BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD

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A USERS GUIDE TO THE SOURCE ROCK DATA-BASE (WILDAT)

(PROGRAM IMFN)

ON THE HEWLETT-PACKARD DATA-BASE

IMAGE SYSTEM

by

R. DeNardi

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Abstract

Two programs are currently available to obtain access to the IMAGE data-base: the IMAGE/1000 package program QUERY; and the program IMFN, which was developed by BMR, in mid 1980.

QUERY can only operate on a single detail set (refer Appendix 4), while IMFN allows access to up to 16 detail sets, linked by a common data item.

Command files have been written for IMFN which interrogate the Source Rock Data-Base (WLDAT) and respond to simple English-language promt requests of the user.

Introduction

The Source Rock Data-Base (WLDAT) was originally accessed via the IMAGE/1000 package program QUERY which allows only one detail set to be accessed and reported in any one session (DeNardi & Jackson, 1980).

In 1980, the program IMFN, developed in BMR, which allows up to sixteen detail sets to be accessed and reported in one session, was adopted. Detailed information on the IMFN program is contained in the BMR Hewlett-Packard computer system IMAGE/1000 data-base users guide (Watt, 1980).

Using IMFN, new command files were created for both retrieval and report procedures to enable interrogation of the Source Rock Data-Base with a minimum of user effort. Terminals used are located in the Petroleum Exploration Branch. Terminal 33 is a visual display unit (VDU) and terminal 50, a teletype.

Command files

Retrieval procedures

Command files will automatically access the program IMFN, and retrieve the data according to the command file selected by the user. The following files are available:

- KEYITM
- KEYO/C
- AGE
- AGEO/C
- DATAS

KEYITM - This file may be used for searching data on any of the following Key items (see Appendix 5 example 1).

SDBSN	Sedimentary Basin
WELNM	Well name
STATE	Australian states and territories
ANLYS	Analyst
RPTID	Report number

KEYO/C - This command file is similar to KEYITM but the user may select confidential or open file data (see Appendix 5 example 2)

AGE - This file may be used to search up to four different geological ages. Care must be taken to use the age abbreviations listed in Appendix 1 (see Appendix 5 example 3).

AGEO/C - This file is similar to AGE but the user may distinguish between confidential and open file data (see Appendix 5 example 4).

DATAS - This file will search for numerical data in a range defined by an upper and lower limit (see Appendix 5 example 5).

If none of the five command files is suitable to do a particular search on the data base, then the user must access the IMFN program manually and type in the appropriate FIND & REPORT commands. User instructions for the five command files, and for manual accession are given in Appendix 5.

Report procedures

Report procedure files comprise part of a command file. They reorganise the data selected by a FIND command into a set format suitable for printing. A list of report file names and their corresponding formats appear in Appendix 2.

A number of these report files have been combined (Appendix 3). These combined report files are useful when using one of the five command files, because only one report file name may be nominated.

User instructions for the report procedure files are contained in Appendix 5.

Output of data

A number of options are available for data output. Printouts may be requested from terminal 50, or for large volumes of data, output may be directed to terminal 6, a high-speed printer, located in room 77, ground floor BMR.

References

DE NARDI, R.W., JACKSON, K.S., 1980 - Petroleum Source rock computer reference system: Operating instructions. Bureau of Mineral Resources, Australia, Record 1980/4 (unpublished)

WATT, C., 1980 - BMR Hewlett-Packard Computer System IMAGE 1000 Data-Base Users guide. Unpublished printout

Appendix 1

AGE Abbreviations used in data base

PLI.=Pliocene	MIO.=Miocene	OLI.=Oliocene	PAL.=Paleocene	EOC.=Eocene	TERT.=Tertiary
CRET.=Cretaceous	JUR.=Jurassic	TRI.=Triassic	PERM.=Permian	CARB.=Carboniferous	DEV.=Devonian
SIL.=Silurian	ORD.=Ordovician	CAM.=Cambrian	PREC.=Pre Cambrian		

Appendix 2

WELINF

WELL NAME	SEDIMENTARY BASIN	AGE & FORMATION	SAMPLE DEPTH (m)	SAMPLE TYPE	ANALYST	REPORT NO.	CNFID	REFERENCE NO.

VISINF

SEDIMENTARY BASIN	WELL NAME	AGE & FORMATION	SAMPLE DEPTH (m)	LATITUDE	LONGITUDE	CNFID	ANALYST	REPORT NO.

VISIN2

SEDIMENTARY BASIN	WELL NAME	SAMPLE TYPE	SAMPLE DEPTH (m)	TOC (%)	VTREF (%)	EOM (PPM)	SATD (PPM)	AROM (PPM)	POLAR (PPM)	ASPH (PPM)	EPOC (%)	HPE (%)	REPORT NO.

