



## Radiation Protection

You are here: [EPA Home](#) [Radiation Protection](#) [Programs](#) [Risk Assessment and Federal Guidance](#) [Risk Assessment](#) CAP88 & CAP88 PC

[Students/Teachers](#) [Librarians](#) [Reporters](#) [General Public](#) [Technical Users](#)

[NEWSROOM](#) [PROGRAMS](#) [TOPICS](#) [REFERENCES](#)

**Risk Assessment and Federal Guidance Programs:** [Risk Assessment](#) [Federal Guidance](#)

# Radiation Risk Assessment Software: CAP88 and CAP88 PC

[Get e-mail updates when updates are available.](#)

**CAP-88**

### On this page:

#### Downloads:

[Version 3.0](#) (Updated )  
[Version 2.1](#)  
[Version 2.0](#)  
[Version 1.0](#)  
[CAP88 Mainframe](#)  
[Hardware Requirements](#)

[Main Page](#)  
[Risk Assessment](#)  
[Frequent Questions](#)  
[About CAP-88](#)  
[NESHAPs Models](#)

You may use any of the three versions of CAP-88 for enforcement purposes. To allow for updates and refinement of the software, Subpart H of 40 CFR Part 61 does not specify any version. However, because Version 3 incorporates the latest science and is more versatile than the older versions, it is recommended. Please note that, as with most models, version 3 has been modified to eliminate errors discovered by the user community. This process is expected to continue.

The new progeny and time step length option allow the user to significantly speed up the buildup factor calculation for cases involving long decay chains. Users are strongly advised to download the new user manual accompanying this version for more information regarding the use of these new options.

You will need Adobe Reader to view some of the files on this page. See [EPA's PDF page](#) to learn more.

### Version 3.0 - Release with Federal Guidance 13 Data and Full Buildup Factor Generation (11/29/06)

[CAP88 Version 3 \(12/09/07\) \(ZIP\)](#) (26,292Kb)

The *December 09, 2007* version makes screen and printer fonts identical for output files in CAP88-PC. It also fixes an indexing problem, which caused the organ index number and the organ dose factor index number to be different in some cases. Neither of these modifications change the environmental concentrations or TEDE values calculated by CAP88-PC.

The user guide has been updated to reflect these changes, and to offer additional guidance on the use of the chain length option.

The *October 13, 2007* release adds selectable progeny and time step lengths to the buildup factor calculation, and changes the annual removal rate in the calculation to 2% from 2.5% to conform with the information in the version 1 user manual. It also modifies the tritium dose calculation for vapor and organic forms based on the recommendations from LLNL. The half-life values in the database for this release have been fully checked against the values in the 8th Edition of the Table of Isotopes.

The *March 15, 2007* update fixes an error in the population file editor that was causing the editor to crash in some systems. This error does not affect any code results. It is a modification of the November 29, 2006 version.

The *November 29, 2006* version fixes a bug in the DEFAULT checking routine that improperly compared the scavenging rates when a non-integer precipitation rate was entered. This issue had no measurable effect on the code results. (Reinstalling should preserve old cases.)

### Supplemental Information

[Notes on Buildup Factor Method for Release versions March 17, 2006 and later \(PDF\)](#)  
(1pp, 10Kb)

[CAP88 PC Version 3.0 \(Draft\) Introductory Slide Show \(PDF\)](#) (35pp, 336Kb)

[Installation Instructions \(PDF\)](#) (3pp, 109Kb)

[User's Guide \(12/09/07\) \(PDF\)](#) (210pp, 1.51Mb)

[Interactive Video/Audio Training \(self-extracting ZIP\)](#) (10,196 Kb [\[about zip format\]](#) ),  
November 2005

---

### Version 2.1

[CAP88 PC-Version 2.1\(Updated Beta Version\) \(ZIP\)](#) (26,494 Kb [\[about zip format\]](#) )

[Installation Instructions \(PDF\)](#) (15pp, 293Kb)

