DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Rept. Bk. No. 82/72

ORGANIC CARBON AND TRACE ELEMENT INVESTIGATIONS, COOPER BASIN SEDIMENTS. FIFTH PROGRESS REPORT: CARBON DISTRIBUTION

GEOLOGICAL SURVEY

By

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November, 1982

D.M.E. No. 225/78

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DEPARTMENT OF MINES AND ENERGY
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Disk No. 126

ORGANIC CARBON AND TRACE ELEMENT INVESTIGATIONS, COOPER BASIN SEDIMENTS
FIFTH PROGRESS REPORT: CARBON DISTRIBUTION

ABSTRACT

Carbonate carbon and to a lesser extent organic carbon are remarkably persistent in their pattern of vertical distribution regardless of structural position. Detailed correlations may be made across the southeast of the basin. Idealised chemostratigraphic successions are proposed which although generally reflecting the accepted stratigraphic rock units are in detail distinctively different.

INTRODUCTION

In April, 1978, a joint project - "Organic Carbon and Trace Element Investigations" - was commenced by the S.A. Department of Mines and Energy and W.G. Shackleton of Salisbury College of Advanced Education (SCAE). The major purpose of this project was to identify possible relationships between the organic and elemental carbon (C_{org}) content and the trace metal content of sedimentary rocks.

The initial results indicated that there is no significant correlation between C_{org} and trace metal content but that rock units may be recognised and defined by their trace element content (Shackleton, 1979; 1981a,b; 1982). As work progressed it became apparent that although it was possible to correlate C_{org} and trace element content from well to well, boundaries between chemostratigraphic units did not necessarily coincide with the boundaries of the established rock units.

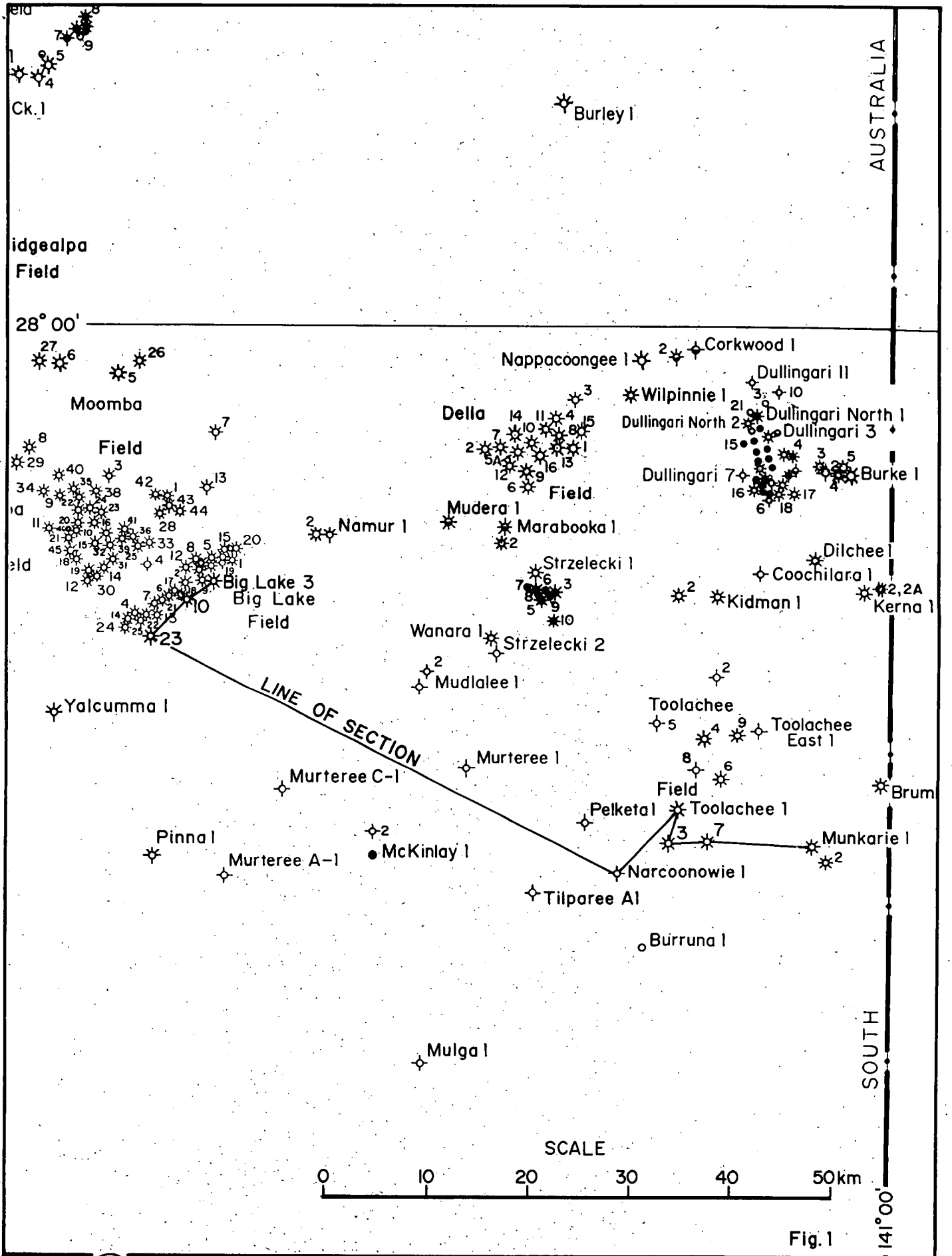

Fig. 1

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
LOCATION OF WELLS INVESTIGATED

COMPILED W.S.	C.D.O. DATE
DRAWN A.F.	SCALE 1 : 500 000
DATE 2-11-82	PLAN NUMBER S16446
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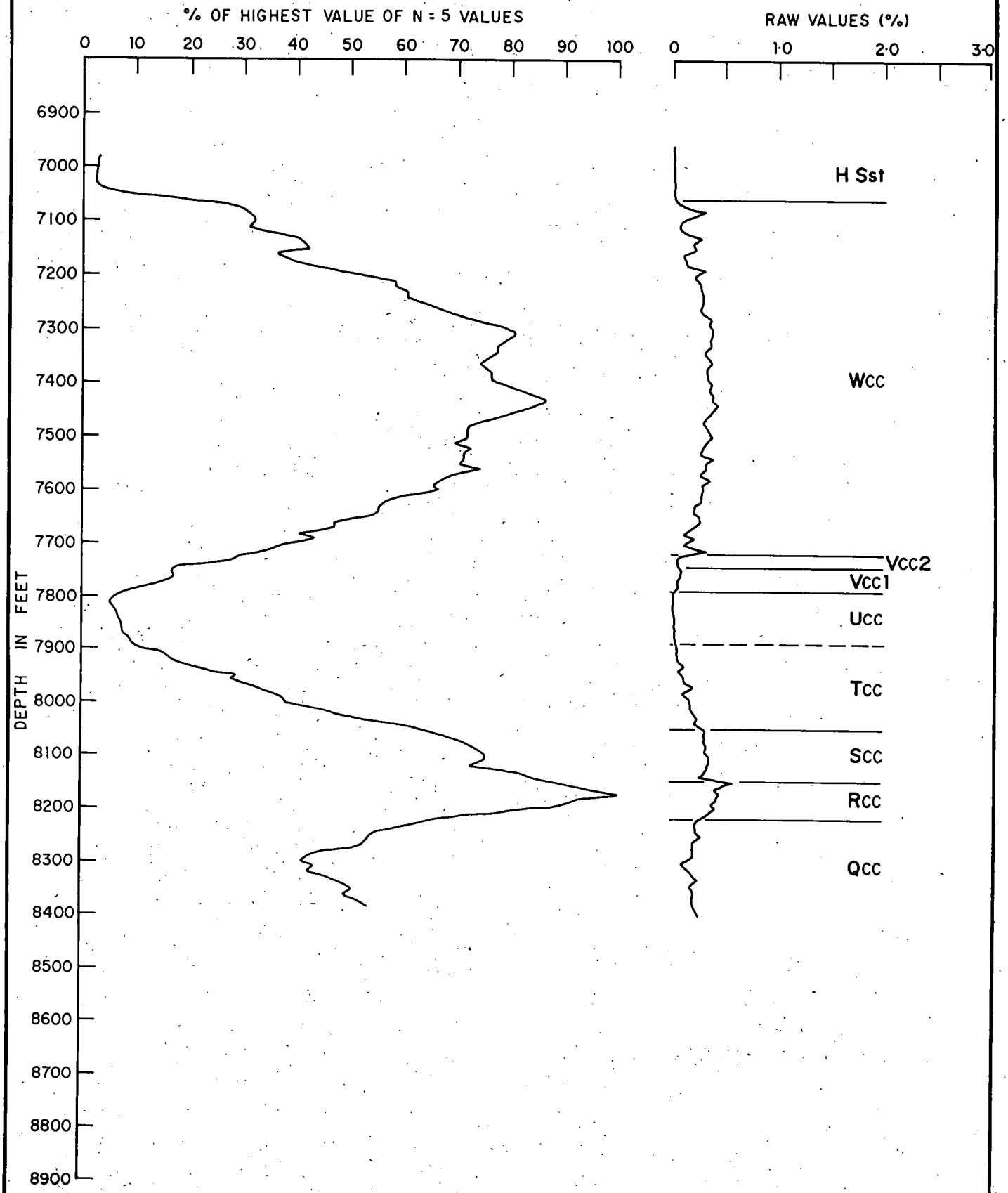

Fig. 2

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
BIG LAKE 3
CARBONATE CARBON VALUES

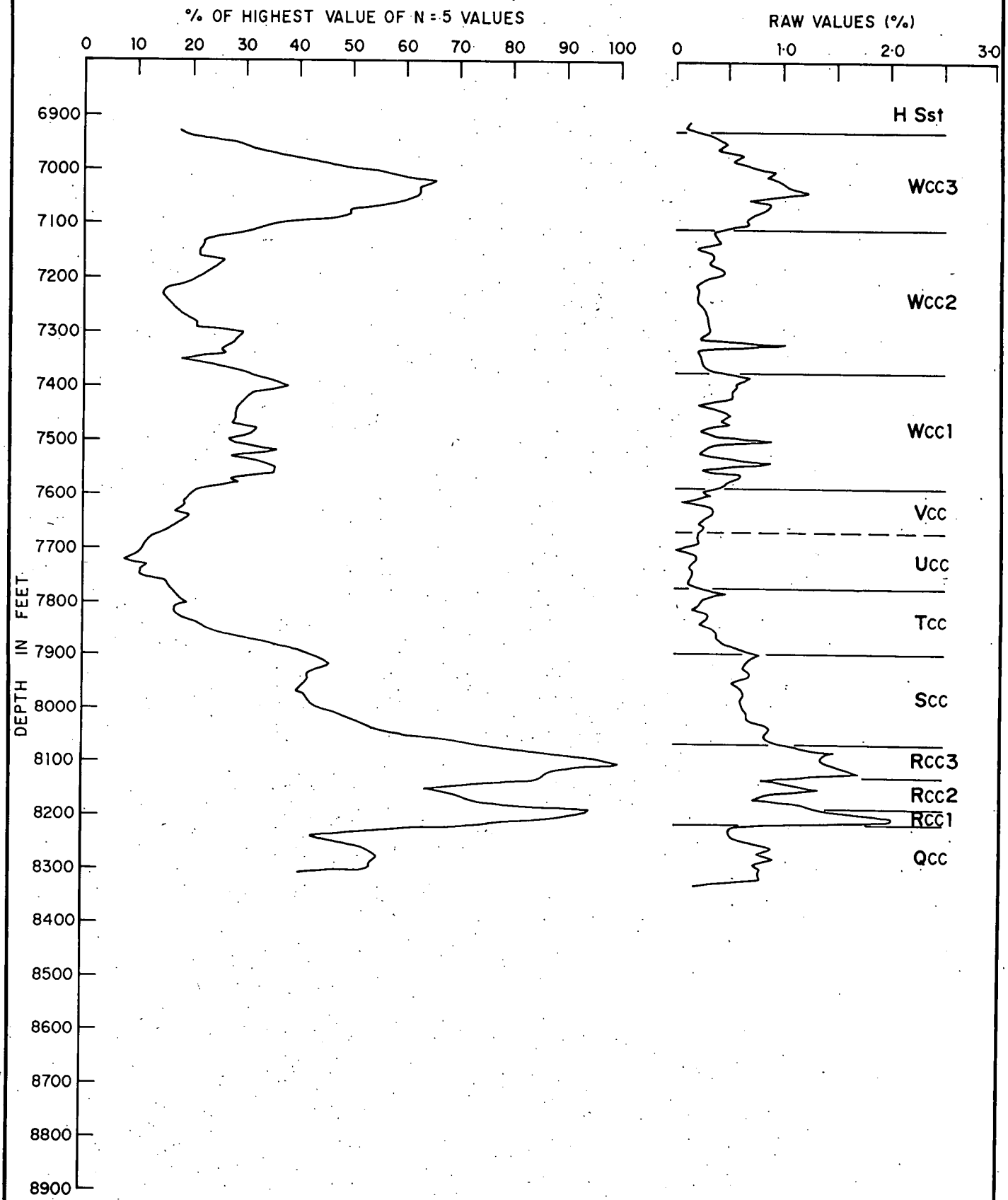

Fig. 3

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
BIG LAKE 10
CARBONATE CARBON VALUES

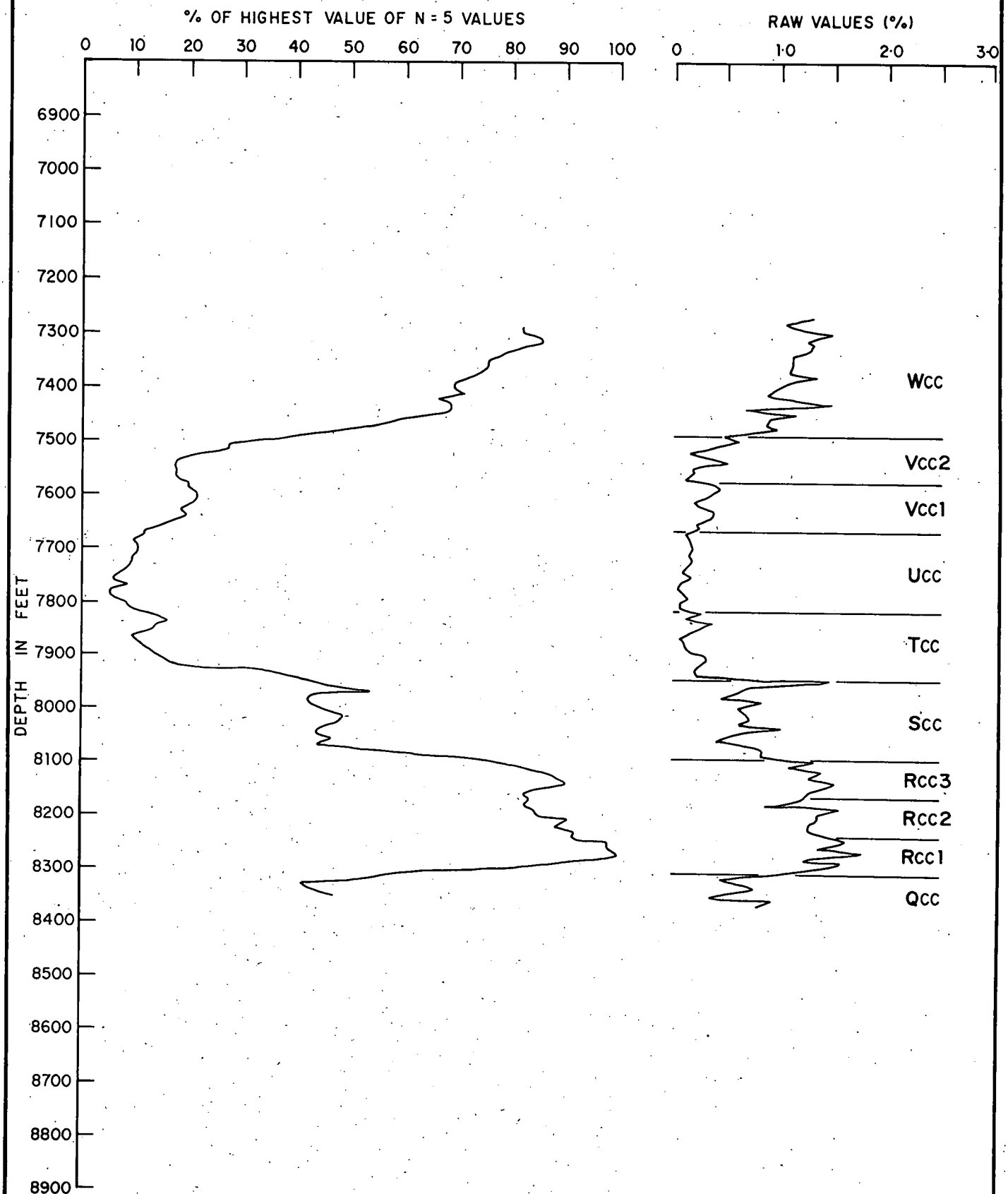

Fig. 4

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DATE 15-10-82

PLAN NUMBER S16449

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
BIG LAKE 23
CARBONATE CARBON VALUES

