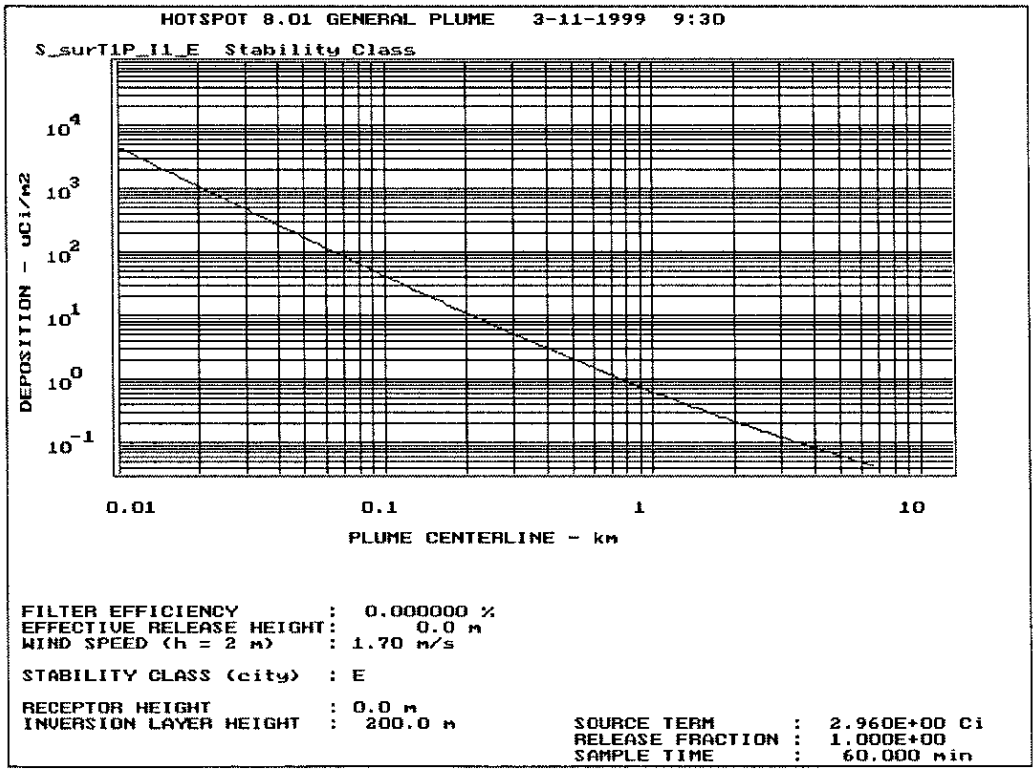

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:30
S_surTP1_I4_E Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 2.9E-03 km2
OUTER Area : 3.1E-03 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 2.190 OUTER: 2.070
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

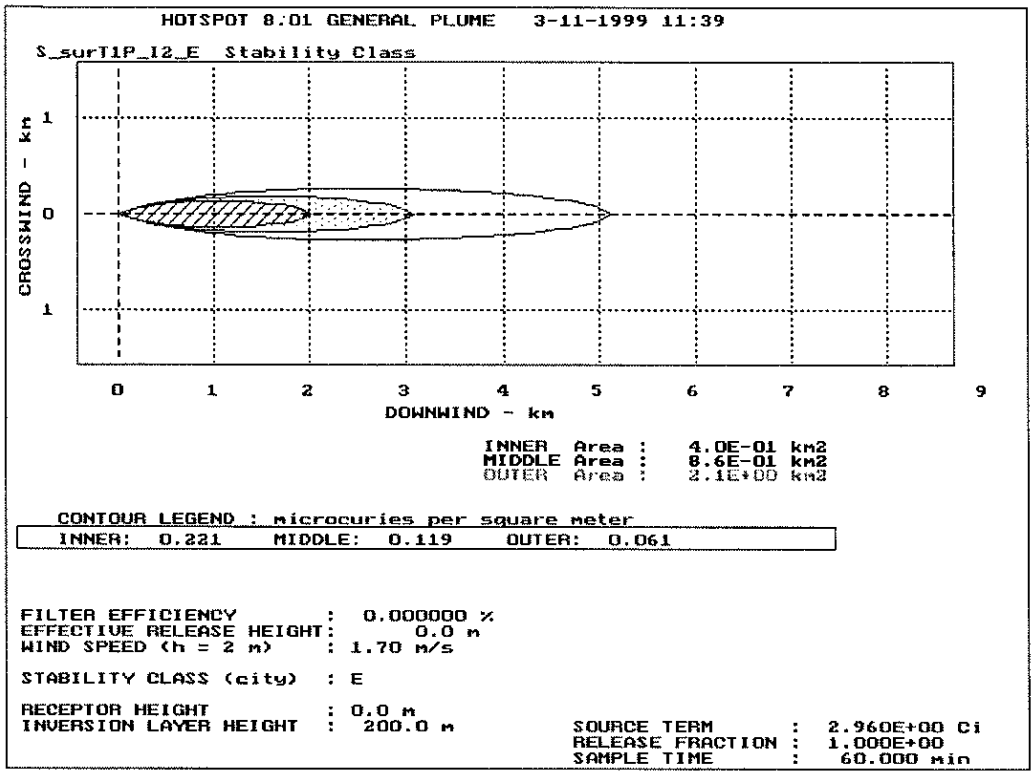

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:32
S_surTP1_I4_E Stability Class
DEPOSITION - uCi/m2
10^3
10^2
10^1
10^0
10^-1
10^-2
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