VISIN3

WELL NAME	SAMPLE DEPTH (m)	TAI	EOMISO (per mil)	SATISO (per mil)	AROISO (per mil)	POLISO (per mil)	ASPISO (per mil)	VIT (%)	EXIN (%)	INER (%)	FUS (%)	PYFR1	PYFR2	PYFR3	PYFR4 (PPM)	PYFT (C)	REPORT NO.

VISIN4

WELL NAME	SAMPLE DEPTH (m)	KRGC (%)	KRGH (%)	KRGS (%)	KRGN (%)	KRGO (%)	KRGHC	KRGOC	KRGISO (per mil)	CHROM	LTGAS	CPPYR	REPORT NO.

Appendix 3

Grouped report file name	Report file names
OUTFMT	WELINF
	VISINF
	VISIN2
	VISIN3
	VISIN4
V234	VISINF
	VISIN2
	VISIN3
	VISIN4
W234	WELINF
	VISIN2
	VISIN3
	VISIN4
I234	VISIN2
	VISIN3
	VISIN4

Appendix 4

Data-Base Terminology

Command File - Controls i) access to program IMFN

ii) Retrieve procedure file

iii) Printing of output data

iv) Report procedure file

v) Termination from program IMFN

Retrieve procedure file - Retrieves data specified by a FIND command.

The format of the FIND command is:

FIND retrieve procedure END;

where retrieve procedure is a group of data item names, data item values, and relational operators joined together by logical connectors.

Report procedure file - Program instruction which accesses a report file.

The format for the command is:

REPORT NAME = procedure name

where procedure name is the name of a file containing REPORT commands stored as a procedure.

Key Item - Items considered to be useful for retrieval of data entries (ie requires no serial read to be performed when searching for data).

Data Item - The smallest entity in a data-base, consisting of a name, used to identify the data item, and a value.

eg. data item name is SDBSN and its corresponding value is COOPER.

Detail set - Set comprising up to fifty different data items.

LIST command - Program instruction which allows user to change the list device. The format for the command is:

LIST = list device;

where list device can be either a terminal or a printer.

Sort-size command - program instruction which controls the maximum number of entries that can be sorted. The form of the command is:

SORT-SIZE = number;

where number is the number of records to be sorted, the default is 1000.

Appendix 5

Example 1

Obtain source rock information for the following wells; Voluta-1, Rowans-1 and Mussel-1.

```
Terminal  :  PLEASE LOG-ON:
   User   :  ROB.PETLAB
Terminal  :  SECURITY CODE?
   User   :  8004
Terminal  :  !
   User   :  RU,IMFN,KEYITM,1,1
Terminal  :  Enter Data Item name
   User   :  WELNM [1]
Terminal  :  Enter 1st value
   User   :  ROWANS-1
Terminal  :  Enter 2nd value
   User   :  VOLUTA-1
Terminal  :  Enter 3rd value
   User   :  MUSSEL-1
Terminal  :  Enter 4th value
   User   :  DUMMY VALUE[2]
Terminal  :  00037  ENTITIES QUALIFIED
Terminal  :  Enter terminal No. for printing of output data (16[3] avoids
                                                          long delays)[4]
   User   :  6
Terminal  :  Enter report name (for output formating)
   User   :  VISINF
Terminal  :  00037  RECORDS TO BE SORTED
Terminal  :  END OF FILE
Terminal  :  NEXT?
   User   :  EXIT;
Terminal  :  IMF 33 LUN 06 SPOOL FILE -0000
Terminal  :  !
   User   :  LN,- 0000
Terminal  :  YOUR OUTPUT FILE - TF 0001
Terminal  :  !
   User   :  EX
```

Example 2

Obtain open file source rock data from BMR report SS289J.

```
Terminal  :  PLEASE LOG-ON:
   User   :  ROB.PETLAB
Terminal  :  SECURITY CODE?
   User   :  8004
Terminal  :  !
   User   :  RU,IMFN,KEYO/C,1,1
Terminal  :  Enter Data Item name
   User   :  RPTID
Terminal  :  Enter 1st value
   User   :  SS289J
Terminal  :  Enter 2nd value
   User   :  DUMMY VAL.
Terminal  :  Enter 3rd value
   User   :  DUMMY VAL.
Terminal  :  Enter 4th value
   User   :  DUMMY VAL.
Terminal  :  OPEN (Open file data)/YES (Confidential data)
   User   :  OPEN
Terminal  :  00020 ENTITIES QUALIFIED
Terminal  :  Enter term. No. for printing of output data (16 avoids long delays)
   User   :  6
Terminal  :  Enter report name (for output formating).
   User   :  I234
Terminal  :  00020 RECORDS TO BE SORTED
Terminal  :  00020 RECORDS TO BE SORTED
Terminal  :  00020 RECORDS TO BE SORTED
Terminal  :  IMF 33 LUN 06 SPOOL FILE - 0001
Terminal  :  !
   User   :  LN, - 0001
Terminal  :  YOUR OUTPUT FILE - TF0002
Terminal  :  !
   User   :  EX
```

