**PACKAGE ID -** 000608IBMPC00 RSAC-5.1

**KWIC TITLE -** Radiological Safety Analysis Computer Program

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**LIMITATION CODE -**COPY **AUDIENCE CODE -** LIM

**COMPLETION DATE -** 08/09/1993 **PUBLICATION DATE -** 02/01/1994

**DESCRIPTION -** RSAC-5.1 calculates the consequences of the release of radionuclides to the atmosphere. Running on a personal computer with a math co-processor, it models the source term from a nuclear event, including generation of fission product inventory from either reactor operating history or criticality events. Users can also input individual nuclides. Source term modelling allows for complete progeny ingrowth and decay during all accident phases. RSAC-5.1 release scenario modelling allows fractionation by chemical group or element and calculates decay and ingrowth during transport through processes, facilities and environment. RSAC-5.1 models the effect of HEPA filters or other clean-up systems. It simulates release through linear or exponential models. RSAC-5.1 meteorological capabilities include Gaussian plume diffusion for Pascal-Gifford, Hilsmeier-Gifford, and Markee models. A unique capability is the ability to model Class F fumigation conditions. Optionally, users supply sigmas or x/Qs to the code as input data. RSAC-5.1 also includes corrections for plume rise and building wake. Calculation of dose can be performed for pathways, including inhalation, ingestion, ground surface, air immersion, water immersion and cloud gamma dose from semi-infinite plume models and finite plume models. A fifty mile population dose, including Regulatory Guide 1.109 modeling, is also available. RSAC-5.1 has been subjected to extensive validation and verification consistent with its historical use for safety related calculations in support of safety analysis reports.

**PACKAGE CONTENTS -** Media Directory; Software Abstract; WINCO-1123 Rev 1; Media Includes Object Library, Eexcutable Module, Sample Problem Input and Output;

**SOURCE CODE INCLUDED? -** No

**MEDIA QUANTITY -** 1 3.5 Diskette

**METHOD OF SOLUTION -** Current consensus models have been used for meteorological diffusion and dose calculations.

**COMPUTER -** IBM PC

**OPERATING SYSTEMS -** DOS with a math co-processor

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**PROGRAMMING LANGUAGES -** RSAC-5.1 FortranIV, RSAC+ Clarion Professional

**SOFTWARE LIMITATIONS -** Both conventional memory and extended memory versions are included. The extended memory version requires users to properly set up their CONFIG.SYS file.

**SOURCE CODE AVAILABLE (Y/N) -** N

**UNIQUE FEATURES -** RSAC-5.1 has undergone extensive verification and validation. RSAC-5.1 is the only computer program that models all aspects of a release to the atmosphere from source term generation to downwind dose.

**RELATED SOFTWARE -** In conjunction with RSAC-5.1, a user friendly interface called RSAC+, was developed. RSAC+ allows easy modification and storing inputs in a database. RSAC+ is written in a fourth generation database language and runs on any PC which supports the RSAC-5.1 code. With RSAC+, a user can take input files and easily modify them. It also permits sets of instructions to the RSAC-5.1 code to be inserted, edited, copied, moved or deleted. RSAC+ stores each problem set in a unique file distinguished with a unique extension. RSAC+ checks all fields to assure that data is in range for the given variable and that consistency in an input series is maintained. RSAC-5.1 is issued with RSAC+. A companion program, RSAC+EP (for Emergency Preparedness) is nearing completion. It is written in C, for transportability from DOS to UNIX.

**OTHER PROG/OPER SYS INFO -** While RSAC+ is provided to prepare RSAC-5.1 input files, users can run RSAC-5.1 directly from ASCII files. SOURCE CODE NOT INCLUDED.

**HARDWARE REQS -** RSAC-5.1 runs under the PC DOS environment. RSAC-5.1 requires a minimum of 400K of conventional memory. RSAC+ requires a minimum of 430K of conventional memory; however, additional memory equivalent to the size of any browsed files is also required.

**TIME REQUIREMENTS -** The time required to execute RSAC-5.1 is totally dependant on the complexity of the run and the speed of the PC being used. Simple runs require as little as a fraction of a second while very complex runs may require in excess of five minutes to run.

**REFERENCES -** D.R. Wenzel, The Radiological Safety Analysis Computer Program (RSAC-5), WINCO-1123 Revision 1, February 1994.

**ABSTRACT STATUS -** Submitted September 1993. Due to no source code being provided, released AS-IS September 30, 1993.

**SUBJECT CLASS CODE -** G

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**KEYWORDS -**
COMPUTER PROGRAM DOCUMENTATION
R CODES
RADIONUCLIDE MIGRATION
BUILDUP
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CLOUDS
COMPUTER CALCULATIONS
COMPUTER CODES
DAUGHTER PRODUCTS
DECAY
DIFFUSION
DOSE COMMITMENTS
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ISOTOPES
PLUMES
POINT KERNELS
RADIATION ACCIDENTS
RADIATION DOSES
RADIOACTIVITY TRANSPORT
REACTOR ACCIDENTS
YIELDS

**EDB SUBJECT CATEGORIES -**
990200 540130

**SPONSOR -** DOE/RW

**PACKAGE TYPE -** AS - IS