

PACKAGE ID - 000728SPARC00 MELT-IIIB

KWIC TITLE - Fast Reactor Transient Overpower Study

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

COMPLETION DATE - 07/01/1997 **PUBLICATION DATE** - 07/01/1997

DESCRIPTION - MELTIIIB is a multichannel, neutronics, thermal-hydraulics digital computer program developed to investigate the transient behavior of a fast reactor during postulated transient overpower conditions. Reactivity feedback resulting from Doppler broadening, coolant density change and expulsion, bulk core expansion, and fuel movement are explicitly taken into account. The bulk of the modeling detail has been addressed to the in-vessel portion of the reactor plant, although the friction and inertial aspects of up to three separate closed primary loops can be simulated. A wide variety of accident conditions may be investigated. Particular modeling emphasis has, however, been placed on the simulation capabilities required for an unprotected transient overpower accident sequence.

PACKAGE CONTENTS - Media Directory; Software Abstract; Code Changes from Cray Version to Sun Version (12 Pages); Media Includes HEDL-TME-74-47 Vol. 1, HEDL-TME-74-47 Vol. 2, HEDL-TME-76-73, HEDL-TME-78-108, HEDL-TC-104-1, Source Code, Sample Problem Input and Output, Control Information;

SOURCE CODE INCLUDED? - Yes

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MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - The energy equations are solved by a Crank-Nicholson type implicit scheme. The momentum equations are solved by an iterative implicit scheme.

COMPUTER - SUN SPARC

OPERATING SYSTEMS - SunOS 4.1.3

PROGRAMMING LANGUAGES - FORTRAN IV

SOFTWARE LIMITATIONS - Calculations for up to 100 channels (e.g., 100 pins representative of subassembly clusters) and 20 axial segments within the fuel region may be performed simultaneously. A total of 10 different axial coolant flow zones having different flow areas can be modeled in the axial direction. Radial heat transfer calculations within each pin axial segment are performed using up to 12 radial fuel nodes (including one surface node), 3 cladding nodes (including inner and outer surface nodes), a coolant node, and a structural node.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - A zero neutron lifetime approximation is available to allow large time-steps to be taken during slow-moving portions of the transient. Protection is included, however, to assure that failure criteria levels are not overshoot.

RELATED SOFTWARE - MELTIIIB is a continuation of the MELT code series with MELTI, MELTII, MELTIII, and MELTIIIA being its predecessors.

OTHER PROG/OPER SYS INFO - File Steady, which is written by the steady-state program is mandatory input for the transient program.

HARDWARE REQS - SUN SPARCstation 2 or better with at least 5 Mbytes memory and 10 Mbytes hard disk space.

TIME REQUIREMENTS - The steady state and transient programs each take approximately 1 minute per case.

REFERENCES - Alan E. Waltar, William L. Partain, Donald C. Kolesar, Larry D. O'Dell, Andrew Padilla, Jr., John C. Sonnichsen, Norman P. Wilburn, Harvey J. Willenberg, and Richard J. Shields, MELT III-A Neutronics Thermal-Hydraulic Computer Program for Fast Reactor Safety, Volume I, HEDL-TME 74-47, December 1974; C.H. Lewis and N.P. Wilburn, MELTIIIA: An Improved Neutronics, Thermal-Hydraulics Modeling Code for Fast Reactor Safety Analysis, HEDL-TME-76-73, December 1976; R.E. Baars and W.P. Horn, Users Manual and Guidelines for TOP Design Procedure Calculation with MELT-III, HEDL-TC-1041, December 1977; K.K. Tabb, C.H.Lewis, L.D.O'dell,

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REFERENCES - (CONT) A.Padilla Jr, D.E. Smith, N.P. Wilburn, MELT-IIIB
An Updated Version of the MELT Code, HEDL-TME-78-108, April 1979.

ABSTRACT STATUS - Released December 1997.

SUBJECT CLASS CODE - GF

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
M CODES
TRANSIENT OVERPOWER ACCIDENTS
EXCURSIONS
FEEDBACK
LMFBR TYPE REACTORS

EDB SUBJECT CATEGORIES -
990200 220900

SPONSOR - DOE/NE

PACKAGE TYPE - SCREENED