DEPARTMENT OF
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PETROLEUM SOURCE ROCK COMPUTER REFERENCE SYSTEM: OPERATING INSTRUCTIONS

by

R.W. DeNardi & K.S. Jackson

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CONTENTS

General: A computer reference system has been established to enable ready retrieval and sorting of petroleum source rock data held at BMR. The items contained in the data base are listed in Appendix 1. They are stored on magnetic discs in BMR's Hewlett-Packard 2117F computer and can be retrieved from any of the on-line terminals. Confidential information held in the system is appropriately identified.

To obtain access to QUERY (the program that manipulates the data base)

terminal	*
command	RU, QUERY, terminal No., 6[1]
terminal reply	QUERY/1000 (8.2) READY
	NEXT?
command	DATA-BASE = WLDAT: security code;
terminal reply	LEVEL = ?
command	WTACC;
terminal reply	MODE = ?
command	1;
terminal reply	NEXT;
command	SELECT-FILE=SELTX;
terminal reply	NEXT;

N.B. The operator should note that the RETURN key must always be pressed after a command has been typed-in.

To extract data

Once logged in, the next step is to type-in a series of commands in order to obtain the information required. A general form for typing-in the commands is given below.

FIND XXX[2] IS[3] "YYY[4]" END;

or

FIND XXX IS "YYY" AND XXX ILT "YYY" END;

or

FIND XXX IS "YYY" AND XXX IGT "YYY" AND XXX ILT "YYY" END;

or

FIND XXX IGT "YYY" OR XXX ILT "YYY" END;

Example 1

To list the wells in the Canning Basin which have a vitrinite reflectance of, say, between 0.80% and 1.35%, the command format would be as follows:

```
        command        FIND SDBSN IS "CANNING" AND
                       VTREF IGT "0.80" AND VTREF
                       ILT "1.35" END;
terminal reply         00010 ENTRIES QUALIFIED
```

For the wells qualified, items need to be chosen and arranged in a suitable format for output. For example if the items selected are: well name (WELNM), formation and age (FMAGE), extractable organic matter (EOM), vitrinite reflectance (VTREF), and total organic carbon (TOC%), they should be typed-in as follows:

```
        command        REPORT;
        command        S, VTREF;5
        command        D, WELNM, 20;6
        command        D, FMAGE, 41;
        command        D, EOM, 51;
        command        D, VTREF, 61;
        command        D, TOC%, 71;
        command        END;
terminal reply         NEXT;
```

Column No.	20	41	51	61	71
Item	WELNM	FMAGE	EOM	VTREF	TOC%

Output spacing arrangement for the above example

At this stage an EXIT command can be given or another question typed-in.

To exit, type-in:

```
        command        EXIT;
terminal reply         QUERY LUN 06 ATTACHED TO FILE-0046
                       *
        command        LN,-0046
```

The output will now be made available at the lineprinter.

It will become evident from example 2 that the formatting of the output can be simplified requiring possibly only one command statement.

Example 2

To list in alphabetical order wells in the Cooper Basin which are contained in source rock reports SS289J or C3, the command format would be as follows:

```
command          FIND SDBSN IS "COOPER" AND RPTID
                 IS "SS289J", "    C3" END;
terminal reply   0000000010 ENTRIES QUALIFIED
```

Several options are now available to the operator. Firstly, for the qualified entries list the well name (WELNM), sample depth (SAMDP), vitrinite reflectance (VTREF), extractable organic matter (EOM), saturated hydrocarbons (SATD), total extract as percent organic carbon (EPOC), and Rock-Eval pyrolysis hydrogen index (PYFR1).

```
Command    REPORT;
   "       S, WELNM;
   "       D, WELNM, 22;
   "       D, SAMDP, 30;
   "       D, VTREF, 36;
   "       D, EOM, 42;
   "       D, SATD, 52;
   "       D, EPOC, 60;
   "       D, PYFR1, 66;
   "       END;
```

However, to save time in output formatting, five options are presently contained in a series of files which are listed in Appendix 3.