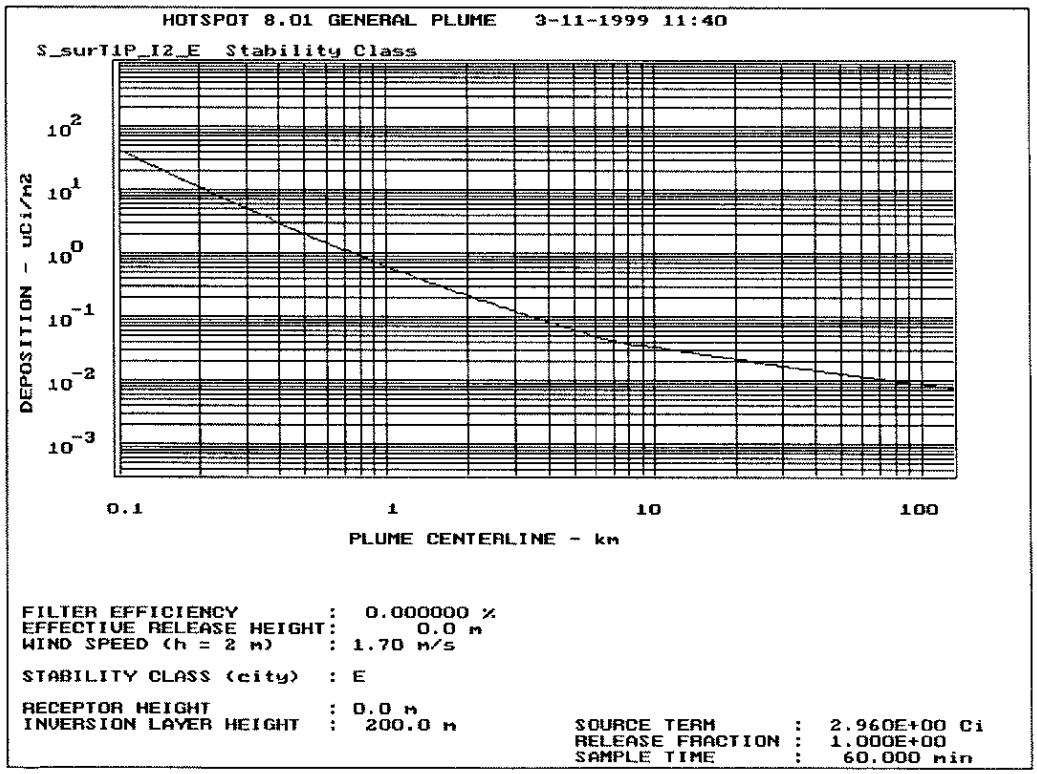
## Attachment V

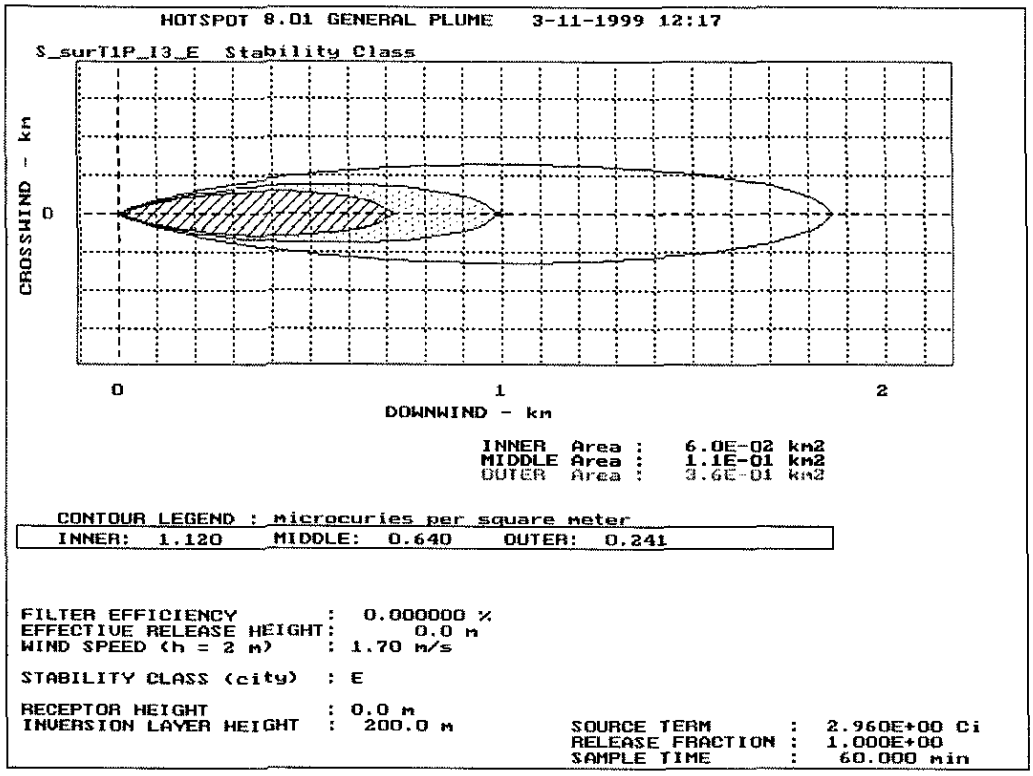
HOTSPOT results - adverse meteorology, 1.0 cm $s^{-1}$

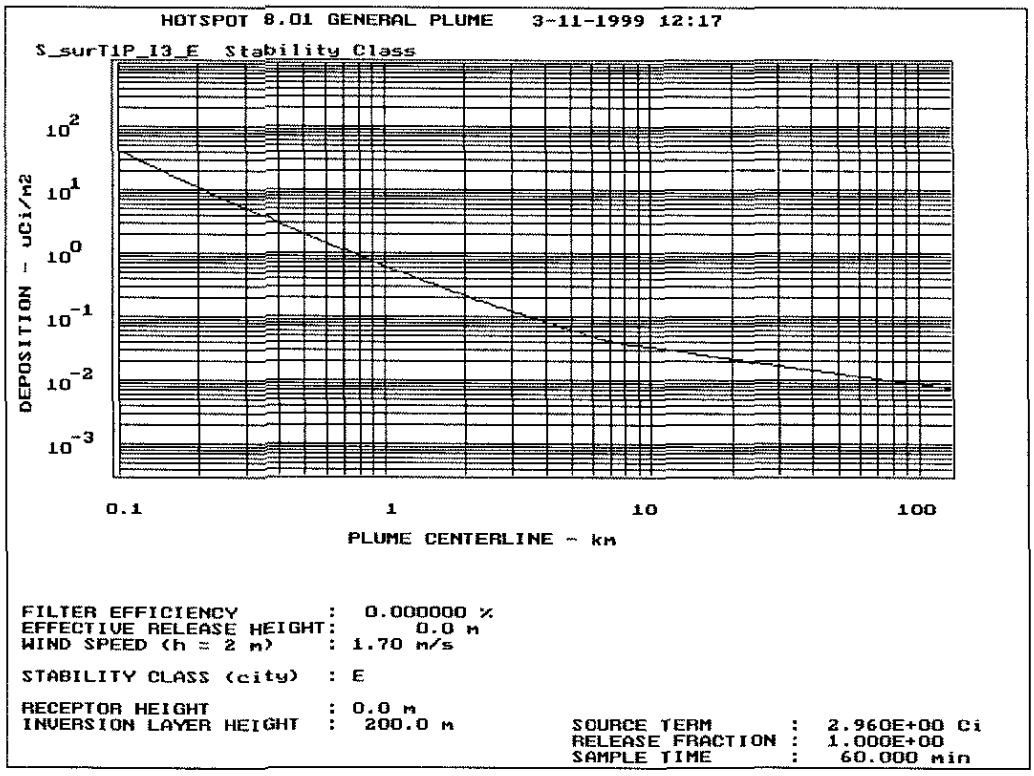

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 9:29
S_surT1P_I1_E Stability Class
CROSSWIND - km
10
0
10
0 10 20 30 40 50 60 70 80 90 100
DOWNWIND - km
INNER Area : 4.0E+00 km2
MIDDLE Area : 5.9E+00 km2
OUTER Area : > 4.5E+02 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.037 MIDDLE: 0.032 OUTER: 0.004
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

