NMBMMR

Open-file Report 448

Hydrocarbon source facies characterization

Pennsylvanian-age sediment penetrated by the El Paso Natural Gas Company No. 50 San Juan Unit 29-5 well, Rio Arriba County, New Mexico

Prepared for
Burlington Resources
Farmington, New Mexico

1997

HYDROCARBON SOURCE FACIES CHARACTERIZATION

Pennsylvanian-Age Sediment Penetrated by the
El Paso Natural Gas Company No. 50 San Juan Unit 29-5 Well,
Rio Arriba County, New Mexico

GeoChem Job Number 4389

Prepared for

BURLINGTON RESOURCES
Mike Dawson

by

GEOCHEM LABORATORIES, INC.
Geoffrey S. Bayliss

Geotechnical
Information Center

Confidential
August, 1997

TABLE OF CONTENTS

TABLE OF CONTENTS

Figures (Continued)

Tables

TABLE OF CONTENTS

Tables (Continued)

Appendices

HYDROCARBON SOURCE FACIES CHARACTERIZATION
Pennsylvanian-Age Sediments Penetrated by the El Paso Natural Gas Company No. 50 San Juan Unit 29-5 Well, Rio Arriba County, New Mexico (GeoChem Job Number 4389)

SUMMARY

The stratigraphic section penetrated over the gross well interval, 11,300± feet to 14,423 feet TD, in the El Paso Natural Gas Company No. 50 San Juan Unit 29-5 Well, Rio Arriba County, New Mexico can be subdivided into two (2) slightly different hydrocarbon source intervals based primarily on lithology and the geothermal diagenetic (time-temperature) profiles determined for these sediments.

The Post-Pennsylvanian and Upper Pennsylvanian sediments, 11,300± feet to 12,550± feet, rate as having a mature poor to - at best - fair gas source character at this well location. These sediments contain dominantly terrestrially derived gas-prone woody structured, herbaceous and inertinite organic matter populations with little realizable oil source capability even if buried deeper elsewhere in the basin.

Paradox and Mississippian sediments at this well location, 12,550± feet to 13,960± feet, have experienced a more severe mature to very mature diagenetic (time-temperature) history and contain higher amounts of organic matter still however of a gas-prone woody structured, herbaceous and inertinitic plant detritus.

These sediments reflect a mature to very mature fair to good gas source character with only the richer subzone at 12,850± feet to 13,225± feet having a fair rating for oil and associated gas generation.

It is surprising that this lower Paradox limestone - evaporitic sequence does not contain any significant amount of more oil-prone amorphous sapropellic kerogen which is a normal organic matter characteristic for sediments of this type. Development of back lagoonal and restricted depositional environments within this dominantly limestone - evaporitic sequence would possibly result in algal - amorphous sapropellic rich sediments which, at a comparable maturity rank shown for this well would represent very favorable oil and associated gas source facies in this area.

HYDROCARBON SOURCE FACIES CHARACTERIZATION
Pennsylvanian-Age Sediments Penetrated by the El Paso Natural Gas Company No. 50 San Juan Unit 29-5 Well, Rio Arriba County, New Mexico (GeoChem Job Number 4389)

INTRODUCTION

This study reports on the results of a detailed geochemical Hydrocarbon Source Facies Characterization of Pennsylvanian-age sediments, penetrated between 11,300± feet and 14,423 feet TD, in the El Paso Natural Gas Company No. 50 San Juan Unit 29-5 Well, Rio Arriba County, New Mexico.

A total of six hundred twenty-four (624) dried cuttings samples, contained in paper envelopes, were received at GeoChem's Houston-based laboratories on June 19, 1997. This well was logged in under the GeoChem Job Number 4389 with each sample being further identified by a suffix -001 through -624 in order of increasing depth of burial. Sample identification against depth is presented for this well in Appendix I, hereto appended.

A copy of an Amstrat Sample Litholog and a Gamma-Neutron log were provided to GeoChem for sample selection purposes. The formation top information was marked on these logs and indicated the stratigraphic zonation as:

Top of Pennsylvanian	11,520± feet
Top of Paradox	12,550± feet
Top of Mississippian	13,810± feet
Top of PreCambrian	13,960± feet
Total Depth (TD)	14,423± feet

Three (3) core runs were made at 12,706± feet to 12,711± feet (recovery 6 feet), 12,736± feet to 12,753± feet (18 feet recovery) and 12,870± feet to 12,899± feet (30 feet recovery). Pieces of the core at one (1) foot intervals were also provided and logged in under the same GeoChem Job Number, 4389, with individual samples being identified by a suffix -001C through -054C in order of increasing depth.

GEOCHEM LABORATORIES, INC. ♦ 1143-C Brittmoore Road ♦ Houston, Texas 77043
Phone: 713/467-7011 ♦ Fax: 713/467-7639

Sample frequency over the interval 11,300± feet to 14,423 feet TD was at five (5) foot intervals.

Sample Selection

The quality of the sample material available on this well was very good although each sample consisted of small-size cuttings of varied mixed lithologies. The quality of the litholog supplied was unfortunately poor probably due to the original having been colored prior to reproduction. However, based primarily on the written sample description it would seem that the sediments representative of the Pennsylvanian upper section, 11,500± feet to 12,550± feet, is a dominant clastic depositional sequence of interbedded sandstones, siltstone, and pale, red dark reddish brown, blackish red and medium dark gray to brownish black shales. There appeared to be almost no limestone of any significance in this interval. A similar depositional character extends into the top of the Paradox formation to a depth of 12,970± feet whereupon the remaining sediments in the deeper Paradox and in the underlying Mississippian consist of a more dominant limestone facies interbedded with sands, siltstones and light gray to medium dark gray limestones and red, grayish red, olive gray and medium dark gray to dark gray shales.

This lithologic interbedding was also characteristic of the sample cuttings with almost every sample examined having mixed lithologies. In keeping with the objectives of this well study, it was decided to select representative 'composite' samples over 45-50 foot intervals and to analyzed such without detailed picking which it was felt may bias the assessment data. In all a total of sixty-three (63) samples were chosen using the sample litholog information and a detailed examination of the sample cuttings. Each sample taken was sieved to remove fines and possible cave, iron removed and the cuttings placed in a suitably labelled vial. Seven (7) core samples were also included in this sample suite.

In total, the sample suite consisted of five (5) Post-Pennsylvanian samples (11,300± feet to 11,510± feet), twenty-one (21) Upper Pennsylvanian samples (11,550± feet to 12,540± feet), thirty-one (31) Paradox samples (12,565± feet to 13,805± feet), three (3) Mississippian (13,825± feet to 13,930± feet) samples and three (3) PreCambrian samples (14,000± feet to 14,405± feet).

GEOCHEM LABORATORIES, INC. ♦ 1143-C Brittmoore Road ♦ Houston, Texas 77043
Phone: 713/467-7011 ♦ Fax: 713/467-7639

A brief lithologic description of these samples is provided in Table I.

In addition, it was decided to select eight (8) samples from the sixty-three (63) total as control samples and to pick and analyze the dominant lithologies in these samples. A lithological description made on these samples is presented in Table III. Thirteen (13) of the sixty-three (63) sample suite were also selected for visual kerogen processing and assessment.

Analytical Program

The analytical program planned for this well study involved measurement of total organic carbon content (TOC) and Rock-Eval (R-E) pyrolysis analysis on all sixty-three (63) representative 'composite' samples as well as the same analyses carried out on the sixteen (16) picked lithology control samples. The data for the total organic carbon (TOC) and Rock-Eval (R-E) pyrolysis analyses is reported in Tables I, II-A, II-B, III, III-A and III-B. The Rock-Eval data is reported in both milligrams/gram (mgm/gm) and in parts per million (ppm wt/wt) for convenient reference. Rock-eval pyrograms are appended in Appendices II and III.

The thirteen (13) samples chosen for visual kerogen work were processed to isolate the contained palynological kerogen. A coarse size portion (approximately 1 gram) of each sample was treated with cold and hot hydrochloric acid, washed to remove calcium and magnesium ions, floated with zinc bromide at sp gr 2.0, washed to remove zinc bromide and a strew slide prepared of the isolated kerogen. The strew slide was examined in transmitted light at high magnification (10X, 40X) and appraised for organic matter type (OMT) and thermal alteration index (TAI) based on the coloration of the spore-pollen and herbaceous cuticle plant material. The summary of the visual kerogen assessment data is shown in Table IV-A with the assessment worksheet reproduced in Table IV-B.

The yield of organic matter (kerogen) was insufficient to enable vitrinite reflectance plugs to be prepared for assessment. If desired, such work can be carried out on a larger sample aliquot should this be necessary.

GEOCHEM LABORATORIES, INC. ♦ 1143-C Brittmoore Road ♦ Houston, Texas 77043
Phone: 713/467-7011 ♦ Fax: 713/467-7639

RESULTS AND DISCUSSION

The results of the various geochemical analyses carried out on the sixty-three (63) selected samples representative of the stratigraphic interval between 11,300± feet and 14,423 feet TD are presented in Tables I-Sample Lithological Description, Sample Identification and Total Organic Carbon (TOC); Table II-A and II-B, Results of Rock-Eval Pyrolysis in mgm/gm and ppm wt/wt values respectively; Table III-Sample Lithological Description, Sample Identification and Total Organic Carbon (TOC) for the Control Samples, Table III-A and III-B, Results of Rock-Eval Pyrolysis for the Control Samples in mgm/gm and ppm wt/wt values respectively; Table IV-A, Summary of Organic Carbon and Visual Kerogen Data, Table IV-B, Visual Kerogen Assessment Worksheet and Table IV-C, Oil and Gas Factors based on Organic Facies Type. A complete sample identification listing is presented in Appendix I with the Rock-Eval pyrogram traces being reproduced in Appendices II and III.

The various sets of data recorded in the designated tables, Tables I through IV-C, have also been presented graphically in a series of Figures which allows the reader to clearly see the data in well profile format. A number of these figures have been presented with different numerical units such that one can readily cross-reference analytical data with interpretational values used in the text. For instance, the Rock-Eval Pyrolysis Summary data has been presented in Figure 1 in milligrams/gram (mgm/gm) and also as parts per million (ppm wt/wt); the former being printed on the pyrograms (Appendices II and III) with the latter being calculated for more convenient discussion purposes.

A. Geological Zonation

A delineation of the various stratigraphic units penetrated by this well between 11,300± feet and 14,423 feet TD, was presented in the preceding Introduction. Although the prime objective was to characterize the Pennsylvanian-age sediments (Upper Pennsylvanian and Paradox), a few samples from the Post-Pennsylvanian and the underlying Mississippian and PreCambrian were also included in order to examine data changes of note across the Pennsylvanian stratigraphic boundaries. Where space has allowed, the stratigraphic tops have been marked on the Tables and Figures by a dividing line; however no names have been inserted along with these stratigraphic top lines.

GEOCHEM LABORATORIES, INC. ◆ 1143-C Brittmoore Road ◆ Houston, Texas 77043
Phone: 713/467-7011 ◆ Fax: 713/467-7639

In addition to comments made in the sample selection text, the litholog provided and used in this study has been included herein as Appendix IV. It is suggested that better copies from the original logs be prepared and added to each of these reports since the reader will be better able to see the overall lithology of the section examined in this study if these logs are conveniently available.

B. Hydrocarbon Source Richness and Source Character

The analytical data reported in this well study addresses the Hydrocarbon Source Richness and Source Character from seven (7) significant perspectives; organic richness as measured by total organic carbon content, hydrocarbon richness as measured by the S_1 volatile pyrolysis yield, the remaining hydrocarbon generating potential as measured by the S_2 generatable hydrocarbon pyrolysis yield, the degree of hydrocarbon production which has already occurred expressed as the productivity index (S_1/S_1+S_2), the quality of the contained organic matter as determined by the Hydrogen Index, Oxygen Index, S_2/S_3 ratio values and visual kerogen assessment and quantification of the various organic matter populations (Al, Am, H, W and I) as well as the measure of the geothermal diagenetic (time-temperature) history for these sediments determined from the thermal alteration index values (TAI).

The Rock-Eval geochemical data are graphically presented in well profile format in Figure 1-Rock-Eval Pyrolysis summary (ppm wt/wt). Similar data for the picked lithologic control samples is presented in Figure 1-A in a comparable manner. Comparing the control sample data to the main unpicked sample data base, one can see that the picked lithology samples are moderately richer in total organic carbon content but afford significantly higher amounts of pyrolysis S_1 volatile hydrocarbon and S_2 generatable hydrocarbon. It is still felt, however, that the unpicked samples chosen for this well are representative of the fifty (50) foot interval and probably provides good unit average data for each stratigraphic unit evaluated.

Reviewing the data presented in Figure 1-Rock-Eval Pyrolysis Summary, the organic carbon contents for each stratigraphic unit were Post-Pennsylvanian (11,300± feet to 11,520± feet) (0.18%-0.38%, average 0.26%), Upper Pennsylvanian (11,520± feet to 12,550± feet) (0.18%-0.68%, average 0.24%), Paradox (12,550± feet to 13,810± feet) (0.20%-1.15%, average 0.44%), Mississippian (13,810± feet to

GEOCHEM LABORATORIES, INC. ♦ 1143-C Brittmoore Road ♦ Houston, Texas 77043
Phone: 713/467-7011 ♦ Fax: 713/467-7639

13,960± feet) (0.22%-0.39%, average 0.30%) and PreCambrian (13,960± feet to 14,423 feet TD) (0.13%-0.33%, average 0.24%).

These values are generally considered to be very poor to poor for clastic type sediments but would rate more favorably as fair to good organic carbon abundances where the samples of a carbonate lithologic type.

The Rock-Eval pyrolysis data is also rated in the very poor to poor category with values for the S_1 volatile hydrocarbon content and the remaining S_2 generatable hydrocarbon potential for each stratigraphic unit being; Post-Pennsylvanian (20 ppm - 50 ppm S_1, average 38 ppm; 0 ppm - 90 ppm S_2, average 28 ppm), Upper Pennsylvanian (10 ppm - 140 ppm S_1, average 43 ppm; 0 ppm - 380 ppm S_2, average 48 ppm), Paradox (10 ppm - 210 ppm S_1, average 39 ppm; 0 ppm - 170 ppm S_2, average 55 ppm), Mississippian (10 ppm - 140 ppm S_1, average 63 ppm; 0 ppm - 30 ppm S_2, average 16 ppm) and PreCambrian (20 ppm - 80 ppm S_1, average 40 ppm; 0 ppm - 20 ppm S_2, average 7 ppm).

With such low values it is apparent that the entire stratigraphic section penetrated at this well location has a very poor to poor hydrocarbon source character, would be considered as nonsource for oil liquids and only marginally poor to possibly fair for the generation of gas. The gas-prone nature of the organic facies penetrated by this well is reflected in the low Hydrogen Index values, the low S_2/S_3 well profile, the high Productivity Indices and the Hydrogen Index versus Oxygen Index plots (Tables II-A, II-B; Figures 1 and 2-A, 2-B).

