

PACKAGE ID - 000263IBMPC00 COALPREP

KWIC TITLE - Coal Preparation Plant Simulation

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

COMPLETION DATE - 12/01/1989 **PUBLICATION DATE** - 12/01/1985

DESCRIPTION - COALPREP assesses the degree of cleaning obtained with different coal feeds for a given plant configuration and mode of operation. It allows the user to simulate coal preparation plants to determine an optimum plant configuration for a given degree of cleaning. The user can compare the performance of alternative plant configurations as well as determine the impact of various modes of operation for a proposed configuration. The devices that can be modelled include froth flotation devices, washers, dewatering equipment, thermal dryers, rotary breakers, roll crushers, classifiers, screens, blenders and splitters, and gravity thickeners. The user must specify the plant configuration and operating conditions and a description of the coal feed. COALPREP then determines the flowrates within the plant and a description of each flow stream (i.e. the weight distribution, percent ash, pyritic sulfur and total sulfur, moisture, BTU content, recoveries, and specific gravity of separation). COALPREP also includes a capability for calculating the cleaning cost per ton of coal. The IBM PC version contains two auxiliary programs, DATAPREP and FORLIST. DATAPREP is an interactive preprocessor for creating and editing COALPREP input data. FORLIST converts carriage-control characters in FORTRAN output data to ASCII line-feed (X'0A') characters.

PACKAGE CONTENTS - NESC Note; Software Abstract; DOE/PC/62684-T2 (Pt.1); DOE/PC/62684-T2 (Pt.2); Media Includes Source Code;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 3 5.25 Diskettes

METHOD OF SOLUTION - Performance of coal washing equipment characterized as float-and-sink devices is determined by use of a distribution, or partition, curve, which expresses the weight percent of feed reporting to clean coal as a function of specific gravity. Use of the distribution curve permits prediction of the ash and pyritic sulfur content of the clean coal and refuse products, as well as the yield of clean coal. The generalized distribution curve is expressed as a modified Weibull function with coefficients appropriate to a given vessel and a given feed size fraction, and the specific gravity of separation is determined by iteration. For froth flotation equipment, detailed specific gravity

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METHOD OF SOLUTION - (CONT) analyses of the clean coal and refuse products are obtained by fitting a distribution curve to the feed that will produce a '1.50-yield/ 1.60-ash' product. In dewatering devices, the residual saturation is estimated using correlations proposed by Wakeman. The methods used to calculate the screen efficiencies are those developed by A. Vaillant at Automated Process Surveys. Within the simulator, the blender and splitter calculations are carried out for each size fraction. The method used to estimate moisture content is similar to that used in the dewatering module except that pressure and centrifugal forces do not need to be considered, and a modification was introduced for larger size coals. Either of two methods may be chosen to calculate the heat of combustion of the coal. The first uses an empirical correlation of heat of combustion and ash content, while the second uses Dulong's formula.

COMPUTER - IBM PC

OPERATING SYSTEMS - DOS 2.11; DOS 3.10; DOS 4.01 (IBM PS/2)

PROGRAMMING LANGUAGES - Microsoft FORTRAN 77

SOFTWARE LIMITATIONS - Maxima of 200 flowstreams, 100 units, 22 size increments for the feed, and 10 specific gravity increments for the feed. The primary multiple roll crusher is the only crusher model available.

SOURCE CODE AVAILABLE (Y/N) - Y

RELATED SOFTWARE - A release of COALPREP was announced in November 1986, but was not distributed.

OTHER PROG/OPER SYS INFO - The auxiliary DATAPREP and FORLIST programs are written in the BASIC programming language.

HARDWARE REQS - The IBM PC version requires a minimum of 512K bytes of memory and a fixed disk; a math coprocessor is advantageous but not required. The sample problem required 365K bytes of memory on an IBM PS/2 Model 70.

TIME REQUIREMENTS - The sample problem, a plant configuration of 19 units and 32 flowstreams, required 32 seconds for execution on a DEC10, 18 minutes on an IBM PC/XT with a coprocessor, and 86 minutes on an IBM PC/XT without a coprocessor. NESC executed the sample problem in 12 minutes on an IBM PC/AT with an 80287 math coprocessor and in 2 minutes on an IBM PS/2 Model 70 with a math coprocessor.

REFERENCES - Byron S. Gottfried and John W. Tierney, Computer Simulation of Coal Preparation Plants, Part I Mathematical Procedures, University of Pittsburgh report, December 1985; Byron

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REFERENCES - (CONT) S. Gottfried and John W. Tierney, Computer Simulation of Coal Preparation Plants, Part II User's Manual, University of Pittsburgh report, Vol. II, December 1985; COALPREP, NESC No. 1079.PCB, COALPREP IBM PC Version Description of Flexible Disk Cartridges, Implementation Information, and Reference Report Errata, National Energy Software Center Note 90-31, December 18, 1989\ Byron S. Gottfried, Computer Simulation of Coal Preparation Plants, Interagency Energy/Environmental R&D Program Report, FE-9000-1 (EPA-600/7-78-211), November 1978.

ABSTRACT STATUS - Abstract first distributed May 1987. IBM PC version submitted September 1986, revised December 1986, revised February 1987, replaced December 1989 by revised Edition B, sample problem executed by NESC September 1988 on an IBM PS/2 Model 70.

SUBJECT CLASS CODE - T

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
C CODES
COAL PREPARATION PLANTS
CLEANING
COAL PREPARATION
COMPUTERIZED SIMULATION
WASHING
CRUSHING
DRYING
SCREENS
WATER REMOVAL

EDB SUBJECT CATEGORIES -

990200 010300

SPONSOR - DOE/FE

PACKAGE TYPE - TESTED