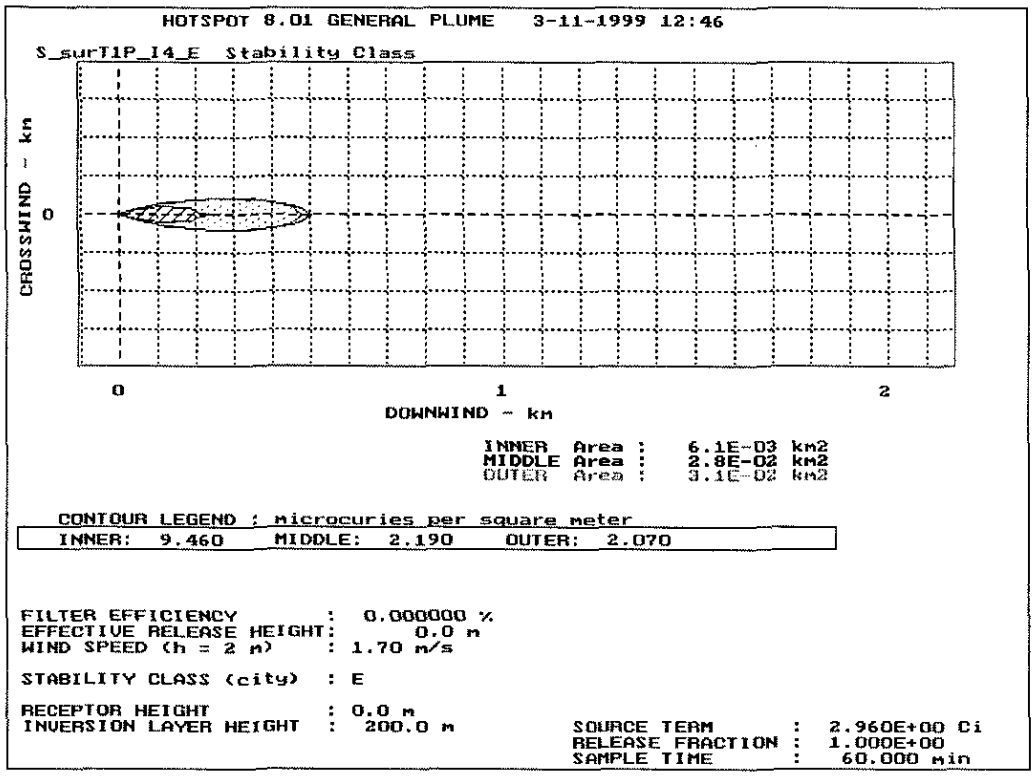

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 9:30
S_surT1P_I1_E Stability Class
DEPOSITION - uCi/m2
10^4
10^3
10^2
10^1
10^0
10^-1
0.01 0.1 1 10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

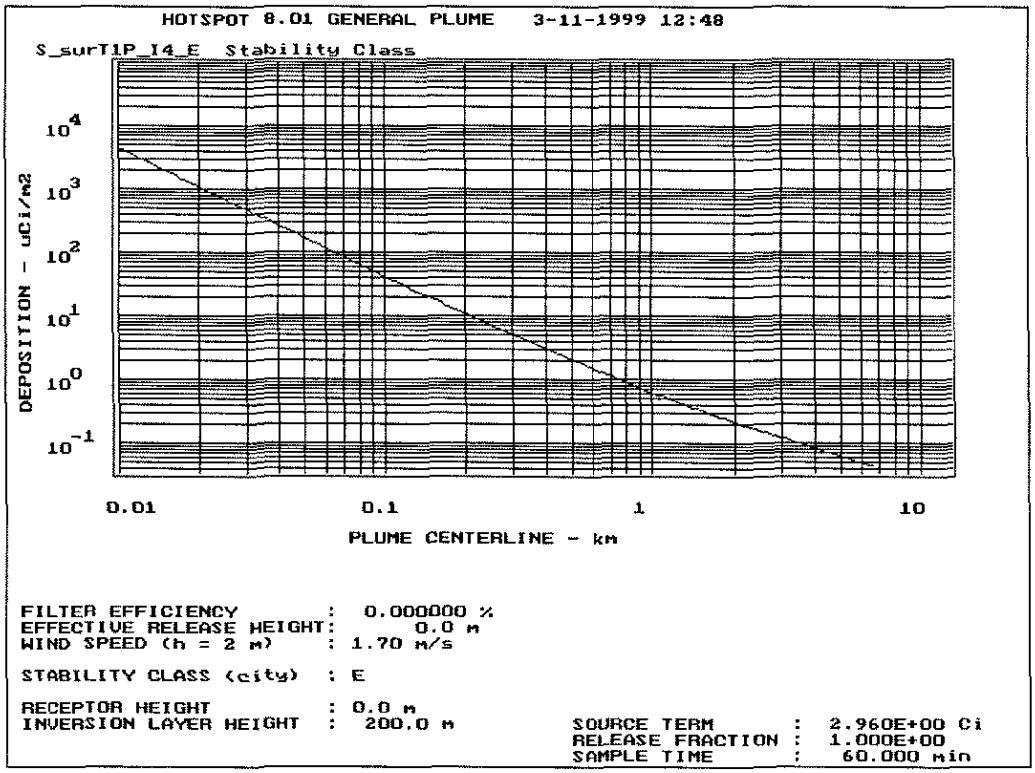

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:39
S_surT1P_I2_E Stability Class
CROSSWIND - km
1
0
1
0 1 2 3 4 5 6 7 8 9
DOWNWIND - km
INNER Area : 4.0E-01 km2
MIDDLE Area : 8.6E-01 km2
OUTER Area : 2.1E+00 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.221 MIDDLE: 0.119 OUTER: 0.061
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

