DOCUMENTATION OF MODEL INPUT AND OUTPUT VALUES FOR THE GEOHYDROLOGY AND MATHEMATICAL SIMULATION OF THE PAJARO VALLEY AQUIFER SYSTEM, SANTA CRUZ AND MONTEREY COUNTIES, CALIFORNIA

By *Hugh T. Mitten* and *Clark J. Londquist*

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CONTENTS

ILLUSTRATION

TABLES

DOCUMENTATION OF MODEL INPUT AND OUTPUT VALUES FOR THE GEOHYDROLOGY AND MATHEMATICAL SIMULATION OF THE PAJARO VALLEY AQUIFER SYSTEM, SANTA CRUZ AND MONTEREY COUNTIES, CALIFORNIA

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ABSTRACT

Documentation of model input and sample output for the geohydrology and mathematical simulation of the Pajaro Valley aquifer system, Santa Cruz and Monterey Counties, California, has not been published previously. In this report, the documentation is contained on a 5 1/4-inch diskette in self-expanding compressed format, which can be decompressed with easy-to-use menus. The decompressed ASCII files require about 5.3 megabytes of disk space on an IBM-compatible microcomputer.

INTRODUCTION

As part of a study of the geology and hydrology of the Pajaro Valley aquifer system, Santa Cruz and Monterey Counties, California, a three-layer mathematical model was developed, using the computational algorithm of McDonald and Harbaugh (1984). The results of the Pajaro Valley study are given by Johnson and others (1988).

The purpose of this report, which is a supplement to the report by Johnson and others (1988), is to provide detailed, electronic documentation of the model, including location of the model grid and data used as model input and sample output. This detailed documentation has not been published previously although the data inputs to the model are summarized in the report by Johnson and others (1988).

The original input and output, which were developed on a Prime computer, were transferred to a microcomputer and compressed into smaller files so that they could be placed on a single diskette. Those compressed files were collected into libraries called self-extracting files. Each of the libraries can be executed by typing the library name and pressing enter, thus decompressing the files. The decompressed files are the same as the original files and are presented according to the American International Standard Code for Information Interchange (ASCII).

This report is in two parts. The first part provides this introductory text, a listing of input and output files, and an explanation of the decompression program. The compression-decompression program, LHarc, is copyrighted by Haruyasu Yoshizaki. Permission to copy is granted freely, provided that all copy contains the statement, "Copyright by Haruyasu Yoshizaki." The second part of the report is a diskette that contains a copy of this text, the compressed files, and one subdirectory. The diskette is available for purchase from the U.S. Geological Survey Books and Open-File Reports Section at the address shown on the back of the title page.

Five files and one subdirectory are included on the Pajaro-model diskette. The high-density, double-sided, soft-sectored diskette has a capacity of 1.2 megabytes. Files on the diskette were created on an IBM-compatible microcomputer using Microsoft MS-DOS version 3.3. The files for the model reside in two libraries (filename.EXE). Table 1 shows contents of the root directory and a description of the files.

Table 1. Contents of root directory

Item	Description
README.DOC	This report; an ASCII file.
PAJARO.BAT	Batch file for menu method of decompressing files; an ASCII file.
INPUT.EXE	The self-extracting compressed library of model-input files (table 2).
OUTPUT.EXE	The self-extracting compressed library of model-output files (table 3).
LH113C.EXE	The self-extracting library of file compression/decompression programs and the section, "Compression-Decompression Program" of this report explains how to execute this program.
UTIL	Directory containing menu-driven utilities.

MODEL DOCUMENTATION

MODEL GRID

Organization of the model grid for the study area was based on a composite of U.S. Geological Survey topographic maps, using the California grid-coordinate system as the ground reference. Model-grid lines lie parallel to the California grid-coordinate system at intervals of 2,000 feet (Johnson and others, 1988). The origin of the model grid (the northwest corner of the cell in row 1, column 1) is 1,586,000 feet east and 194,000 feet north of the origin of zone 3 (M.J. Johnson, U.S. Geological Survey, written commun., 1989).

INPUT AND OUTPUT FILES

Decompression of the compressed libraries, INPUT.EXE and OUTPUT.EXE (table 1), creates 44 model-input files (table 2), and 3 model-output files (table 3). A total of about 5.2 megabytes is required on the hard disk to

Table 2. Model-input files, Fortran units, size, and descriptions

[IBOUND, a variable showing status of model cell; SF1, primary storage factor; VCONT, a variable expressing both vertical hydraulic conductivity and vertical grid spacing]