Unfortunately, no valid Tmax °C data which would have reflected the thermal maturity rank attained by these sediments was generated in the pyrolysis analyses. The values actually printed out were all lower than 400°C and are interpreted as being erroneous due to instrumentation limitations. This is an analytical problem which occurs whenever samples analyzed on the Rock-Eval contain low amounts of total organic carbon (TOC) or generate low yields of S_2 generatable hydrocarbon. The instrument arbitrarily assigns an erroneous S_2 peak value for the Tmax °C value.

The visual kerogen assessment data of thermal alteration index (TAI) and organic matter type (OMT) (Tables IV-A, IV-B; Figure 2) also confirm a gas-prone organic matter facies type with the sediments containing dominant amounts of terrestrially derived woody structured and inertinitic plant detritus along with herbaceous plant remains. This type of kerogen population is dominantly gas-prone with only a minor potential for

GEOCHEM LABORATORIES, INC. ♦ 1143-C Brittmoore Road ♦ Houston, Texas 77043
Phone: 713/467-7011 ♦ Fax: 713/467-7639

contributing wet gas, condensate or oil liquids. A minor trace amount of amorphous-sapropel was present in sample 4389-261 at 12,600± feet to 12,605± feet which, although of little interest as a contributing source, could be significant as indicating an organic facies change at the top of the Paradox Formation.

The thermal maturity profile noted for the sediments penetrated by this well indicate two (2) distinctly different geothermal histories. The geothermal diagenetic (time-temperature) history experienced by the Post-Pennsylvanian and the Upper Pennsylvanian section, 11,300± feet to 12,550± feet, is at a mature thermal ranking which progressively grades from a TAI = 2.8 to a TAI = 2.9 with increasing depth. This ranking would place these upper sediments in the light oil and associated gas generation window. The Paradox Formation and the Mississippian Formation sediments have experienced a more severe diagenetic history and are rated as mature to bordering on very mature (TAI = 3.5). This maturity level would place the Paradox and Mississippian sediments at a gas to wet gas state of generation at this well location.

The hydrocarbon source richness data has also been presented on GeoChem plots of Total Organic Carbon content versus S_1 and S_2 pyrolysis yields in ppm wt/wt (Figure 3-Hydrocarbon Source Richness-Shales & Mudstones (Total Data Base)). The S_1 volatile data and the S_2 generatable hydrocarbon data have also been independently plotted in Figures 3-A and 3-B for convenient reference.

As one can see (Figures 3, 3-A, 3-B), most of the samples analyzed for this well rate as nonsources (46 samples), marginal dry gas sources (9 samples), poor oil and associated gas sources (4 samples) and the remainder (4 samples) fair oil and gas sources. In addition, the remaining S_2 generatable hydrocarbon distribution (Figure 3-B) would also indicate an overall poor potential for these sediments being able to contribute anything further to the system other than additionally generated methane gas.

These above comments are made based on the sample data being interpreted for clastic type shale sediments. Should one apply carbonate source richness criteria (Figure 3, 3-A, 3-B - Carbonates), there is a marked difference which clearly illustrated a much more gas-prone source character for both the hydrocarbon already sourced and represented by the S_1 volatile hydrocarbon data (Figure 3-A - Carbonates) as well as the remaining hydrocarbon source potential shown by the remaining S_2 generatable hydrocarbon response (Figure 3-B - Carbonates).

GEOCHEM LABORATORIES, INC. ◆ 1143-C Brittmoore Road ◆ Houston, Texas 77043
Phone: 713/467-7011 ◆ Fax: 713/467-7639

For completeness and ease of reference, the same data have also been presented for each stratigraphic unit (Figures 3-D1 through 3-D5) along with the data for the control samples (Figures 3-E1 through 3-E3).

It is believed that these carbonate hydrocarbon source figures are probably more representative of the actual hydrocarbon source character of the stratigraphic sections penetrated from 11,300± feet to 14,423 feet TD at this well location.

The dominant gas-prone hydrocarbon source character of the sediments penetrated by this well at this location is also substantiated by the calculation of the oil factor (OF) and the gas factor (GF) based on the visual abundance of the various prime palynological organic matter types assessed on the isolated kerogen concentrates. These values are presented in Table IV-C and illustrated overall high gas-prone factors ranging from 60.6% to 75.8%, average 67.9%. Similarly computed oil factor (OF) were uniformly low ranging from 24.2% to 39.4%, average 32.1%.

Conclusion

The stratigraphic sections penetrated over the gross well interval 11,300± feet to 14,423 feet TD, in the El Paso Natural Gas Company No. 50 San Juan Unit 29-5 Well, Rio Arriba County, New Mexico can be subdivided into two (2) slightly different hydrocarbon sources intervals based primarily on the geothermal diagenetic (time-temperature) profiles measured for these two (2) sections.

Post-Pennsylvanian and Upper Pennsylvanian sediments, 11,300± feet to 12,550± feet, have experienced a mature level of diagenetics grading with increasing depth from a thermal alteration rank of TAI = 2.8 to a slightly more mature TAI = 2.9 maturity level.

The Paradox and Mississippian sediments (12,550± feet to 13,960± feet) are ranked at a mature to very mature TAI = 3.5 maturity rank consistent with a gas and wet gas-condensate hydrocarbon generation character.

The organic facies character of both the Post-Pennsylvanian and Upper Pennsylvanian subgroup and the Paradox-Mississippian subgroup is typified by dominant amounts of gas-prone terrestrially derived woody structured, herbaceous and inertinitic

GEOCHEM LABORATORIES, INC. ♦ 1143-C Brittmoore Road ♦ Houston, Texas 77043
Phone: 713/467-7011 ♦ Fax: 713/467-7639

plant detritus and low overall organic carbon contents. As a consequence, the entire well section evaluated herein is characterized as a non to very poor source facies for any oil liquids generation and an equally poor to-at-best-fair source facies for the generation of gas and wet gas at this well location.

GEOCHEM LABORATORIES, INC. ♦ 1143-C Brittmoore Road ♦ Houston, Texas 77043
Phone: 713/467-7011 ♦ Fax: 713/467-7639

FIGURE 1
ROCK-EVAL PYROLYSIS SUMMARY (mgm/gram)

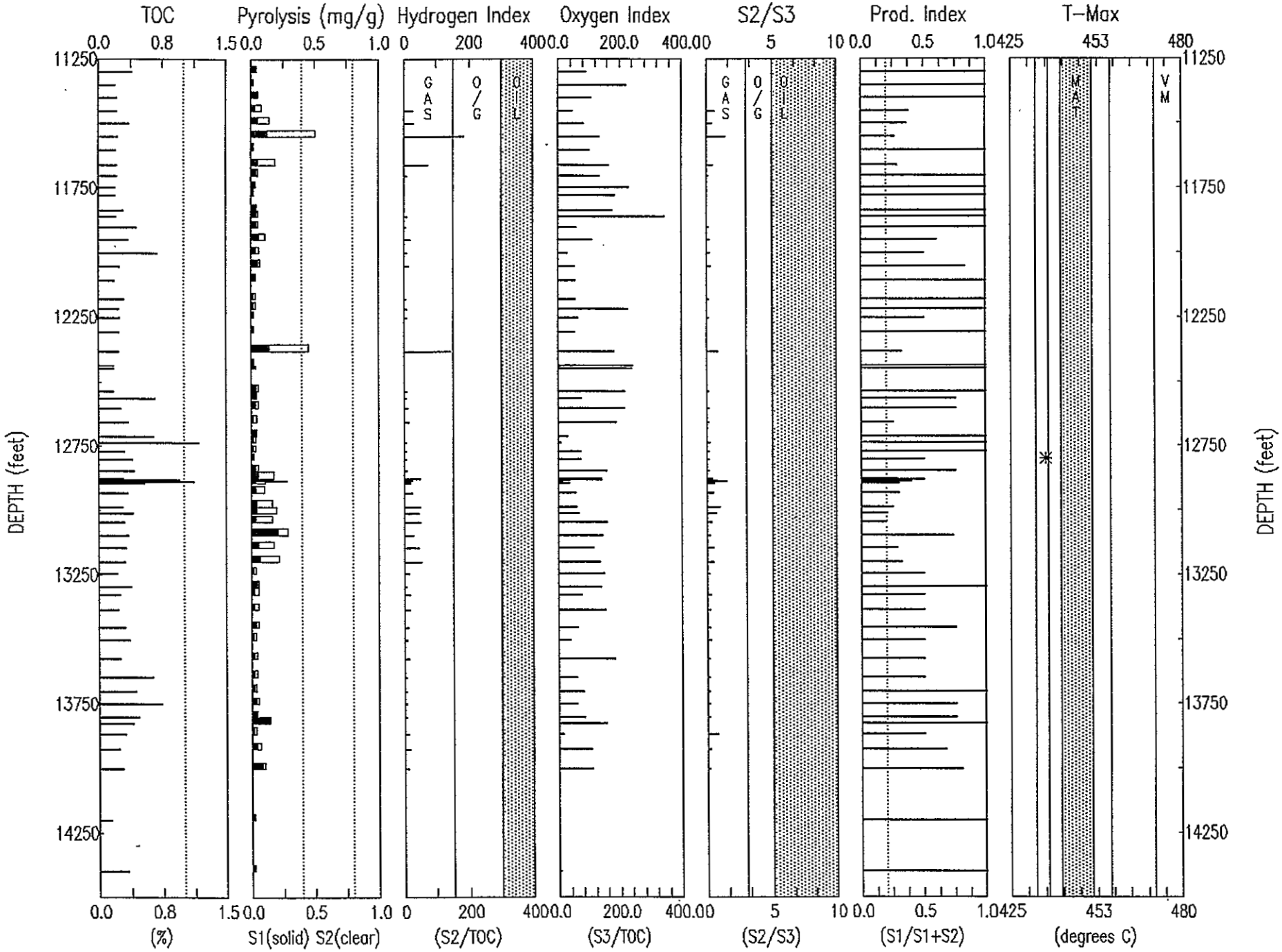


FIGURE 1
ROCK-EVAL PYROLYSIS SUMMARY (ppm wt/wt)

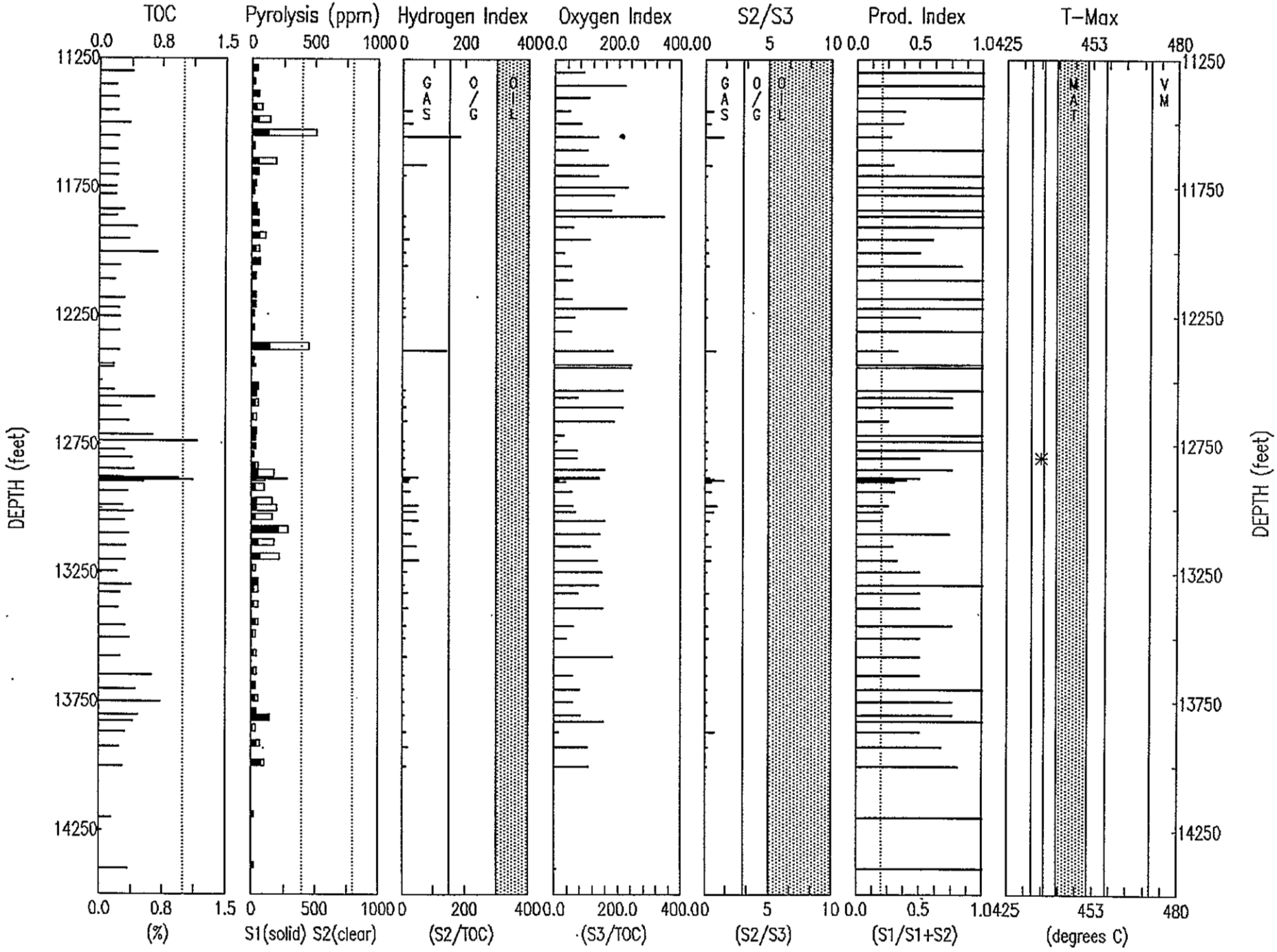


FIGURE 1-A

ROCK-EVAL PYROLYSIS SUMMARY - CONTROL SAMPLES (mgm/gram)