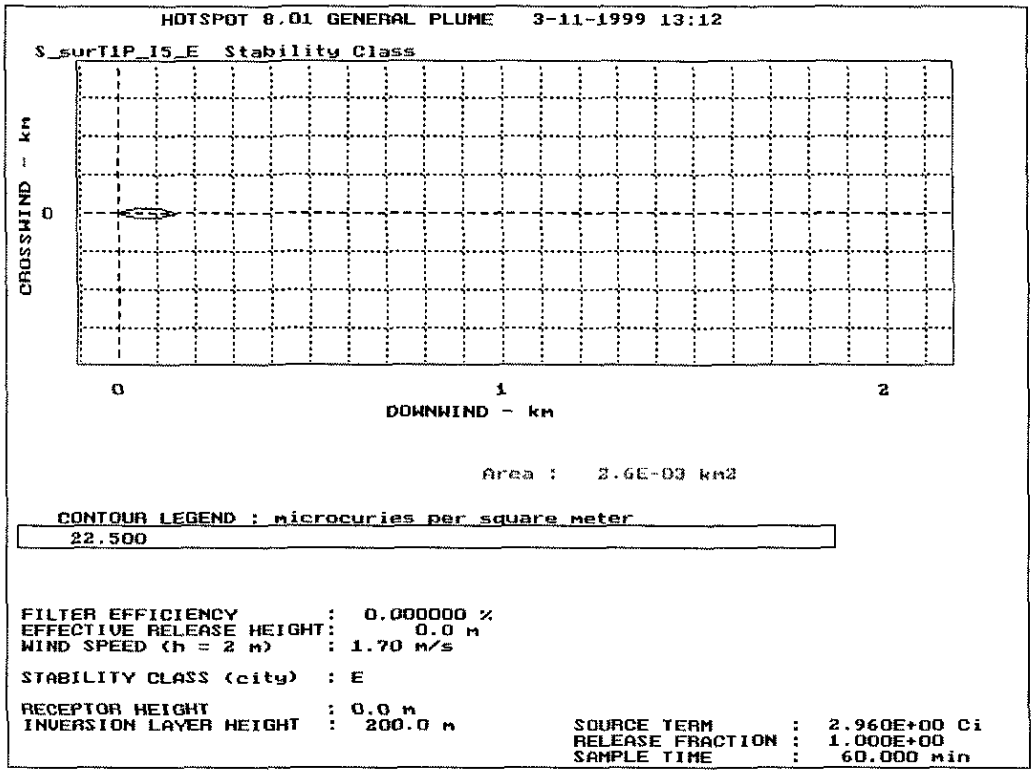

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:40
S_surT1P_I2_E Stability Class
DEPOSITION - uCi/m2
10^2
10^1
10^0
10^-1
10^-2
10^-3
0.1 1 10 100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

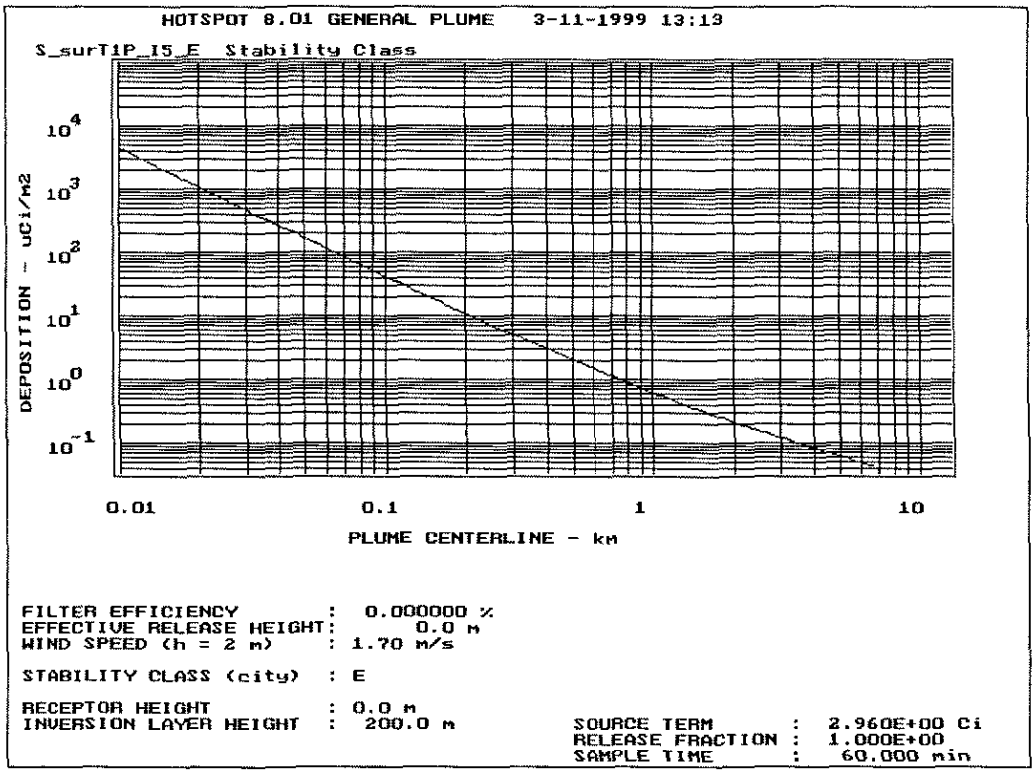

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:17
S_surT1P_I3_E Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 6.0E-02 km2
MIDDLE Area : 1.1E-01 km2
OUTER Area : 3.6E-01 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 1.120 MIDDLE: 0.640 OUTER: 0.241
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:17
S_surT1P_I3_E Stability Class
DEPOSITION - uCi/m2
10^2
10^1
10^0
10^-1
10^-2
10^-3
0.1
1
10
100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:46
S_surT1P_I4_E Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 6.1E-03 km2
MIDDLE Area : 2.8E-02 km2
OUTER Area : 3.1E-02 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 9.460 MIDDLE: 2.190 OUTER: 2.070
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

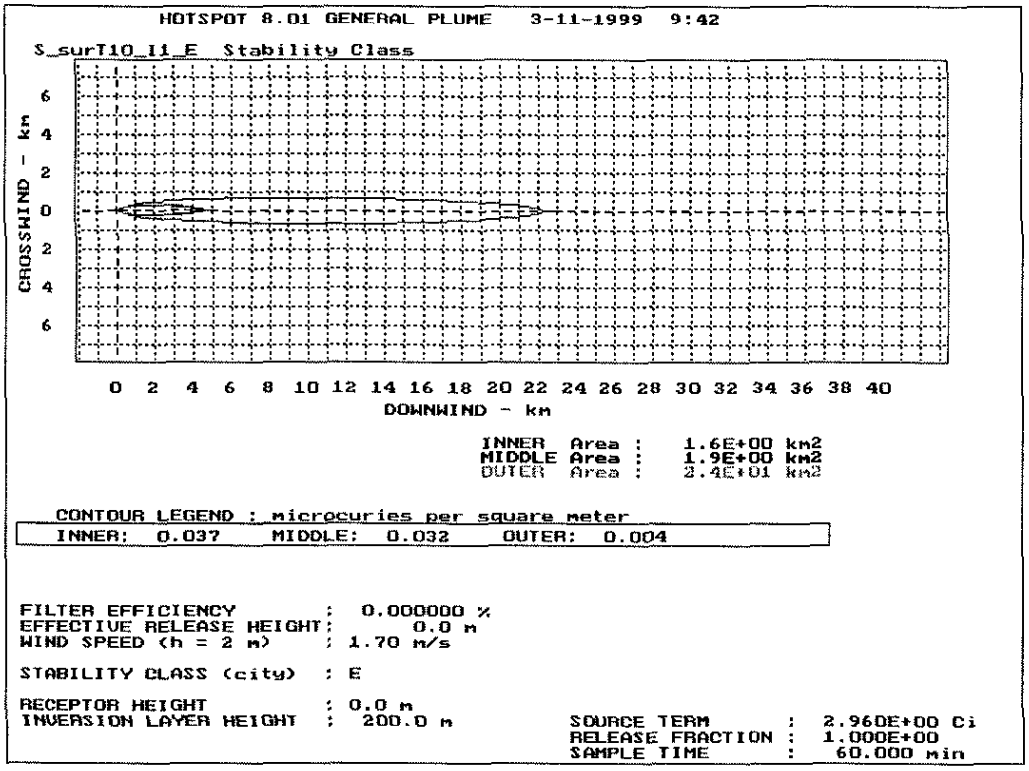

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:48
S_surT1P_I4_E Stability Class
DEPOSITION - uCi/m2
10^4
10^3
10^2
10^1
10^0
10^-1
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

