INS TITUTE

GF

HYDROLOGY

IH ADDRESS LABEL PROGRAM SUITE

by

R F TEMPLEMAN

# ABSTRACT

This report describes the design and operation of the computer program for the storage and selective retreival of addresses on the Institute's mailing lists.



Report NO 83

March 1983

# CONTENTS

		Page
1	INTRODUCTION AND OBJECTIVES	1
2	IMPLEMENTATION	1
	2.1 Address structure	1
	2.2 Address alphabetisation	1 2 2
į	2.3 The address specification record	2
3	THE FUNCTION SUITE	5
	3.1 Quality control of input address files	5
	3.2 Alphabetical sorting of address files	6
	3.3 Generation of labels	6
4	CONCLUSION	8
	Acknowledgements	8
	APPENDIX 1	9
	APPENDIX 2	10
	APPENDIX 3	11

#### INTRODUCTION AND OBJECTIVES

The need to compile a new mailing list for the distribution of the Institute of Hydrology's triennial research report in 1980 stimulated interest in the computerisation and rationalisation of all the Institute's mailing lists. It was decided to combine the lists of recipients of all the various IH publications into a single system. This system had to be structured to provide the following facilities:

- (1) Specialised lists of addresses needed to be retrieved on demand, e.g. a list of all the universities in Europe which receive the Low Flow Reports.
- (2) Supplementary information such as order numbers had to be stored and retrieved when mailing occurred.
- (3) Alphabetic sorting of addresses by recipient organisation was essential to aid manual checking that addresses were on lists, and eliminate duplicates, etc.
- (4) Simple mechanisms were required for the addition of extra reports, new recipients, new orders, etc.
- (5) Sets of address labels for selective mailings had to be produced with the order numbers where appropriate and the number of reports required in a dispatch included on the label.

#### 2 IMPLEMENTATION

# 2.1 Address structure

It was decided to store the address information in a sequential computer-disc file which could be amended (by deletions, additions, character string corrections, etc) using a standard editor. Each address would be structured according to the following rules:

- (1) Up to ten'lines of address information should be allowed including a terminating line consisting of a "\$" in column 1. This restriction results from the depth of the labels on the stationery used.
- (2) No line should exceed 40 characters, the width of the label stationery.
- (3) Each line, except the terminating line, must end with a comma.

It was thought that these rules would not prove too onerous for those compiling the address lists and would simplify the computer programming significantly in meeting the above objectives. As the total system would probably require several Mbytes of disc storage, and a standard editor and sort package were required, it was decided to mount the programs on a mainframe computer - the NERC Univac 1108 in the first instance. This computer had fast lineprinters, a good FORTRAN 77 compiler and an efficient SORT package. After the Univac was withdrawn from service in March 1982, the programs were rewritten to run of the NERC Honeywell, and the rest of this report concentrates on the Honeywell implementation.

## 2.2 Address alpha Detisation

Alphabetisation of the addresses is based on the third line each address which is normally an organisation although occasionally individuals are the direct addressee. To achieve the correct placement of the third line within the address, null lines (just a comma in column 1) must be included in the address, e.g.

AREA DISTRIBUTION ENGINEER,
BEDFORD WATER DIVISION,
ANGLIAN WATER AUTHORITY,
BYRON ROAD,
AYLESBURY,
BUCKS,

and

CHIEF EXECUTIVE,
ANGLIAN WATER AUTHORITY,
DIPLOMA HOUSE,
GRAMMAR SCHOOL WALK,
HUNTINGDON,
CAMB,
\$

Both these addresses would be alphabetised under ANGLIAN WATER— AUTHORITY and as these key lines are identical, the corresponding addresses would appear in a sorted file in sequence.

In order to maintain the third line as the line on which addresses are sorted yet allow address lines of greater than in characters, a variation to rule (2) above had to be incorporated, namely that long lines may be split over two or more lines by putting a hyphen in column 40 of each line to be continued. The programs dealing with this data treat such long lines as one logical line, but print all the physical lines separately on any labels or listing produced.

