

**PACKAGE ID** - 000299D870000 FRACFLO

**KWIC TITLE** - Two-Dimensional Ground Water Transport

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

**COMPLETION DATE** - 04/01/1991   **PUBLICATION DATE** - 07/01/1990

**DESCRIPTION** - FRACFLO computes the two-dimensional, space, time dependent, convective dispersive transport of a single radionuclide in an unbounded single or multiple parallel fracture system with constant aperture. It calculates the one-dimensional diffusive transport into the rock matrix as well as the mass flux and cumulative mass flux at any point in the fracture. Steady-state isothermal ground water flow and parallel streamlines are assumed in the fracture, and the rock matrix is considered to be fully saturated with immobile water. The model can treat a single or multiple finite patch source or a Gaussian distributed source subject to a step or band release mode.

**PACKAGE CONTENTS** - NESC Note; Software Abstract; BMI/OWTD-5; BMI/OWTD-6; Media Includes Source, Sample Problems; Control Information, Auxiliary Information, Auxiliary Programs;

**SOURCE CODE INCLUDED?** - Yes

**MEDIA QUANTITY** - 1 CD Rom

**METHOD OF SOLUTION** - Analytical solutions for the transient advective, dispersive transport of a single radionuclide through fractures (two-dimensional analysis) and rock (one-dimensional analysis) are based on Laplace and Fourier transformation techniques and a Gauss-Legendre integration scheme.

**COMPUTER** - DEC VAX8700

**OPERATING SYSTEMS** - VMS 5.0.

**PROGRAMMING LANGUAGES** - VAX FORTRAN

**SOFTWARE LIMITATIONS** - The flow field is assumed to be semi-infinite in the horizontal direction normal to the source, and of either finite or infinite extent in the vertical direction orthogonal to the source. The initial concentration in both the fracture and the rock is assumed to be zero.

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

**RELATED SOFTWARE** - MASCOT simulates a radionuclide decay chain in a fracture of unit thickness where diffusion into the rock matrix is

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**RELATED SOFTWARE - (CONT)** ignored.

**OTHER PROG/OPER SYS INFO** - The FRACGRF and FRACGRF2D postprocessors use the proprietary CA-DISSPLA 10.5 software to produce graphical results. FRACFLO must be compiled using the G FLOATING compiler option, which implements extended-range floating-point arithmetic. Other non-standard FORTRAN 77 features include extended-length variable names, the END DO statement, and calls to system DATE and TIME routines.

**REFERENCES** - A. Berge Gureghian, FRACFLO: Analytical Solutions for Two-Dimensional Transport of a Decaying Species in a Discrete Planar Fracture and Equidistant Multiple Parallel Fractures with Rock Matrix Diffusion, BMI/OWTD-5, July, 1990; A. Berge Gureghian, FRACFLO User's Guide: Version 1.1 for FRACFLO, Analytical Solutions for Two-Dimensional Transport of a Decaying Species in a Discrete Planar Fracture and Equidistant Multiple Parallel Fractures with Rock Matrix Diffusion, BMI/OWTD-6, July 1990; FRACFLO, NESC No. 9411, FRACFLO Tape Description, National Energy Software Center Note 91-72, April 30, 1991.

**ABSTRACT STATUS** - Abstract first distributed April 1991. DEC VAX version submitted August 1990.

**SUBJECT CLASS CODE** - R

**KEYWORDS** -

COMPUTER PROGRAM DOCUMENTATION  
F CODES  
TWO-DIMENSIONAL CALCULATIONS  
TIME DEPENDENCE  
RADIONUCLIDE MIGRATION  
GROUND WATER  
RADIOACTIVITY TRANSPORT  
ENVIRONMENTAL TRANSPORT  
CONVECTION  
DISPERSIONS  
DECAY  
ROCK-FLUID INTERACTIONS  
HIGH-LEVEL RADIOACTIVE WASTES  
RADIOACTIVE WASTE MANAGEMENT

**EDB SUBJECT CATEGORIES** -

990200 540230

**SPONSOR** - DOE/RW

**PACKAGE TYPE** - SCREENED