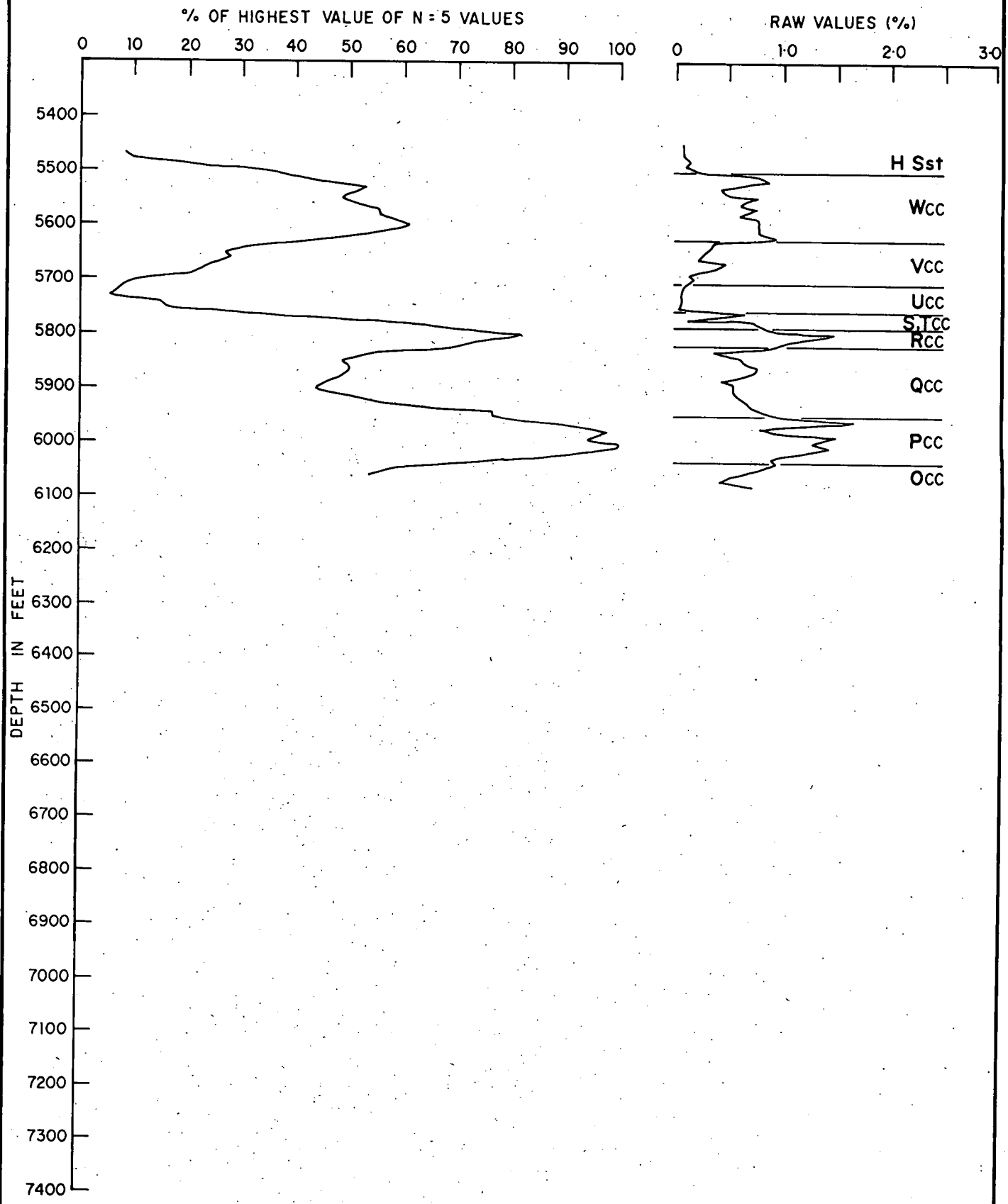

Fig. 5

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
NARCOONOWIE 1
CARBONATE CARBON VALUES

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DATE 15-10-82	PLAN NUMBER S16450
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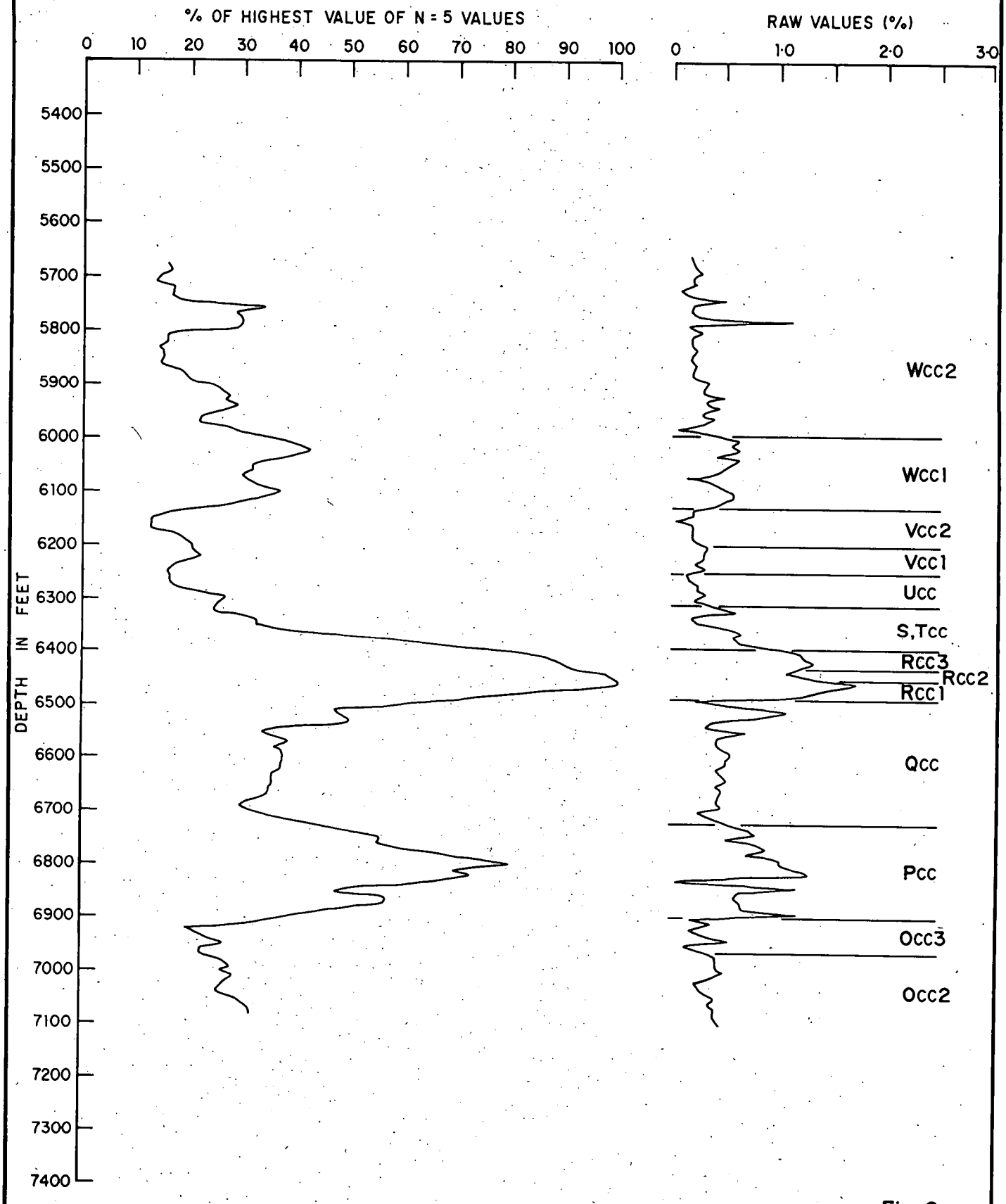

Fig. 6

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SCALE 1: 3048 Vertical

DATE 15-10-82

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
TOOLACHEE 1
CARBONATE CARBON VALUES

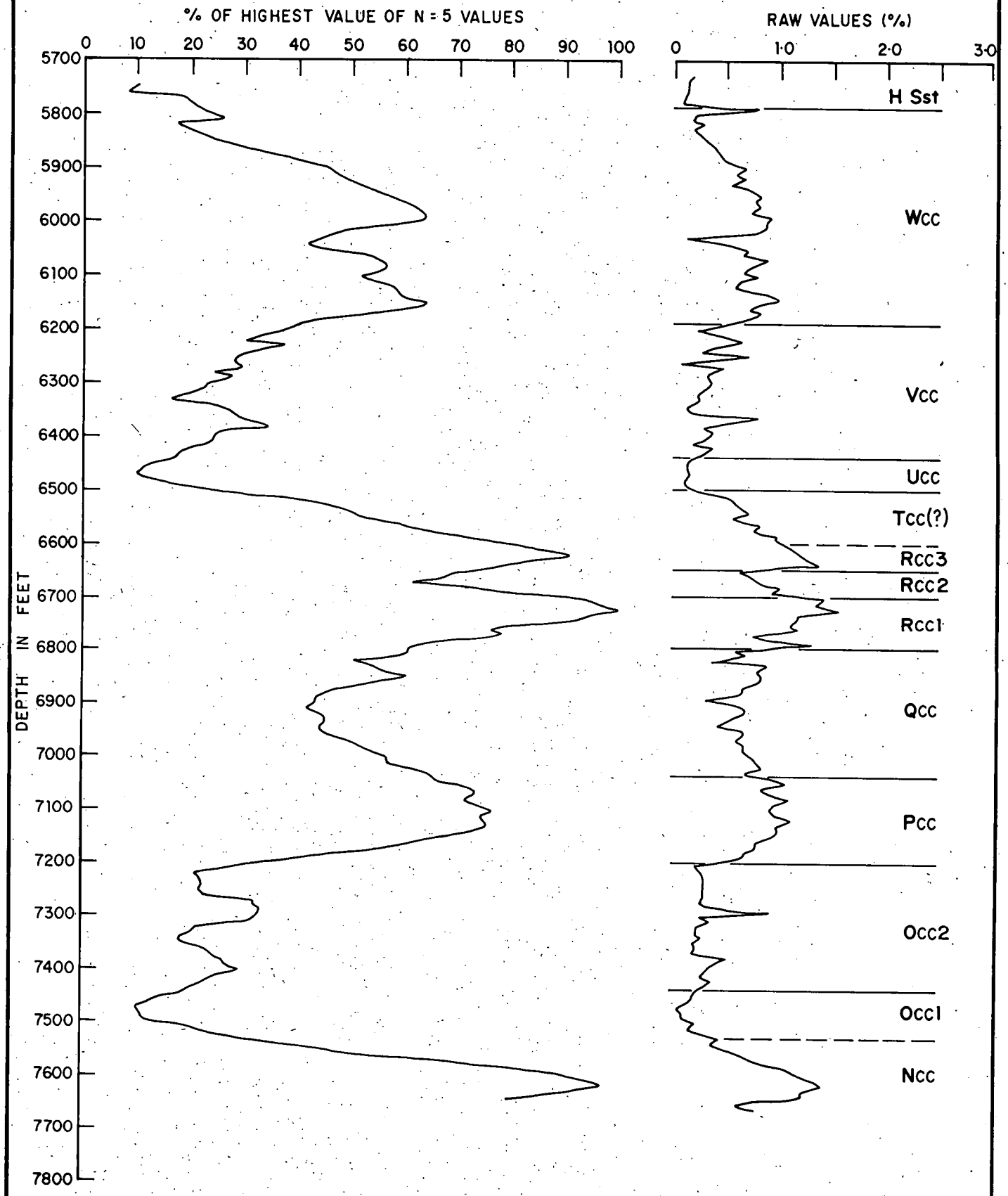

Fig. 7

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
TOOLACHEE 3
CARBONATE CARBON VALUES

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DATE 15-10-82	PLAN NUMBER S16452
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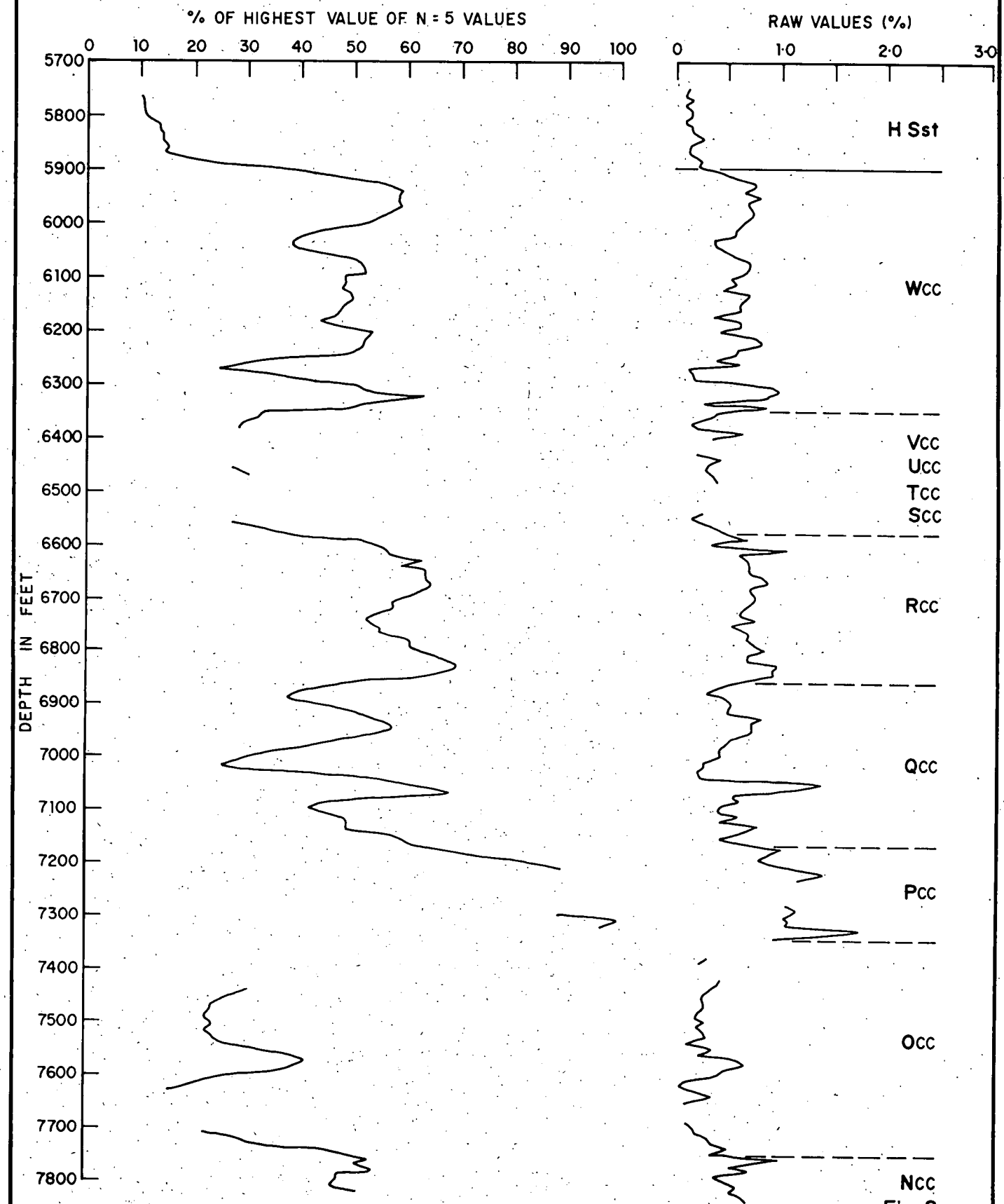

Fig. 8

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C.D.O DATE

DRAWN A. F.

