**Title**: Source Leak Test and Inventory

**Purpose**: This spreadsheet calculates the activity on a wipe used for a sealed source leak test and lets the RSO document the semi-annual sealed source inventory and leak test results. Leak test results that are satisfactory are indicated by the cell turning green; unsatisfactory leak test results are indicated by a red cell.

**Theory**: The “Inventory and leak test” tab calculates the decayed activity of sources entered into inventory using the radioactive decay equation: (). The RSO enters the source information in the first set of cells (Columns A through I) and documents the semi-annual inventory and leak test in the remainder of the columns.

 The “Leak test wipe counting” tab calculates the DPM on a smear wipe, including the effects of background count rate, detector counting efficiency, and counting times. Counting efficiency is determined by dividing the measured count rate (in CPM) of a check source by the calculated decay rate in DPM. The activity on the wipe is calculated by dividing the measured net count rate (the gross count rate minus the background count rate, both in CPM) by the counting efficiency. The results cell (C13) is conditionally formatted so that a result greater than the standard (185 Bq or 11,100 DPM) is indicated by a red cell and a result less than the standard results in a green cell.

**You enter**: In the “Inventory and leak test” tab the RSO enters source information (nuclide, half-life in years, source ID or serial number, source assay date, assayed source activity, and the units of this activity) in the Source Information section of this tab. When each inventory and leak test cycle is completed, the RSO enters his/her initials to indicate the inventory was completed and enters the wipe test DPM in the next column. This column is also conditionally formatted to indicate whether or not the amount of activity is acceptable.

 If you are performing a single check source count, use the middle set of cells to calculate counting efficiency and enter the result in Cell C12 in the “Leak test results” box. If you are performing multiple check source counts, enter each result (up to five counts) in Cells L10-14 in the Counting efficiency (multiple counts) set of cells. The spreadsheet will calculate the average net count rate based on the number of counts that are entered.

**The spreadsheet**:

**The Inventory and Leak Test tab c**alculates the decay constant, the age of the source in years, and the source’s decayed activity (as of the date the spreadsheet is opened).

**The Leak test wipe counting tab** calculates the background radiation count rate in CPM for any counting period. It also calculates the instrument counting efficiency when counting a source of known strength (including correcting for the background count rate), whether performing a single count (of any counting period) or multiple counts, including correcting for decay of the check source. Finally, the spreadsheet uses the net CPM on the leak test and the counting efficiency to determine the amount of contamination on the wipe, and cell formatting changes to reflect whether the results are satisfactory (green) or unsatisfactory (red).

**In addition**: Each individual leak test count can be printed out to document the leak test results; this printout can be included (for example) with shipping papers when transferring sources to other licensees.

Multiple source can be included on a single sheet by copying the calculational cells to additional rows.

 If the activity of your check source is provided in Bq, divide the activity in Bq by 37,000 to convert this to µCi (or divide by 37 to convert kBq to µCi).

 If the activity of your check source is provided in nCi, divide by 1000 to convert to µCi.

 If the activity of your check source is provided in mCi, multiply by 1000 to convert to µCi.

It is important to use a check source with a radiation type and energy similar to that of the source(s) you are leak testing.