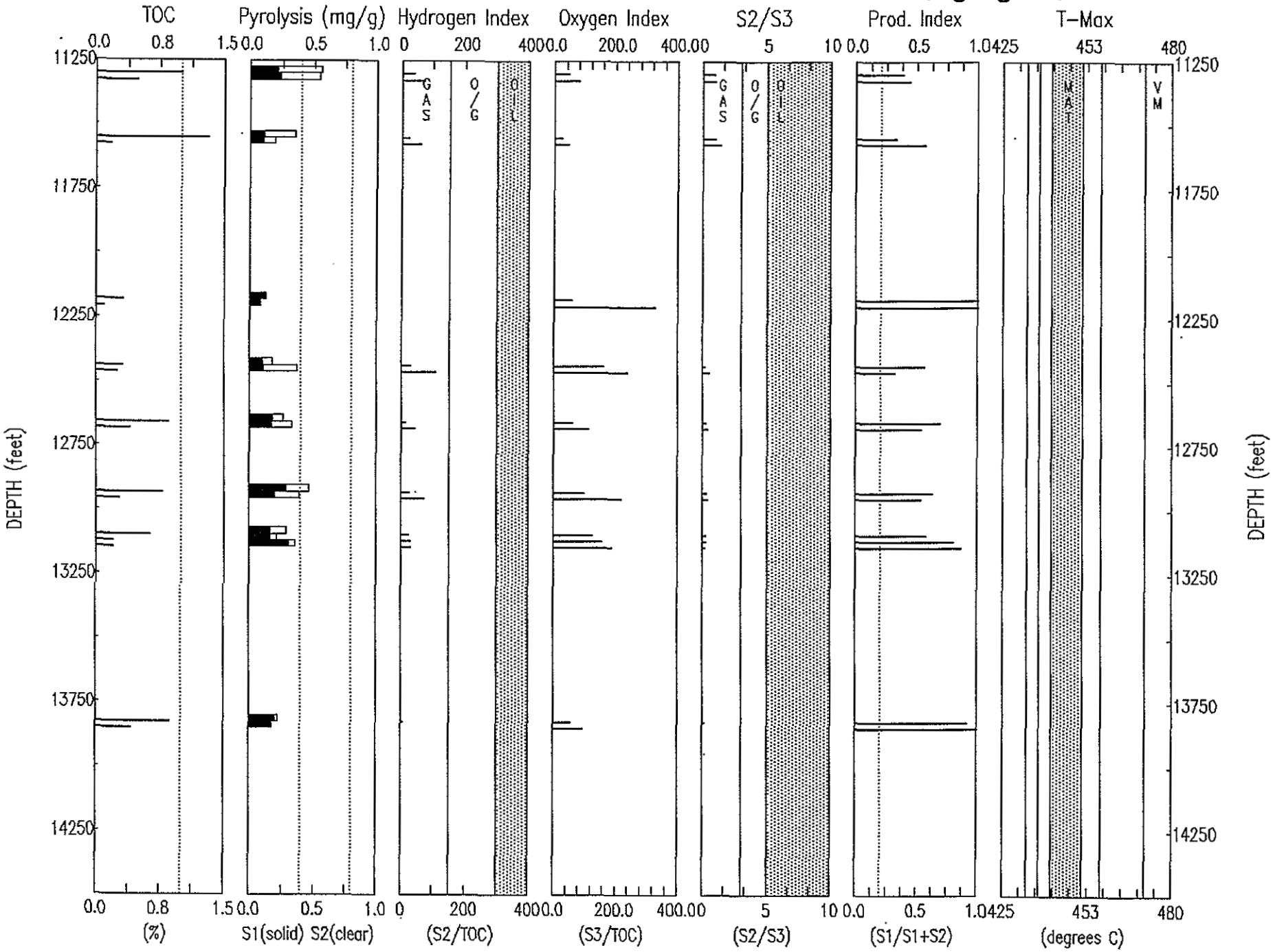


FIGURE 1-A

ROCK-EVAL PYROLYSIS SUMMARY - CONTROL SAMPLES (ppm wt/wt)

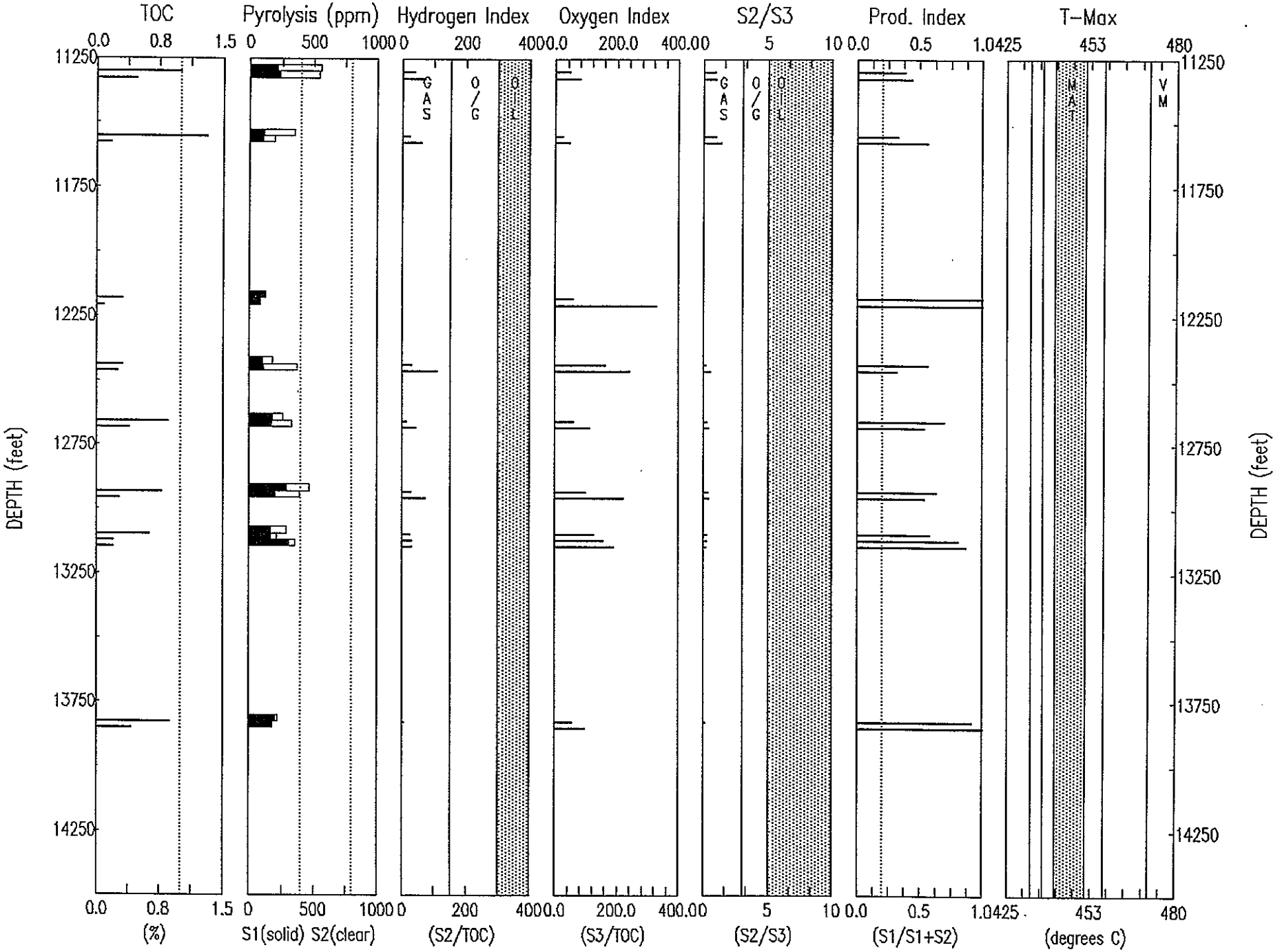


FIGURE 2
KEROGEN SUMMARY - TAI AND OMT

GeoChem Job Number 4389

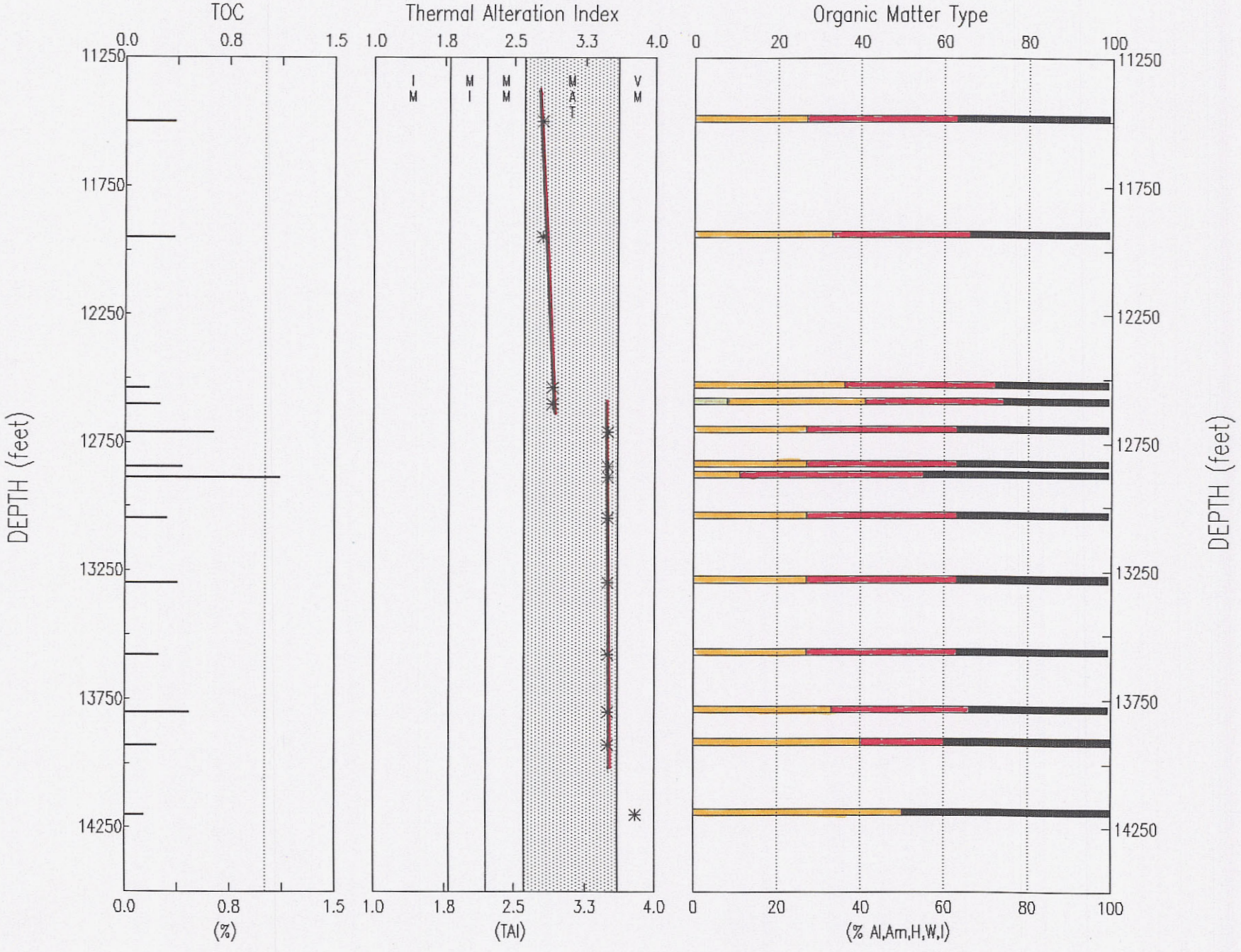


FIGURE 2-A
HYDROGEN INDEX VS. OXYGEN INDEX
(Modified Van Krevelin Diagram)

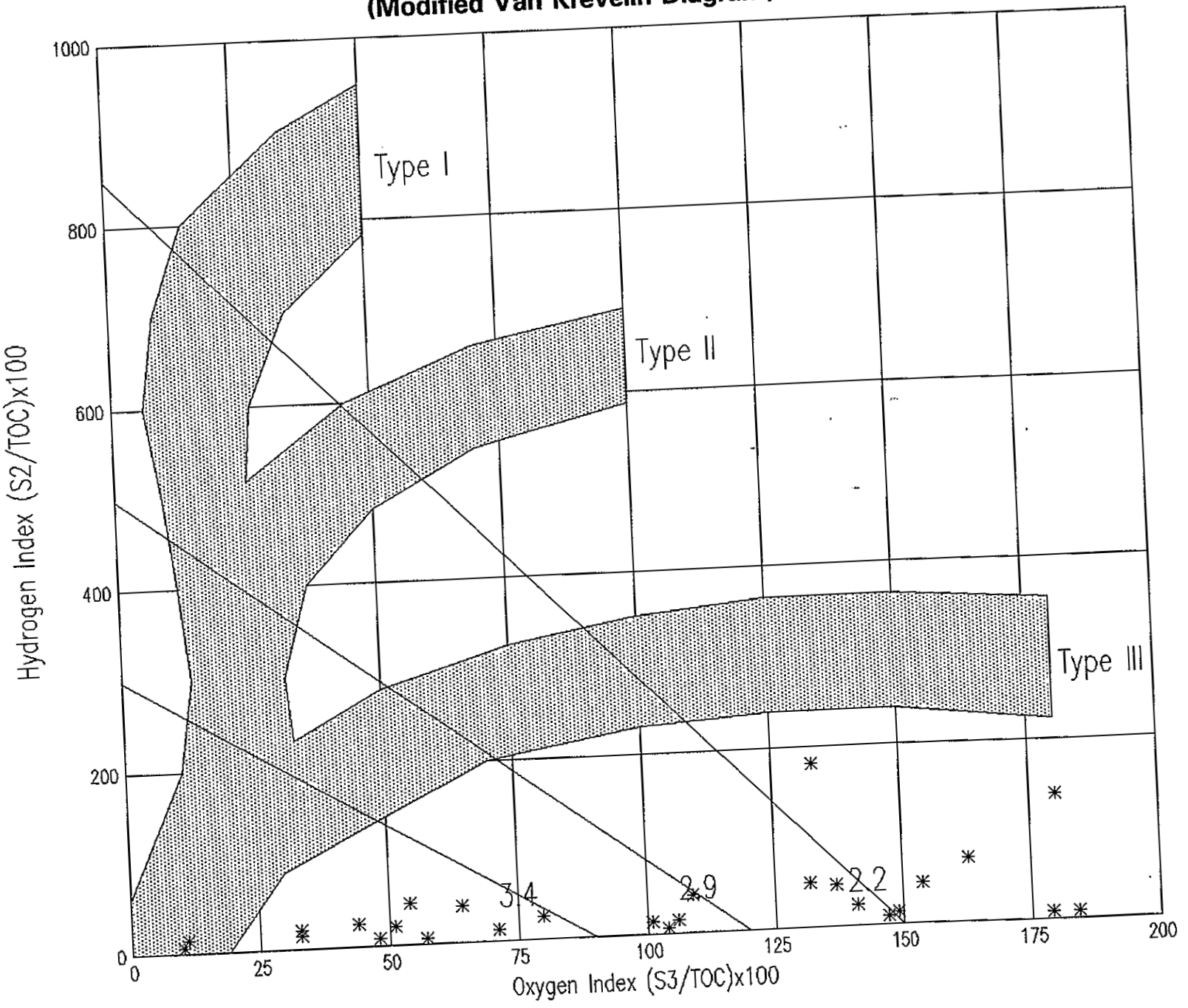


FIGURE 2-B
HYDROGEN INDEX VS. OXYGEN INDEX
(Picked Control Samples)