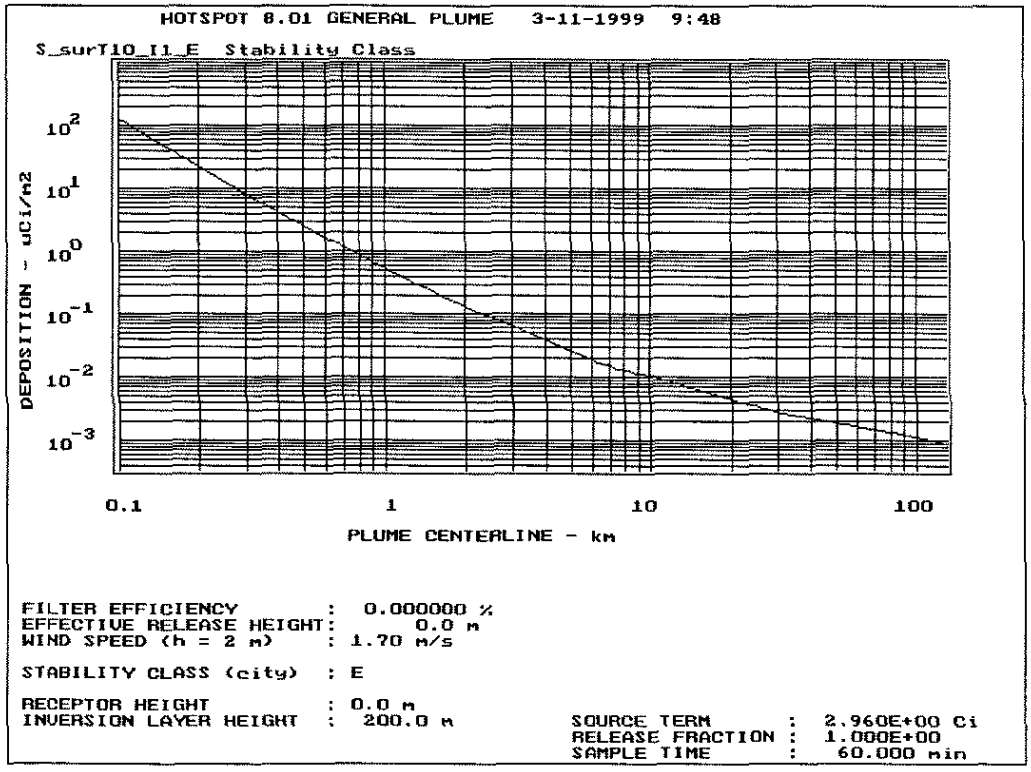

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 13:12
S_surT1P_I5_E Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
Area : 2.6E-03 km2
CONTOUR LEGEND : microcuries per square meter
22.500
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

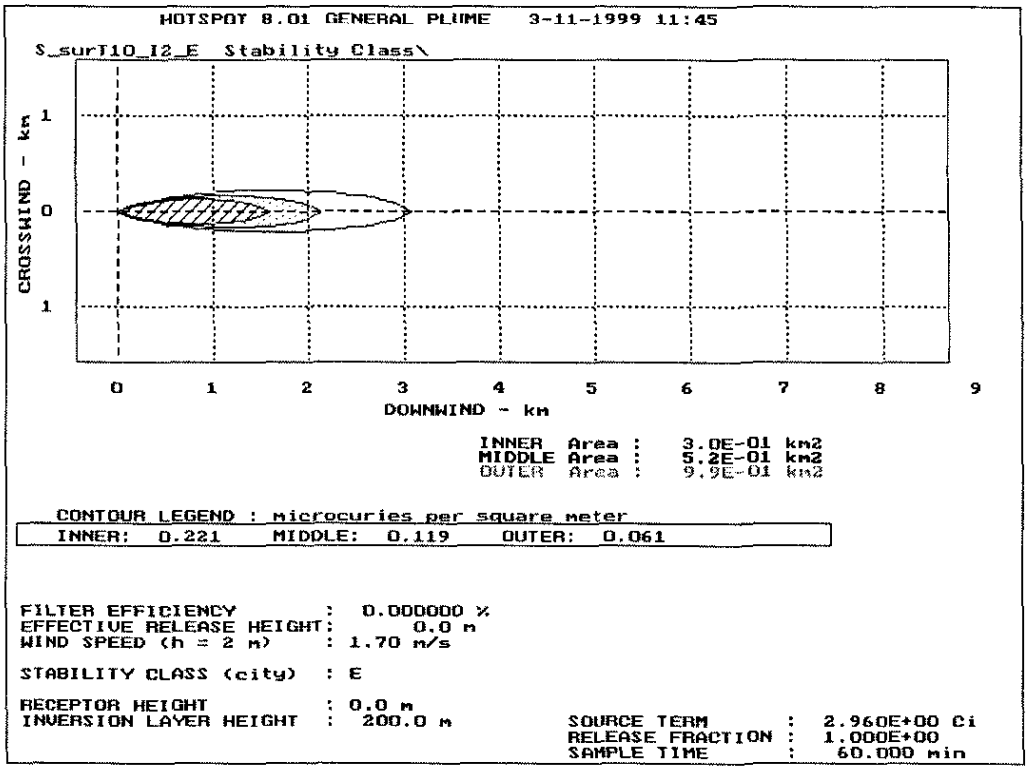

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 13:13
S_surT1P_I5_E Stability Class
DEPOSITION - uCi/m2
10^4
10^3
10^2
10^1
10^0
10^-1
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