Example 3

Obtain a listing of Permian and Ordovician source rock data.

```
Terminal  :  PLEASE LOG-ON:
   User   :  ROB.PETLAB
Terminal  :  SECURITY CODE ?
   User   :  8004
Terminal  :  !
   User   :  RU,IMFN,AGE,1,1
Terminal  :  5C
   User   :  PERM.[5]
Terminal  :  5C
   User   :  ZZZZZ
Terminal  :  4C
   User   :  ORD.[6]
Terminal  :  4C
   User   :  ZZZZ
Terminal  :  SERIAL READ MUST BE PERFORMED
Terminal  :  00500  ENTITIES QUALIFIED
Terminal  :  Enter term. No. for printing of output data (16 avoids long delays)
   User   :  16
Terminal  :  Enter report name (for output formating).
   User   :  I234
Terminal  :  00500 RECORDS TO BE SORTED
Terminal  :  00500 RECORDS TO BE SORTED
Terminal  :  00500 RECORDS TO BE SORTED
Terminal  :  !
   User   :  EX
```

Example 4

Obtain a listing of confidential Cretaceous source rock data.

```
Terminal  :  PLEASE LOG-ON:
   User   :  ROB.PETLAB
Terminal  :  SECURITY CODE ?
   User   :  8004
Terminal  :  !
   User   :  RU,IMFN,AGEO/C,1,1
Terminal  :  5C
   User   :  CRET.
Terminal  :  5C
   User   :  ZZZZZ
Terminal  :  4C
   User   :  ZZZZ
Terminal  :  4C
   User   :  ZZZZ
Terminal  :  OPEN (Open file data)/(YES (Confidential data).
   User   :  YES
Terminal  :  SERIAL READ MUST BE PERFORMED
Terminal  :  00390  ENTITES QUALIFIED
Terminal  :  Enter term. No. for printing of output data (16 avoids long delays).
   User   :  16
Terminal  :  Enter report name (for output formating).
   User   :  V234
Terminal  :  00390  RECORDS TO BE SORTED
Terminal  :  00390  RECORDS TO BE SORTED
Terminal  :  00390  RECORDS TO BE SORTED
Terminal  :  00390  RECORDS TO BE SORTED
Terminal  :  !
   User   :  EX
```

Example 5

Obtain a listing of source rock data which have Vitrinite Reflectance values between 0.85% and 1.35%.

```
Terminal  :  PLEASE LOG-ON:
   User   :  ROB.PETLAB
Terminal  :  SECURITY CODE ?
   User   :  8004
Terminal  :  !
   User   :  RU,IMFN,DATAS,1,1
Terminal  :  Enter Data Item name
   User   :  VTREF
Terminal  :  Enter Min. Val.
   User   :  0.85
Terminal  :  Enter Data Item name
   User   :  VTREF
Terminal  :  Enter Max. Val.
   User   :  1.35
Terminal  :  SERIAL READ MUST BE PERFORMED
Terminal  :  000290  ENTITIES QUALIFIED
Terminal  :  Enter term. No. for printing of output data (16 avoids long delays).
   User   :  6
Terminal  :  Enter sort-size (Min. = 1000).
   User   :  1000
Terminal  :  Enter report name (for output formating).
   User   :  VISIN2
Terminal  :  000290  RECORDS TO BE SORTED
Terminal  :  END OF FILE
Terminal  :  NEXT?
   User   :  EXIT;
Terminal  :  IMF 33 LUN 06 SPOOL FILE -0002
Terminal  :  !
   User   :  LN, -0002
Terminal  :  YOUR OUTPUT FILE -TF0003
Terminal  :  !
   User   :  EX
```

Example 6

Obtain a listing of confidential source rock data from Yongala-1 (Eromanga basin only), contained in BMR report SS289F.

```
Terminal  :  PLEASE LOG-ON:
   User   :  ROB.PETLAB
Terminal  :  SECURITY CODE ?
   User   :  8004
Terminal  :  !
   User   :  RU,IMFN,1,1
Terminal  :  DATA-BASE : SECURITY = ?
   User   :  WLDAT:8005
Terminal  :  NEXT?
   User   :  LINK = MREFN;
Terminal  :  NEXT ?
   User   :  FIND SDBSN IS "EROMANGA" AND WELNM IS "YONGALA-1"
             AND RPTID IS "SS289F" AND CNFID IS "YES" END;
Terminal  :  00004  ENTITIES  QUALIFIED
Terminal  :  NEXT ?
   User   :  REPORT NAME = WELINF;
Terminal  :  0004  RECORDS TO BE SORTED
   User   :  LIST = 6;
Terminal  :  NEXT ?
```