SCALE 1: 3048 Vertical

DATE 15-10-82

PLAN NUMBER S16453

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
TOOLACHEE 7
CARBONATE CARBON VALUES

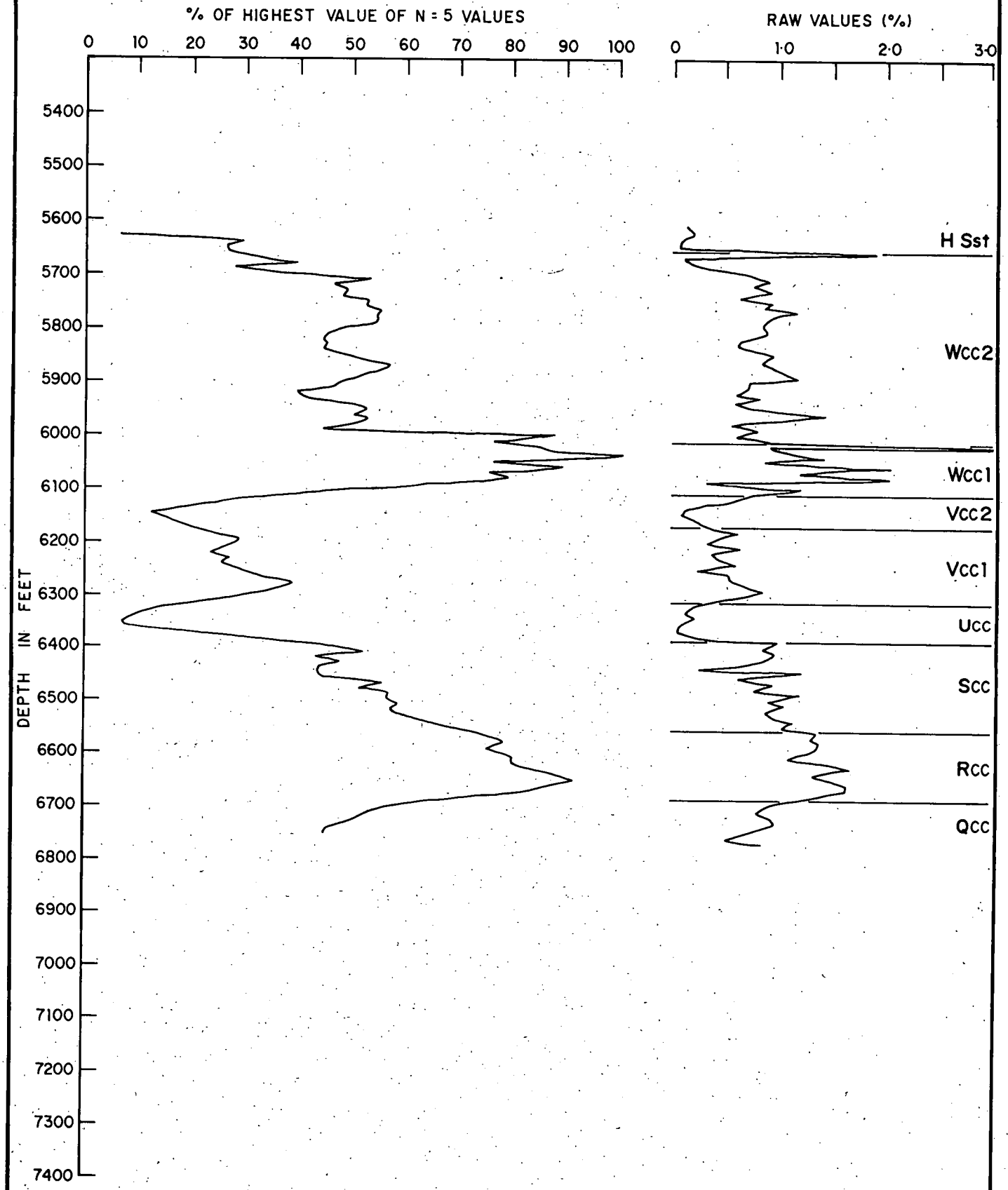

Fig. 9

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
MUNKARIE 1
CARBONATE CARBON VALUES

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DRAWN A.F.	SCALE 1:3048 Vertical
DATE 15-10-82	PLAN NUMBER S16454
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This report proposes a chemostratigraphic succession in the Permian of the Cooper Basin based on C_{org} and carbonate carbon (C_{CO_3}) content only.

The following wells were investigated:-

Big Lake No. 3

Big Lake No. 10

Big Lake No. 23

Narcoonowie No. 1

Toolachee No. 1

Toolachee No. 3

Toolachee No. 7

Munkarie No. 1

The locations of these wells are shown on Fig. 1.

PREPARATION AND TREATMENT OF SAMPLES

Cuttings were treated as described by Shackleton (1979, 1981a). A complete listing of all analytical results obtained during this investigation will be issued as a separate report.

DISCUSSION OF RESULTS

Following Shackleton (1979), results were plotted both as raw values and as rolling means (n = 5). Figs. 2 to 9 are of C_{CO_3} values and figs. 10 to 17 are of C_{org} values. C_{CO_3} values are expressed as a percentage of the highest value in each well to allow comparison with the low absolute values in Big Lake No. 3.

Carbonate Carbon

The rolling mean plots were examined first to determine if there are any similarities from well to well. With the exception of Toolachee No. 7, a peak of high values occurs in the middle of the sequence, above which is a deep trough. In detail, the similarities are striking, even between Munkarie No. 1 in the far east of the basin and Big Lake Nos. 10 and 23 in the centre.

Although the smoothing effect of the rolling mean technique enables such comparisons to be made, the plots of raw data are more useful when attempting to determine accurately the boundaries between chemostratigraphic units. The chemostratigraphic units were selected without reference to the established stratigraphy.

A detailed description of each of the distinctive units proposed is given below, commencing from the bottom of the sequence. The subscript cc is used to distinguish C_{CO_3} units from C_{org} units ($_{CO}$). Values given are absolute, neglecting the anomalously (?) low values of Big Lake No. 3.

Unit N_{cc} Moderate to high values (0.5 to nearly 1.5 per cent), only seen in Toolachee Nos. 3 and 7 because these are the only two wells in which sampling extended deep enough.

Unit O_{cc} Averaging overall about 0.25 per cent, this unit contains a trough of quite low values at the bottom, a middle zone of higher values and an upper zone of consistently low values with minor fluctuations. On the basis of the data from the Toolachee wells, even with the incomplete data from Toolachee No. 7, this unit may be subdivided into $O_{cc}1$, $O_{cc}2$ and $O_{cc}3$.

Unit P_{cc} On entering this unit the C_{CO_3} content rises sharply to relatively high values of about 1.0 per cent. This unit forms a major peak on the rolling mean plots.

Unit Q_{cc} Moderate values ranging from 0.5 to 0.75 per cent prevail with little fluctuation. There is usually a very abrupt increase in values on passing up into the overlying unit.

Unit R_{cc} Generally the highest value unit in the succession with values greater than 1.0 per cent. In many wells, however, there is a central trough of varying values which is best seen in the rolling mean plots. This unit may thus be subdivided into $R_{cc}1$, $R_{cc}2$ and $R_{cc}3$.

Unit S_{cc} A plateau of lower values than R_{cc}; about 0.5 to 0.75 per cent. The upper limit is often indicated by a solitary high value. This unit is not always present.

Unit T_{cc} There is often a sharp drop in values on entering this unit, which appears to be transitional between units S_{cc} and U_{cc}. Not always present.

Unit U_{cc} Values are consistently very low (less than 0.25 per cent), the lowest in the Permian succession. Always present, although subtle in Toolachee No. 1 (and Toolachee No. 7?).

Unit V_{cc} Moderately low and erratic values (0.25 to 0.5 per cent), often containing a trough of lower values at the top, hence subdivided into $V_{cc}1$ and $V_{cc}2$. There is some similarity between the interval V_{cc} plus U_{cc} and O_{cc}. Present in all wells.

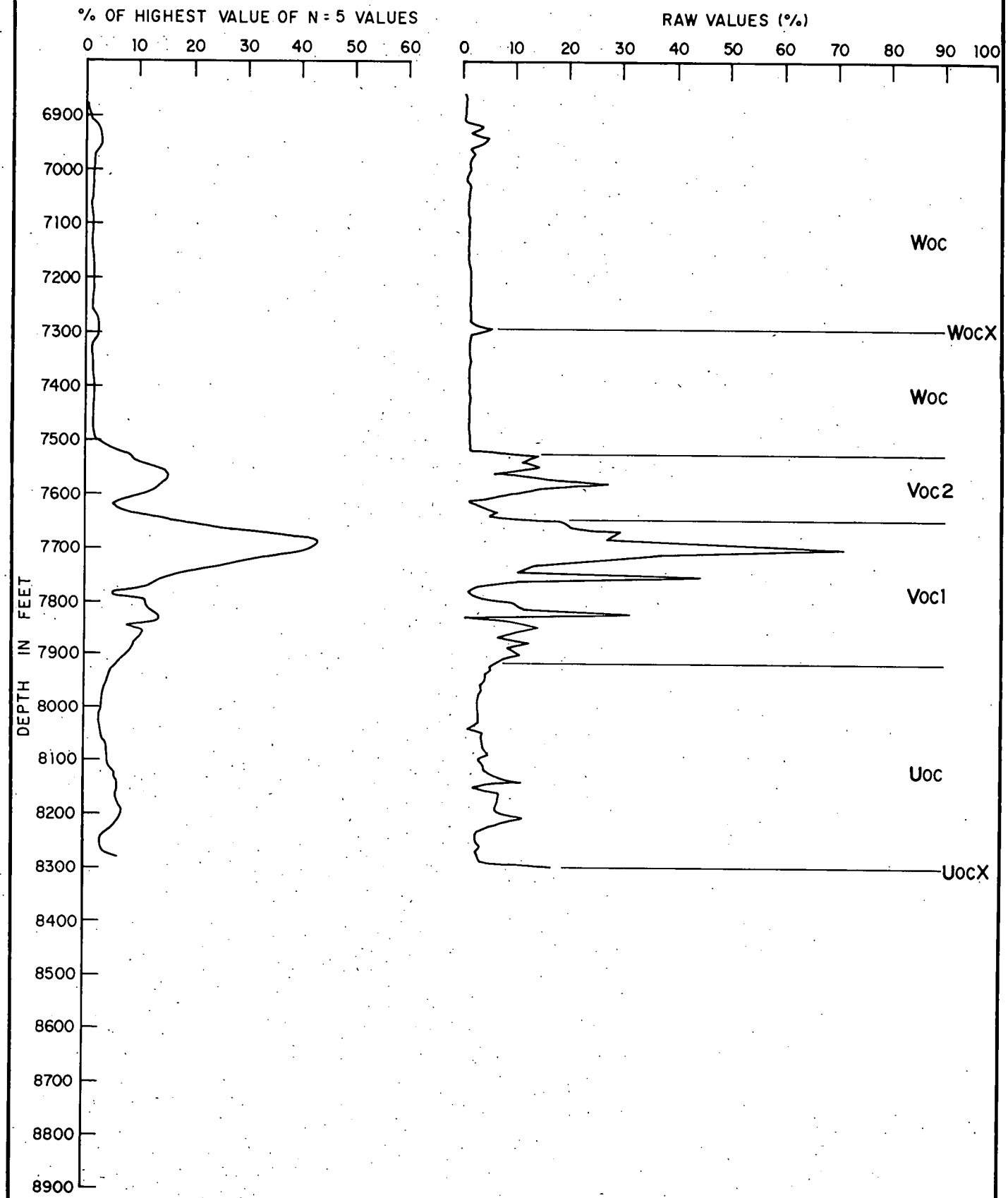

Fig. 10

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
BIG LAKE 3
ORGANIC CARBON VALUES

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DATE 15-10-82	PLAN NUMBER S16455
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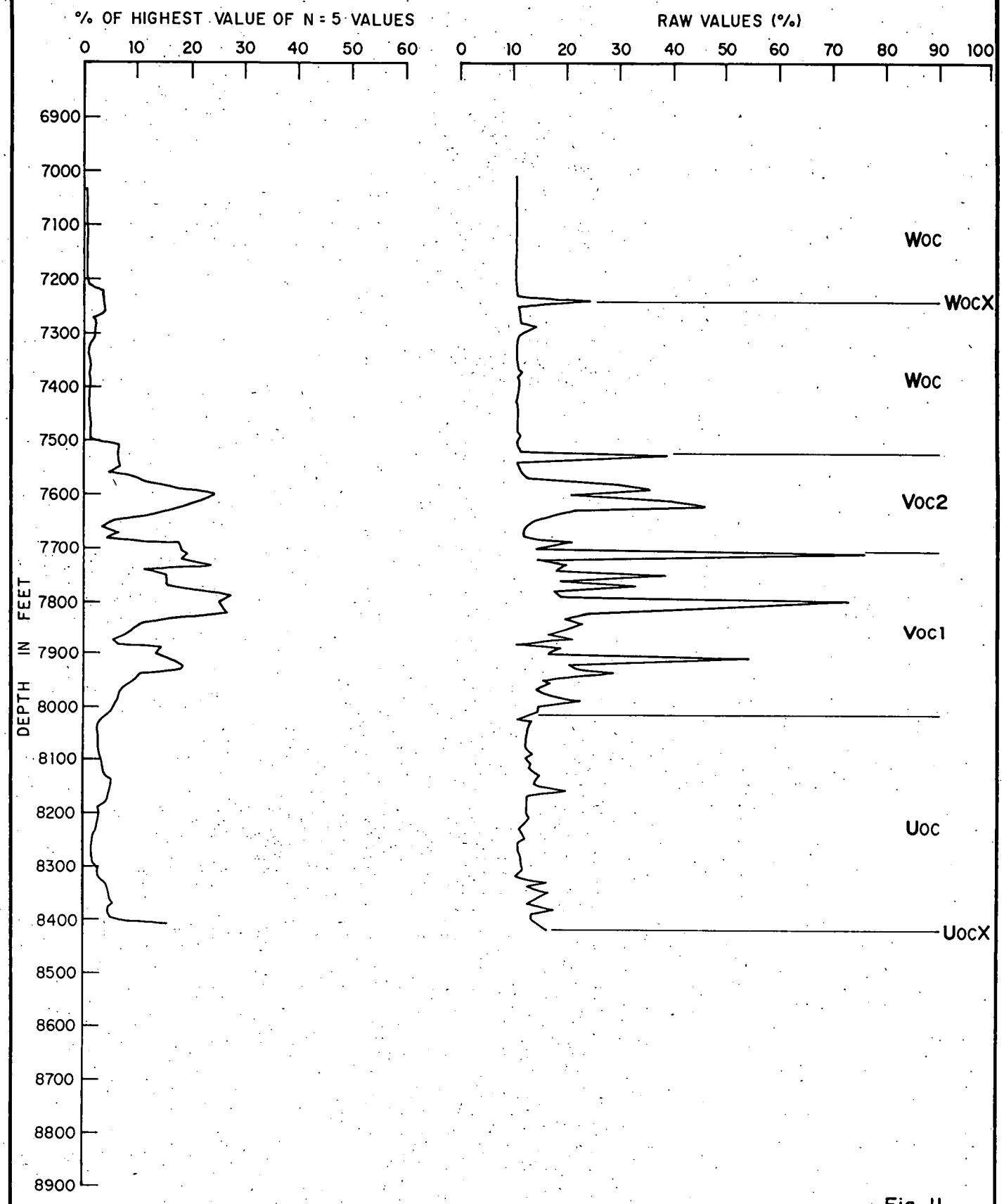

Fig. 11

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COMPILED W. S.

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DATE 15-10-82

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C D O DATE

SCALE 1: 3048 Vertical

PLAN NUMBER S16456

COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
BIG LAKE 10
ORGANIC CARBON VALUES

2985

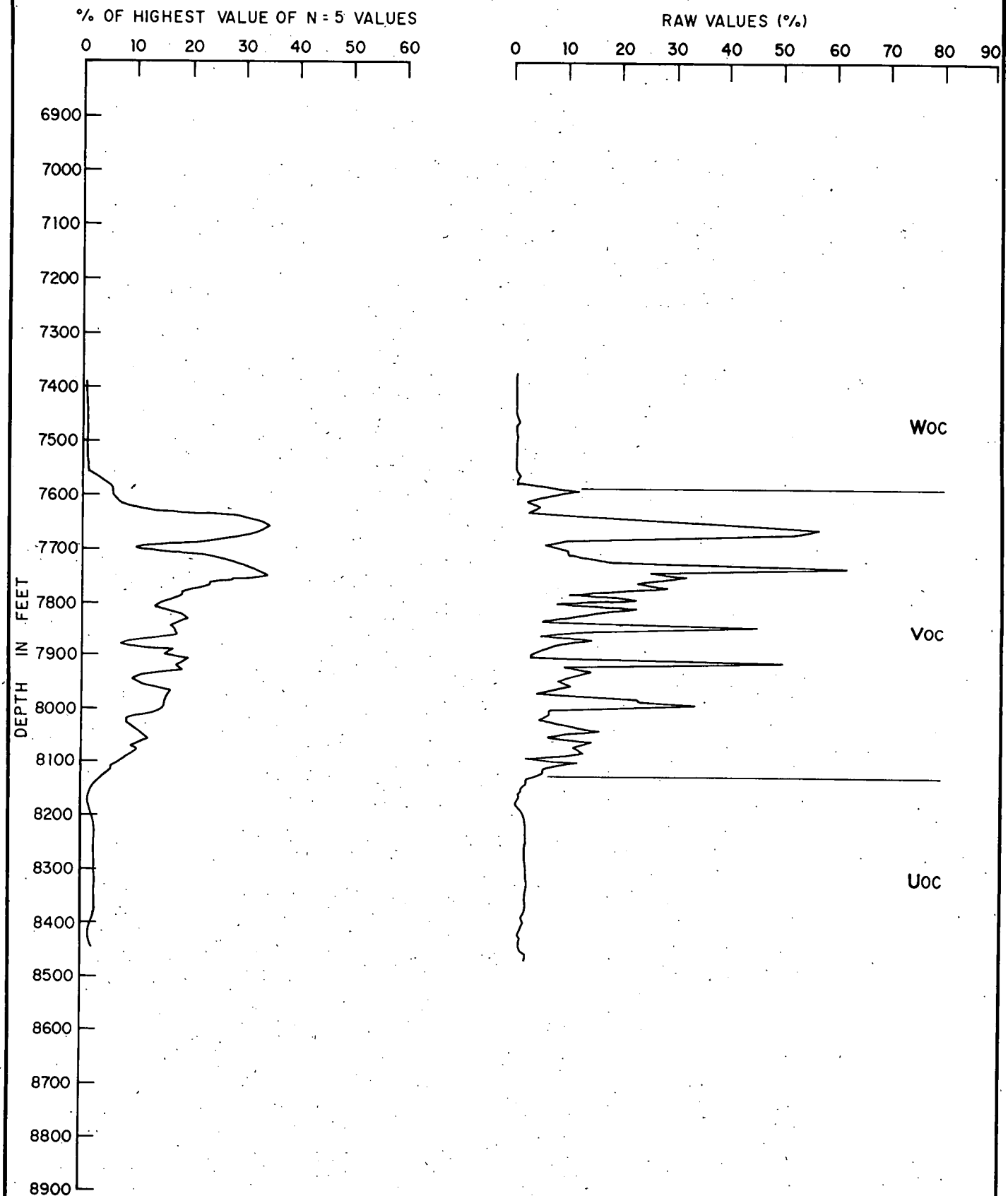

Fig. 12

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COMPILED W. S.