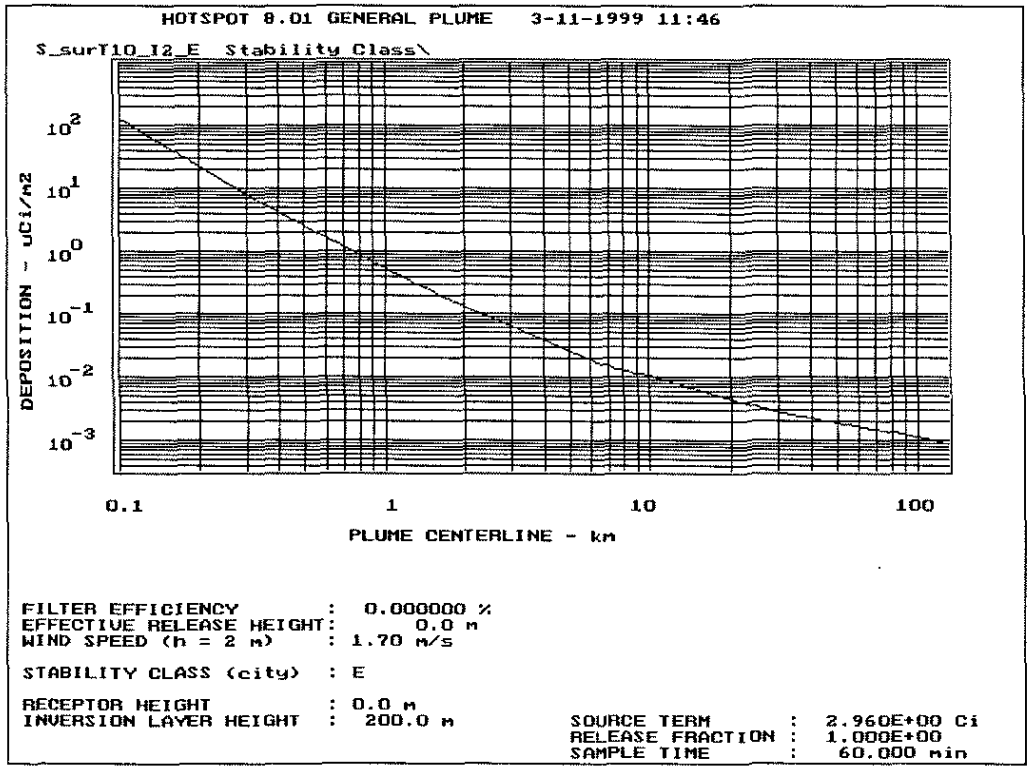
## Attachment W

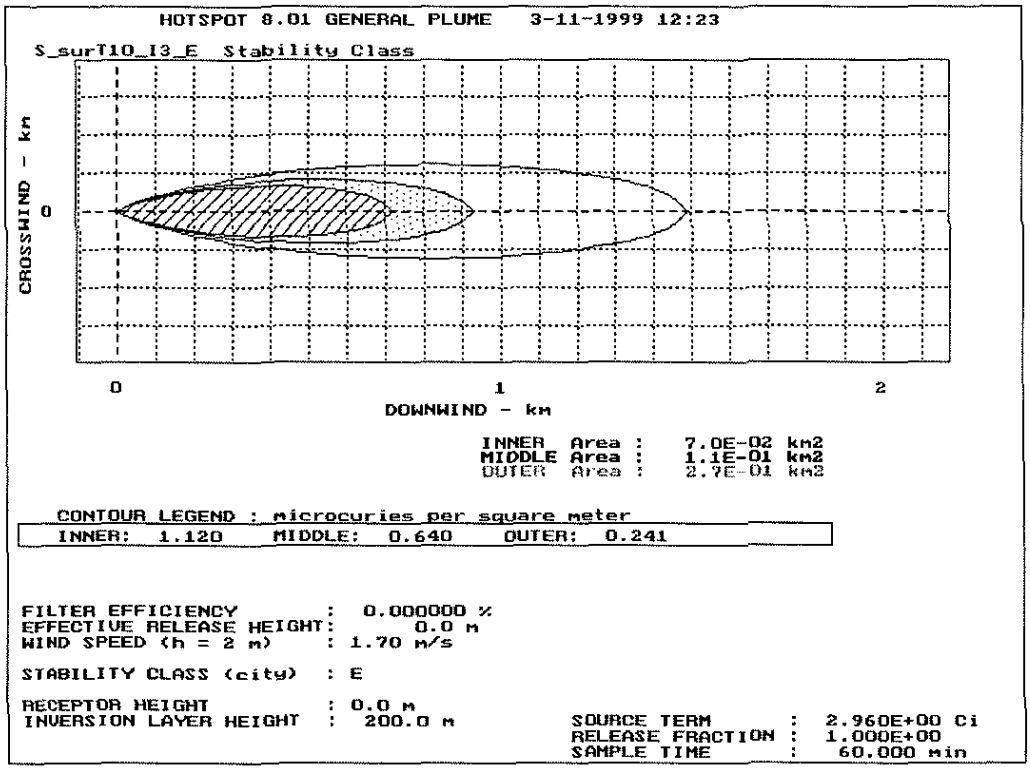
HOTSPOT results - adverse meteorology, 10 cm $s^{-1}$

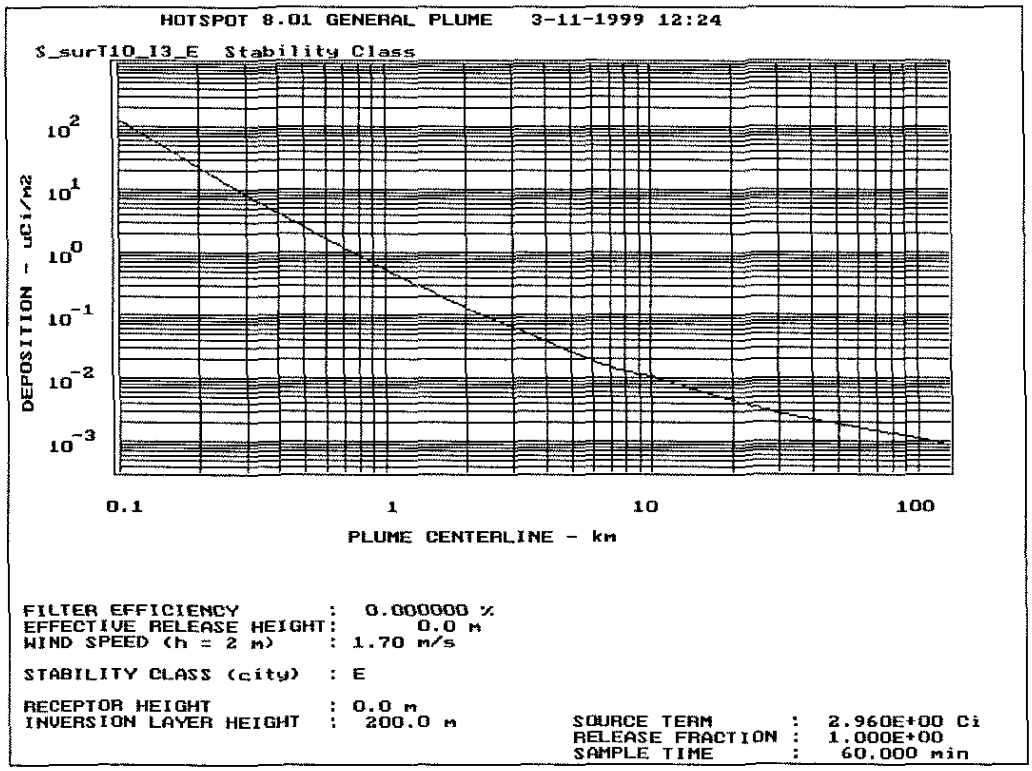

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 9:42
S_surT10_I1_E Stability Class
CROSSWIND - km
6
4
2
0
2
4
6
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40
DOWNWIND - km
INNER Area : 1.6E+00 km2
MIDDLE Area : 1.9E+00 km2
OUTER Area : 2.4E+01 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.037 MIDDLE: 0.032 OUTER: 0.004
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.96DE+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

