PACKAGE ID - 000323IPCAT00 SAGEWASP

KWIC TITLE - Optimal Electric Utility Expansion

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

COMPLETION DATE - 10/01/1989 **PUBLICATION DATE -** 10/10/1989

DESCRIPTION - SAGE-WASP is designed to find the optimal generation expansion policy for an electrical utility system. New units can be automatically selected from a user-supplied list of expansion candidates which can include hydroelectric and pumped storage projects. The existing system is modeled. The calculational procedure takes into account user restrictions to limit generation configurations to an area of economic interest. The optimization program reports whether the restrictions acted as a constraint on the solution. All expansion configurations considered are required to pass a user supplied reliability criterion. The discount rate and escalation rate are treated separately for each expansion candidate and for each fuel type. All expenditures are separated into local and foreign accounts, and a weighting factor can be applied to foreign expenditures.

PACKAGE CONTENTS - NESC Note; Software Abstract; ORNL-4945;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 2 5.25 Diskettes

METHOD OF SOLUTION - A dynamic programming algorithm is used in the optimization to calculate the best expansion policy. This is defined as the policy which results in a system that satisfies the reliability criterion and which results in the minimum discounted cash flow expenditures over the study period. An objective function is defined to evaluate and compare the effects of the various decisions. A probabilistic simulation model is used to calculate production costs for all allowable configurations.

COMPUTER - IBM PC/AT

OPERATING SYSTEMS - MS DOS 3.3

PROGRAMMING LANGUAGES - FORTRAN 77

SOFTWARE LIMITATIONS - SAGE-WASP allows study periods of up to 30 years. The maximum number of configurations in the optimization program for any year is 200. A maximum of 2000 configurations is

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SOFTWARE LIMITATIONS -(CONT) permitted in any run of the dynamic programming module.

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - The SAGE-WASP package is designed to run on relatively small computers. The code uses magnetic disk files to preserve information from iteration to iteration, thus avoiding repetition of calculations.

RELATED SOFTWARE - The WASP program evolved from the Tennessee Valley Authority's Systems Analysis Generation Expansion (SAGE) program. This release includes the modifications and enhancements defined by the IAEA Newsletters (references 3, 4,and 5) and includes any changes up to but not including those described at the Columbus, Ohio, August 1977 WASP User's Meeting.

OTHER PROG/OPER SYS INFO - Eleven disk files are created by the program and up to six of these are used by an individual program.

HARDWARE REQS - 170K bytes of storage are required.

TIME REQUIREMENTS - The sample problem ran in 22 minutes on a Compaq 386s without a numeric coprocessor.

REFERENCES - R.T. Jenkins and D.S. Joy, WIEN Automatic System Planning Package (WASP) - An Electric Utility Optimal Generation Expansion Planning Computer Code, ORNL-4945, July 1974\ International Atomic Energy Agency (IAEA) report, WASP-II User's Manual 2nd Draft, September 1976; Peter Heinrich, IAEA WASP Newsletter No. 1, November 17, 1976; Peter Heinrich, IAEA WASP Newsletter No. 2, March 10, 1977; Alvaro J. Covarrubias, IAEA WASP Newsletter No. 3, September 30, 1977; R. Taber Jenkins and Timothy C. Vorce, Supplementary WASP Documentation, WASP Conference Paper, Columbus, Ohio, August 18-19, 1977; Bruce A. Anderson, Modifications to Augment Private Utility Use of the Wien Automatic System Planning Package, Duke Power Company report.

ABSTRACT STATUS - Abstract first distributed December 1977. IBM PC version submitted October 1989, sample problem executed by NESC October 1989 on a Compaq 386s.

SUBJECT CLASS CODE - D

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
S CODES
ELECTRIC UTILITIES
POWER GENERATION
ECONOMIC DEVELOPMENT

EDB SUBJECT CATEGORIES -
990200 296000

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SPONSOR - DOE/NE

PACKAGE TYPE - TESTED