C.D.O DATE

DRAWN A.F.

SCALE 1:3048 Vertical

DATE 15-10-82

PLAN NUMBER S16457

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
BIG LAKE 23
ORGANIC CARBON VALUES

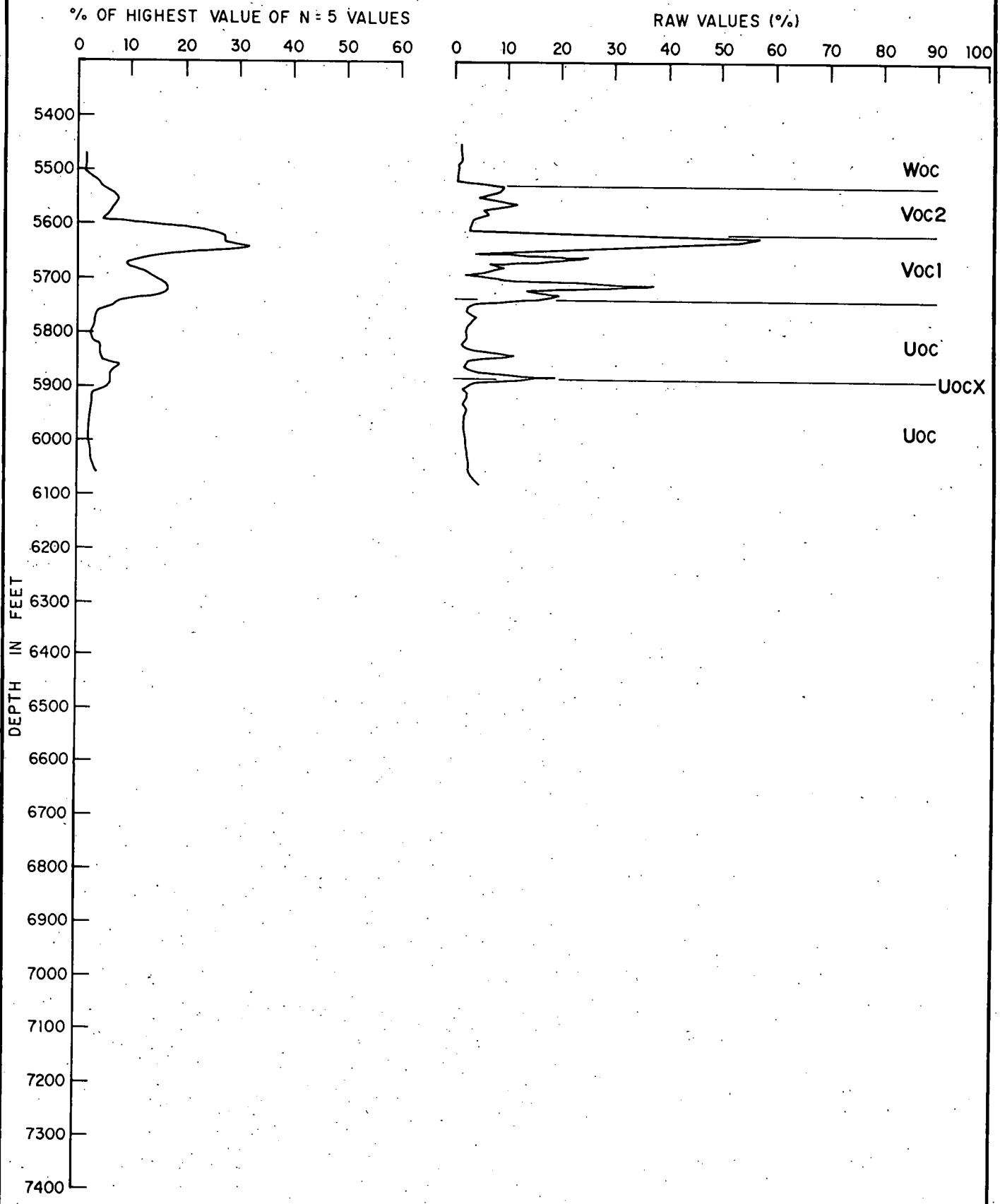

Fig. 13

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	COMPILED W. S.	C.D.O. DATE
COOPER BASIN SEDIMENTS CARBON DISTRIBUTION NARCOONOWIE 1 ORGANIC CARBON VALUES	DRAWN A.F.	SCALE 1:3048 Vertical
	DATE 15-10-82	PLAN NUMBER S16458
	CHECKED	

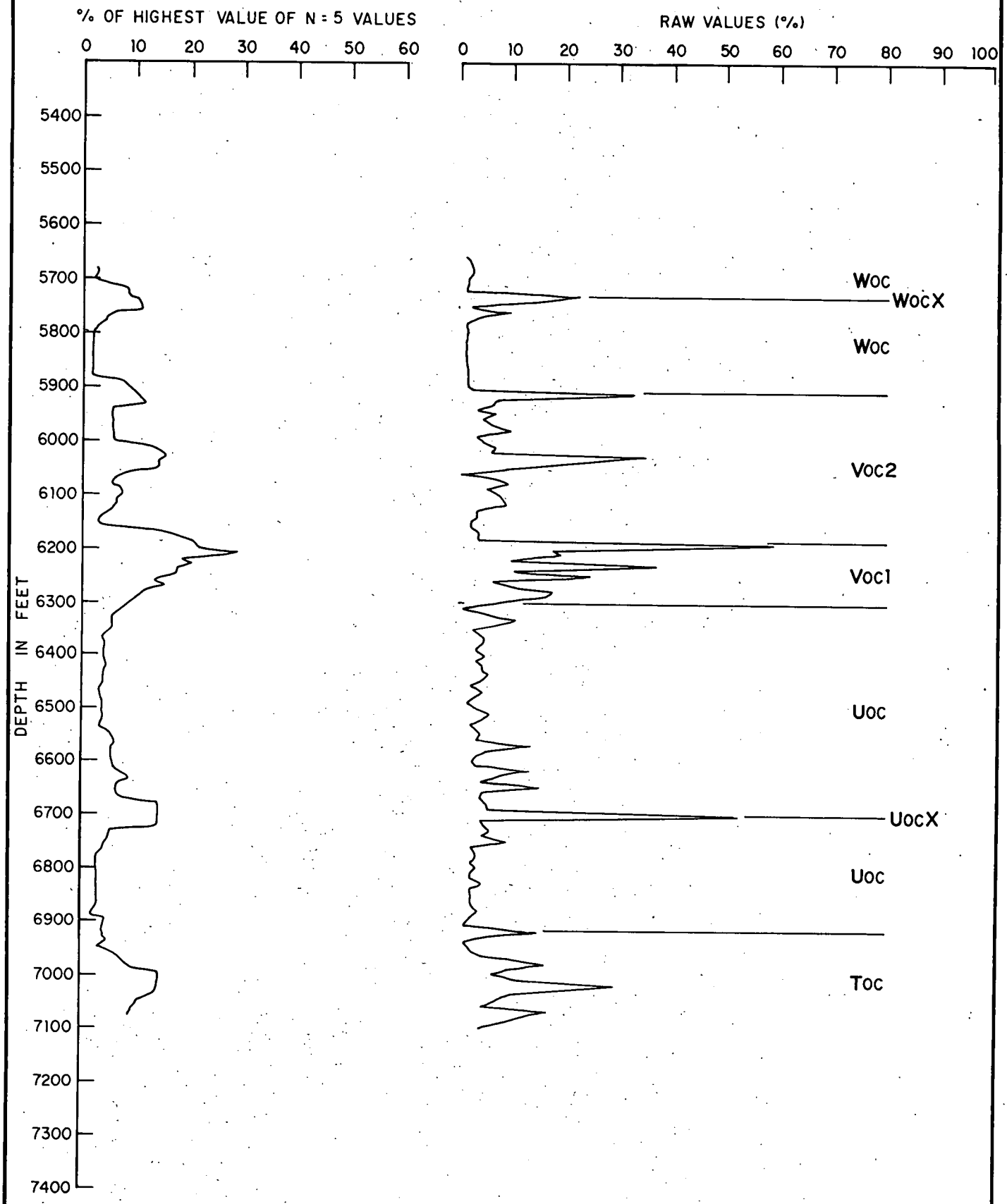

Fig. 14

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
TOOLACHEE 1
ORGANIC CARBON VALUES

COMPILED W. S.	C.D.O DATE
DRAWN A.F.	SCALE 1:3048 Vertical
DATE 15-10-82	PLAN NUMBER S16459
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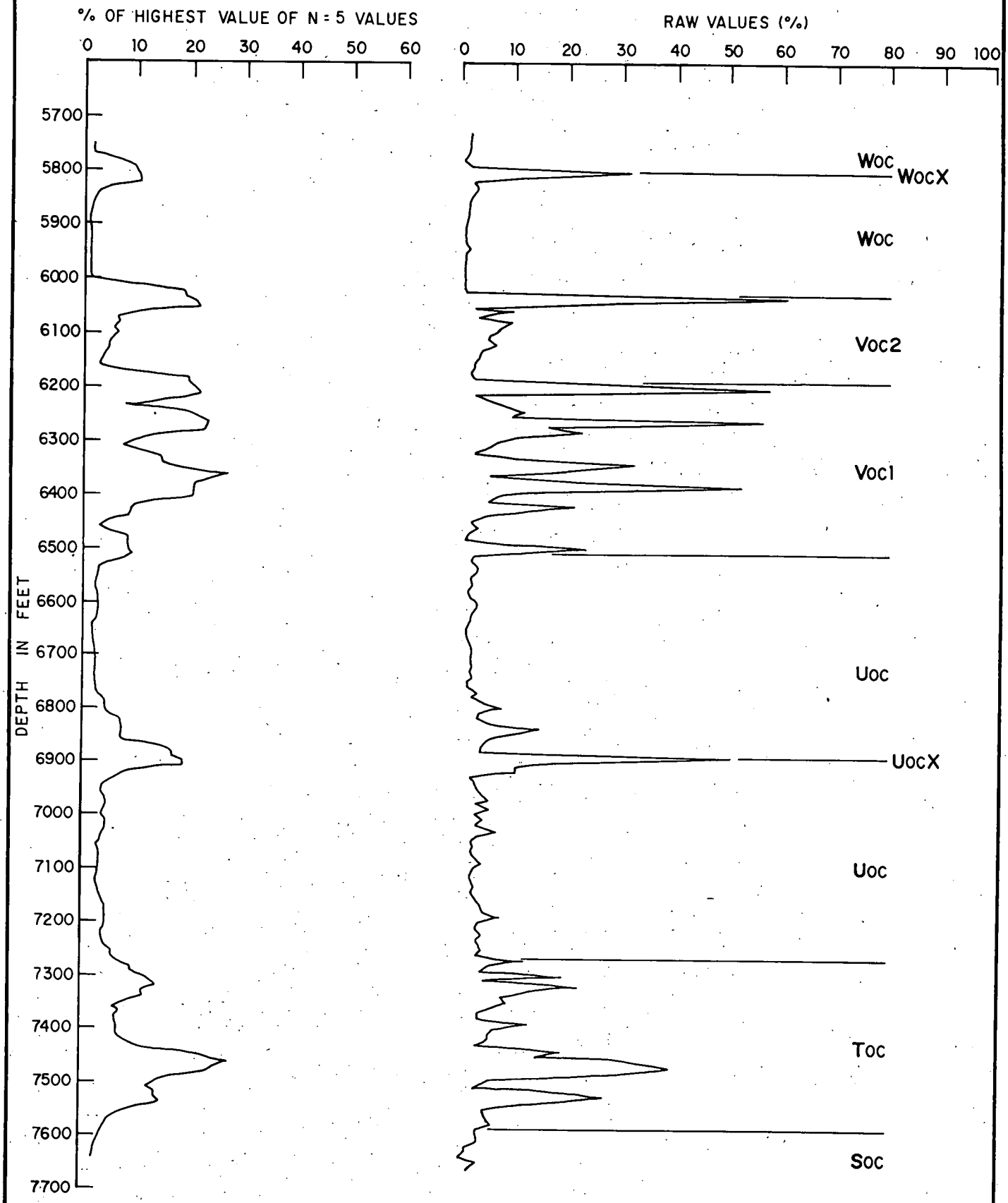

Fig. 15

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DATE 15-10-82
PLAN NUMBER S16460
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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
TOOLACHEE 3
ORGANIC CARBON VALUES

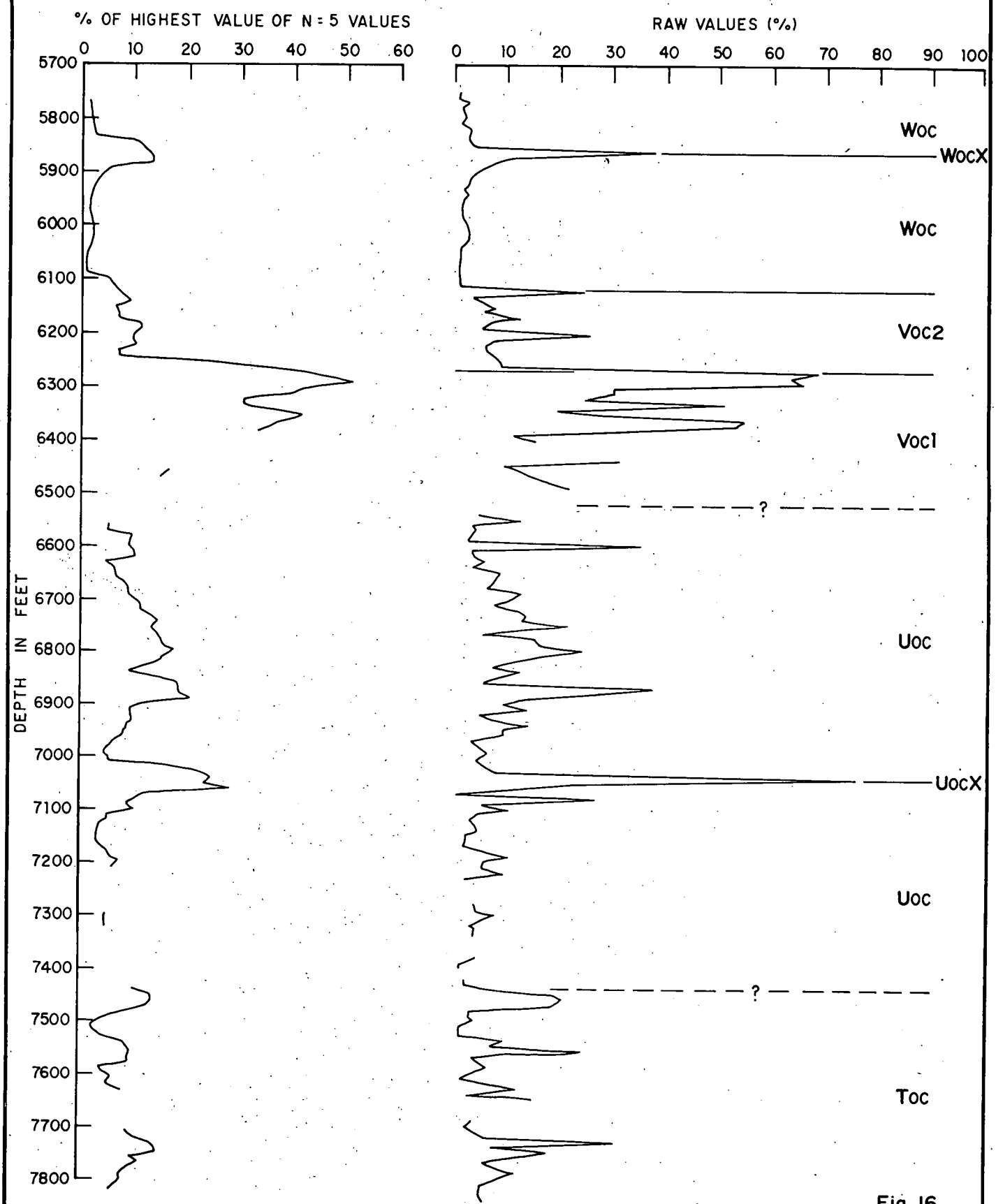

Fig. 16

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C.D.O DATE

DRAWN A.F.