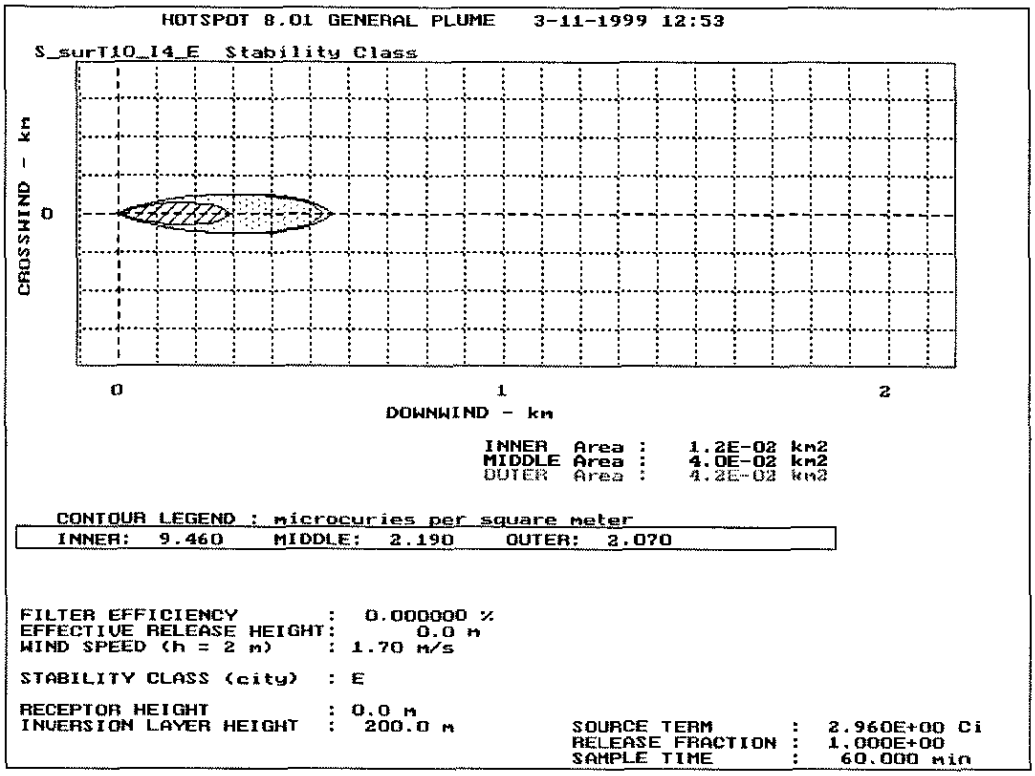

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 9:48
S_surT10_I1_E Stability Class
DEPOSITION - uCi/m2
10^2
10^1
10^0
10^-1
10^-2
10^-3
0.1
1
10
100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

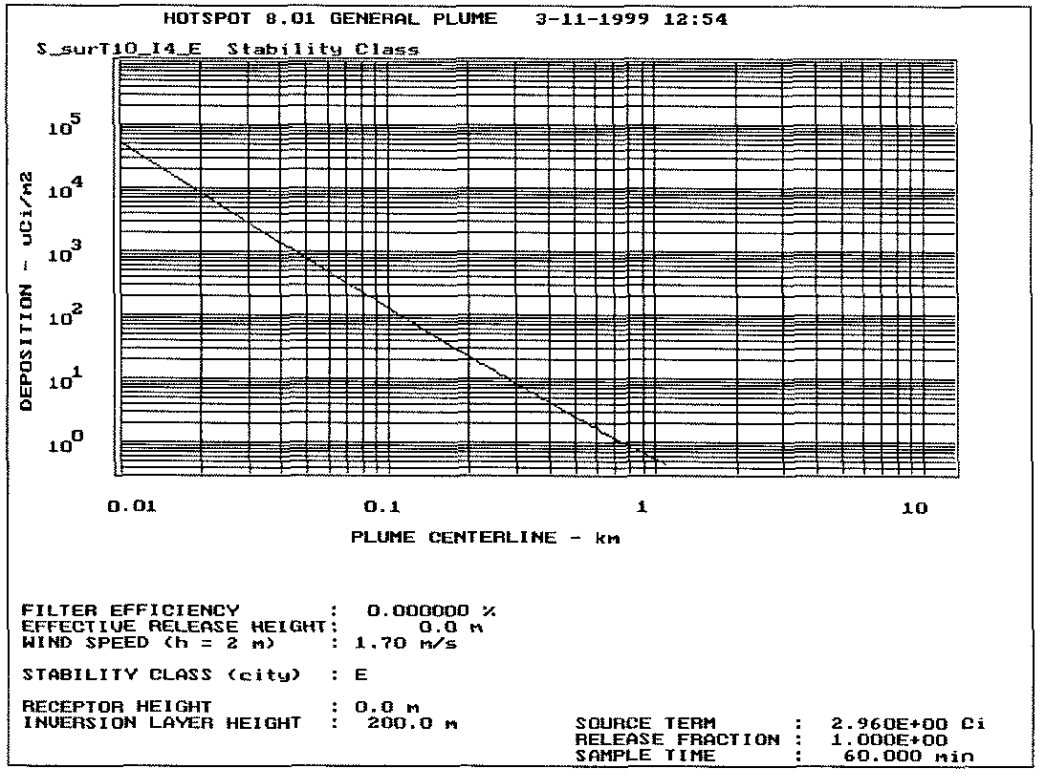

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:45
S_surT10_I2_E Stability Class\
CROSSWIND - km
1
0
1
0 1 2 3 4 5 6 7 8 9
DOWNWIND - km
INNER Area : 3.0E-01 km2
MIDDLE Area : 5.2E-01 km2
OUTER Area : 9.9E-01 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 0.221 MIDDLE: 0.119 OUTER: 0.061
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