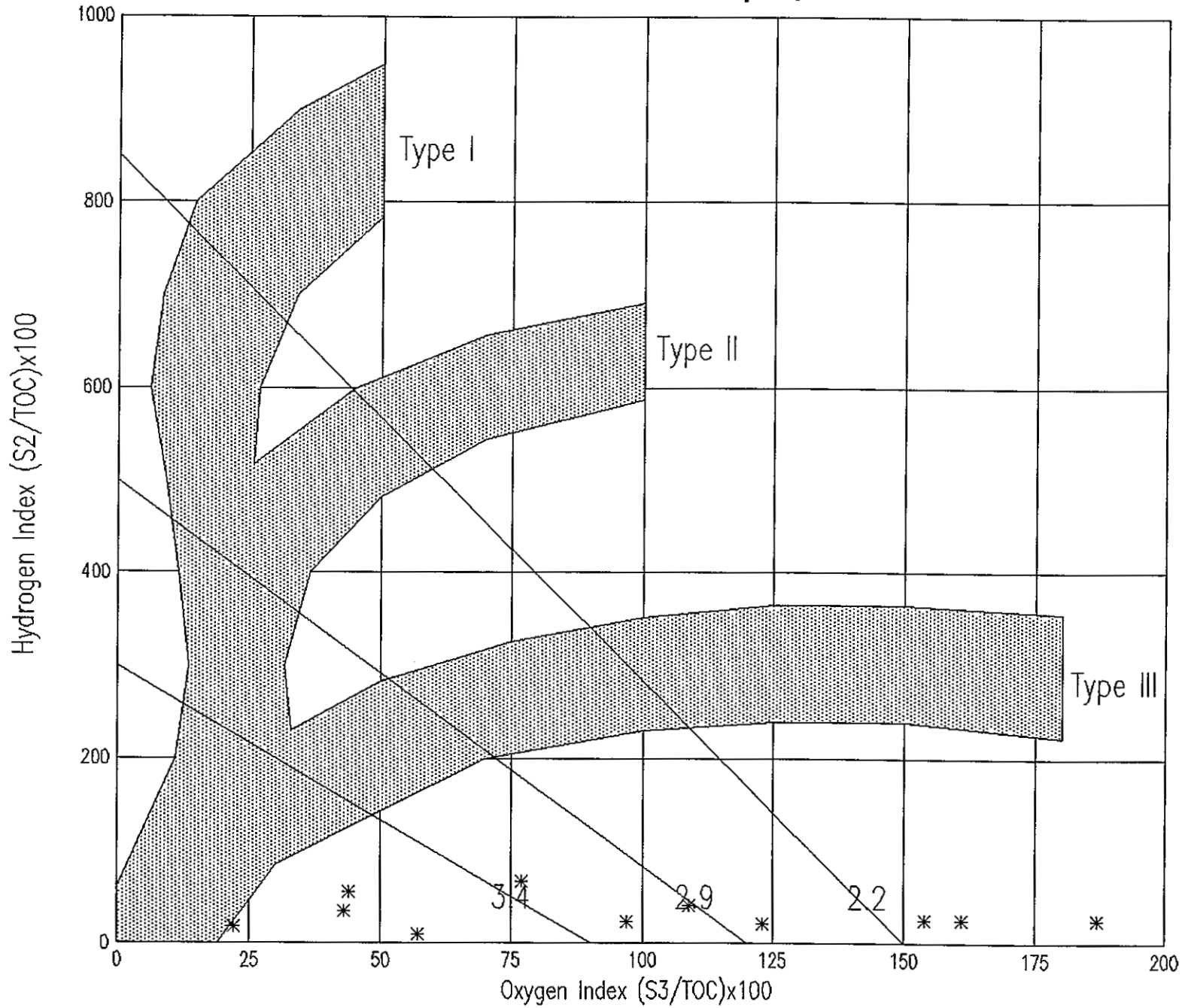


FIGURE 3
HYDROCARBON SOURCE RICHNESS - SHALES & MUDSTONES
(Total Data Base)

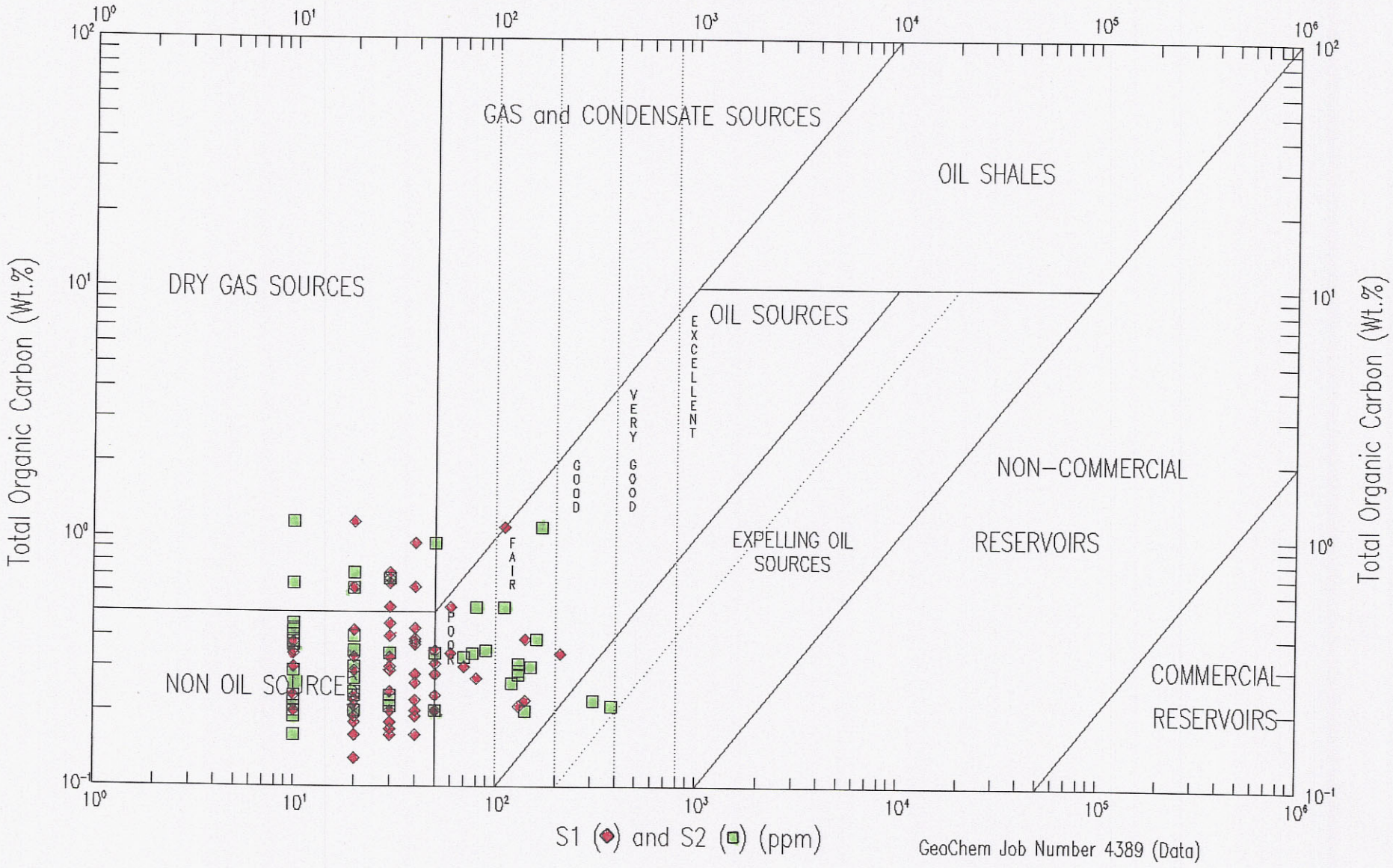


FIGURE 3-A
HYDROCARBON SOURCE RICHNESS - SHALES & MUDSTONES
S_1 VOLATILE HYDROCARBON

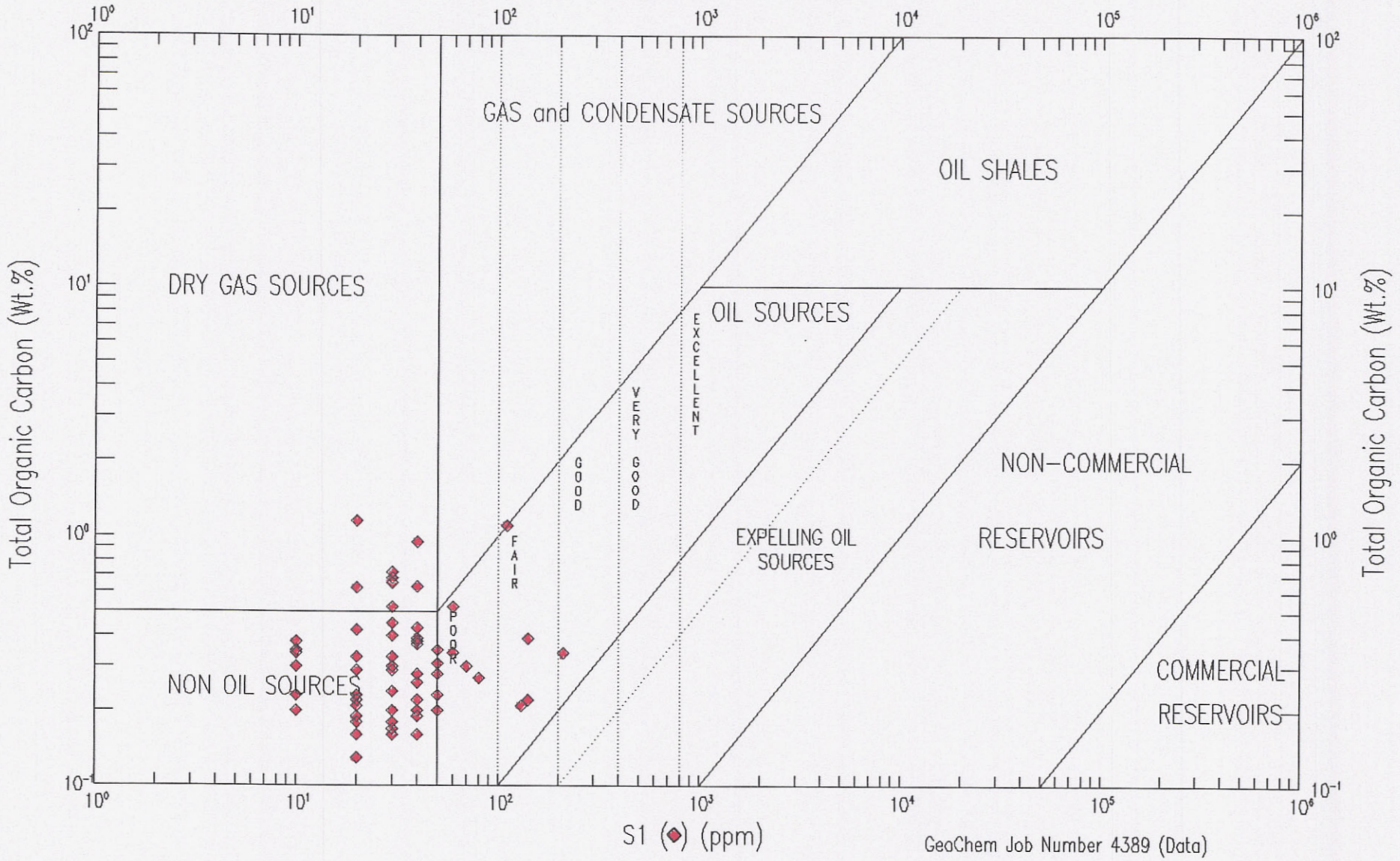


FIGURE 3-B
HYDROCARBON SOURCE RICHNESS - SHALES & MUDSTONES
S_2 REMAINING GENERATABLE HYDROCARBON

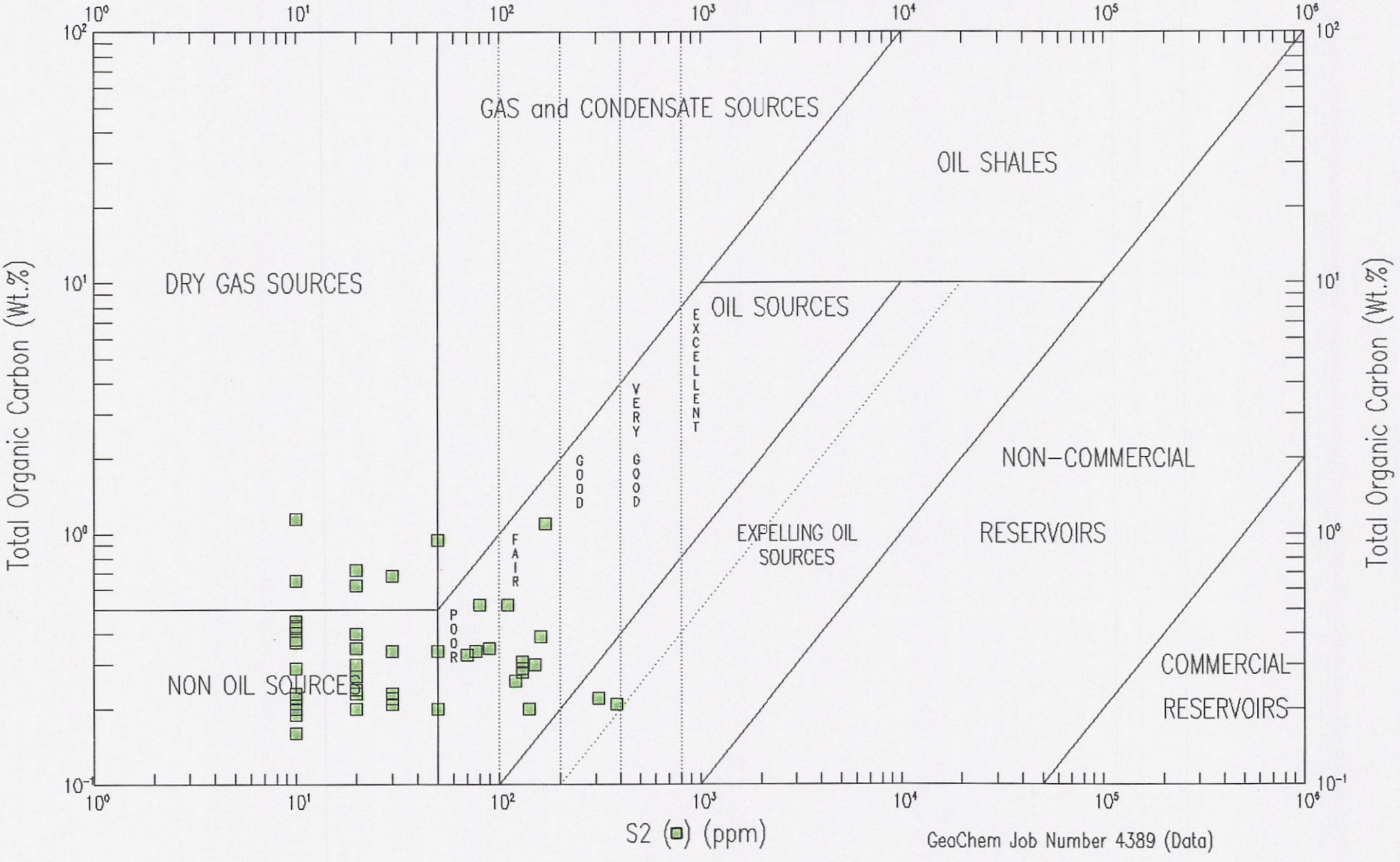


FIGURE 3
HYDROCARBON SOURCE RICHNESS - SHALES & MUDSTONES
(Picked Control Samples)