SCALE 1:3048 Vertical

DATE 15-10-82

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
TOOLACHEE 7
ORGANIC CARBON VALUES

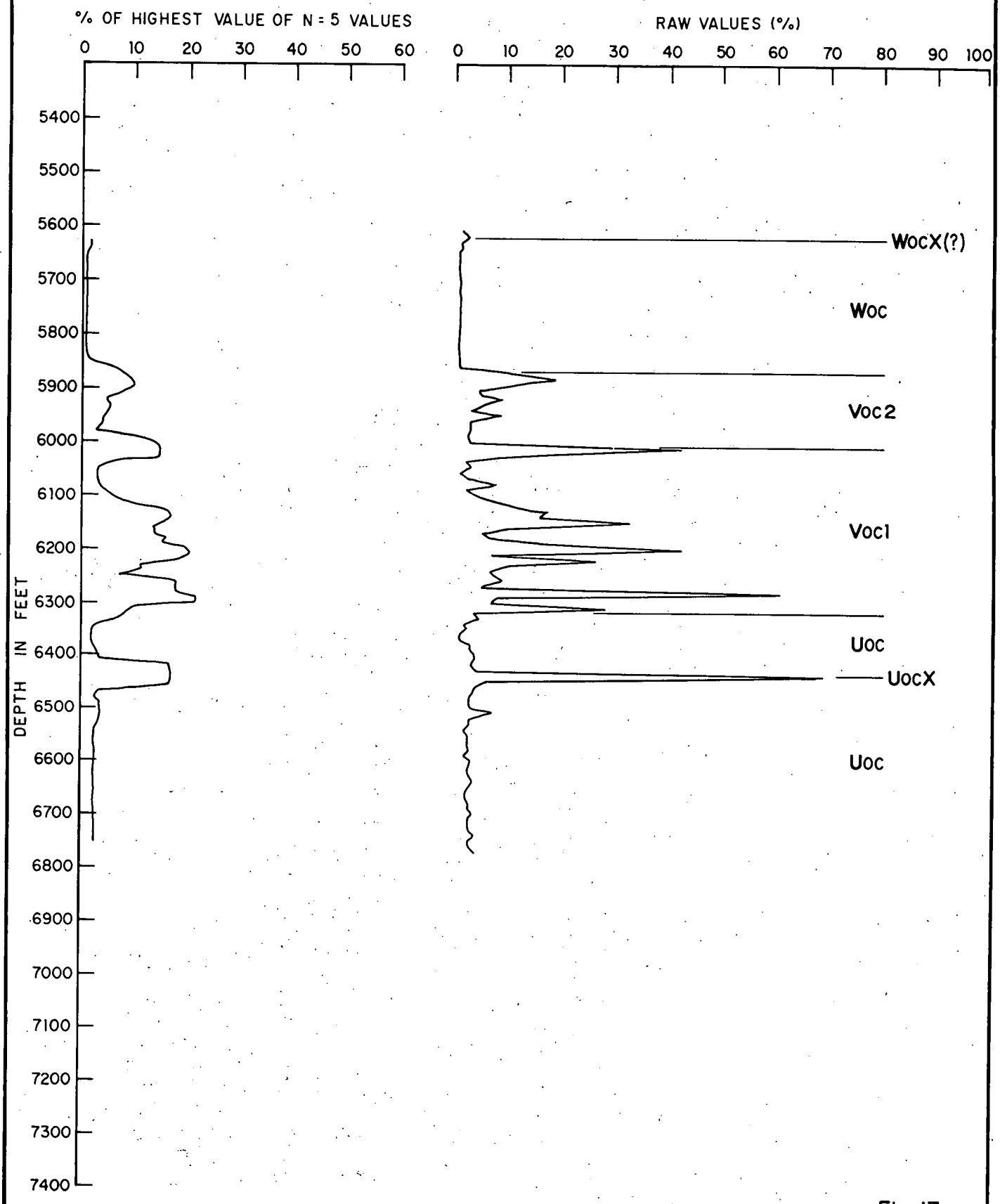

Fig. 17

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
MUNKARIE 1
ORGANIC CARBON VALUES

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DRAWN A. F.	SCALE 1: 3048 Vertical
DATE 15-10-82	PLAN NUMBER S16462
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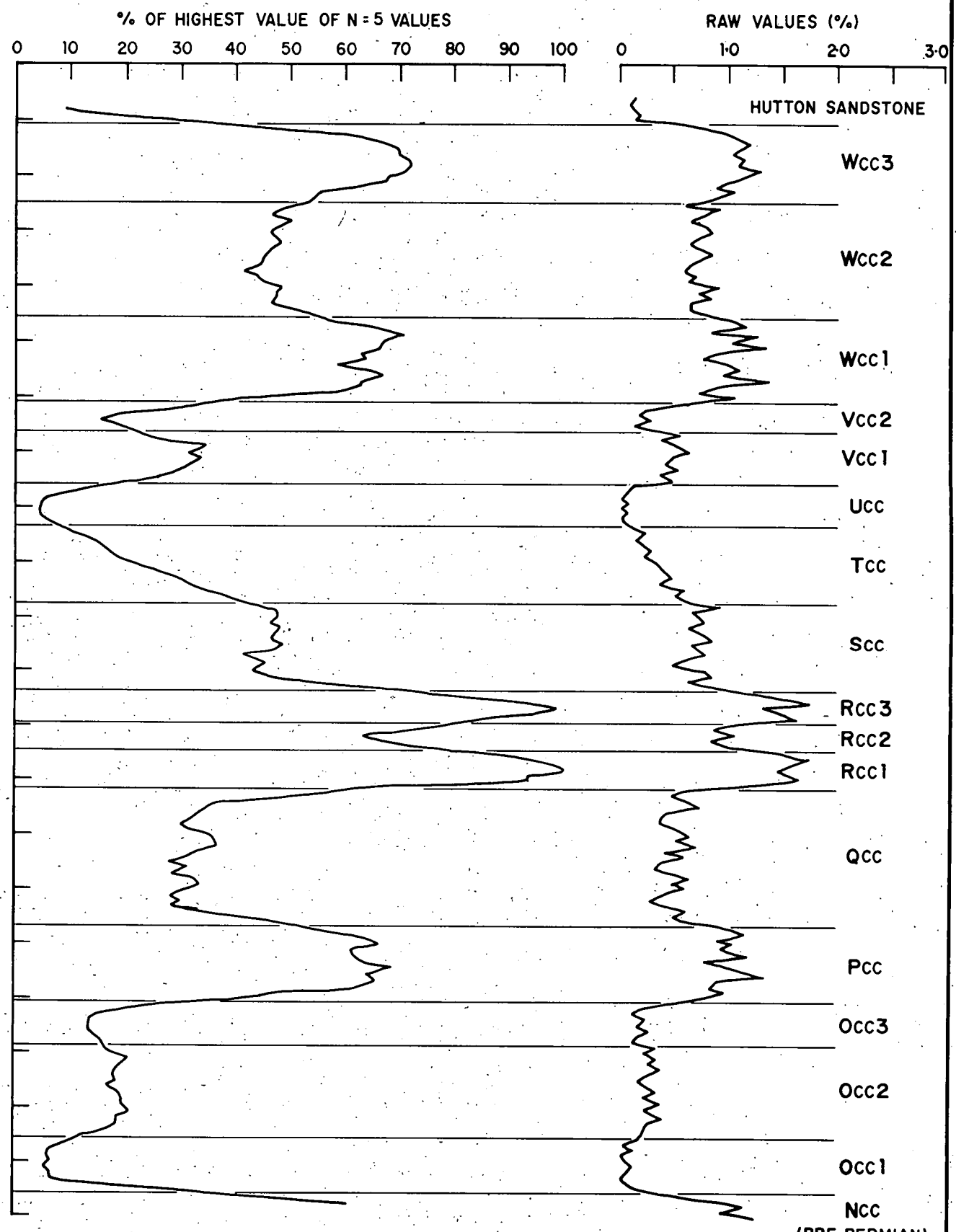

Fig. 18 (PRE-PERMIAN)

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SCALE 1:3048 Vertical

DATE 15-10-82

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PLAN NUMBER S16463

COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
IDEALISED VERTICAL PROFILE OF PERMIAN CARBONATE CARBON VALUES

Unit W_{cc}. Characterised by moderate values ranging from 0.5 to 1.0 per cent. In some wells (e.g. Big Lake No. 10 and Toolachee No. 7) there is an upper zone of higher values. There is also commonly a lower portion of higher erratic values, e.g. in Big Lake No. 10, Toolachee No. 1 and Munkarie No. 1. The unit is therefore subdivided into $W_{cc}1$, $W_{cc}2$ and $W_{cc}3$.

The C_{CO_3} content then falls to very low values in the overlying rocks which generally correspond to the Hutton Sandstone.

Fig. 18 is an idealised profile of C_{CO_3} values through the Permian.

Organic and Elemental Carbon

All wells show remarkable similarities in C_{org} distribution. There is a major zone of high and erratic values towards the top of the succession and a zone of slightly lower values at the bottom. All other portions of the succession have low values, especially in the upper part where values are very low and consistent. In both intervals containing low values there are isolated peaks which may be correlated from well to well.

A detailed description of each of the distinctive units is given below, commencing at the bottom of the succession. Because of the highly variable nature of the C_{org} values boundaries are less clear cut than in the case of C_{CO_3} values.

Units S_{co} Values are less than 5 per cent. Only found in Toolachee No. 3.

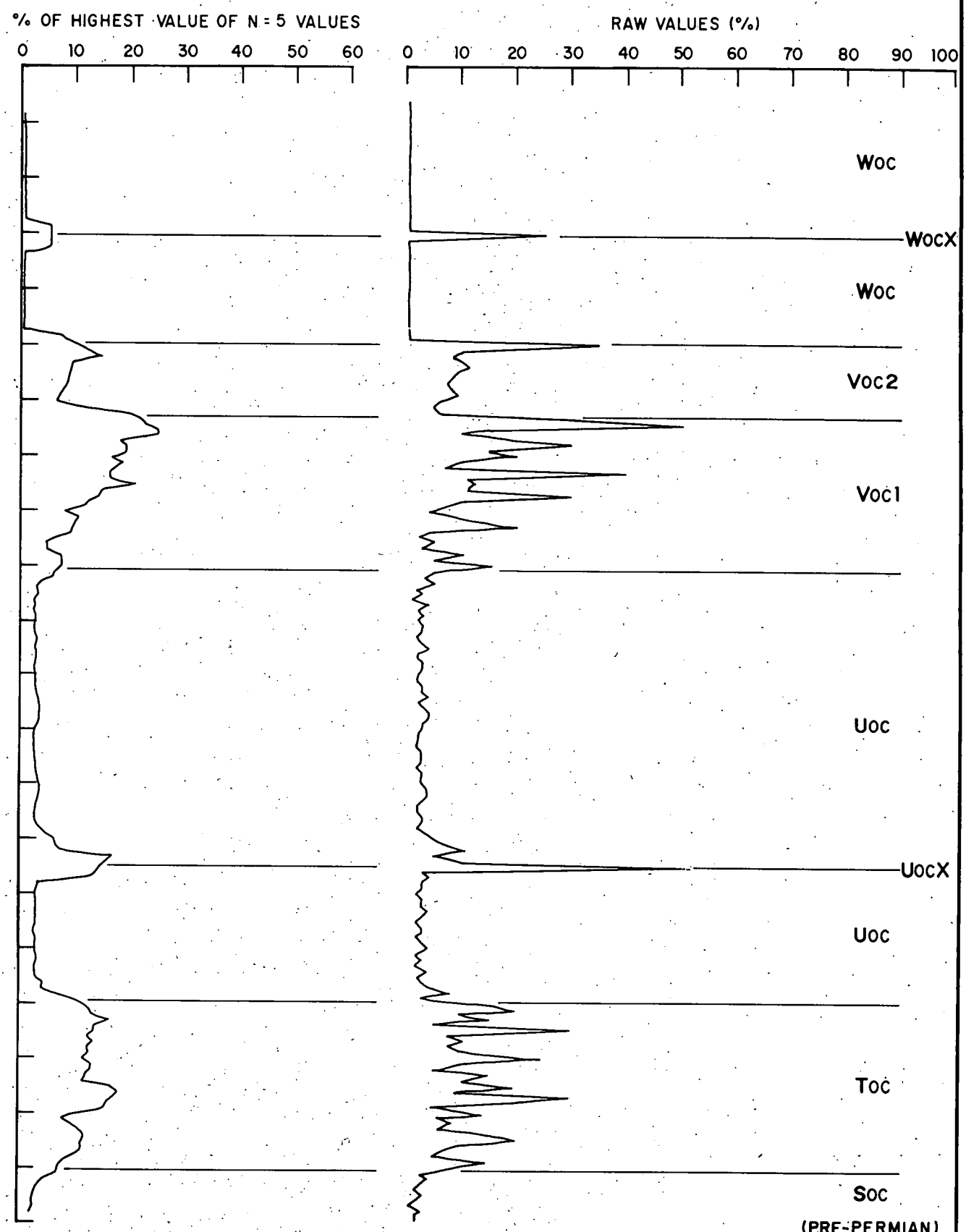

Fig. 19

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

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SCALE 1:3048 Vertical

DATE 15-10-82
PLAN NUMBER S16464

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COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
IDEALISED VERTICAL PROFILE OF PERMIAN ORGANIC CARBON VALUES