# 2.3 The address specification record

Each address in the file is preceded by a specification record which provides information about the address and publications required by the addressee. This record is terminated by a "/" and may be up to 80 characters I mg; it takes the following form:

nnnOPZPnPm ..../

where

# TABLE 1 COUNTRY CODES

Cor	intry	Zone	Country	Zone	Country	Zone	Country	Zone	Country	Zone
ເຕ	England	IN	046 Abu Dhabi	AZ	091 East Timor	CZ	136 Malawi	BZ	183 Senegal	BZ
	Ireland	IN	047 Afganistan	BZ	092 Ecuador	BZ	137 Malaysia	BZ	184 Seychelles	BZ
	Scotland	IN	048 Ajman	AZ	093 Egypt	AZ	138 Maldives	BZ	185 Sharjah	AZ
	Wales	IN	049 Algeria	AZ	094 El Salvador	BZ	139 Mali	BZ	186 Sierra Leone	BZ
•			050 Angola	BZ	095 Equatorial		140 Mariana Islands	CZ	187 Singapore	BZ
005	Albania	EU	051 Antigua	BZ	Guinea	BZ	141 Marshall Islands	CZ	188 Solomon Islands	
	Andorra	EU	O52 Argentina	BZ	096 Ethiopia	AZ	142 Mauritania	BZ.	189 Somali	BZ
	Austria	EU	053 Ascension	BZ	097 Falkland Is.	BZ	143 Mauritius	BZ	190 South Africa	BZ
	Azores	EU	054 Australia	CZ	098 Fiji	CZ	144 Mexico	BZ	191 Sp. Terr. N. Af:	
	Balearic Isles	EU	O55 Bahamas	BZ	099 Fr. Guinea	BZ	145 Mongolia	CZ	192 Sri Lanka	BZ
	Belgium	EU	056 Bahrain	<b>7.2</b>	100 Fr. Polyneria	CZ	146 Montserrat	BZ	193 Sudan	Aï
	Bulgaria	ΣU	O57 Bangladesh	BZ	101 Fr. S & Ant Ter.		147 Morocco	AZ	194 Suriname	AZ
	Canary Isles		058 Barbados	BZ	102 Fr. West Ind.	BZ	148 Mozambique	BZ	195 Swaziland	BZ
	Cape Verde Isles	•	O59 Belize	BZ	103 Fujairah	AZ	149 Nauru Island	cz	196 Syrian Arab. Rep	
	Corsica	EU	O60 Benin	BZ	104 Gabon	BZ	150 Nepal	BZ	197 Taiwan	CZ
	Cyprus	EU	061 Bermuda	BZ	105 Gambia	BZ	151 Netherl. Antilles	BZ	198 Tanzania	BZ
	Czechoslovakia	EU	O62 Bhutan	BZ	106 Gaza & K. Yunis	AZ	152 New Caledonia	CZ	199 Thailand	BZ
	Denmark	EU	O63 Bolivia	BZ	107 Ghana	BZ	153 New Hebrides	CZ	200 Tibet	B2
	Farce Isles	EU	C6: Botswana	BZ	108 Grenada	BZ	154 New Zealand	CZ	201 Togo	BZ
	Finiand	EU	Obb brazil	BZ	109 Guatemala	BZ	155 N.Z. Island Terr.	CZ	202 Tonga	CZ
	France	EU	066 Brit. Indian	74	110 Guinea	BZ	156 Ricarayaa	BZ	203 Trinidad & Tobag	
	German Dem kep	EU	Ocean Terr.	BZ	111 Guinea-Bissau	BZ	157 Nigeria	BZ	204 Tristan da Cunha	
	Germany, Fed Rep		067 Brit. Virgin Is	BZ	112 Guyana	BZ	158 Niger Republic	BZ	205 Tunisia	AZ
	Gibraltar	EU	O68 Brunel	BZ	113 Haiti	BZ	159 Norfolk Island	CZ	206 Turks & Caicos I	
	- · — <del></del> - ·	EU	069 Burma	PZ	114 Honduras	BZ	160 Oman	AZ	207 Tuvalu	CZ
		EU	070 Burundi	BZ	115 Hong Kong	BZ	161 Pakistan	BZ	208 Uganda	BZ
		-	071 Cambodia	BZ	116 India	BZ	162 Panama	BZ	209 Umm al Qatwain	AZ
	_ <del>-</del>		072 Cameroon	BZ	117 Indonesia	BZ	163 Papua New Guinea	CZ	23.0 U.S.A.	BZ
			073 Canada	DZ		AZ	164 Paraguay	BZ		BZ
	_		074 Caroline Islands	ÇZ	_	AZ	165 Peru		211 Uraguay 212 Venezuela	BZ
			075 Cayman Islands		- <u>-</u>	AZ	166 Philippines		213 Vietnam	BZ
			076 Cent. African Rep.			BZ	167 Pitcairn Island		214 Virgin Is.	BZ
			Of ! Chad		T		168 Portuguese Timor		215 Wake Island	CZ.
			078 Chile				169 Fuerto Rico		216 Western Samoa	CZ
	_		079 China				170 Qatar		217 Yemen (Arab Rep)	
			080 Christmas Island		and the same		171 Ras al Khaimah		218 Yemen (Dem Rep)	AZ
			OBI Cocos Is				172 Reunion		210 Tamen (Dem Rep) 219 Zaire	nz by
	221		OC2 Colombia		. 67		172 Rediton 173 Khodesia		219 Zalie 220 Zambia	52 52
			O83 Comoros				174 Rwanda		221 Namibia	BZ
	- ·		084 Congo				175 St Helena		222 Upper Volta	BZ
			085 Costa Rica		and an arrangement of the second of the seco		176 St Kitts-NevAng.		222 Opper Voica	82
74, 7			086 Cuba				176 St Ricts-NevAng. 177 St Lucia	BZ BZ		
	_		087 Dijbouti				177 St Lucia 178 St Pierre & Miq.	BZ BZ		
	•		088 Dominica				178 St Fierre & Hiq.	BZ BZ		
			089 Dominican Rep.		· · ·		160 Samoa	CZ		
	_		090 Dubai				181 São Torne & Princip		÷ <b>6</b>	
~ 40	angeration i		COW HUNCIA	nu ,	100 Madeyanta		181 Sau Wine a Princip 182 Saudi Arabia	ebz AZ		
						•	tot addrt Wignig	AL.		•