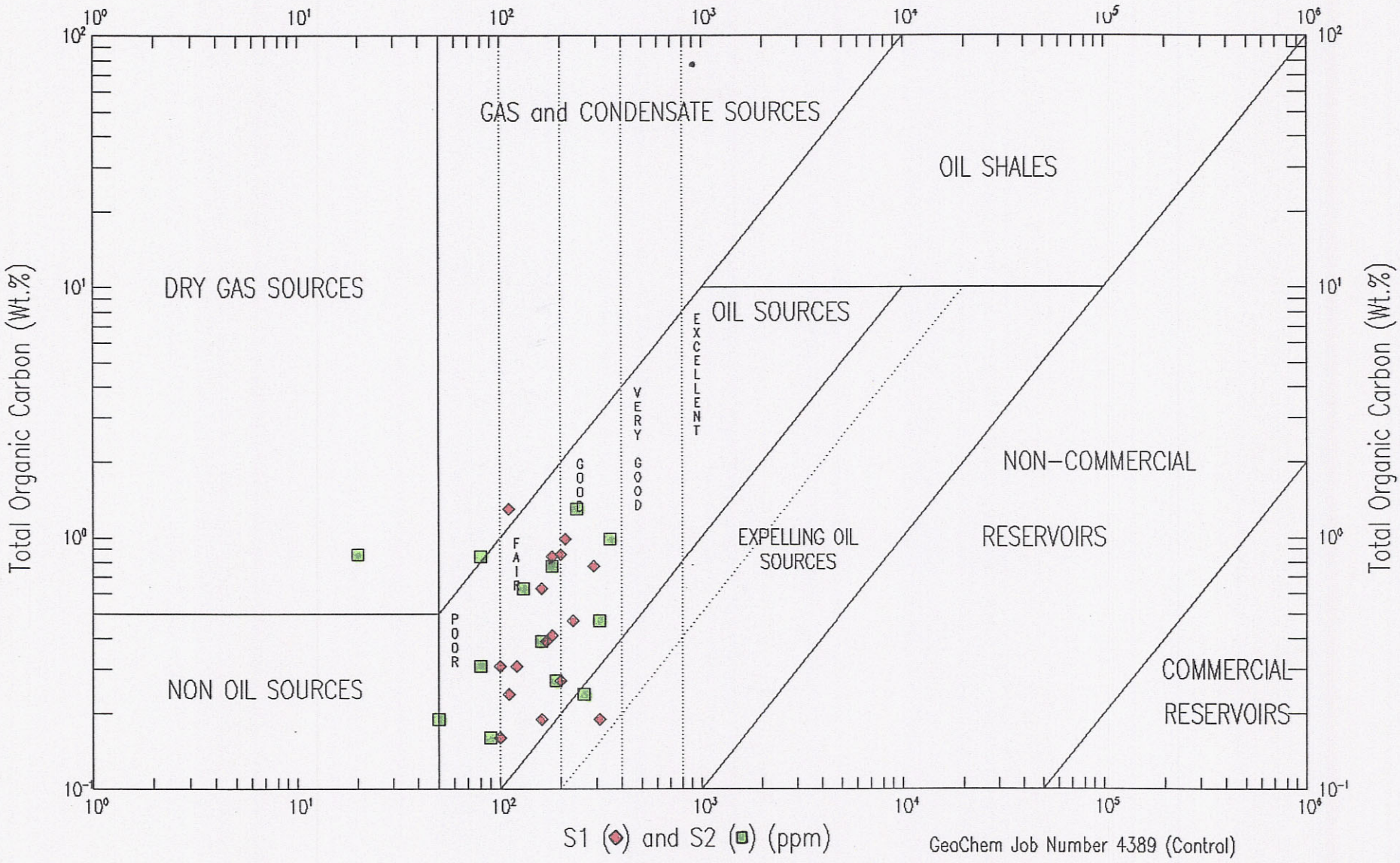


FIGURE 3-A
HYDROCARBON SOURCE RICHNESS - SHALES & MUDSTONES
CONTROL SAMPLES - S_1 VOLATILE HYDROCARBON

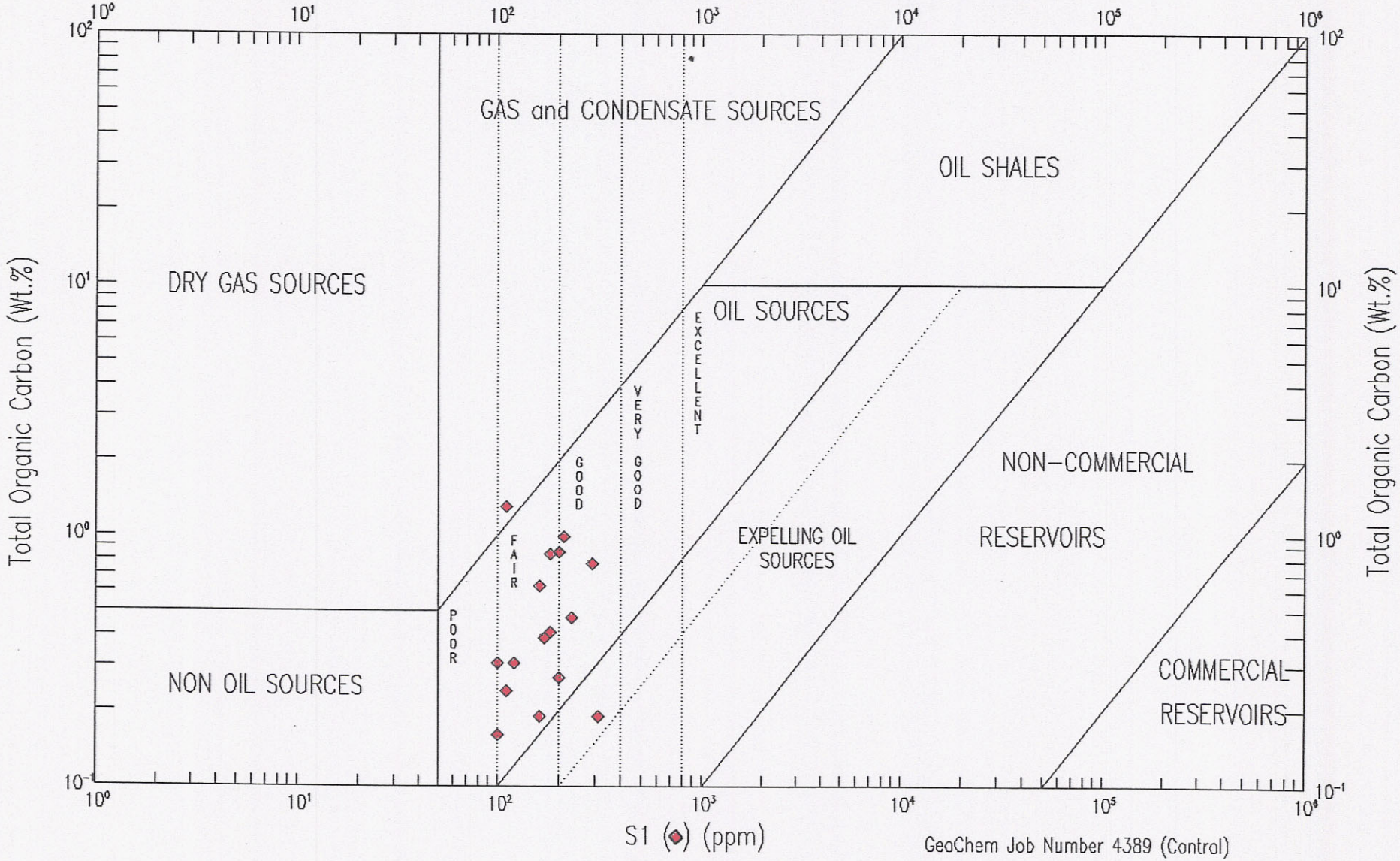


FIGURE 3-B

HYDROCARBON SOURCE RICHNESS - SHALES & MUDSTONES
CONTROL SAMPLES - S_2 REMAINING GENERATABLE HYDROCARBON

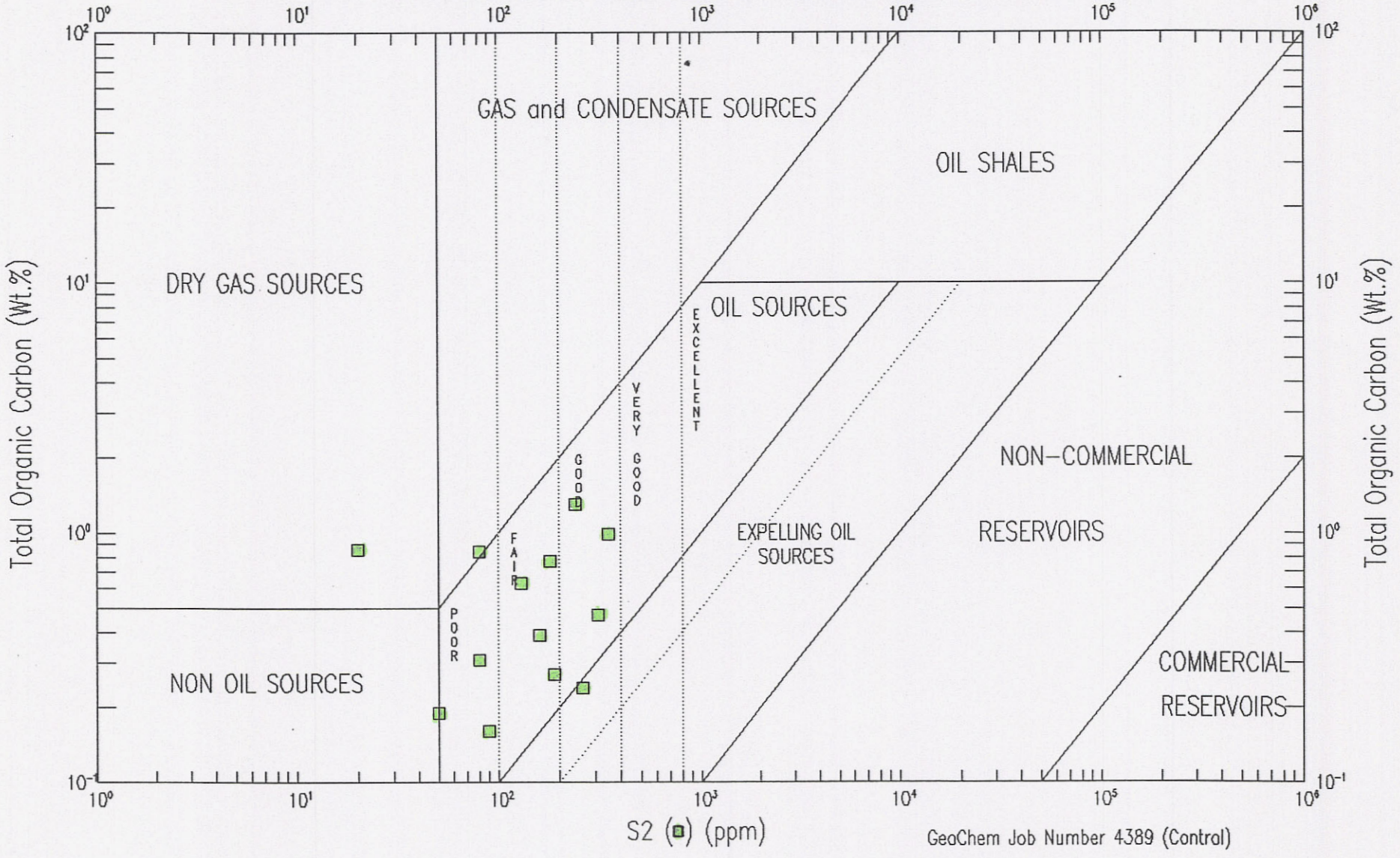


FIGURE 3
HYDROCARBON SOURCE RICHNESS - CARBONATES
(Total Data Base)