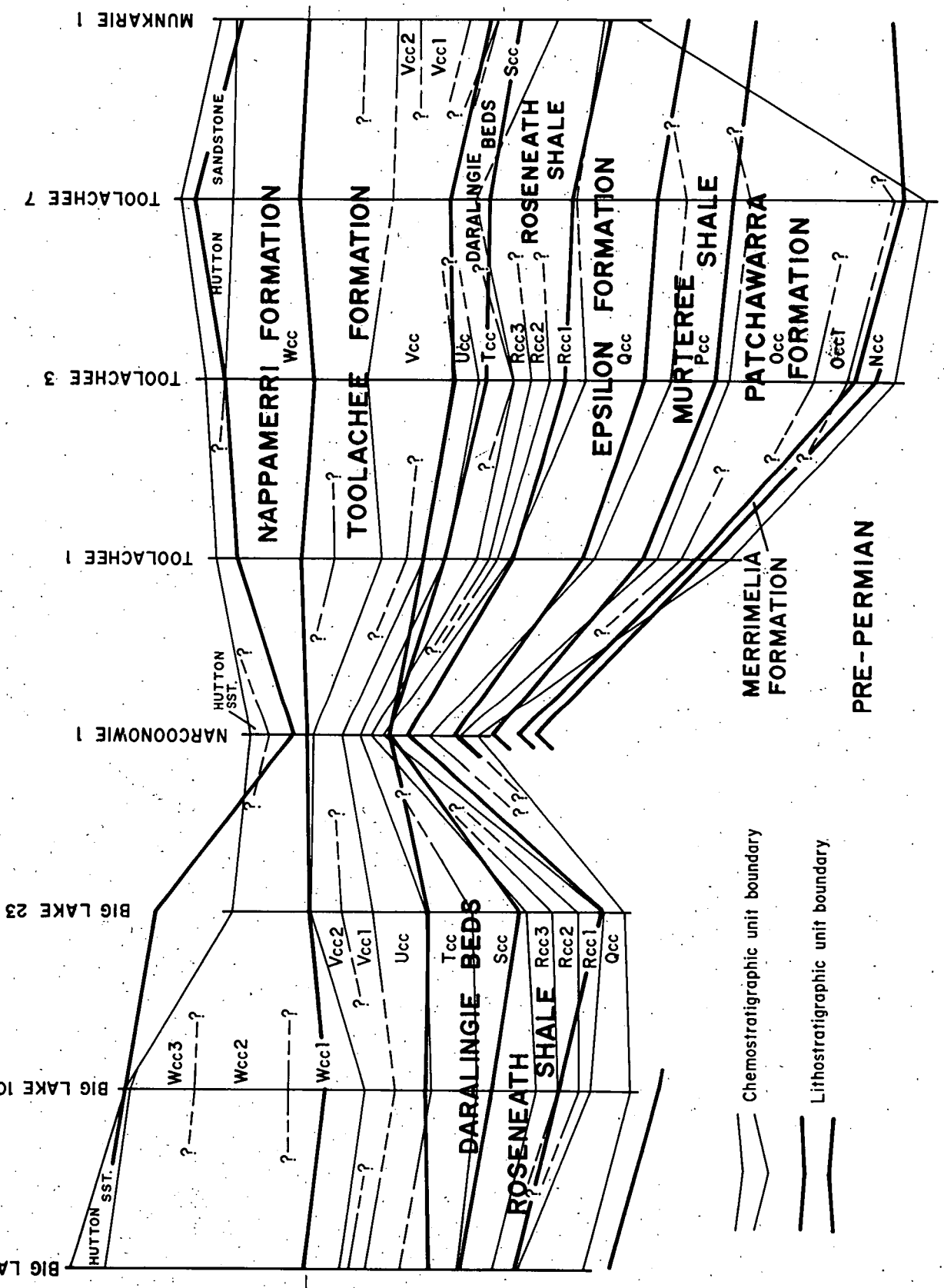

Fig. 20

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	COMPILED W.S.	C.D.O. DATE
COOPER BASIN SEDIMENTS CARBON DISTRIBUTION SCHEMATIC SECTION THROUGH WELLS INVESTIGATED CARBONATE CARBON CHEMOSTRATIGRAPHIC UNITS	DRAWN A.F.	SCALE
	DATE 2-11-82	PLAN NUMBER S 16465
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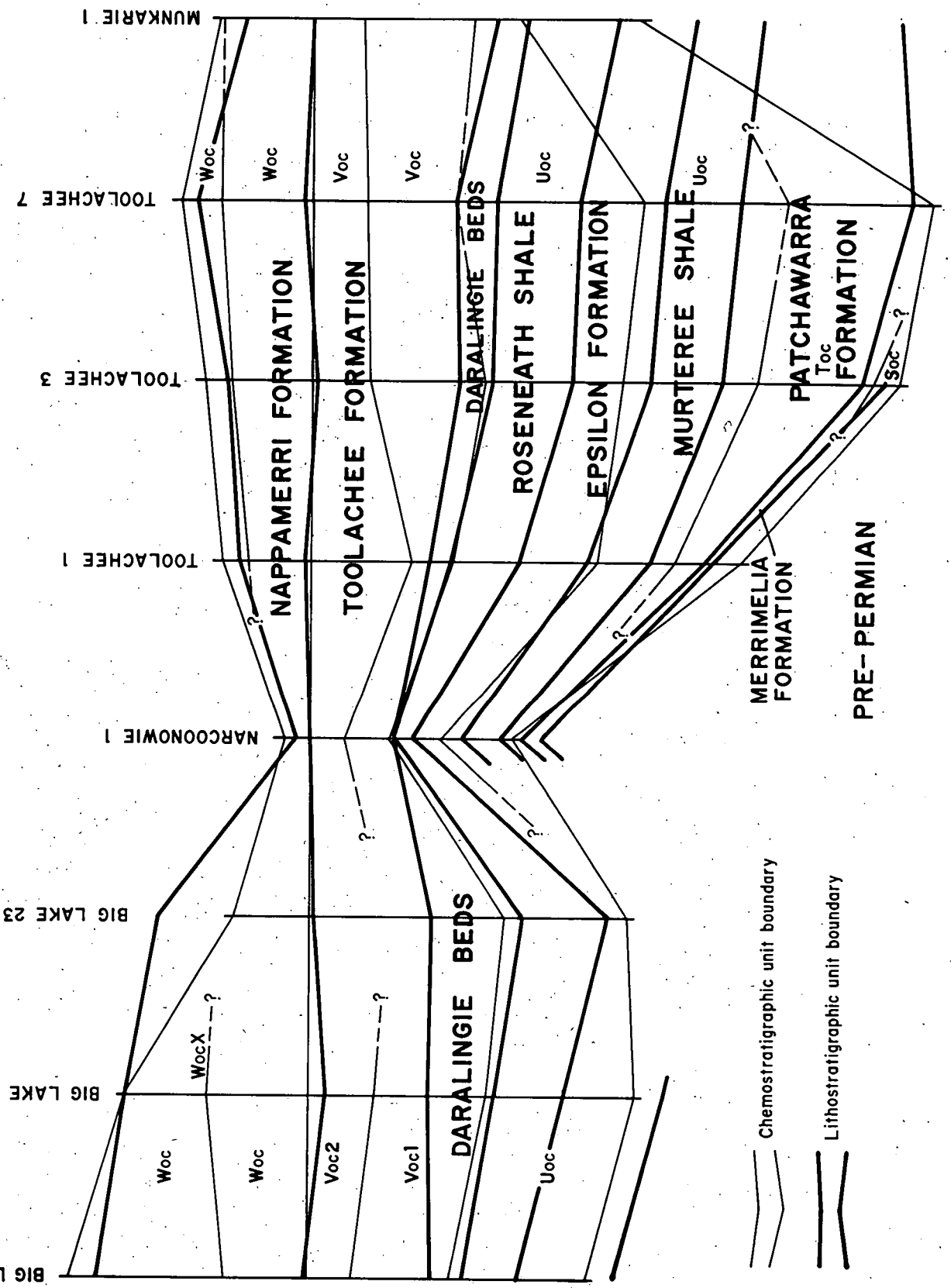

Fig. 21

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

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C.D.O. DATE
DRAWN A.F.
SCALE
DATE 2-11-82
CHECKED
PLAN NUMBER S16466

COOPER BASIN SEDIMENTS CARBON DISTRIBUTION
SCHEMATIC SECTION THROUGH WELLS INVESTIGATED
ORGANIC CARBON CHEMOSTRATIGRAPHIC UNITS

Unit T_{co} Erratic, moderate values of up to 40 per cent, averaging 10 per cent, occur. The upper limit of this unit is problematic in Toolachee No. 1 but was selected at the point shown because the isolated high value appears to correspond with the zone of higher values in the upper part of this unit in Toolachee No. 3.

Unit U_{co} An extensive unit of low values generally between 2.5 and 5.0 per cent. Variation is generally small (with the exception of Toolachee No. 7). In the middle of this unit is an isolated high value which is designated $U_{co}x$.

Unit V_{co} A major zone of high and erratic values. In many wells there is a break towards the top of the unit above which values are slightly lower but still moderately high and erratic. This unit is thus divided into $V_{co}1$ and $V_{co}2$.

Unit W_{co} The boundary between V_{co} and W_{co} is extremely sharp. Unit W_{co} contains very low (about one per cent) consistent values. As in Unit U_{co}, there is an isolated high value in this unit, designated $W_{co}x$.

Fig. 19 is an idealised profile of C_{org} values through the Permian.

Distribution of Chemostratigraphic Units in the Cooper Basin

Figs. 20 and 21 show the distribution of C_{CO_3} and C_{org} units (respectively) across the Cooper Basin from the Big Lake Field in the west to Munkarie No. 1 in the east. The horizontal datum line was selected at the boundary of C_{org} units W_{co} and V_{co} because this boundary should also be the same as that between the

Toolachee and Nappamerri formations; one aim of this investigation was to determine a suitable method of defining the limits of the Toolachee Formation. Each of the above figures has drawn on it an accentuated overlay of the accepted rock unit boundaries.

Carbonate carbon units, although reflecting the overall distribution of rock units and their boundaries, do not correspond with the rock units. However, the C_{CO_3} units can be traced across the whole west-east section, generally with much finer detail than provided by the rock units. Although some chemostratigraphic boundaries do closely correspond with rock unit boundaries (e.g. the lower boundary of the Toolachee Formation with the lower boundary of Unit U_{cc} in Toolachee Nos. 1 and 3), this is unusual. However, the position of the boundary between units R_{cc} and Q_{cc} consistently approximates to the lower boundary of the Roseneath Shale in all wells studied.

Organic carbon units generally reflect the overall distribution of rock units but their respective unit boundaries, as in the case of C_{CO_3}, do not coincide. The two exceptions are (i) the upper boundary of the Toolachee Formation and (ii) the lower boundary of the Daralingie Beds. In the latter case the boundaries do not coincide in (a) Toolachee No. 7 because of the general difficulty of selecting chemostratigraphic boundaries in that well, and (b) Munkarie No. 1 where $U_{co}x$ is actually the lower boundary of V_{co} (it must be remembered that the vertical chemostratigraphic profiles were determined without geologic controls). This would explain why, in its present position, $U_{co}x$ goes against the general trend of structure between Toolachee No. 7 and Munkarie No. 1.

The isolated coaly units $W_{CO}x$ and $U_{CO}x$ appear to occur consistently throughout the section where sampling has extended far enough.

CONCLUSIONS

1. The carbonate carbon distribution in the Permian sediments of the southeastern portion of the Cooper Basin enables a detailed chemostratigraphic correlation to be made.
2. The distribution of organic carbon is of less value than that of carbonate carbon. However, two persistent coaly units $W_{CC}x$ and $U_{CC}x$ may be of stratigraphic value.
3. Carbon chemostratigraphic units have only a limited value in determining accepted stratigraphic rock units.
4. In a more speculative vein, carbonate carbon values may reflect climatic variation because of their persistence over the length of the section, despite the presence of several structural features, and the boundaries between chemostratigraphic units may be time-lines.

ACKNOWLEDGEMENTS

The author thanks the Director-General of the Department of Mines and Energy, South Australia, for making financial and other assistance available for this project.

Mr. P.M. Austin of the same Department contributed stimulating discussion, constructive criticism and valuable advice throughout this investigation.

This report was compiled in the Mining Geology Division of the Department of Geology, Royal School of Mines, Imperial College of Science and Technology, London, where the author is a visiting academic during his sabbatical from Salisbury C.A.E. The author would like to thank the Director and Council of Salisbury C.A.E. for making available this opportunity and also Professor G.R. Davis, of the Department of Geology, Imperial College, for providing facilities.

Dr. P. Garrard, of the Department of Geology, Imperial College, provided valuable advice during the preparation of this report.

W Shackleton

WGS:ZV

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APPENDIX

Analytical Results for Carbonate Carbon and Organic and Elemental Carbon

BIG LAKE NO. 3

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
6950	6960	0.02	0.14
6960	6970	0.01	0.64
6970	6980	0.02	0.47
6980	6990	0.01	0.17
6990	7000	0.01	0.11
7000	7010	0.01	0.22
7010	7020	0.01	3.36
7020	7030	0.01	1.65
7030	7040	0.01	4.80
7040	7050	0.01	3.54
*7040	7050	0.01	3.34
7050	7060	0.04	1.43
7060	7070	0.12	2.10
7070	7080	0.31	1.54
7080	7090	0.17	1.21
7090	7100	0.07	1.17
7100	7110	0.07	0.95
7110	7120	0.13	0.87
7120	7130	0.28	1.28
7130	7140	0.22	1.04
7140	7150	0.23	1.14
*7140	7150	0.23	1.06
7150	7160	0.11	0.93
7160	7170	0.14	1.01
7170	7180	0.15	0.85
7180	7190	0.31	1.28
7190	7200	0.22	1.05
7200	7210	0.26	1.06
7210	7220	0.28	1.12
7220	7230	0.29	1.17
7230	7240	0.30	1.10
7240	7250	0.28	1.10
*7240	7250	0.29	1.20
7250	7260	0.27	1.22
7260	7270	0.30	1.10
7270	7280	0.38	1.37
7280	7290	0.36	1.44
7290	7300	0.39	1.52
7300	7310	0.38	1.44
7310	7320	0.37	1.59
7320	7330	0.38	1.48
7330	7340	0.32	1.30
7340	7350	0.34	1.61
*7340	7350	0.35	1.51
7350	7360	0.37	1.58
7360	7370	0.34	1.69
7370	7380	0.34	1.19
7380	7390	0.35	5.42
7390	7400	0.37	1.36
7400	7410	0.36	1.42
7410	7420	0.40	1.45
7420	7430	0.39	1.40
7430	7440	0.44	1.51
7440	7450	0.41	1.86

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
*7440	7450	0.42	1.63
7450	7460	0.34	1.37
7460	7470	0.30	1.27
7470	7480	0.32	1.11
7480	7490	0.34	1.27
7490	7500	0.37	1.42
7500	7510	0.33	1.34
7510	7520	0.30	1.63
7520	7530	0.28	1.42
7530	7540	0.40	1.32
7540	7550	0.33	1.30
*7540	7550	0.34	1.35
7550	7560	0.34	1.35
7560	7570	0.27	1.32
7570	7580	0.37	1.32
7580	7590	0.29	1.17
7590	7600	0.30	1.24
7600	7610	0.29	1.22
7610	7620	0.29	1.26
7620	7630	0.22	14.1
7630	7640	0.22	11.7
7640	7650	0.27	6.84
*7640	7650	0.27	22.5
7650	7660	0.28	5.24
7660	7670	0.20	16.3
7670	7680	0.12	27.3
7680	7690	0.22	14.4
7690	7700	0.13	9.62
7700	7710	0.33	1.34
7710	7720	0.09	3.40
7720	7730	0.06	6.96
7730	7740	0.07	5.26
7740	7750	0.10	18.8
*7740	7750	0.11	18.9
7750	7760	0.09	20.5
7760	7770	0.06	29.8
7770	7780	0.07	27.3
7780	7790	0.02	49.3
7790	7800	0.02	71.6
7800	7810	0.03	37.1
7810	7820	0.01	26.7
7820	7830	0.04	13.9
7830	7840	0.04	10.8
*7830	7840	0.05	10.9
7840	7850	0.03	44.6
7850	7860	0.04	10.6
7860	7870	0.02	2.64
7870	7880	0.04	1.67
7880	7890	0.05	3.00
7890	7900	0.06	10.0
7900	7910	0.05	11.3
7910	7920	0.07	31.6
7920	7930	0.13	0.87

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
7930	7940	0.08	10.3
7940	7950	0.12	15.3
*7940	7950	0.12	13.8
7950	7960	0.13	10.9
7960	7970	0.21	6.90
7970	7980	0.11	12.3
7980	7990	0.17	8.98
7990	8000	0.19	10.9
8000	8010	0.19	7.44
8010	8020	0.23	5.10
8020	8030	0.26	5.64
8030	8040	0.24	4.48
8040	8050	0.23	4.62
*8040	8050	0.44	4.48
8050	8060	0.32	3.78
8060	8070	0.32	3.94
8070	8080	0.34	3.38
8080	8090	0.33	3.46
8090	8100	0.37	3.24
8100	8110	0.37	3.26
8110	8120	0.35	3.42
8120	8130	0.33	3.38
8130	8140	0.27	1.32
8140	8150	0.59	4.48
*8140	8150	0.57	3.86
8150	8160	0.43	3.90
8160	8170	0.47	4.12
8170	8180	0.44	4.34
8180	8190	0.40	5.20
8190	8200	0.43	3.44
8200	8210	0.36	4.14
8210	8220	0.25	4.70
8220	8230	0.24	6.42
8230	8240	0.25	10.6
8240	8250	0.24	3.00
*8240	8250	0.37	2.78
8250	8260	0.23	7.14
+8260	8270	0.23	6.91
+8270	8280	0.23	6.68
8280	8290	0.23	6.45
8290	8300	0.12	7.50
8300	8310	0.17	11.5
8310	8320	0.21	6.90
8320	8330	0.28	3.14
8330	8340	0.21	2.90
8340	8350	0.22	3.12
*8340	8350	0.22	3.12
8350	8360	0.24	3.62
8360	8370	0.23	2.90
8370	8380	0.01	3.32
8380	8390	0.26	4.08
8390	8400	0.27	17.1

BIG LAKE 10

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
7000	7010	0.13	0.46
7010	7020	0.09	0.37
7020	7030	0.27	0.21
7030	7040	0.39	0.35
7040	7050	0.48	0.41
7050	7060	0.40	0.50
7060	7070	0.63	0.44
7070	7080	0.53	0.37
7080	7090	0.69	0.36
7090	7100	0.94	0.31
*7090	7100	0.91	0.30
7100	7110	0.85	0.30
7110	7120	0.97	0.38
7120	7130	1.04	0.44
7130	7140	1.24	0.34
7140	7150	0.70	0.39
7150	7160	0.89	0.37
7160	7170	0.84	0.44
7170	7180	0.74	0.56
7180	7190	0.67	0.68
7190	7200	0.65	0.55
*7190	7200	0.70	0.56
7200	7210	0.36	1.00
7210	7220	0.39	0.89
7220	7230	0.43	0.85
7230	7240	0.20	14.40
7240	7250	0.35	0.93
7250	7260	0.36	1.31
7260	7270	0.32	1.32
7270	7280	0.45	1.41
7280	7290	0.47	4.60
7290	7300	0.30	1.88
7290	7300	0.30	1.83
7300	7310	0.21	0.92
7310	7320	0.23	0.97
7320	7330	0.21	0.97
7330	7340	0.21	0.96
7340	7350	0.26	0.82
7350	7360	0.30	0.84
7360	7370	0.31	1.70
7370	7380	0.31	0.84
7380	7390	0.32	1.06
7390	7400	0.39	1.01
*7390	7400	0.36	0.87
7400	7410	0.24	0.93
7410	7420	1.04	0.44
7420	7430	0.21	0.97
7430	7440	0.24	1.02
7440	7450	0.25	0.98
7450	7460	0.26	0.94
7460	7470	0.39	0.83
7470	7480	0.70	0.78
7480	7490	0.58	1.33
7490	7500	0.56	0.67
7490	7500	0.58	0.94

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
7500	7510	0.54	0.86
7510	7520	0.54	1.57
7520	7530	0.23	29.00
7530	7540	0.46	0.87
7540	7550	0.52	1.06
7550	7560	0.44	1.71
7560	7570	0.52	2.64
7570	7580	0.25	18.40
7580	7590	0.37	26.00
7590	7600	0.73	11.60
7590	7600	1.65	10.90
7600	7610	0.32	29.60
7610	7620	0.24	35.90
7620	7630	0.43	11.50
7630	7640	0.90	7.30
7640	7650	0.25	3.92
7650	7660	0.61	2.76
7660	7670	0.51	1.99
7670	7680	0.46	2.16
7680	7690	0.27	11.70
7690	7700	0.34	4.28
*7690	7700	0.36	4.28
7700	7710	0.08	66.70
7710	7720	0.35	4.24
7720	7730	0.37	9.44
7730	7740	0.30	7.90
7740	7750	0.23	29.00
7750	7760	0.29	8.90
7760	7770	0.22	23.00
7770	7780	0.22	7.48
7780	7790	0.23	8.34
7790	7800	0.02	63.10
7790	7800	Missing	
7800	7810	0.21	34.70
7810	7820	0.20	14.40
7820	7830	0.15	9.50
7830	7840	0.18	12.90
7840	7850	0.17	10.00
7850	7860	0.13	6.34
7860	7870	0.20	11.00
7870	7880	0.48	0.41
7880	7890	0.26	8.64
7890	7900	0.26	6.24
*7890	7900	0.26	6.40
7900	7910	0.17	44.20
7910	7920	0.31	10.30
7920	7930	0.32	12.00
7930	7940	0.25	18.40
7940	7950	0.35	5.82
7950	7960	0.40	6.94
7960	7970	0.40	4.14
7970	7980	0.49	6.38
7980	7990	0.62	12.40
7990	8000	0.81	4.50

