

PACKAGE ID - 000427IBMPC00 SYSRAP

KWIC TITLE - System Reconfiguration Analysis Program

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

COMPLETION DATE - 10/01/1990 **PUBLICATION DATE** - 10/10/1990

DESCRIPTION - SYSRAP is a distribution automation applications software package for assessing system reconfiguration opportunities and volt/var control on radial electric distribution feeders.

PACKAGE CONTENTS - Media Directory; Software Abstract; ORNL-6575;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 2 5.25 Diskettes

METHOD OF SOLUTION - The SYSRAP program combines a radial power flow analysis, short-circuit analysis, and data structuring of input and calculated values. The power flow uses a simple voltage drop over each feeder line section and is implemented in an indexed sequential access-oriented data base management system environment. The short-circuit analysis only considers three-phase faults, and executes quickly because loads are neglected in computing short-circuit duties and because accumulated load data is stored in the database. The program uses the Turbo Pascal Database Toolbox as the database management system. Indexing the data records by a line section connectivity pointer allows a list, rather than a sparse matrix, approach to be used. The software scales customer electric load based on the total single-phase feeder real and reactive power injections, single-phase voltages at the feeder breaker, billed kilowatt-hours and connected transformer kVA. The real and reactive power are modeled as a second-order Taylor series expansion of the real and reactive power as a function of voltage.

COMPUTER - IBM PC

OPERATING SYSTEMS - MS-DOS or PC-DOS 2.0 or later operating systems

PROGRAMMING LANGUAGES - Turbo Pascal version 5.0

SOFTWARE LIMITATIONS - Because of the large data record size, accessing the data from disk is a processing bottleneck. To increase the

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SOFTWARE LIMITATIONS - (CONT) data retrieval speed, the database management system was modified allowing feeder data to be dynamically allocated to system memory. When feeder data is first requested, it is read into memory so that it is accessed from memory instead of either from a floppy or hard disk. Feeder data can be allocated until the full 640 available kilobytes of the MS-DOS operating system are used unless expanded memory according to the Lotus/Intel/Microsoft expanded memory specification. When all memory is used, the oldest feeder data in memory is written to disk, allowing additional memory to be allocated for new feeder data.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - While the principles of distribution system analysis and operation are well known, there are no applications software packages that are completely suitable for supporting the operators of extensively automated electric power distribution systems. The SYSRAP software fills this void by providing a software package for assessing system reconfiguration opportunities and volt/var control on radial distribution feeders. SYSRAP combines power flow and short-circuit analyses with database management and is adept at reorganizing the database to reflect switching operations and changes in the status of volt/var equipment. The program is especially well suited for answering what if questions posed by the operator with respect to switch orders, capacitor bank dispatch and regulator tap adjustments. The program runs on a personal computer and can interface with mainframe computer that controls the real-time data acquisition and control system.

RELATED SOFTWARE - SYSRAP is a unique software package written for assessing system reconfiguration opportunities and volt/var control on automated radial electric power distribution feeders. The software program is self-contained in that it does not need any other software other than the operating system to run. However, any modification of the source code of the SYSRAP program requires Turbo Pascal 5.0 or higher and the Turbo Pascal Database Toolbox.

OTHER PROG/OPER SYS INFO - The executable, data, and source files for the SYSRAP program are compressed in a .ZIP format and require the use of the PKZIP.EXE program for installing the files on a hard disk. Turbo Pascal version 5.0 or higher is required for any modifications to the source code.

HARDWARE REQS - IBM or IBM compatible personal computer

TIME REQUIREMENTS - SYSRAP was not designed as real-time software, rather it was designed to be a highly interactive program to be run on relatively slow personal computers without sacrificing a fast machine response time. SYSRAP executes power flow and short-circuit analyses for detailed feeder models in tens of

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TIME REQUIREMENTS - (CONT) seconds.

REFERENCES - J.B. Patton, D.T. Rizy, and J.S. Lawler, Systems
Reconfiguration Analysis Program, User's Manual, ORNL-6575, April
1991.

ABSTRACT STATUS - Submitted July 1992.

SUBJECT CLASS CODE - T

KEYWORDS -

S CODES
COMPUTER PROGRAM DOCUMENTATION
POWER DISTRIBUTION
ELECTRIC POWER
ELECTRIC POWER INDUSTRY
ELECTRIC UTILITIES
PERSONAL COMPUTERS
AUTOMATION
CAPACITORS
CAPACITY
COMPUTER CALCULATIONS
POWER SYSTEMS
REAL TIME SYSTEMS

EDB SUBJECT CATEGORIES -
990200 240201

SPONSOR - DOE/EM

PACKAGE TYPE - AS - IS