At this stage another REPORT command, a new FIND command or an EXIT command may be typed in.

```
   User   :  EXIT;
Terminal  :  IMF  33  LUN  06  SPOOL  FILE  -0003
Terminal  :  !
   User   :  LN, -0003
Terminal  :  YOUR OUTPUT FILE -TF 0004
Terminal  :  !
   User   :  EX
```

Notes

1. For a complete listing of data-item names and their description refer to Appendix 6.

2. If less than 4 different values are to be entered then dummy values need to be inserted. An entry should never be left blank as this will result in an incorrect number of entities qualifying.

3. 16 will automatically send the output to the line printer i.e. no need for operator to attach file once the sort has been completed.

4. User may change terminal No. for printing of output data.

5. 5 characters must be entered e.g. CRET., PERM. etc, not to be used for a four character age (see Appendix 1).

6. 4 characters must be entered e.g. ORD., CAM., etc.

APPENDIX 6

Data Base = WLDAT

WLDAT items	Max. No. of columns	Description
REFNO	8	Reference number
WELNM	20	Well name
GRDNS	12	N-S Grid or Latitude
GRDEW	12	E-W Grid or longitude
SDBSN	20	Sedimentary basin
LCRPT	20	Location of report
SAMTY	4	Sample type
SAMDP	14	Sample depth (metres)
FMAGE	20	Formation and age
TOC%	4	Total organic carbon
VTREF	4	Vitrinite reflectance
TAI	4	Thermal alteration index, spore colouration (prefix F means 0-5 scale, prefix T means 0-10 scale)
EOM	6	Extractable organic material (ppm)
SATD	6	Saturated hydrocarbons (ppm)
AROM	6	Aromatic hydrocarbons (ppm)
POLAR	6	Polar, N.S.O. - containing organic compounds (ppm)
ASPH	6	Asphaltenes (ppm)
EPOC	6	Total extract (EOM) as % organic carbon
HPOC	4	Total hydrocarbons (SATS + AROM) as % organic carbon
HPE	4	Total hydrocarbon as % extract
CHROM	4	Availability of gas chromatographic analysis of hydrocarbon fractions (usually SATD)
LTGAS	4	Availability of light gas analysis
EOMISO	6	C13/C12 isotopic ratio (in per mil %.) for EOM
SATISO	6	C13/C12 isotopic ratio in per mil %.) for SATD
AROISO	6	C13/C12 isotopic ratio (in per mil %.) for AROM
POLISO	6	C13/C12 isotopic ratio (in per mil %.) for POLAR
ASPISO	6	C13/C12 isotopic ratio (in per mil %.) for ASPH
KRGC	4	Kerogen analysis % carbon
KRGH	4	" " " hydrogen
KRGS	4	" " " sulphur
KRGN	4	" " " nitrogen
KRGO	4	" " " oxygen
KRGHC	4	Kerogen atomic H/C ratio
KRGOC	4	" " O/C "
KRGISO	4	C13/C12 isotopic ratio (in per mil %.) for kerogen

WLDAT items	Max no of columns	Description
PYFR1	4	Rock Eval pyrolysis hydrogen index
PYFR2	4	Rock Eval pyrolysis production index
PYFR3	4	Rock Eval pyrolysis oxygen index
PYFR4	6	Rock Eval pyrolysis potential yield (ppm)
PYFT	6	Rock Eval pyrolysis temperature at maximum rate (^{o}C)
CPPYR	4	Availability of curie point (fixed temperature) pyrolysis
VIT	4	% Vitrinite in organic maceral description
EXIN	4	% Exinite in organic maceral description
INER	4	% Interinite " " "
FUS	4	% Fusinite + semi-fusinite in organic maceral description
CNFID	4	Confidentiality
ANLYS	10	Analyst
CSTMR	6	Analysis customer
RPTID	6	Report identification
STATE	6	Australian States and territories

$$HPE = \frac{SATD(ppm) + AROM(ppm)}{EOM(ppm)} \times \frac{100}{1}$$

$$EPOC = \frac{EOM(ppm)}{TOC(\%) \times 10^{4}} \times \frac{100}{1}$$

$$HPOC = \frac{SATD(ppm) + AROM(ppm)}{TOC(\%) \times 10^{4}} \times \frac{100}{1}$$