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
*7990	8000	0.78	4.49
8000	8010	0.67	4.80
8010	8020	0.64	0.30
8020	8030	0.70	3.52
8030	8040	0.70	2.92
8040	8050	0.55	2.72
8050	8060	0.62	2.52
8060	8070	0.65	2.35
8070	8080	0.61	2.66
8080	8090	0.62	3.84
8090	8100	0.67	2.46
*8090	8100	0.63	2.48
8100	8110	0.68	3.52
8110	8120	0.69	3.08
8120	8130	0.86	5.00
8130	8140	0.90	4.20
8140	8150	0.85	4.00
8150	8160	0.88	10.00
8160	8170	1.09	2.78
8170	8180	1.50	2.82
8180	8190	1.38	2.88
8190	8200	1.41	2.66
8190	8200	1.41	2.88
8200	8210	1.62	3.06
8210	8220	1.71	2.38
8220	8230	0.80	1.30
8230	8240	1.11	1.93
8240	8250	1.35	2.22
8250	8260	0.87	0.97
8260	8270	0.74	0.96
8270	8280	1.18	1.36
8280	8290	1.33	1.86
8290	8300	1.90	1.56
*8290	8300	1.90	1.63
8300	8310	2.02	1.94
8310	8320	0.53	0.72
8320	8330	0.52	6.48
8330	8340	0.55	2.72
8340	8350	0.74	6.36
8350	8360	0.91	4.84
8360	8370	0.80	2.48
8370	8280	0.95	7.84
8380	8390	0.74	3.70
8390	8400	0.86	3.60
8390	8400	0.82	3.74
8400	8410	0.80	4.60
8410	8420	0.81	6.10
8420	8430	0.21	61.10

BIG LAKE NO. 23

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
7360	7370	1.29	0.51
7370	7380	1.05	0.77
7380	7390	1.12	0.57
7390	7400	1.47	0.62
7400	7410	1.27	0.52
7410	7420	1.31	0.53
*7410	7420	1.33	0.43
7420	7430	1.28	0.70
7430	7440	1.12	0.38
7440	7450	1.11	0.61
7450	7460	1.11	1.12
7460	7470	1.08	0.44
7470	7480	1.32	0.51
7480	7490	1.07	0.76
7490	7500	0.96	0.53
7500	7510	0.57	0.55
7510	7520	1.00	0.05
7520	7530	1.49	0.56
7530	7540	0.68	0.53
7540	7550	1.13	0.80
7550	7560	0.88	1.30
7560	7570	0.87	0.71
7570	7580	0.96	0.83
7580	7590	0.49	12.08
7500	7600	0.61	7.80
7600	7610	0.46	3.18
7610	7620	0.10	4.96
7620	7630	0.34	2.99
7630	7640	0.50	18.56
7640	7650	0.18	35.59
7650	7660	0.20	57.15
7660	7670	0.11	52.24
7670	7680	0.39	10.49
7680	7690	0.44	6.02
7690	7700	0.31	10.58
*7690	7700	0.40	9.55
7700	7710	0.20	10.35
7710	7720	0.25	19.40
7720	7730	0.38	62.11
7730	7740	0.37	25.55
7740	7750	0.22	32.06
7750	7760	0.25	23.39
7760	7770	0.11	28.63
7770	7780	0.15	10.16
7780	7790	0.17	22.75
7790	7800	0.18	8.51
7800	7810	0.15	19.04
7800	7810	0.15	25.29
7810	7820	0.18	10.29
7820	7830	0.15	5.20
7830	7840	0.09	46.92
7840	7850	0.16	13.47
7850	7860	0.07	5.24

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
7860	7870	0.04	14.51
7870	7880	0.10	7.85
7880	7890	0.14	4.26
7890	7900	0.06	3.55
7900	7910	0.07	50.26
7910	7920	0.26	9.44
7920	7930	0.13	14.01
7930	7940	0.37	10.49
7940	7950	0.28	8.84
7950	7960	0.20	10.18
7960	7970	0.07	4.78
7970	7980	0.11	23.24
7980	7990	0.13	33.51
7990	8000	0.29	6.81
8000	8010	0.31	6.82
8010	8020	0.25	5.01
8020	8030	0.20	9.25
8030	8040	0.23	15.88
8040	8050	1.45	6.49
8050	8060	0.72	14.70
8060	8070	0.63	11.54
8070	8080	0.96	12.65
8080	8090	0.82	2.89
8090	8100	6.62	11.83
8100	8110	0.68	5.83
8110	8120	0.72	5.50
8120	8130	0.63	2.49
8130	8140	1.00	2.70
8140	8150	0.61	1.90
8150	8160	0.40	1.07
8160	8170	0.66	1.31
8170	8180	0.83	0.87
8180	8190	0.82	1.69
*8180	8190	1.33	2.13
8200	8210	1.10	2.29
8210	8220	1.38	2.83
8220	8230	1.28	2.67
8230	8240	1.51	2.24
8240	8250	1.41	2.52
8250	8260	1.26	2.29
8260	8270	1.21	2.32
8270	8280	0.88	2.64
8280	8290	1.56	2.46
8290	8300	1.36	2.72
8300	8310	1.37	2.52
8310	8320	1.27	2.66
8320	8330	1.27	2.95
8330	8340	1.41	2.73
8340	8350	1.62	2.16
*8340	8350	1.62	2.46
8350	8360	1.36	2.57
8360	8370	1.77	2.57
8370	8380	1.24	2.44

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
8380	8390	1.57	1.92
8390	8400	1.44	2.16
8400	8410	0.84	1.76
8410	8420	0.47	1.05
8420	8430	0.57	1.53
8430	8440	0.77	1.31
8440	8450	0.36	1.52
8450	8460	0.94	3.12
8460	8470	0.81	2.69

NARCOONOWIE NO. 1

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
5444	5470	0.09	1.38
5470	5480	0.13	1.51
5480	5490	0.11	0.79
5490	5500	0.18	0.98
*5490	5500	0.25	0.79
5500	5510	0.80	0.82
5510	5520	0.86	0.64
5520	5530	0.45	9.02
5530	5540	0.48	8.44
5540	5550	0.76	4.64
5550	5560	0.61	11.6
5560	5570	0.75	5.46
5570	5580	0.61	6.12
5580	5590	0.76	3.70
5590	5600	0.81	3.04
*5590	5600	0.76	3.06
5600	5610	0.77	2.98
5610	5620	0.91	56.5
5620	5630	0.36	49.8
5630	5640	0.34	23.1
5640	5650	1.63	3.86
5650	5660	0.24	24.2
5660	5670	0.47	7.26
5670	5680	0.39	8.40
5680	5690	0.14	2.68
5690	5700	0.06	8.60
*5690	5700	0.29	8.25
5700	5710	0.09	37.7
5710	5720	0.07	14.1
5720	5730	0.07	19.5
5730	5740	0.07	4.35
5740	5750	0.05	2.56
5750	5760	0.65	2.62
5760	5770	0.14	4.20
5770	5780	0.75	3.44
5780	5790	0.84	2.26
5790	5800	1.47	2.38
*5790	5800	1.44	2.48
5800	5810	1.14	2.44
5810	5820	0.93	1.83
5820	5830	0.36	2.78
5830	5840	0.60	10.7
5840	5850	0.64	2.85
5850	5860	0.76	2.08
5860	5870	0.73	4.44
5870	5880	0.43	18.7
5880	5890	0.55	3.56
5890	5900	0.54	2.00
*5890	5900	0.55	1.93
5900	5910	0.58	2.72
5910	5920	0.67	2.64
5920	5930	0.71	1.83
5930	5940	0.83	2.54

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
5940	5950	0.98	1.99
5950	5960	1.64	1.96
5960	5970	0.82	1.84
5970	5980	0.94	1.74
5980	5990	1.49	2.06
5990	6000	1.25	2.06
*5990	6000	1.30	2.00
6000	6010	1.42	2.06
6010	6020	1.20	2.32
6020	6030	0.91	2.62
6030	6040	0.94	2.69
6040	6050	0.81	2.58
6050	6060	0.52	2.92
6060	6070	0.45	3.94
6070	6077	0.69	4.48
6077	6090	Missing	
6090	6100	"	
6100	6110	"	
6110	6120	"	
6120	6130	"	
6130	6140	"	
6140	6150	"	
6150	6160	0.39	1.76
6160	6170	0.49	1.39
6170	6180	0.64	1.06
6180	6190	0.72	0.83
6190	6200	1.01	0.74
*6190	6200	0.94	0.85

TOOLACHEE NO. 1

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
5650	5660	0.17	1.15
5660	5670	0.20	2.40
5670	5680	0.21	2.58
5680	5690	0.27	2.36
5690	5700	0.19	1.69
*5690	5700	0.19	1.71
5700	5710	0.21	1.52
5710	5720	0.07	1.18
5720	5730	0.15	22.3
5730	5740	0.50	15.7
5740	5750	0.19	2.52
5750	5760	0.18	9.40
5760	5770	0.24	4.66
5770	5780	1.12	1.63
5780	5790	0.17	1.91
5790	5800	0.18	1.75
*5790	5800	0.39	1.46
5800	5810	0.17	1.42
5810	5820	0.18	1.29
5820	5830	0.23	1.32
5830	5840	0.19	1.26
5840	5850	0.17	1.24
5850	5860	0.22	1.33
5860	5870	0.19	1.23
5870	5880	0.19	1.22
5880	5890	0.33	1.47
5890	5900	0.29	1.33
*5890	5900	0.33	1.31
5900	5908	0.28	33.1
5908	5920	0.47	7.06
5920	5930	0.33	6.26
5930	5940	0.43	3.90
5940	5950	0.29	6.28
5950	5960	0.40	4.44
5960	5970	0.30	5.94
5970	5980	0.05	9.22
5980	5990	0.40	3.50
5990	6000	0.62	4.36
*5990	6000	0.62	4.14
6000	6010	0.56	6.70
6010	6020	0.62	6.04
6020	6030	0.43	35.3
6030	6040	0.62	19.0
6040	6043	missing	
6043	6058	0.46	0.18
6058	6068	0.16	0.13
6068	6074	0.02	32.5
6070	6080	0.37	8.76
6080	6090	0.47	5.05
6090	6100	0.56	7.30
*6090	6100	0.59	7.42
6100	6110	0.58	8.14
6110	6120	0.46	8.94

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
6120	6130	0.20	3.22
6130	6140	0.20	3.36
6140	6150	0.05	2.12
6150	6160	0.20	2.14
6160	6170	0.20	3.76
6170	6180	0.20	3.56
6180	6190	0.21	59.4
6190	6200	0.33	17.6
*6190	6200	0.33	17.6
6200	6210	0.31	19.0
6210	6220	0.30	9.66
6220	6230	0.23	37.2
6230	6240	0.31	10.4
6240	6250	0.14	24.3
6250	6260	0.15	6.58
6260	6270	0.24	10.5
6270	6280	0.24	17.5
6280	6290	0.32	16.7
6290	6300	0.27	8.94
*6290	6330	0.17	8.94
6300	6310	0.40	0.86
6310	6320	0.58	4.78
6320	6330	0.19	10.3
6330	6340	0.24	7.76
6340	6350	0.51	2.86
6350	6360	0.65	4.00
6360	6370	0.58	4.98
6370	6380	0.63	4.56
6380	6390	0.94	3.08
6390	6400	1.38	4.42
*6390	6400	1.01	5.42
6400	6410	1.25	3.18
6410	6420	1.32	4.58
6420	6430	1.19	4.60
6430	6440	1.07	5.26
6440	6450	1.27	4.48
6450	6460	1.71	2.50
6460	6470	1.44	4.60
6470	6482	1.23	3.20
6482	6490	0.26	1.95
6490	6495	0.17	3.26
6495	6510	1.06	5.70
*6495	6510	1.08	5.72
6510	6520	0.87	4.10
6520	6530	0.38	2.64
6530	6540	0.34	3.34
6540	6550	0.69	4.04
6550	6560	0.44	3.80
6560	6570	0.43	13.8
6570	6580	0.47	5.90
6580	6590	0.56	3.56
6590	6600	0.53	2.64
*6590	6600	0.52	2.80

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
6600	6610	0.52	3.18
6610	6620	0.43	13.5
6620	6630	0.49	7.46
6630	6640	0.52	4.30
6640	6650	0.44	15.8
6650	6660	0.49	4.52
6660	6670	0.46	4.10
6670	6680	0.44	5.02
6680	6690	0.47	5.74
6690	6700	0.26	52.1
*6690	6700	0.25	51.3
6700	6710	0.38	4.32
6710	6720	0.53	4.80
6720	6730	0.74	5.78
6730	6740	0.79	4.84
6740	6750	0.53	8.50
6750	6760	0.79	2.90
6760	6770	0.88	3.04
6770	6780	0.72	3.44
6780	6790	1.03	2.78
6790	6800	1.03	3.30
*6790	6800	0.98	3.52
6800	6810	1.27	2.74
6810	6820	1.30	2.42
6820	6830	0.07	4.20
6830	6840	1.19	2.58
6840	6850	0.64	2.96
6850	6860	0.61	2.88
6860	6870	0.67	2.92
6870	6880	0.68	3.64
6880	6890	1.22	2.88
6890	6897	0.15	0.14
6897	6903	0.22	0.34
*6897	6903	0.22	0.23
6903	6907	0.34	0.14
6907	6911	0.42	2.58
6911	6919	0.20	14.9
6919	6926	0.27	9.60
6926	6934	0.32	2.88
6934	6942	0.55	1.24
6942	6950	0.16	2.50
6950	6958	0.19	1.97
6958	6960	0.52	6.38
6960	6970	0.45	4.90
6970	6980	0.44	16.2
6980	6990	0.44	9.68
6990	7000	0.51	7.02
*6990	7000	0.51	6.62
7000	7010	0.43	12.0
7010	7020	0.25	29.5
7020	7030	0.29	15.9
7030	7040	0.35	8.82
7040	7050	0.43	6.92

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
7050	7060	0.38	4.82
7060	7070	0.43	16.9
7070	7080	0.42	12.7
7080	7090	0.44	8.22
7090	7100	0.50	4.50
*7090	7100	0.44	4.38

TOOLACHEE NO. 3

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
5720	5730	0.19	1.68
5730	5740	0.14	1.55
5740	5750	0.13	1.47
5750	5760	0.12	1.09
5760	5770	0.10	1.02
5770	5780	0.09	0.55
5780	5790	0.80	1.86
5790	5800	0.20	31.5
*5790	5800	0.22	31.0
5800	5810	0.19	12.0
5810	5820	0.29	2.42
5820	5830	0.21	3.06
5830	5840	0.26	2.32
5840	5850	0.32	1.50
5850	5860	0.40	1.24
5860	5870	0.43	1.07
5870	5880	0.48	1.10
+5880	5890	0.59	0.875
5890	5900	0.69	0.63
*5890	5900	0.67	0.63
5900	5910	0.61	0.73
5910	5920	0.67	0.70
5920	5930	0.55	0.84
5930	5940	0.73	1.44
5940	5950	0.84	0.76
5950	5960	0.78	0.86
5960	5970	0.83	0.69
5970	5980	0.74	0.83
5980	5990	0.92	0.74
5990	6000	0.88	0.68
*5990	6000	0.90	0.67
6000	6010	0.88	0.72
6010	6020	0.74	1.00
6020	6030	0.13	60.9
6030	6040	0.52	28.8
6040	6050	0.70	2.88
6050	6060	0.67	9.74
6060	6070	0.88	3.28
6070	6080	0.76	9.14
6080	6090	0.67	7.22
6090	6100	0.78	5.04
*6090	6100	0.79	5.10
6100	6110	0.63	5.02
6110	6120	0.58	6.24
6120	6130	0.88	3.98
6130	6140	1.00	3.38
6140	6150	0.81	2.88
6150	6160	0.73	2.78
6160	6170	0.82	1.95
6170	6180	0.70	2.34
6180	6190	0.49	32.9
6190	6200	0.25	58.1
*6190	6200	0.21	57.1