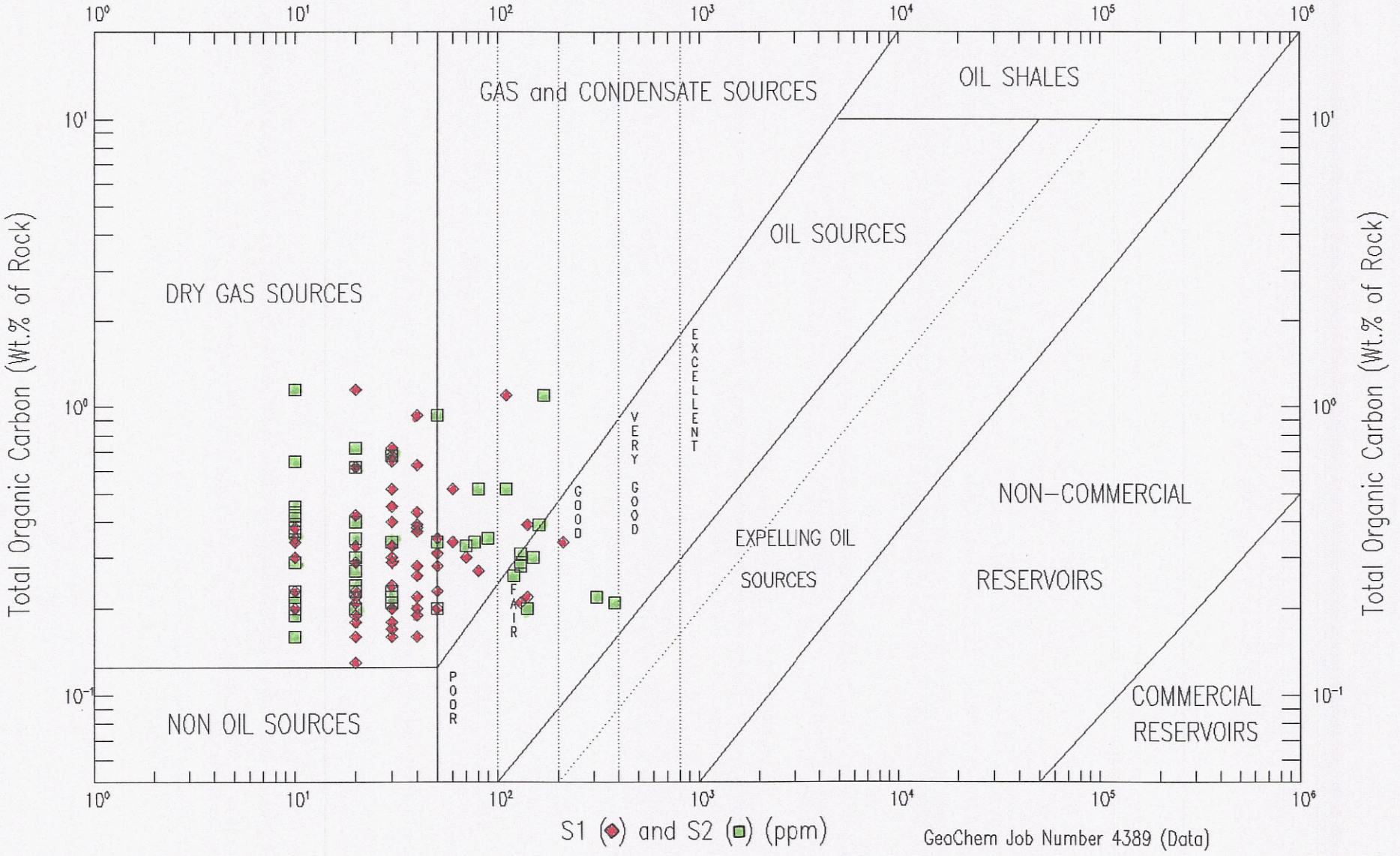


FIGURE 3-A
HYDROCARBON SOURCE RICHNESS - CARBONATES
S_1 VOLATILE HYDROCARBON

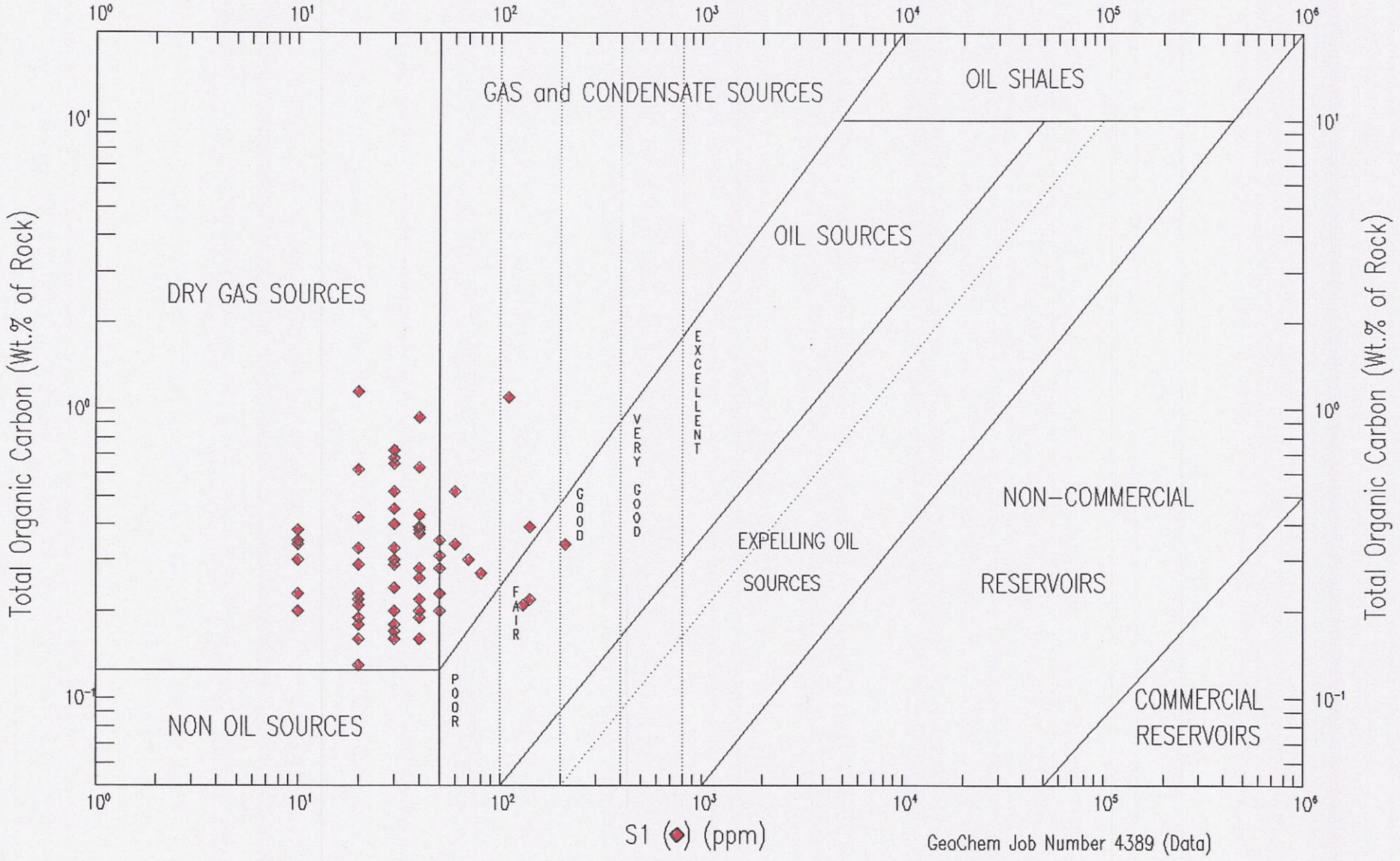


FIGURE 3-B
HYDROCARBON SOURCE RICHNESS - CARBONATES
S_2 REMAINING GENERATABLE HYDROCARBON

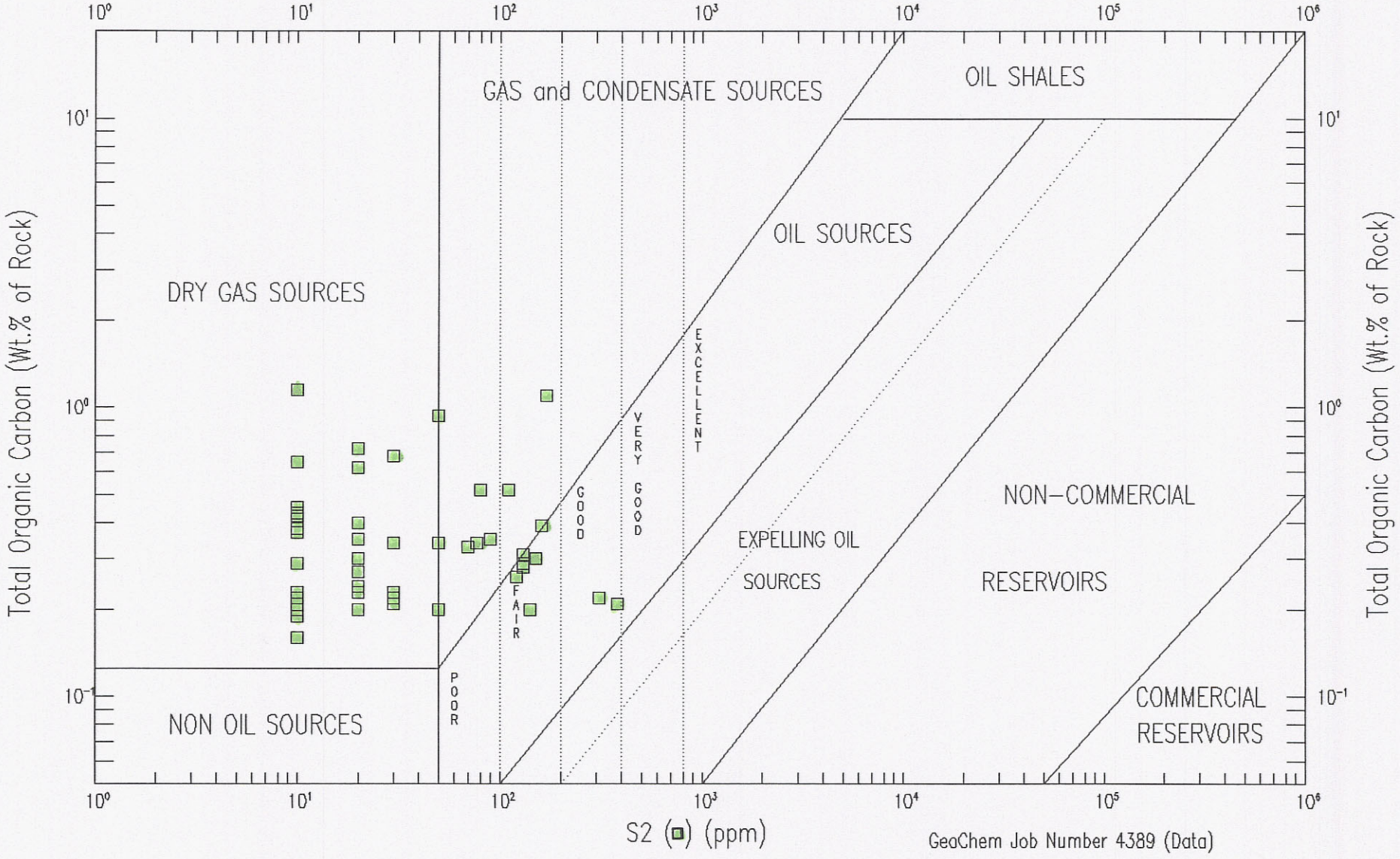


FIGURE 3-C
HYDROCARBON SOURCE RICHNESS - SHALES & MUDSTONES
(Picked Control Samples)

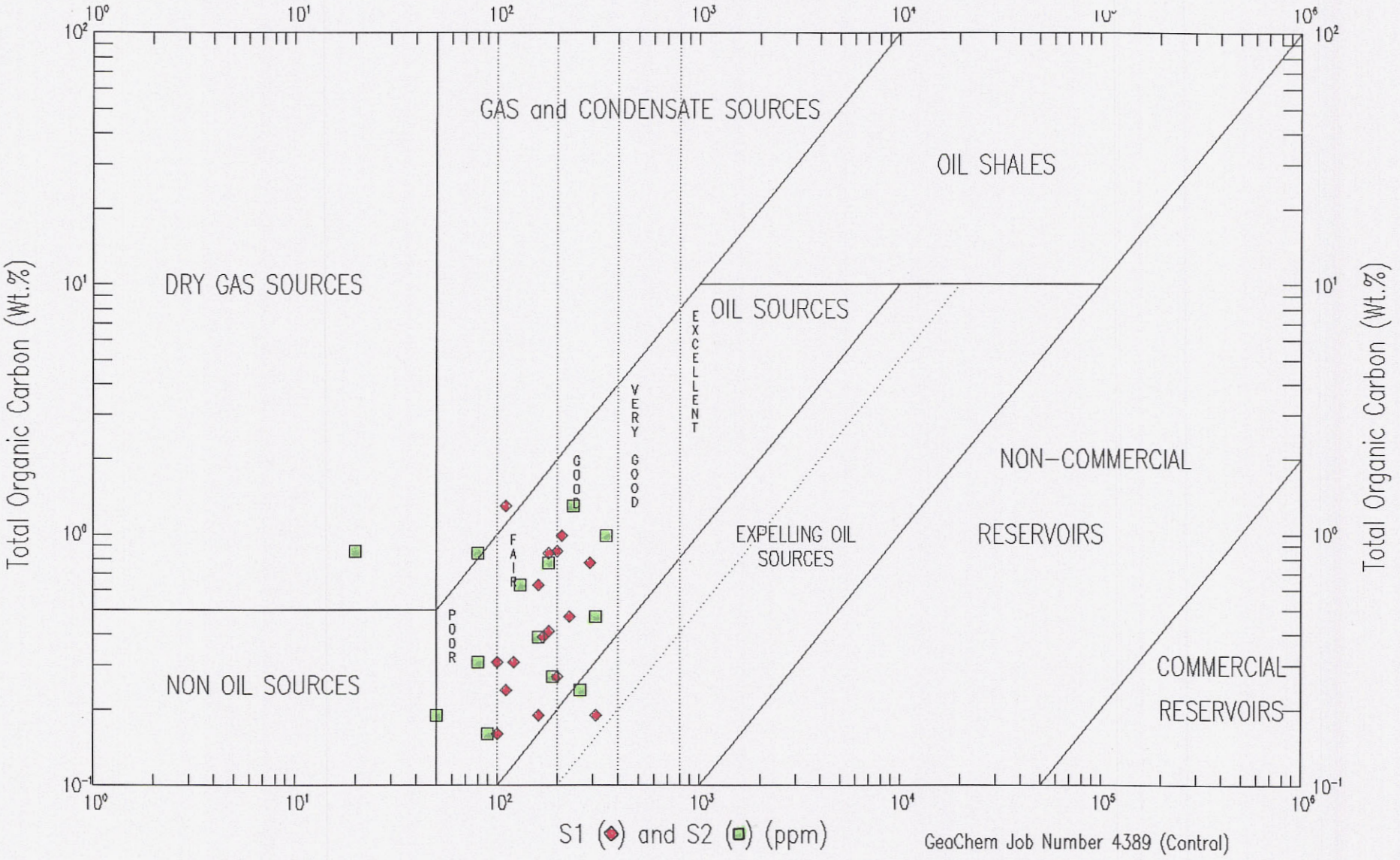


FIGURE 3
HYDROCARBON SOURCE RICHNESS - CARBONATES
(Total Data Base)