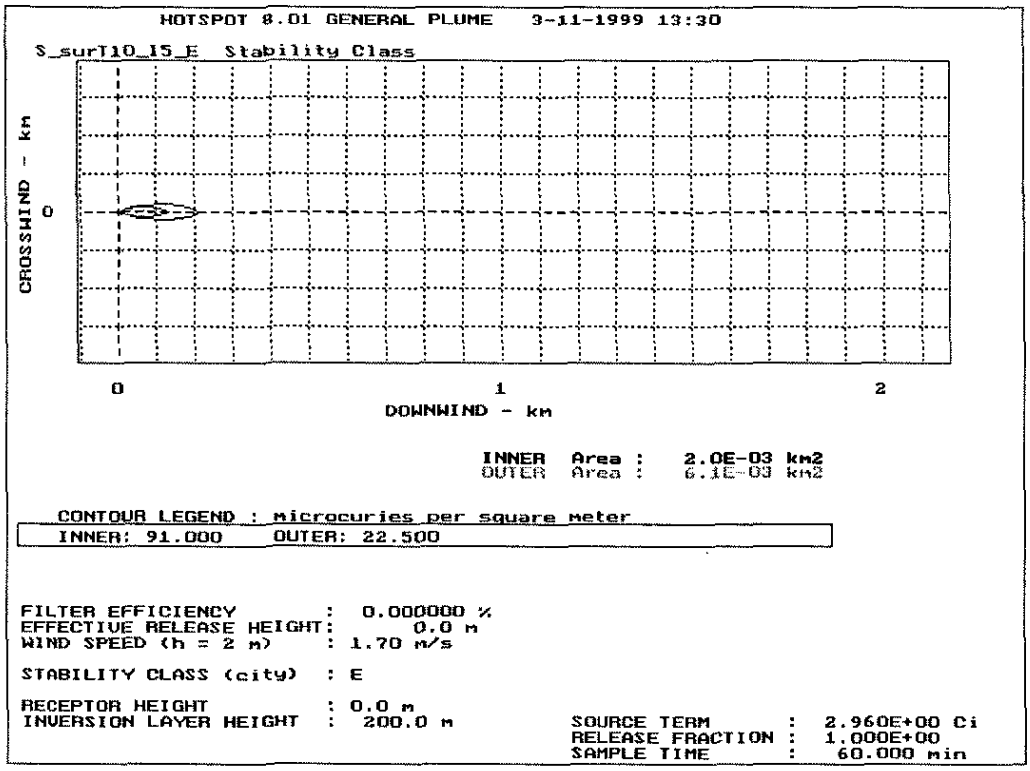

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 11:46
S_surT10_I2_E Stability Class\
DEPOSITION - uCi/m2
10^2
10^1
10^0
10^-1
10^-2
10^-3
0.1 1 10 100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min

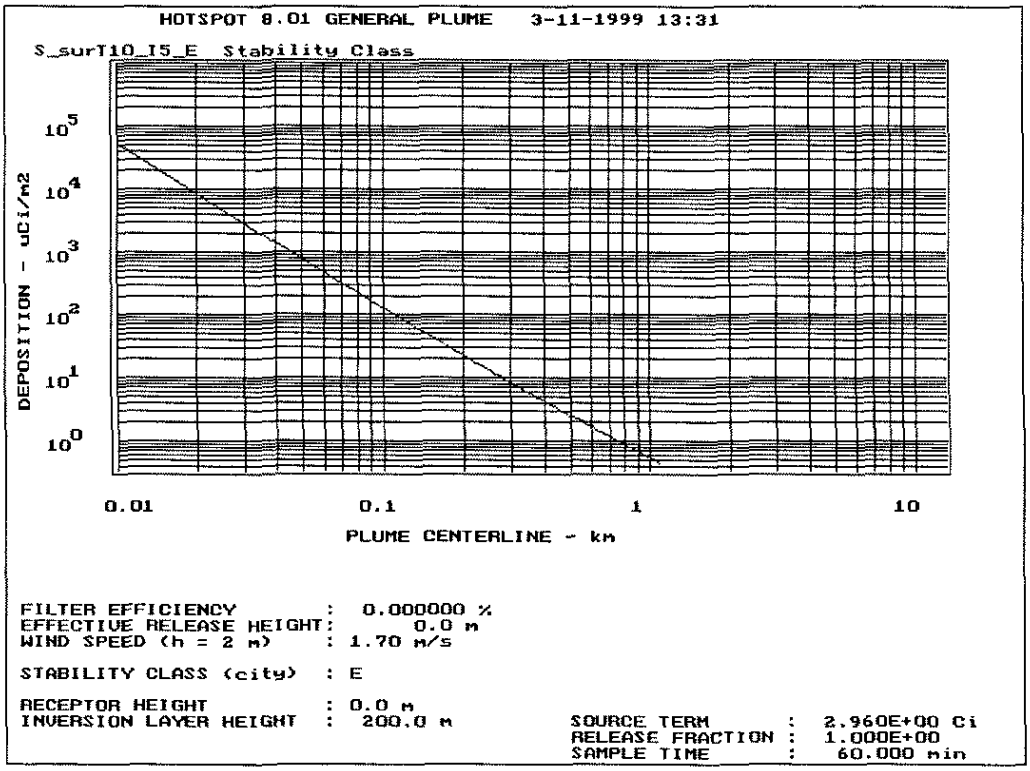

HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:23
S_surT10_I3_E Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 7.0E-02 km2
MIDDLE Area : 1.1E-01 km2
OUTER Area : 2.7E-01 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 1.120 MIDDLE: 0.640 OUTER: 0.241
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:24
S_surT10_I3_E Stability Class
DEPOSITION - uCi/m2
10^2
10^1
10^0
10^-1
10^-2
10^-3
0.1
1
10
100
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:53
S_surT10_I4_E Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 1.2E-02 km2
MIDDLE Area : 4.0E-02 km2
OUTER Area : 4.2E-02 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 9.460 MIDDLE: 2.190 OUTER: 2.070
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 12:54
S_surT10_I4_E Stability Class
DEPOSITION - uCi/m2
10^5
10^4
10^3
10^2
10^1
10^0
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 13:30
S_surT10_I5_E Stability Class
CROSSWIND - km
0
0
1
2
DOWNWIND - km
INNER Area : 2.0E-03 km2
OUTER Area : 6.1E-03 km2
CONTOUR LEGEND : microcuries per square meter
INNER: 91.000 OUTER: 22.500
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min


HOTSPOT 8.01 GENERAL PLUME 3-11-1999 13:31
S_surT10_I5_E Stability Class
DEPOSITION - uCi/m2
10^5
10^4
10^3
10^2
10^1
10^0
0.01
0.1
1
10
PLUME CENTERLINE - km
FILTER EFFICIENCY : 0.000000 %
EFFECTIVE RELEASE HEIGHT: 0.0 m
WIND SPEED (h = 2 m) : 1.70 m/s
STABILITY CLASS (city) : E
RECEPTOR HEIGHT : 0.0 m
INVERSION LAYER HEIGHT : 200.0 m
SOURCE TERM : 2.960E+00 Ci
RELEASE FRACTION : 1.000E+00
SAMPLE TIME : 60.000 min