If for example, VISI1 and VISI2 (see Appendix 3) were suitable output formats, the following would be typed-in after the terminal had replied with the number of entries qualified.

```
       command     REPORT NAME = VISI1;
terminal reply     NEXT?
       command     REPORT NAME = VISI2;
terminal reply     NEXT?
       command     EXIT;
```

The output would then appear as follows:

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SEDIMENTARY BASIN	WELL NAME	AGE & FORMATION	LATITUDE	LONGITUDE	SAMPLE TYPE	CNF ID	ANALYST	REPORT No.	REFERENCE No.
COOPER	BURY-1	PERM. UNNAMED	25 02'40"S	145 36'20"E	CORE	YES	ROB./RES.	SS289J	00001647
	CUMBROO-1	TRIA. HUTTON SST.	26 13'40"S	143 22'47"E	CORE	YES	ROB./RES.	SS289J	00001600
		TRIA. CHANDOS GRP	26 13'40"S	143 22'47"E	CORE	YES	ROB./RES.	SS289J	00001601
		TRIA. CHANDOS GRP	26 13'40"S	143 22'47"E	CORE	YES	ROB./RES.	SS289J	00001602
		PERM. GIDGEALPA FM.	26 13'40"S	143 22'47"E	CORE	YES	ROB./RES.	SS289J	00001603
	ETONVALE-1	PERM. UNNAMED	25 09'40"S	144 59'40"E	CORE	YES	ROB./RES.	SS289J	00001637
	MT. HOWITT-1	L/TRIA. NAPPAMERRN FM	26 37'27"S	142 28'17"E	CORE	YES	ROB./RES.	SS289J	00001595
		L/TRIA. NAPPAMERRN FM	26 37'27"S	142 28'17"E	CORE	YES	ROB./RES.	SS289J	00001594
	THUNDA-1		25 29'28"S	143 28'28"E	CORE	YES	ROB./RES.	SS289J	00001613
		PERM. GIDGEALPA FM.	25 29'30"S	143 28'28"E	CORE	YES	ROB./RES.	SS289J	00001614

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SEDIMENTARY BASIN	WELL NAME	DEPTH (m)	TOC (%)	VTREF (%)	EOM (ppm)	SATD (ppm)	AROM (ppm)	POLAR (ppm)	ASPH (ppm)	EPOC (%)	HPE (%)	REPORT No.	REFERENCE No.
COOPER	BURY-1	1511.0	0.39	0.54								SS289J	00001647
COOPER	CUMBROO-1	1935-0	3.13	0.64	6673					21.31	3.0	SS289J	00001600
COOPER	CUMBROO-1	2025.0	1.42	0.67	2820					19.85	2.0	SS289J	00001601
COOPER	CUMBROO-1	2029.0	22.4	0.72	10773					4.79	5.0	SS289J	00001602
COOPER	CUMBROO-1	2156.0	25.9	0.81	5350					2.06	2.0	SS289J	00001603
COOPER	ETONVALE-1	1715.0	2.38	0.76	1520					6.38	4.0	SS289J	00001637
COOPER	MT. HOWITT-1	1744.0	0.18	0.97								SS289J	00001595
COOPER	MT. HOWITT-1	1746.0	0.22	0.73								SS289J	00001594
COOPER	THUNDA-1	2291.0		0.09								SS289J	00001613
COOPER	THUNDA-1	2334.0	0.30	0.90	221					7.36		SS289J	00001614

Problems can be created when typing in a FIND command if not enough space is allowed for the specific item; this is only applicable to right-justified entries as shown in Appendix 4.

For example:

```
FIND SDBSN IS "CANNING" AND EOM IGT
"    30" AND EOM ILT "  2000" END;
```

The item EOM has, according to Appendix 1, a maximum spacing of 6 and is a right-justified item; therefore, a number such as 30 must be preceded by 4 blanks and similarly 2000 must be preceded by 2 blanks.

If a more detailed knowledge of the data base (QUERY) system is required, section VII of the Image handbook is recommended.

Notes

1. The 6 will transfer the output to the line printer, ground floor BMR. If the output is required at the terminal you are working, replace the 6 by the terminal number.
2. The X's refer to items listed in Appendix 1.
3. A key to the relational operators is given in Appendix 2.
4. The Y's refer to either numerical values or alphabetic characters.
5. On this command, output is listed in increasing order of vitrinite reflectance. If the output is to be listed according to well names in alphabetical order then it should be typed as, S, WELNM;
6. 20 refers to the maximum number of allowable spaces for well name:

APPENDIX 1

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	6	Sample depth
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 SAT
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
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 (°C)
CPPYR	4	Availability of Curie point (fixed temperature) pyrolysis