File	Fortran unit	Size (bytes)	Description
BASIC.PAC	5	1487	BASIC package
BCF.PAC	11	960	Block-centered flow package
BOTTOM.UN1	48	7828	Bottom of layer 1
DRAIN.PAC	13	6330	DRAIN package
HYDCOND.UN1	41	22274	Hydraulic conductivity layer 1
IBOUND.UN1	31	3956	Layer 1
IBOUND.UN2	32	3956	Layer 2
IBOUND.UN3	33	3956	Layer 3
RECH.PAC	18	1484	RECHARGE package
RECH.S70	61	22634	
RECH.S71	62	22634	
RECH.S72	63	22634	
RECH.S73	64	22634	
RECH.S74	65	22634	
RECH.S75	66	22634	Summer recharge 1970-81
RECH.S76	67	22634	
RECH.S77	68	22634	
RECH.S78	69	22634	
RECH.S79	70	22634	
RECH.S80	71	22634	
RECH.S81	72	22634	
RECH.W71	73	22634	
RECH.W72	74	22634	
RECH.W73	75	22634	
RECH.W74	76	22634	
RECH.W75	77	22634	
RECH.W76	78	22634	Winter recharge 1971-80
RECH.W77	79	22634	
RECH.W78	80	22634	
RECH.W79	81	22634	
RECH.W80	82	22634	
RECH.W81	83	22634	
SF1.UN1	40	22274	Layer 1
SF1.UN2	43	22274	Layer 2
SF1.UN3	46	22274	Layer 3
SHEADUN1.W70	34	23353	Starting head layer 1 winter 1970
SHEADUN2.W70	35	23349	Starting head layer 2 winter 1970
SHEADUN3.W70	36	23353	Starting head layer 3 winter 1970
SIP.PAC	19	74	Strongly implicit procedure package
TRAN.UN2	49	22346	Transmissivity layer 2
TRAN.UN3	52	22578	Transmissivity layer 3
VCONT.U12	42	22614	VCONT between layers 1 and 2
VCONT.U23	45	22274	VCONT between layers 2 and 3
WELL7081.PAC	12	806268	Well pumpage 1970-81
TOTAL.....		1605844	

Table 3. Model-output files

[Files were originally one large mainframe file assigned to Fortran unit 6. Output includes a mirror of input values plus model budgets and potentiometric heads for model layers]

File	Size (bytes)
PAJARO1.OUT	1208646
PAJARO2.OUT	1184967
PAJARO3.OUT	1191060
TOTAL	3584673

hold all the decompressed input and output ASCII files. Note that a single diskette does not have the capacity to contain all the decompressed files from either library. Units are in combinations of feet and seconds, where applicable. Each file, with the exception of those decompressed from the output library, contains records of 80 characters or less. The original model output from the Prime mainframe computer is made up of 36,152 records containing 132 or fewer characters. This large Prime computer file is divided into three subfiles containing records of 132 characters or less (table 3), each of which can be placed on a separate high-density diskette, if desired.

COMPRESSION-DECOMPRESSION PROGRAM

LHARC is the compression-decompression program used to create the self-extracting files, INPUT.EXE and OUTPUT.EXE, from the original input and output files. The program and documentation may be decompressed by copying LH113C.EXE to any directory on either the hard disk or a diskette and executing `LH113C´. The program and documentation require 109,534 bytes.

DECOMPRESSING THE FILES

One of two methods is used to decompress the files: (1) the "menu method" is used for a version of MS-DOS more recent than 2.0; and (2) the "DOS method" is used for versions 2.0 or earlier.

MENU METHOD

To implement the program, place the diskette in drive A:, attach to A:, type `pajaro´, and press enter. The menu shown in figure 1*A* will appear. When either drive C: or D: is selected, the menu shown in figure 1*B* will appear. By selecting choices from both menus, each group of files may be placed on either or both drives in any convenient combination.

Executing the self-extracting files will create a PAJARO directory on the drive(s) and, depending on choice, subdirectories, INPUT (1,605,844 bytes), and OUTPUT (3,584,673 bytes).

DOS METHOD

Files can be decompressed and placed in the C: or D: directory of the hard disk by copying the appropriate filename.EXE to that directory and then executing by typing the file name. For example, if the input files are to be placed in a subdirectory named MODEL, copy the file INPUT.EXE to MODEL; attach to that directory; type `input´; and press enter. Computer instructions contained within INPUT.EXE will cause the decompression of this file and place decompressed files into MODEL.

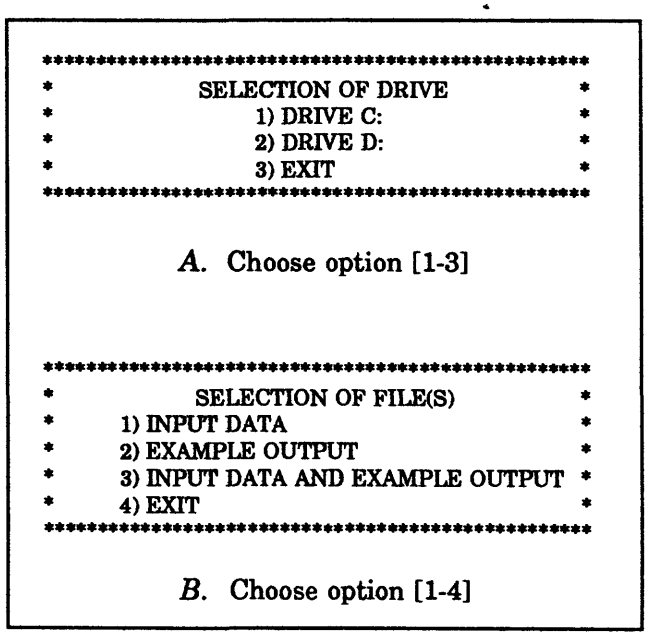

Figure 1. Menus to select disk and decompress files.

SELECTED REFERENCES

Johnson, M.J., Londquist, C.J., Laudon, Julie, and Mitten, H.T., 1988, Geohydrology and mathematical simulation of the Pajaro Valley aquifer system, Santa Cruz and Monterey Counties, California: U.S. Geological Survey Water-Resources Investigations Report 87-4281, 62 p.

McDonald, M.G., and Harbaugh, A.W., 1984, A modular three-dimensional finite-difference ground-water flow model: U.S. Geological Survey Open-File Report 83-875, 528 p.

Wolverton, Van, 1986, Supercharging MS-DOS: Redmond, Washington, Microsoft Press, 300 p.