many copies of each. This is achieved by using a single letter to define the publication (Table 3 as a list of letter and associated publications currently included) followed by the number of copies involved.

TABLE 2 ORGANISATION CODES

Code	Organisation
В	Bookshops
С	Consultants
G	Government departments
I	Industry
J	Journals (publishers or)
L .	Libraries
F	Personal
R ju	Research organisations
U	Universities (and other further educational establishments)
yi .	Water industry

#### TABLE 3 PUBLICATIO: CODES

Code	Publication					
Λ	Triennial Research Re					
C	International Course c					
E	European Floods Study L ist					
F	Flood Studies Report (Or customers)					
G	Low Flow Studies Course circulars					
I	Institute of Hydrology Reports (miscellaneous series)					
- -	Low Flow Studies Report					
₽	Flood Studies Report (new edition)					
S	Supplementary Flood Studies Reports					
U	Urban Hydrology Reports					

Where a client has more than one publication, the codes and numbers of copies for each publication follow each other other along the line up to the terminating / character. Often publications are sent to clients in response to an order and it was felt useful to incorporate the order number and possibly other information relating to the order on the address specification record. This is achieved by including the required information within pointed brackets (< >) immediately following the number of copies and before the next publication code (or /). Within the brackets all characters are valied. This structure is best illustrated using the following example of an address specification record:

#### 040UEUA1F1<ORDER:59621>13/

Here the Customer is a Swiss (European postal zone) university which receives one copy of the triennial research report, three copies of Institute of Hydrology reports and has ordered one copy of the Flood Studies Report using order number 59621.

If address labels for this customer were printed, a separate label would be generated for each publication at the time of mailing of each of the publications. The number

of copies required would be printed on the last line of the label for each, and the order number also printed there in the case of the Flood Studies Report label.

#### 3 THE PROGRAM SUITE

1 1

4 11 1

1 1

There are three programs provided for users of the system to perform the following functions:

- (1) Quality control of address files
- (2) Sort address lists alphabetically by organisation
- (2) Concrate batches of labels, lists of addresses or count the number of addresses in specified categories.