WLDAT items	Max. no. of columns	Description
VIT	4	% Vitrinite in organic maceral description
EXIN	4	% Exinite in organic maceral description
INER	4	% Inertinite in organic maceral description
FUS	4	% Fusinite + semi-fusinite in organic maceral description
CNFID	4	Confidentiality
ANLYS	10	Analyst
CSTMR	6	Analysis customer
RPTID	6	Report identification

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

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

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

APPENDIX 2

Relational operator	Meaning
IS	equals
IGT	is greater than
ILT	is less than
INGT	is not greater than
INLT	is not less than

Appendix 3

VISI1

SEDIMENTARY BASIN	WELL NAME	AGE & FORMATION	LATITUDE	LONGITUDE	SAMPLE TYPE	CNFID	ANALYST	REPORT No.	REFERENCE No.

VISI2

SEDIMENTARY BASIN	WELL NAME	DEPTH (m)	TOC (%)	VTREF (%)	EOM (ppm)	SATD (ppm)	AROM (ppm)	POLAR (ppm)	ASPH (ppm)	EPOC (%)	HPE (%)	REPORT No.	REFERENCE No.

VISI3

REFERENCE No.	TAI	CHROM	LTGAS	EOMISO (per mil)	SATISO (per mil)	AROISO (per mil)	POLISO (per mil)	ASPISO (per mil)	CPPYR	VIT (%)	EXIN (%)	INER (%)	FUS (%)	PYFR1	PYFR2	PYFR3	PYFR4 (ppm)	PYFT (°C)

VISI 4

REFERENCE No.	KRGC (%)	KRGH (%)	KRGS (%)	KRGN (%)	KRGO (%)	KRGHC	KRGOC	KRGISO (per mil)

WELIST

WELL NAME	SEDIMENTARY BASIN	FORMATION & AGE	DEPTH m	ANALYST	REPORT No.	CNFID	REFERENCE No.

APPENDIX 4

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
REFNO	*	*	*	*	*	*	*	*												
WELNM	$	$	$	$	$															
GRDNS		*	*		*	*	'	*	*	"	S									
GRDEW	*	*	*		*	*	'	*	*	"	E									
SDBSN	$	$	$	$	$															
LCRPT	$	$	$	$																
SAMTY	$	$	$	$																
SAMDP		*	*	*	.	*														
FMAGE	$	$	$	$	$															
TOC %	*	.	*	*																
VTREF	*	.	*	*																
TAI	F	*	.	*																
EOM			*	*	*	*														
SATD				*	*	*														
AROM				*	*	*														
POLAR				*	*	*														
ASPH				*	*	*														
EPOC		*	*	.	*	*														
HPOC	*	.	*	*																
HPE		*	.	*																
CHROM	$	$	$																	
LTGAS	$	$	$																	
EOMISO		-	*	*	.	*														
SATISO		-	*	*	.	*														
AROISO		-	*	*	.	*														
POLISO		-	*	*	.	*														
ASPISO		-	*	*	.	*														
KRGC	*	*	.	*																
KRGH	*	.	*	*																
KRGS	*	.	*	*																
KRGN	*	.	*	*																
KRGO	*	*	.	*																
KRGHC	*	.	*	*																
KRGOC	*	.	*	*																
KRGISO																				
PYFR 1		*	*	*																
PYFR 2	*	.	*	*																
PYFR 3																				
PYFR 4			*	*	*	*														
PYFT				*	*	*														
CPPYR	$	$	$																	
VIT		*	*	*																
EXIN		*	*	*																
INER		*	*	*																
FUS		*	*	*																
CNFID	$	$	$																	
ANLYS	$	$	$	$	$	$														
CSTMR	$	$	$																	
RPTID				*	*	*														

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
REFNO																				
WELNM																				
GRDNS																				
GRDEW																				
SDBSN																				
LCRPT																				
SAMTY																				
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HPOC																				
HPE																				
CHROM																				
LTGAS																				
EOMISO																				
SATISO																				
AROISO																				
POLISO																				
ASPISO																				
KRGC																				
KRGH																				
KRGS																				
KRGN																				
KRGO																				
KRGHC																				
KRGOC																				
KRGISO																				
PYFR 1																				
PYFR 2																				
PYFR 3																				
PYFR 4																				
PYFT																				
CPPYR																				
VIT																				
EXIN																				
INER																				
FUS																				
CNFID																				
ANLYS																				
CSTMR																				
RPTID																				

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$ *Alphabetical characters (left justified)*

* *Numerical values (right justified)*

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