

**PACKAGE ID** - 000207I036000 ATM

**KWIC TITLE** - Atmospheric Transport & Diffusion Model

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**LIMITATION CODE** - UNL                    **AUDIENCE CODE** - UNL

**COMPLETION DATE** - 09/01/1978    **PUBLICATION DATE** - 10/01/1977

**DESCRIPTION** - ATM can be used to estimate the transport of a pollutant from an emitting source to some receptor point. It is based on a Gaussian plume model and is capable of calculating wet and dry deposition and air concentration of non-radioactive pollutants at various receptor points located within 50 kilometers of a source or sources. The model can treat point, area, and line sources, including wind blown sources. The use of either the Pasquill Gifford or the Briggs Smith dispersion parameters can be specified.

**PACKAGE CONTENTS** - Media Directory; Software Abstract; ORNL/NSF/EATC-17 & Errata; Media Includes Source Code, Sample Problem;

**SOURCE CODE INCLUDED?** - Yes

**MEDIA QUANTITY** - 1 CD Rom

**METHOD OF SOLUTION** - This program uses a Gaussian plume formalism, incorporating plume depletion via wetfall and dryfall processes, for multiple sources and multiple receptor points.

**COMPUTER** - IBM360

**OPERATING SYSTEMS** - OS/360; OS/370

**PROGRAMMING LANGUAGES** - FORTRAN IV (96%) and BAL (4%)

**SOFTWARE LIMITATIONS** - Current storage allocation of the program allows maxima of, 10 receptor points, 14 time periods, 10 each of point, area, and line sources and 5 pollutants. The wind rose data must have 16 directions, a maximum of 7 stabilities, and a maximum of 8 wind speeds.

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

**UNIQUE FEATURES** - The model includes the effect of aerodynamic roughness on dispersion constants, incorporates a tilting plume for heavy particulates, and includes an episodic calculation for exposure maxima. The depth of the plume is specified so as not to

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**UNIQUE FEATURES - (CONT)** exceed that of the planetary boundary layer.

**RELATED SOFTWARE** - The model can be coupled to the Wisconsin Hydrologic Transport Model, WHTM, to provide estimates of input wetfall and dryfall depositions.

**OTHER PROG/OPER SYS INFO** - Input is assigned logical unit 50, print output on logical unit 51 and punch output on logical unit 7.

**HARDWARE REQS** - 210K bytes of storage are used with a unit for input and output printer and punch units.

**TIME REQUIREMENTS** - A test case involving a single source, 2 pollutants, 4 time periods and 8 receptor points requires approximately 40 seconds of CPU time on the IBM360/91.

**REFERENCES** - W.M. Culkowski and M.R. Patterson, A Comprehensive Atmospheric Transport and Diffusion Model, ORNL/NSF/EATC-17, April 1976 with Errata, October 1977.

**ABSTRACT STATUS** - Abstract first distributed October 1978. IBM360 version submitted October 1977, sample problem executed by NESC September 1978 on an IBM370/195.

**SUBJECT CLASS CODE** - R

**KEYWORDS** -

COMPUTER PROGRAM DOCUMENTATION  
A CODES  
ENVIRONMENTAL TRANSPORT  
AIR POLLUTION  
DIFFUSION  
ENVIRONMENTAL IMPACTS  
POWER PLANTS  
METEOROLOGY  
PLUMES  
AEROSOLS  
EARTH ATMOSPHERE  
HEALTH HAZARDS  
FORECASTING  
SULFUR DIOXIDE

**EDB SUBJECT CATEGORIES** -  
990200 540120

**SPONSOR** - DOE/ER

**PACKAGE TYPE** - TESTED