#### 3.1 Quality control of input address files

The usefulness of any automatic address system is limited by the accuracy of the human transcription of the address information from text into the form required by computer programs, and in this system by correctly generating the address specification records. A program has been written to check the accuracy of performance of these tasks and indicate where an address file needs correction. Appendix I gives an example of the runstream required to run this program on the Honeywell. It is strongly recommended that a user of the system runs this program after changing an address file before proceeding to sort the addresses or generate labels, as these latter operations can produce unpredictable output if the input files they work on contain errors. The address file should be corrected, using a standard Boneywell editor, until running the quality control program gives only allowable warning messages. The program checks and prints a warning message where necessary, giving the type of error and the address and line on which the error was detected. The error types are as follows:

- (1) Termination line (\$) encountered too quickly after previous such line
- (2) Country code not valid
- (3) Function code not valid
- 4) Postal zone code not valid
- (5) Country code and postal zone code do not match
- (6) < symbol encountered out of sequence
- (7) Illegal publication code
- (8) Warning if number of copies exceeds 10
- (9) Two consecutive publication codes found (i.e. not separated by number of copies)
- (10) > missing on line after < has been detected
- (11) / missing on specification record
- (12) Comma missing at end of line or line over 40 characters long
- (13) \$ termination record missing or address contains too many lines.

None of these checks can actually pinpoint errors in the contents of the address lines themselves so great care and thorough manual checking are required when changing information in an address file.

The program, as well as being used to produce diagnostic messages, can optionally be used in a debug mode whereby an expanded interpretation of each address specification line is written to a file (FORTRAN channel 29). The information generated includes the country code as England, Ireland, Scotland, Wales or non-UK, the organisation type in full, and the number of copies of each required report, the name of which is printed in full. This node is entered by changing line 85 of the source program held in RT/NERC/LAB/ENTRY as explained in the notes in Appendix 1. The generated file 29 can be searched or listed using the standard Honeywell editor.

# 3.2 Alphabetical sorting of address files

As the Honeywell has no adequate SORT package, the approach outlined in this section was adopted to sort address files. The sorting is performed alphabetically on the organisation which is always on the fourth logical record of the address (the address specification record is included in this court). The complete fourth (Organisation) record is thus the key on which sorts are made. The first stage is to write the organisation record of every address in the file to be sorted to another sequential disc file (FORTRAN channel 13) having appended a sequence number to each such record. At the same time the whole addresses are written to a direct access file (FORTRAN channel 12) in such a way that the pth address constitutes the mth record. A sample runstream to do this is given in Appendix 3(a). A program calling standard Honeywell SORT subroutines then sorts the records in file 13 into alphabetical order to generate a new file (FORTRAN channel 14) of sorted organisation records which still have their original address numbers appended to them (see Appendix 3(b) for example runstream).

Because of a peculiarity in the supplied Honeywell sorting software, the sorted file 14 is produced in non-TSS format with an additional spurious first record. The file must therefore be converted to MSS-format before being processed further. This is achieved by invoking the ISS command IN/SORTECRT which asks the user to enter the name of the file to be converted using the prompt "filename?".

Once this procedure has been followed, the final stage of generating a sequential file of addresses sorted by organization on FORTRAN channel 15 can be entered using a runstream like that shown in Appendix 3(c). This stage writes out in turn the addresses contained in file 13 in the order defined by the sorted records in file 14. For example, if the Sirst organization in file 14 corresponded to the nth address in the original file, then the nth record of file 12 would be copied to file 15 first, and then this process repeated until the complete sorted file was written.

# 3.3 Generation of labels

A requirement for two distinct modes of operation of the program to produce labels has emerged: these are

- (a) print labels for selected sussets of addressess irrespective of which publications they receive (none that this opens up the possibility of storing and categorising addresses of organisations which currently receive no reports but who may be regarded as potential customers).
- (b) print labels for selected subsets of addresses for a given report adding to each label order number information and the number of copies required by each recipient.

