PACKAGE ID - 000246I037000 TDIST3

KWIC TITLE - Community Energy Consumption Analysis

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

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DESCRIPTION - The TDIST3 program performs an analysis of large integrated community total energy systems (TES) supplying thermal and electrical energy from one or more power stations. The program models the time-dependent energy demands of a group of representative building types, distributes the thermal demands within a thermal utility system (TUS), simulates the dynamic response of a group of power stations in meeting the TUS demands, and designs an optimal base-loaded (electrically) power plant and thermal energy storage reservoir combination. The capital cost of the TES is evaluated. The program was developed primarily to analyze thermal utility systems supplied with high temperature water (HTW) from more than one power plant. The TUS consists of a transmission loop and secondary loops with a heat exchanger linking each secondary loop to the transmission loop. The power stations electrical output supplies all community buildings and the HTW supplies the thermal demand of the buildings connected through the TUS, a piping network. Basic components of the TES model are one or more power stations connected to the transmission loop. These may be dual-purpose, producing electricity and HTW, or just heating plants producing HTW. A thermal storage reservoir is located at one power station. The secondary loops may have heating plants connected to them. The transmission loop delivers HTW to local districts; the secondary loops deliver the energy to the individual buildings in a district.

PACKAGE CONTENTS - Media Directory; Software Abstract; FESA-TSD 2062; Media Includes Source, Sample Problem;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - The analysis is performed using an iterative boundary value technique on the quasi-steady state energy supply and demand in the community. The analysis includes the response of one power source to the energy demands, equipment cost evaluation, and hourly variations in consumer loads.

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METHOD OF SOLUTION -(CONT)
COMPUTER - IBM370

OPERATING SYSTEMS - OS/370 MVT Release 21.7

PROGRAMMING LANGUAGES - FORTRAN IV (G-level compiler)

SOFTWARE LIMITATIONS - Maxima of 20 different building types, 10 energy sources in the piping network, and 75 energy consumer groups. The piping network is restricted to parallel, counter-current flow supply, and equal diameter pipes.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - Multiple energy sources can be considered.

RELATED SOFTWARE - TDIST3 is the third in the MIT TDIST series of community total-energy-consumption simulation programs. An alteration and extension of TDIST2 , it was developed primarily for analysis of thermal utility systems supplied with high-temperature water from more than one power station. Other changes include elimination of constraints on the piping network structure, deletion of the absorption air-conditioning mode of the secondary loops of the TUS, and deletion of the piping cross-sectional area design option. NBSLD is a set of programs developed by the National Bureau of Standards (reference 5).

HARDWARE REQS - 280K bytes of memory, card-image input and printer output units.

TIME REQUIREMENTS - Running time is largely dependent on the number of energy sources and complexity of the piping network. A three-source, twenty-sink system may require from 1 to 3 minutes of CPU time on an IBM370/168. NESC executed the sample problem involving a 24-hour total energy simulation of a community of 53 buildings (17 building types) and four power stations in 9 CPU seconds on an IBM3033.

REFERENCES - D. B. Ebeling-Koning and Michael W. Golay, TDIST3, A Computer Code for Community Energy Consumption Analysis and Total Energy System Design, FESA-TSD 2062, December 30, 1978, and Errata, January 21, 1980\ TDIST3, NESC No. 854, TDIST3 Sample Problem Output, National Energy Software Center Note 80-28, July 31, 1980; Steven B. Goldman, Frederick R. Best, and Michael W. Golay, TDIST2, A Computer Program for Community Energy Consumption Analysis and Total System Design, FESA-RT-2047, December 1977; J. W. Stetkas and M. W. Golay, User's Manual: TDIST, A Program for Community Energy Demand Analysis and Total Energy System Response Simulation, MIT Department of Nuclear Engineering and MIT Energy Laboratory, August 31, 1976; T. Kusada, NBSLD, Computer Programs for Heating and Cooling Loads in Buildings, NBSIR-74-574, National Bureau of

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REFERENCES -(CONT) Standards, Washington, D. C., November 1974.

ABSTRACT STATUS - Abstract first distributed January 1980. IBM370 version submitted February 1979, revised January 1980, sample problem executed by NESC October 1979 and February 1980 on an IBM3033.

SUBJECT CLASS CODE - T

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
T CODES
TOTAL ENERGY SYSTEMS
CAPITALIZED COST
ENERGY ANALYSIS
ECONOMICS
ENERGY DEMAND
ELECTRIC POWER

EDB SUBJECT CATEGORIES -
990200 290100 320100

SPONSOR - DOD

PACKAGE TYPE - TESTED