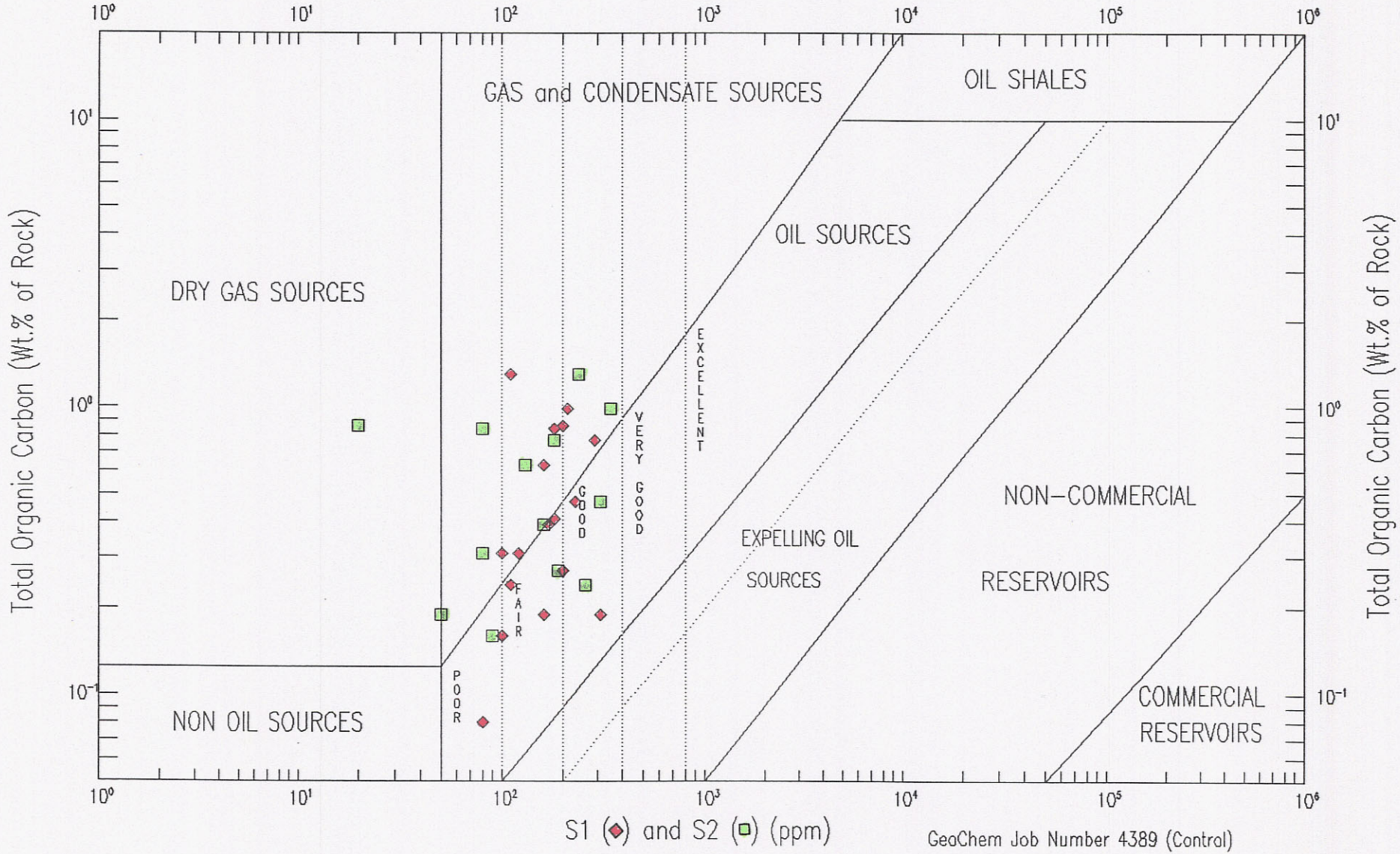


FIGURE 3-A
HYDROCARBON SOURCE RICHNESS - CARBONATES
S_1 VOLATILE HYDROCARBON

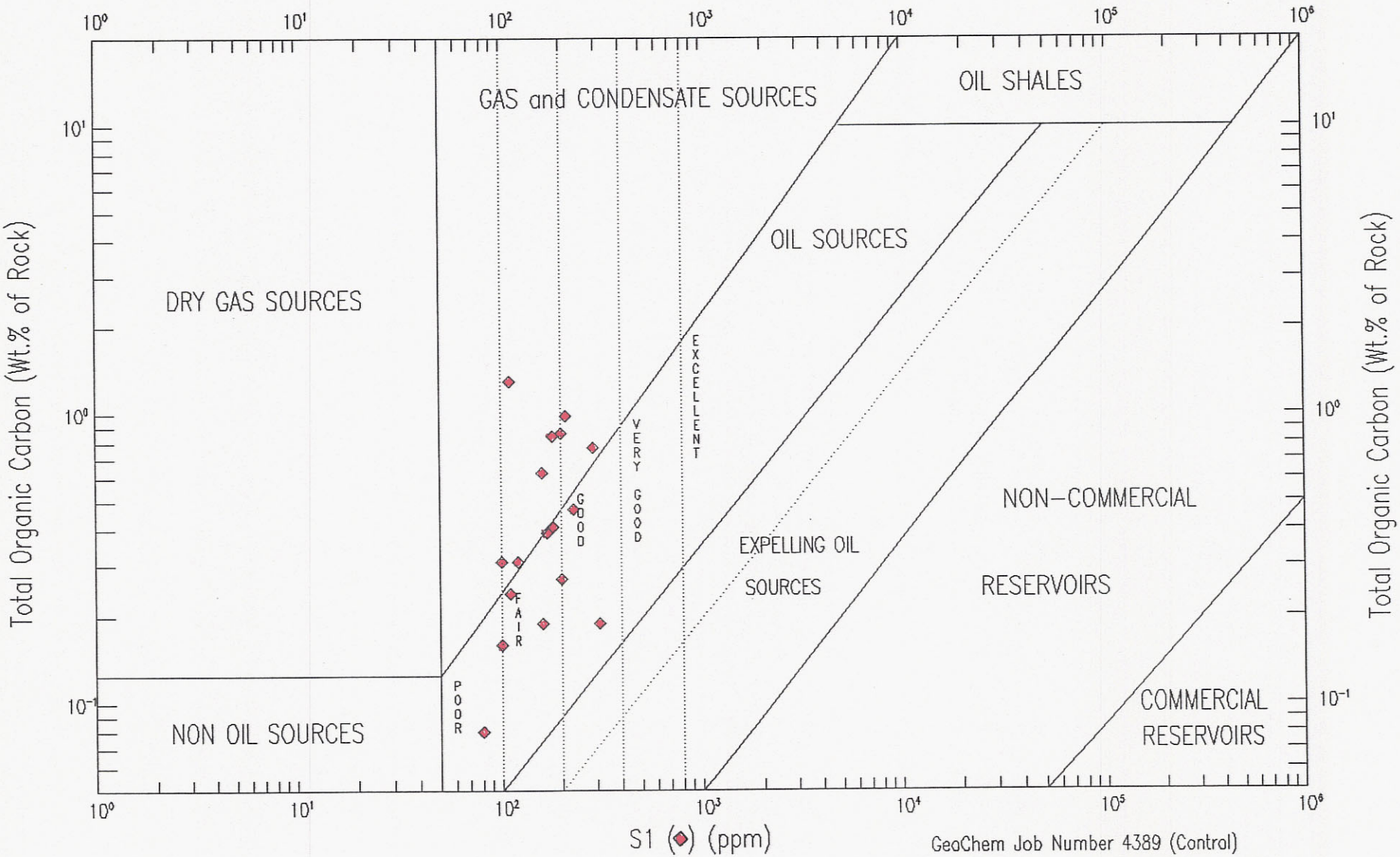


FIGURE 3-B
HYDROCARBON SOURCE RICHNESS - CARBONATES
S_2 REMAINING GENERATABLE HYDROCARBON

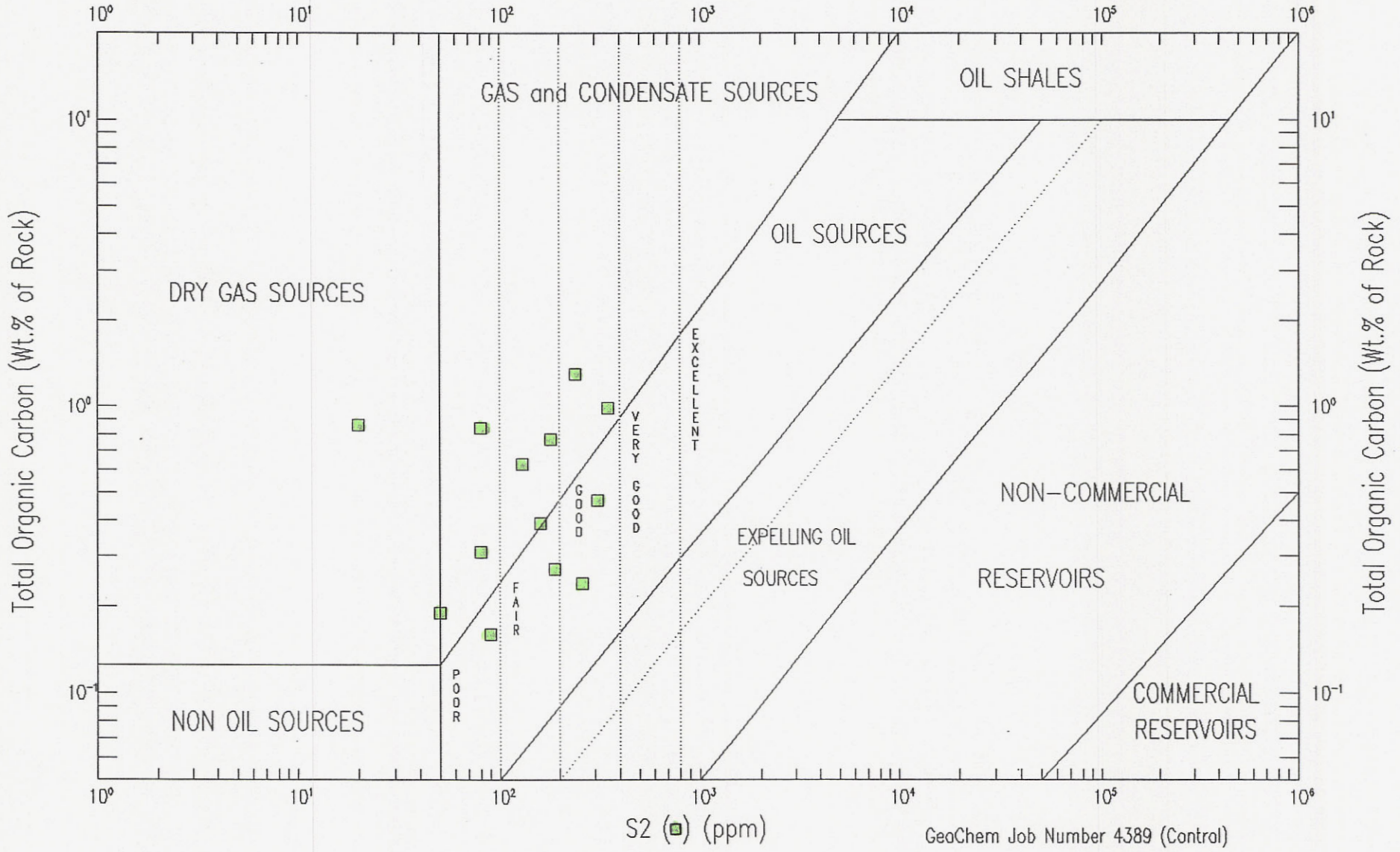


FIGURE 3-D1
HYDROCARBON SOURCE RICHNESS BY STRATIGRAPHIC SECTION - POST-PENNSYLVANIAN

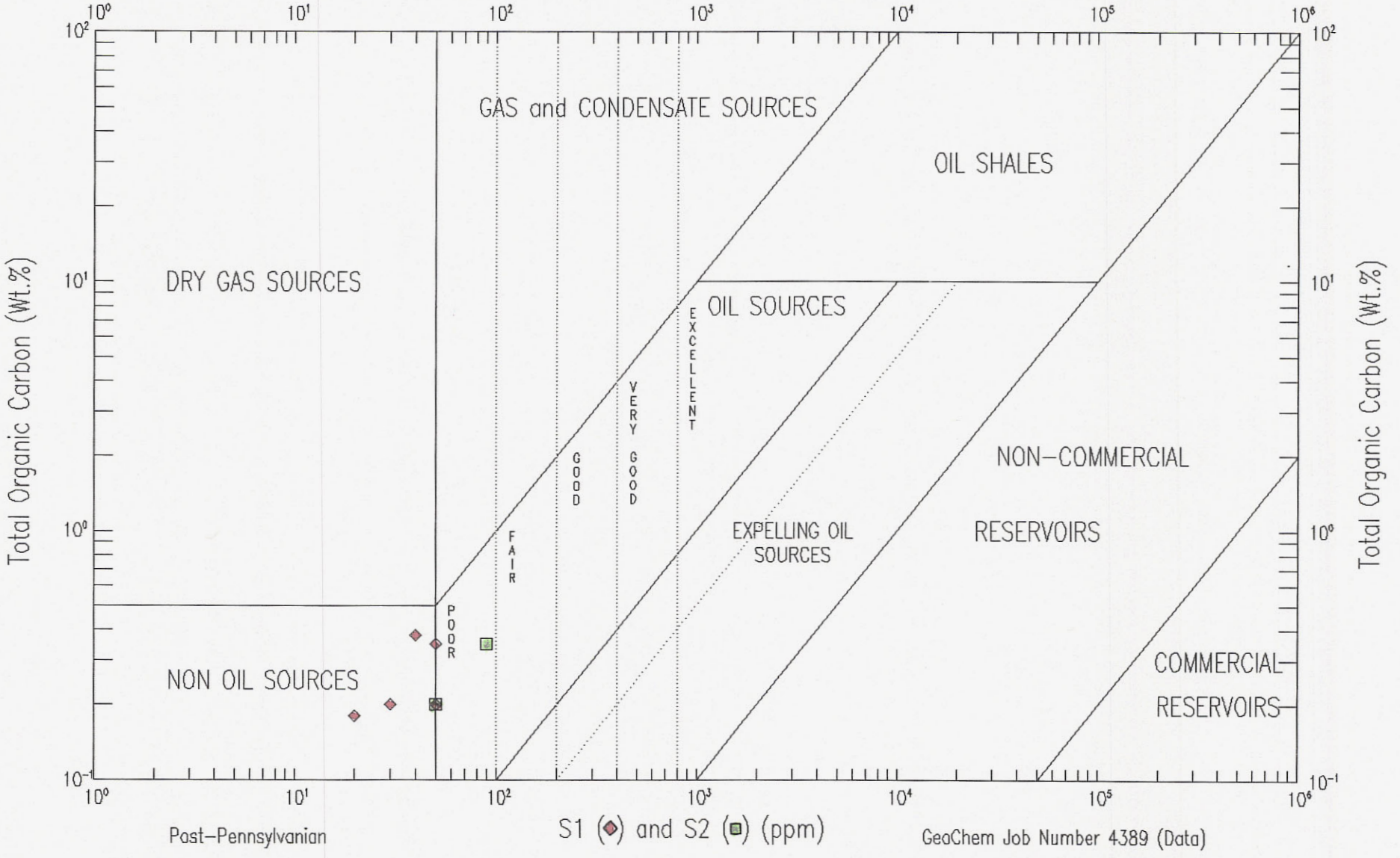


FIGURE 3-D2
HYDROCARBON SOURCE RICHNESS BY STRATIGRAPHIC SECTION - PENNSYLVANIAN