To satisfy both requirements, two versions of the program have been written and example runstreams to call each on the Honeywell are shown in Appendix 2. Both programs decode the information items upon which selections can be made and store them in FORTRAN variables as shown in Table 3. Both may be run in any of the following modes:

- (i) Produce a list of the addresses which satisfy the selection criteria (mode = 0)
- (ii) Produce the labels containing the addresses which satisfy the selection criteria (mode = 1)

Running mode O or mode I will also report the number of hits as the final step. The desired mode is selected by supplying the mode number on the first data "card" in the runstream (i.e. the first statement after the \$:DATA:05 card; e.g. in Appendix 2 the statement 120#1 selects mode 1). The second data card specifies either the type of organisation by which selection is to be made (case (a)) or the publication (case (b)). In both cases the letter defining the required code is substituted by its order number in the alphabet, e.g. A by 1, B by 2, etc. Examples are given in lines 130 of Appendix 2.

To meet any required selection criteria, line 810 in the source program (selected by the 50\$\$SELECT statements of Appendix 2) may be changed. This line takes the following form:

810 IF(logical expression)GO TO 500

1 1

where "logical expression" may be any valid FORTRAN logical expression involving the variables listed in Table 4 and the FORTRAN logical operators e.g. .EQ., .NE., .GT., .A'D., .OR., etc. For example, the expressions in the programs as they stand are:

- (a) 810 IF(ICCTY(LPUB).GT.O)GO TO 500 to select addressees requesting more than zero copies of publication IPUB, whose value is defined on data card 1
- and (b) 810 IF(N.EQ.IORG)GO TO 500 to select addresses for organisations of the type IORG whose value is also defined on the appropriate data card 1.

TABLE 4 IDENTIFICATION RECORD DECODING INFORMATION

TABLE 4 IDENTIFICATION RECORD DECODING INFORMATION					
Item	FORTRAN variable	Туре	Range		
Country code Function	IC	Integer	1 to 222		
(organisation) code	N	Integer	1 to 26		
Postal zone	A	Character*4	IN, EU, AZ, BZ or CZ		
Publication code	M	Integer	1 to 26		
Number of copies	ICOPY (M)	Integer array	1 to 99		

The example quoted in the objectives of the system (section 1(1)) would be satisfied by changing line 810 of RT/NERC9/LAB/SELECT to

810 IF (N.EQ. 21. AND. A.EQ. 'EU') GO TO 500

and the second data card to 130#12.

It is worth mentioning that any file of addresses which is formatted according to the rules previously described may be used. It may be a sorted or unsorted file and is specified in the Appendix 2 runstreams at line 108. Note also that when labels are being generated they should be directed to the special print queue reserved for labels to help the computer staff who supervise the operations of the lineprinters used.

#### 4 CONCLUSION

It has been found possible to write programs and convert them to run on the NERC HOneywell mainframe computer to satisfy the stated objectives for an integrated address label system. Currently, the addresses of all recipients of mailed items from IH are held in two large files - the first is a sorted list of all UK addresses, the second a sorted list of all foreign addresses. This split is quite arbitrary (any suitably constructed address file may be used by the system), but reduces the total number of addresses to be searched to more manageable proportions for most applications, although the two files may of course be combined where necessary. At March 1983 these files contained 8090 lines (UK) and 7944 lines (foreign).

# Acknowledgements

The author would like to thank Linda Dixon, Celia Kirby, Sue Neal and Julia Tucker for their help in generating and checking the address lists, and to Mike Lowing for interesting discussions during the design stage of the system.

The author is indebted to Peter Lucas of NCJ local support at Wallingford. He converted the FORTRAN subroutines actually used to condition the line printers for label output and to format the address information into a suitable form for printing on a label. Thanks are also due to the operators Lynn Howard and Sue Phelan who have patiently changed from normal lineprinter paper to label stationery and back again when the system has to be run during tests and in production.

#### APPENDIX 1

Example runstream to quality control a file containing address information - the file is zpecified at line 108.

