PACKAGE ID - 000191MLTPL00 RELAP5/MOD3.2*

KWIC TITLE - Modeling Reactor Coolant Systems
Thermal-Hydraulic Transients

AUTHORS - RELAP5 development team
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LIMITATION CODE -UNL **AUDIENCE CODE -** UNL

COMPLETION DATE - 09/15/1995 **PUBLICATION DATE -** 09/15/1995

DESCRIPTION - RELAP5/MOD3.2* is used to model reactor coolant systems during postulated accidents. The code models the coupled behavior of the reactor coolant system and the core for loss-of-coolant accidents and operational transients such as anticipated transients without scram, loss of offsite power, loss of feedwater, and loss of flow. A generic modeling approach is used that permits simulating a variety of thermal-hydraulic systems. Control system and secondary system components are included to allow modeling of the plant controls, turbines, condensers, and secondary feedwater systems.

PACKAGE CONTENTS - Media Directory; Software Abstract; Media Includes Source Code, User's Guide, Sample Problem Input Data;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 2 CD Rom

METHOD OF SOLUTION - RELAP5/MOD3.2* uses a nonhomogenous and non equilibrium six-equation model to describe the steam-water mixture (i.e., mass conservation, energy conservation, and momentum conservation for each phase). Constitutive relations, in the form of algebraic expressions are used to model wall heat transfer, wall friction, interfacial drag, and interfacial heat and mass transfer. The conservation equations are solved using a partiall implicit numercial scheme to permit fast execution speeds.

COMPUTER - MLT-PLTFM

OPERATING SYSTEMS - Computer dependent

PROGRAMMING LANGUAGES - FORTRAN 77 with mil-spec extensions

SOFTWARE LIMITATIONS - RELAP5/MOD3.2* is a very general code, and therefore has very few limitations. It has been designed to model reactor behavior during accidents, but not to the point of core damage. From a practical standpoint, limits on the number of components (i.e., control volumes, junctions, heat structures, etc.) is more often dictated by maintaining a reasonable execution time than by internal code limits.

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SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - RELAP5/MOD3.2* features a fully integrated multi-dimensional hydrodynamic and kinetics modeling capability. The code benefits from its broad validation history and extensive user base.

RELATED SOFTWARE - The code package comes with scripts (files of O/S commands which are used for installing and developing the code. Two companion codes, XMGR5* (ESTSC 001328MLTPL00) and the Nuclear Plant Analyzer (ESTSC 001329MLTPL00) can be used to engance the interpretation of RELAP5/MOD3.2* output. XMGR5* is a plotting program that reads the plot/restart file generated by RELAP5/MOD3.2*. The NPA provides a graphical depiction of reactor transient behavior by translating coolant conditions into colors displayed on a user designed, two-dimensional representation of the coolant system.

OTHER PROG/OPER SYS INFO - File naming conventions used in RELAP5/MOD3.2* are as follows: file.F Source code prior to preprocessing (which prepares the code for a specific machine and operating system), file.H Include cooling prior to preprocessing, file.f Source code after preprocessing, file.h Include coding after preprocessing, file.i Input deck, tpffile material property file (e.g. tpfh2o for water). After installation certain files exist that are machine specific: file.o Object files, file.a library of object files, file.x executable files.

TIME REQUIREMENTS - Variable, depending upon problem size and simulation time.

ABSTRACT STATUS - Released AS-IS 3/14/2000

SUBJECT CLASS CODE - GH

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
R CODES
REACTORS

EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE/DP

PACKAGE TYPE - AS - IS