[What's New in Version 2.1 \(PDF\)](#) (8pp, 116Kb)

[User's Guide \(PDF\)](#) (67pp, 726Kb)

---

### Version 2.0

CAP88-PC version 2.0 is a Windows version of CAP88-PC. Version 2.0 includes some minor changes compared to the DOS version. These changes include:

addition of decay chains for six radionuclides

Strontium Chain (SR-90/Y-90)

Zirconium Chain (ZR-95/NB-95)

Ruthenium 103 Chain (RU-103/RH-103M)

Ruthenium 106 Chain (RU-106/RH-106)

Cerium Chain (CE-144/PR-144)

Plutonium (PU-241/AM-241)

corrects a minor error in the Uranium decay chain;

corrects a typographical error in the concentration reports.

EPA has approved use of CAP88-PC version 2.0 for demonstrating compliance with [40 CFR 61.93 \(a\) NESHAPs subpart H-emissions of Radionuclides Other than Radon from Department of Energy Facilities](#).

[CAP88 PC-Version 2.0 \(ZIP\)](#) (3842Kb [\[about zip format\]](#) )

[Y2K Patch \(ZIP\)](#) (114Kb [\[about zip format\]](#) )

[User's Guide \(Updated\) \(PDF\)](#) (148pp, 1.3Mb)

[Special Instructions for Windows 95 and higher installation](#) Read before you install.

[Approval Memo \(PDF\)](#) (2pp,170Kb)

[CAP88 PC Web Training \(PDF\)](#) (32pp, 296Kb)

### Special Installation Instructions for Version 2.0

CAP88-PC v2.0 will NOT run under WindowsXP or WindowsNT. It will run under Windows95 - Windows2000 if installed following special instructions that compensate for the more limited file recognition capabilities of Windows 3.1 used to develop CAP88-PC v2.0. Windows95-2000 will automatically install it in the directory "c:\Program files\", which has more than the eight characters CAP88-PC v2.0 can recognize.

To install the program correctly, follow these instructions:

1. click on the C2.EXE file to download, and save it to your c:\ drive.
2. Open Windows Explorer, and double click on the C2.EXE file. The "Welcome" dialogue box will appear and ask if you want to install the program.
3. Click "OK."
4. When the "Select Destination Directory" dialog box appears, change the path:  
*from:* c:\Program Files\CAP88PC2  
*to:* c:\CAP88PC2
5. Click "OK."
6. Follow the directions in the succeeding dialogue boxes to complete installation of the program.
7. Before running the program for the first time, download and execute the "[Y2K/Windows95 patch.](#)"

---

### Version 1.0

CAP88-PC version 1.0 is a personal computer software system used for calculating dose and risk from annual average releases of radionuclides to the air. CAP88-PC version 1.0 is a DOS based software and is approved for demonstrating compliance with 40 CFR 61.93 (a).

[CAP88 PC-Version 1.0 \(DOS\) \(ZIP\)](#) (1042Kb [\[about zip format\]](#) )

[Installation Instructions](#)

[User's Guide \(PDF\)](#) (255pp, 3Mb)

---

### CAP88 Mainframe

[User's Manual Version 1.0](#)

Further information on models may be obtained by accessing [Risk Assessment](#)

---

### Hardware Requirements

The following is a description of the computer hardware which will be required to use this software.

DOS (Disk Operating System) version 2.0 or higher

IBM PC or compatible

At least 640K RAM with a minimum of 500K free (the memory required for CAP88-PC to complete an assessment may vary from machine to machine and more complex assessments may require more available RAM.)

Hard disk drive.

A parallel communications port (used for printer IO)

EGA or VGA color monitor

Any parallel printer compatible with the system and connected to LPT1. Other printers may work, but we cannot guarantee the results.

Understanding Radiation in Your Life, Your World

[Newsroom](#) · [Programs](#) · [Topics](#) · [References](#)