To activate the debug mode and write information to channel 29, change statment 85 in the source program (RT/NERC9/LAB/ENTRY to

5 INTEGER DBUG/1/

C5\$\$S,T,ROUT(MA)

CU10\$:IDENT:RT,LA-RT-CP,IHAD1

CU2G\$:LOWLCAD

OC3G\$:OPTION:FORTRAN,RELMEM,NOMAF

C04G\$:FGRTRAN:ASCII

CU43\$:LIMITS:,28K

C045\$:LIBRARY:AA

50\$\$SELECT(RT/NERC9/LAE/ENTR/:DEFAULT/M)

CU7U\$:USE:.GTLIT

CU6G\$:PRMFL:AA,R,R,RT/NERUA/LAEEL

C107\$:PRMFL:AA,R,R,RT/NERUA/LAEEL

C107\$:PRMFL:29,W,S,RT/NERUA/LAEEL

C106\$:DATA:US

3U0\$:ENDJOB

#### APPENDIX 2(a)

Runstream to produce labels (mode = 1) for all consultants (organisation code C which is 3rd letter of alphabet) held in the sorted UK address file, RT/NERCS/UK/

CDSSS/T/ROUT(ML) GUICA: IDENT: RT/LA-RT-DP/IM122 CORCE:LCHLOAD CO301:OPTION:FORTRANARELMEMANOMAP CU401:FORTRAN:ASCII 50434:LIMITS:,25K CO455:LIBKARY:AA JOILOELECT (STINERCOIL ARICEL SCTOLARFALLTIN) COTOS:USE: GTLIT COACS: EXECUTE C1051: PRMFL: 44, R, R, RT/ WERCA/LABEL C1051:FRMFL:13/R/S/RT/NERC?/UKS \$1101:34TA:35 120±1 130±3 3007:ENE JOS

### APPENDIX 2(b)

Runotream to produce labels (mode = 1) for all recipients of Institute of Hydrology Reports (Publication code I which is 9th letter of alphabet).

CSSST.ROUT(ML) COTUE: IDENT: RYOLA-RT-CP, IHAG1 COROS: LONGOND CUBOS: OPTION: FORTRAN, REL MEM, NOMAP CO404: FURTHAN: ASCII 50455: LIBRARY: AA 505&SELECT(RT/NERC9/LAB/SELECTP:DEFAULT, M) COTUS:USE:.GTLIT DOBOF: EXECUTE: 905:LIMITS:/?OK//5OK C1054:PRMFL:AAJRJRJRT/NERCA/LAPEL C1081:PRMAL:15/R/S/RT/NEGC5/UKS C1164:DATA:05 120£1 13039 BOUNE: &OUE

### APPENDIX 3(a)

10sss/t/Rout(MA)
2Js:IDENT:RT/LA-RT-DP/IM123
3US:LOWLOAD
4US:OFTION:FCRTRAN/RELMEM/NUMAP
5US:FORTRAN:ASCII
70ssselect(RT/NeRC9/LAB/CAHM:DEFAULT/M)
EUS:USE:.GTLIT
9Ds:EXECUTE
120b:PRMFL:13/W/S/RT/NERC8/12
130s:PRMFL:15/R/S/BORIS/NERCA/RT/F
140b:PPMFL:12/W/R/ECRIS/NERCA/RT/12
120s:ENDJUB

#### WARFUDIY 2(n)

1:55/1/2007(74) 105:IDENT:RT/L-RT-DP/IH125 235:LOHLOHD 3C5:LIBRARY:L1 303:opt\_on:fortran/nomap Sus:use:.gtlit 659: fortran 7USSELECT (RT/NERC 9/LAB/SCRT:DEFAULT/M) BOSEEXECUTE 9JE:LIMITS: / 6CK 1301:Poral:L1/o/o/univac/soptule 1515:PRRFL: 13, F, S, RT/NERCe/15 1525: PRMFL: 14, W/S/RF/NERCE/14 1335:FILE:S1/x10/50R 1405:DATA:05 130110 40 0 9005:ENDUCE

# APPENDIX 3(c)

10655/T/ROUT(MA)
208:IDENT:RT/LA-RT-DP/IN123
308:LOWLOAD
406:OPTION:FORTRAN, RELMEY/NOMAP
508:FORTRAN:ASCII
70865ELECT(RT/NERCY/LAE/DAR:DEFAULT/M)
208:USE:.GTLIT
908:EXECUTE
1206:PRMFL:12/R/R/BORIS/NERCA/RT/12
1308:PRMFL:14/R/S/RT/NERC6/15
1400:PRMFL:15/M/S/PT/NERC6/15
1806:ENDUCE