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
6200	6210	0.49	2.64
6210	6220	0.66	5.78
6220	6230	0.38	8.60
6230	6240	0.27	11.7
6240	6250	0.70	9.62
6250	6260	0.11	56.5
6260	6270	0.47	16.1
6270	6280	0.33	22.5
6280	6290	0.37	10.1
6290	6300	0.38	6.68
*6290	6300	0.35	6.60
6300	6310	0.28	5.28
6310	6320	0.24	2.94
6320	6330	0.26	10.1
6330	6340	0.14	32.6
6340	6350	0.20	21.4
6350	6360	0.77	5.72
6360	6370	0.48	21.1
6370	6380	0.32	52.3
6380	6390	0.39	15.3
6390	6400	0.34	7.46
*6390	6400	0.32	7.22
6400	6410	0.20	5.38
6410	6420	0.39	21.2
6420	6430	0.31	10.0
6430	6440	0.18	4.88
6440	6450	0.14	2.26
6450	6460	0.14	3.48
6460	6470	0.17	1.81
6470	6480	0.12	1.30
6480	6490	0.11	13.3
6490	6500	0.29	23.8
*6490	6500	0.28	23.3
6500	6510	0.53	2.86
6510	6520	0.60	2.24
6520	6530	0.64	3.28
6530	6540	0.71	3.26
6540	6550	0.59	1.94
6550	6560	0.82	2.20
6560	6570	0.77	2.24
6570	6580	0.99	1.68
6580	6590	0.97	2.02
6590	6600	1.08	3.16
*6590	6600	1.04	3.32
6600	6610	1.15	3.34
6610	6620	1.21	2.32
6620	6630	1.26	2.04
6630	6640	1.38	1.81
6640	6650	0.64	1.51
6650	6660	0.74	1.43
6660	6670	0.80	1.86
6670	6680	1.00	2.08
6680	6690	0.93	2.16

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
6690	6700	1.41	2.14
*6690	6700	1.43	2.14
6700	6710	1.36	2.18
6710	6720	1.56	2.42
6720	6730	1.18	2.12
6730	6740	1.17	2.56
6740	6750	1.12	1.40
6750	6760	1.18	1.56
6760	6770	0.75	3.24
6770	6780	0.87	2.22
6780	6790	1.29	4.24
6790	6800	0.63	6.92
*6790	6800	0.61	7.78
6800	6810	0.69	3.78
6810	6820	0.38	3.26
6820	6830	0.88	6.08
6830	6840	0.81	14.4
6840	6850	0.84	7.98
6850	6860	0.83	4.80
6860	6870	0.67	4.18
6870	6880	0.65	4.04
6880	6890	0.31	50.5
6890	6900	0.45	18.5
*6890	6900	0.71	17.4
6900	6910	0.68	10.5
6910	6920	0.68	10.2
6920	6930	0.56	2.42
6930	6940	0.43	3.00
6940	6950	0.67	3.68
6950	6960	0.68	4.34
6960	6970	0.61	5.60
6970	6980	0.69	3.22
6980	6990	0.69	5.68
6990	7000	0.78	3.34
*6990	7000	0.76	3.10
7000	7010	0.80	4.24
7010	7020	0.85	3.46
7020	7030	0.69	6.80
7030	7040	0.91	3.16
7040	7050	1.06	2.44
7050	7060	0.85	2.92
7060	7070	0.93	2.52
7070	7080	1.10	3.32
7080	7090	0.96	4.40
7090	7100	0.49	26.6
*7090	7100	0.93	2.74
7100	7110	0.99	2.34
7110	7120	1.12	2.48
7120	7130	0.99	2.88
7130	7140	1.00	2.52
7140	7150	0.93	3.02
7150	7160	0.79	3.62

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
7160	7170	0.79	4.34
7170	7180	0.67	4.94
7180	7190	0.64	6.08
7190	7200	0.21	3.90
*7190	7200	0.25	3.64
7200	7210	0.27	3.34
7210	7220	0.30	4.36
7220	7230	0.31	3.64
+7230	7240	0.30	4.1
7240	7250	0.29	4.56
7250	7260	0.30	3.48
7260	7270	0.27	12.4
7270	7280	0.34	5.30
7280	7290	0.94	4.36
7290	7300	0.28	20.4
*7290	7300	0.30	19.6
7300	7310	0.37	5.32
7310	7320	0.25	22.8
7320	7330	0.24	13.1
7330	7340	0.29	8.02
7340	7350	0.21	9.10
7350	7360	0.25	6.42
7360	7370	0.22	3.82
7370	7380	0.52	4.16
7380	7390	0.40	13.1
7390	7400	0.39	6.22
*7390	7400	0.31	6.54
7400	7410	0.29	5.94
7410	7420	0.39	5.64
7420	7430	0.32	3.68
7430	7440	0.24	19.2
7440	7450	0.21	14.1
7450	7460	0.17	33.6
7460	7470	0.08	39.9
7470	7480	0.12	30.4
7480	7490	0.13	5.96
7490	7500	0.27	4.86
*7490	7500	0.20	5.04
7500	7510	0.19	3.06
7510	7520	0.32	22.2
7520	7530	0.47	26.7
7530	7540	0.40	12.9
7540	7550	0.53	4.84
7550	7560	0.68	5.20
7560	7570	0.79	5.84
7570	7580	0.90	6.26
7580	7590	1.15	3.58
7590	7600	1.11	3.64
*7590	7600	1.30	4.22
7600	7610	1.38	3.90
7610	7620	1.42	1.94

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
7620	7630	1.24	1.68
7630	7640	1.24	0.73
7640	7650	0.62	3.88
7650	7660	0.79	2.82

TOOLACHEE NO. 7

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
5740	5750	0.13	0.95
5750	5760	0.10	0.76
5760	5770	0.16	2.54
5770	5780	0.10	1.43
5780	5790	0.15	1.72
5790	5800	0.17	1.48
*5790	5800	0.15	2.16
5800	5810	0.09	1.20
5810	5820	0.16	2.96
5820	5830	0.17	2.84
5830	5840	0.26	2.66
5840	5850	0.15	3.50
5850	5860	0.13	38.7
5860	5870	0.15	11.9
5870	5880	0.25	7.30
5880	5890	0.22	5.62
5890	5900	0.43	4.02
*5890	5900	0.40	3.86
5900	5910	0.53	2.90
5910	5920	0.75	2.68
5920	5930	0.76	1.75
5930	5940	0.65	2.22
5940	5950	0.79	1.62
5950	5960	0.68	1.25
5960	5970	0.72	1.46
5970	5980	0.74	1.51
5980	5990	0.69	2.02
5990	6000	0.63	2.24
*5990	6000	0.63	2.32
6000	6010	0.59	2.42
6010	6020	0.57	2.74
6020	6030	0.37	2.14
6030	6040	0.38	0.99
6040	6050	0.48	0.97
6050	6060	0.56	0.93
6060	6070	0.70	0.71
6070	6080	0.70	0.82
6080	6090	0.68	0.91
6090	6100	0.55	1.03
*6090	6100	0.53	1.13
6100	6110	0.57	1.01
6110	6120	0.46	24.4
6120	6130	0.70	3.38
6130	6140	0.67	5.64
6140	6150	0.62	7.24
6150	6160	0.62	5.88
6160	6170	0.37	12.8
6170	6180	0.62	6.40
6180	6190	0.64	5.06
6190	6200	0.43	25.4
*6190	6200	0.43	25.4
6200	6210	0.77	7.60

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
6210	6220	0.81	5.84
6220	6230	0.60	5.86
6230	6240	0.59	7.76
6240	6250	0.41	8.46
6250	6260	0.61	8.68
6260	6270	0.14	68.2
6270	6280	0.17	63.3
6280	6290	0.19	65.3
6290	6300	0.87	30.3
*6290	6300	0.96	29.4
6300	6310	0.96	30.1
6310	6320	0.86	24.4
6320	6330	0.29	50.4
6330	6340	0.85	19.4
6340	6350	0.42	27.3
6350	6360	0.34	54.9
6360	6270	0.17	53.8
6370	6380	0.22	32.4
6380	6390	0.65	11.0
6390	6400	0.38	14.7
*6390	6400	0.35	15.4
6400	6410	Missing	
6410	6420	"	
6420	6430	"	
6430	6440	0.22	30.1
6440	6450	0.44	9.56
6450	6460	0.33	12.5
6460	6470	0.31	14.0
6470	6480	0.37	17.8
6480	6490	0.42	21.5
6490	6500	Missing	
*6490	6500	"	
6500	6510	"	
6510	6520	"	
6520	6530	"	
6530	6540	0.27	4.92
6540	6550	0.18	12.4
6550	6560	0.27	3.96
6560	6570	0.41	4.12
6570	6580	0.55	3.58
6580	6590	0.70	2.96
6590	6600	0.34	43.2
*6590	6600	0.37	27.4
6600	6610	1.07	3.25
6610	6620	0.63	3.68
6620	6630	0.71	5.42
6630	6640	0.73	3.60
6640	6650	0.72	8.70
6650	6660	0.84	8.08
6660	6670	0.90	7.66
6670	6680	0.72	6.58
6680	6690	0.75	12.7

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
6690	6700	0.75	11.1
6690	6700	0.78	11.1
6700	6710	0.73	7.92
6710	6720	0.65	12.3
6720	6730	0.62	13.5
6730	6740	0.76	13.0
6740	6750	0.56	21.7
6750	6760	0.66	13.7
6760	6770	0.71	5.80
6770	6780	0.70	15.7
6780	6790	0.76	16.4
6790	6800	0.83	24.4
*6790	6800	0.86	22.5
6800	6810	0.71	17.6
6810	6820	0.70	12.8
6820	6830	0.97	7.58
6830	6840	0.94	12.1
6840	6850	0.94	9.66
6850	6860	0.63	5.56
6860	6870	0.44	37.8
6870	6880	0.34	27.2
6880	6890	0.49	13.7
6890	6900	0.56	9.44
*6890	6900	0.52	
6900	6910	0.52	13.8
6910	6920	0.51	5.00
6920	6930	0.82	7.10
6930	6940	0.74	14.6
6940	6950	0.75	9.46
6950	6960	0.69	9.32
6960	6970	0.54	3.48
6970	6980	0.5	4.91
6980	6990	0.45	6.34
6990	7000	0.44	5.22
*6990	7000	0.48	5.86
7000	7010	0.30	4.62
7010	7020	0.29	5.82
7020	7030	0.24	7.34
7030	7040	0.27	75.9
7040	7050	1.39	22.9
7050	7060	1.12	11.3
7060	7070	0.58	0.86
7070	7080	0.62	26.4
7080	7090	0.47	5.74
7090	7100	0.40	9.90
*7090	7100	0.47	10.6
7100	7110	0.60	4.24
7110	7120	0.46	3.44
7120	7130	0.81	4.30
7130	7140	0.70	4.88
7140	7150	0.44	2.30
7150	7160	0.59	2.36

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
7160	7170	1.02	2.10
7170	7180	Missing	
7180	7190	0.83	10.1
7190	7200	0.90	5.90
7200	7210	1.15	5.70
7210	7220	1.41	9.28
7220	7230	1.19	2.44
7230	7240	Missing	
7240	7250	"	
7250	7260	"	
7260	7270	"	
7270	7280	1.08	4.10
7280	7290	2.25	4.56
7290	7300	1.06	7.10
*7290	7300	1.08	8.12
7300	7310	1.12	5.46
7310	7320	1.08	3.32
7320	7330	1.76	4.20
7330	7340	0.96	4.12
7340	7350	Missing	
7350	7360	"	
7360	7370	"	
7370	7380	0.35	4.72
7380	7390	0.27	1.64
*7380	7390	0.26	1.75
7390	7400	Missing	
7400	7410	"	
7410	7420	0.47	2.28
7420	7430	0.44	2.24
7430	7440	0.36	7.66
7440	7450	0.30	19.5
7460	7470	0.32	18.7
7470	7480	0.26	3.44
7480	7490	0.25	3.50
7490	7500	0.31	4.24
*7490	7500	0.31	3.92
7500	7510	0.25	1.68
7510	7520	0.32	1.78
7520	7530	0.34	1.88
7530	7540	0.17	9.18
7540	7550	0.38	7.24
7550	7560	0.29	24.2
7560	7570	0.61	4.18
7570	7580	0.69	4.94
7580	7590	0.51	6.58
7590	7600	0.43	2.98
*7590	7600	0.46	3.18
7600	7610	0.14	1.89
7610	7620	0.10	8.26
7620	7630	0.22	12.2
7630	7640	0.37	3.13

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
7640	7650	0.14	15.1
7650	7660	Missing	
7660	7670	"	
7670	7680	"	
7680	7690	0.16	3.94
7690	7700	0.22	2.86
*7690	7700	0.21	2.98
7700	7710	0.25	4.44
7710	7720	0.36	6.04
7720	7730	0.38	30.7
7730	7740	0.53	7.74
7740	7750	0.38	17.6
7750	7760	1.03	11.3
7760	7770	0.58	6.08
7770	7780	0.74	9.06
7780	7790	0.43	12.0
7790	7800	0.55	8.96
*7790	7800	0.53	9.02
7800	7810	0.63	5.70
7810	7820	0.57	5.68
7820	7830	0.68	5.66
7830	7835	0.72	6.12

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FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
5600	5610	0.13	1.14
5610	5620	0.19	2.56
5620	5630	0.12	1.02
5630	5640	0.07	1.10
5640	5650	0.07	0.62
5650	5660	1.89	0.72
5660	5670	0.12	0.67
5670	5680	0.18	0.74
5680	5690	0.49	0.47
5690	5700	0.72	0.94
5690	5700	0.75	1.02
5700	5710	0.90	0.70
5710	5720	0.77	0.76
5720	5730	0.93	0.65
5730	5740	0.64	0.88
5740	5750	0.92	0.68
5750	5760	0.88	0.62
5760	5770	1.15	0.41
5770	5780	0.92	0.43
5780	5790	0.85	0.37
5780	5790	0.84	0.47
5790	5800	0.87	0.43
5800	5810	0.88	0.40
5810	5820	0.65	0.56
5820	5830	0.62	0.58
5830	5840	0.78	0.64
5840	5850	0.94	0.63
5850	5860	0.85	0.69
5860	5870	0.91	11.40
5870	5880	1.00	18.45
5880	5890	1.15	11.15
5890	5900	0.71	4.38
5900	5910	0.71	4.42
5910	5920	0.61	8.30
5920	5930	0.79	4.74
5930	5940	0.61	2.70
5940	5950	0.76	8.05
5950	5960	1.43	2.80
5960	5970	0.92	2.88
5970	5980	0.59	2.83
5980	5990	0.82	2.18
*5980	5990	0.78	2.17
5990	6000	0.62	2.50
6000	6010	0.91	42.6
6010	6020	3.21	18.9
6020	6030	0.98	7.65
6030	6040	1.43	1.86
6040	6050	0.90	2.82
6050	6060	2.05	0.59
6060	6070	1.23	2.94
6060	6070	1.16	3.36
6070	6080	2.02	7.35

FROM (FEET)	TO	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
6080	6090	0.33	1.80
6090	6100	1.21	3.20
6100	6110	0.71	5.35
6100	6110	0.75	5.60
6110	6120	0.62	9.75
6120	6130	0.34	17.0
6130	6140	0.12	15.35
6140	6150	0.09	32.4
6150	6160	0.21	9.65
6160	6170	0.32	4.74
6170	6180	0.61	5.80
6180	6190	0.49	15.65
6190	6200	0.34	42.5
6200	6210	0.64	6.62
6210	6220	0.39	26.0
6220	6230	0.43	9.90
6230	6240	0.60	6.30
6240	6250	0.26	7.05
6250	6260	0.55	8.25
6260	6270	0.55	4.94
6260	6270	0.56	4.90
6270	6280	0.71	61.1
6280	6290	0.85	7.40
6290	6300	0.66	6.70
6300	6310	0.31	27.9
6310	6320	0.20	3.60
6320	6330	0.14	4.16
6330	6340	0.23	1.35
6340	6350	0.12	2.03
6350	6360	0.06	0.86
6350	6360	0.06	0.89
6360	6370	0.06	0.65
6370	6380	0.24	2.40
6380	6390	0.98	2.64
6390	6400	0.61	3.78
*6390	6400	1.10	3.30
6400	6410	0.97	3.50
6410	6420	0.93	2.88
6420	6430	0.70	3.56
6430	6440	0.27	68.6
6440	6450	1.20	5.80
6450	6460	0.65	3.68
6460	6470	0.93	3.01
6470	6480	0.77	2.45
6480	6490	1.11	2.25
6480	6490	1.08	2.23
6490	6500	0.93	2.76
6500	6510	1.06	6.78
6510	6520	0.89	2.37
6520	6530	0.94	2.64
6530	6540	1.12	1.60
6540	6550	1.06	2.16
6550	6560	1.35	2.07

FROM (FEET)	TO (FEET)	CARBONATE CARBON %	ORGANIC & ELEMENTAL CARBON %
6560	6570	1.32	2.06
6570	6580	1.38	2.37
6580	6590	1.36	1.75
*6580	6590	1.38	1.83
6590	6600	1.29	2.78
6600	6610	1.11	2.35
6610	6620	1.43	2.10
6620	6630	1.67	2.73
6630	6640	1.35	3.02
6640	6650	1.49	2.48
6650	6660	1.65	1.99
6660	6670	1.65	1.96
6670	6680	1.37	2.35
6680	6690	1.02	2.52
*6680	6690	1.02	2.38
6690	6700	0.88	3.21
6700	6710	0.82	2.39
6710	6720	0.93	2.37
6720	6730	0.97	2.54
6730	6740	0.87	3.58
6740	6750	0.63	2.48
6750	6760	0.51	2.13
6760	6770	0.85	3.16
*6760	6770	0.86	3.31