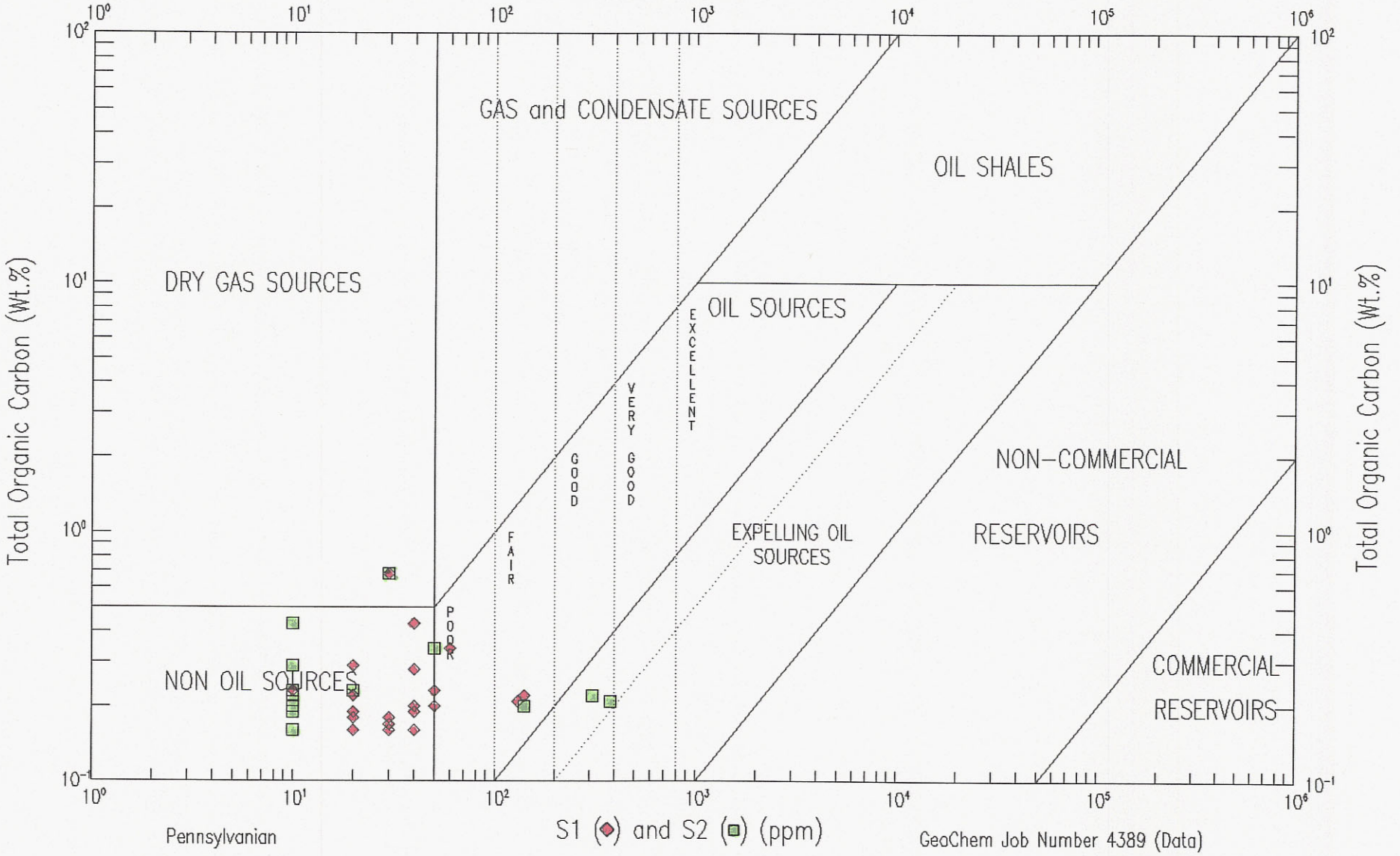


FIGURE 3-D3
HYDROCARBON SOURCE RICHNESS BY STRATIGRAPHIC SECTION - PARADOX

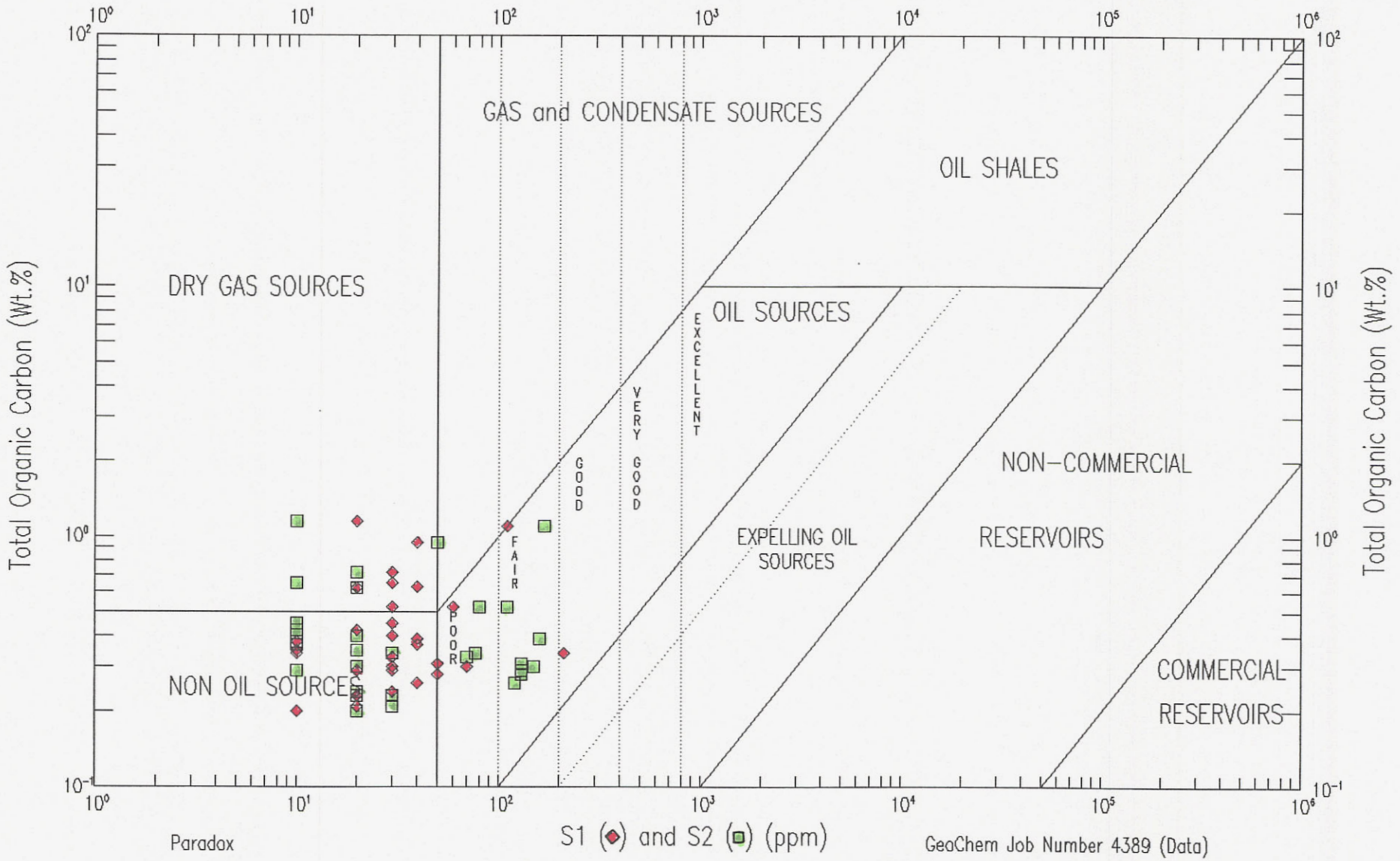


FIGURE 3-D4
HYDROCARBON SOURCE RICHNESS BY STRATIGRAPHIC SECTION - MISSISSIPPIAN

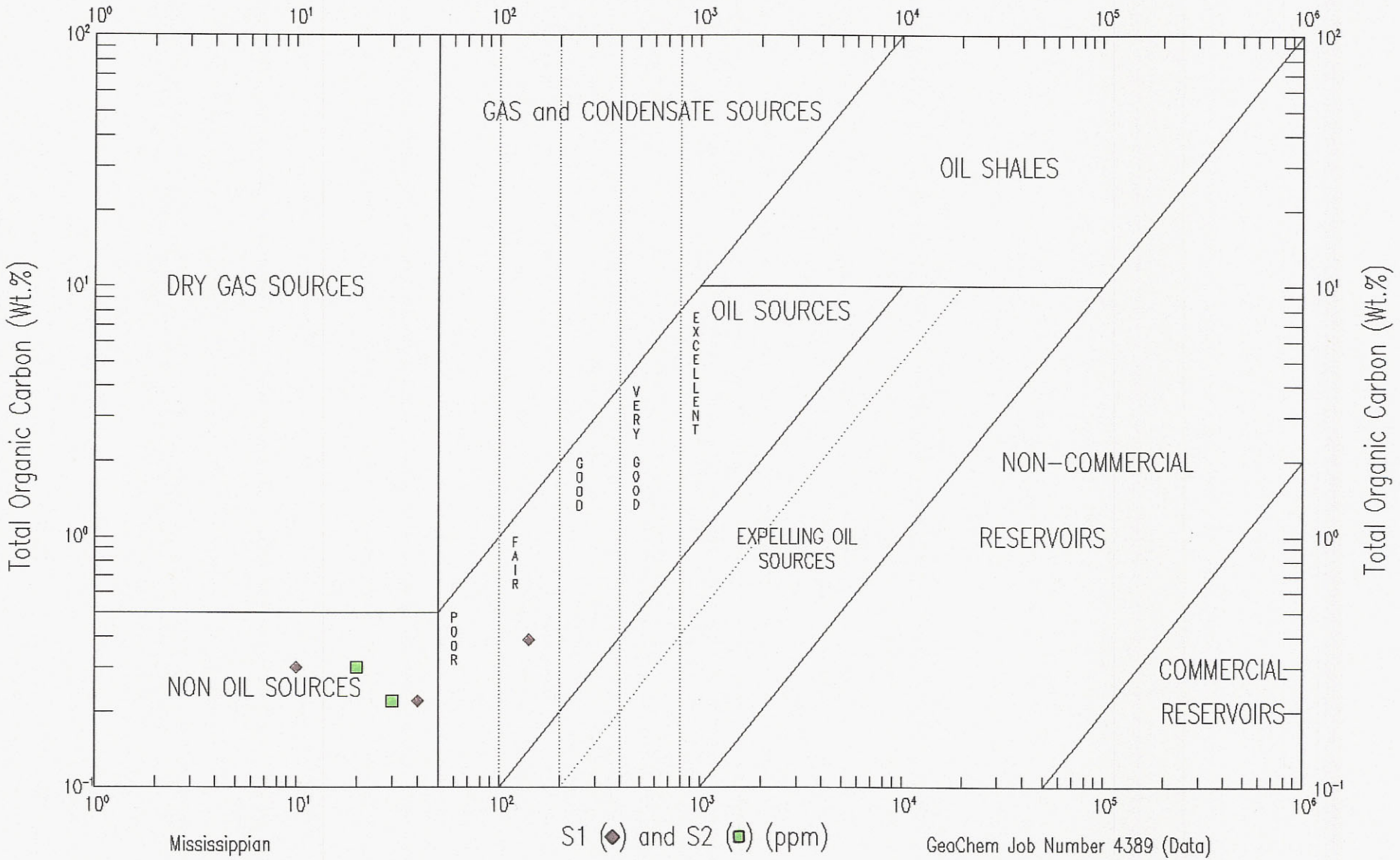


FIGURE 3-D5
HYDROCARBON SOURCE RICHNESS BY STRATIGRAPHIC SECTION - PRECAMBRIAN

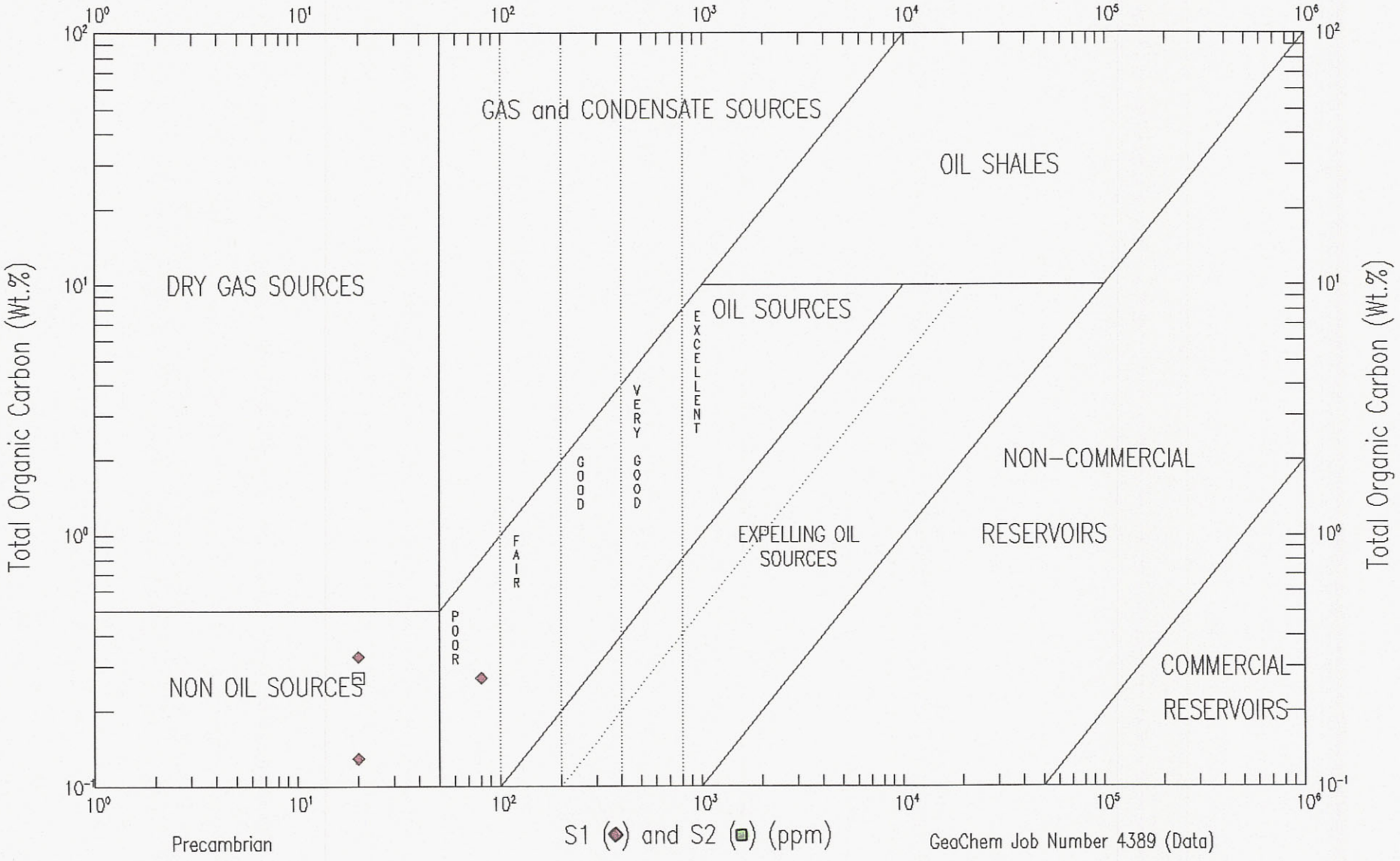


FIGURE 3-E1
HYDROCARBON SOURCE RICHNESS BY STRATIGRAPHIC SECTION - CONTROL SAMPLES - PENNSYLVANIAN

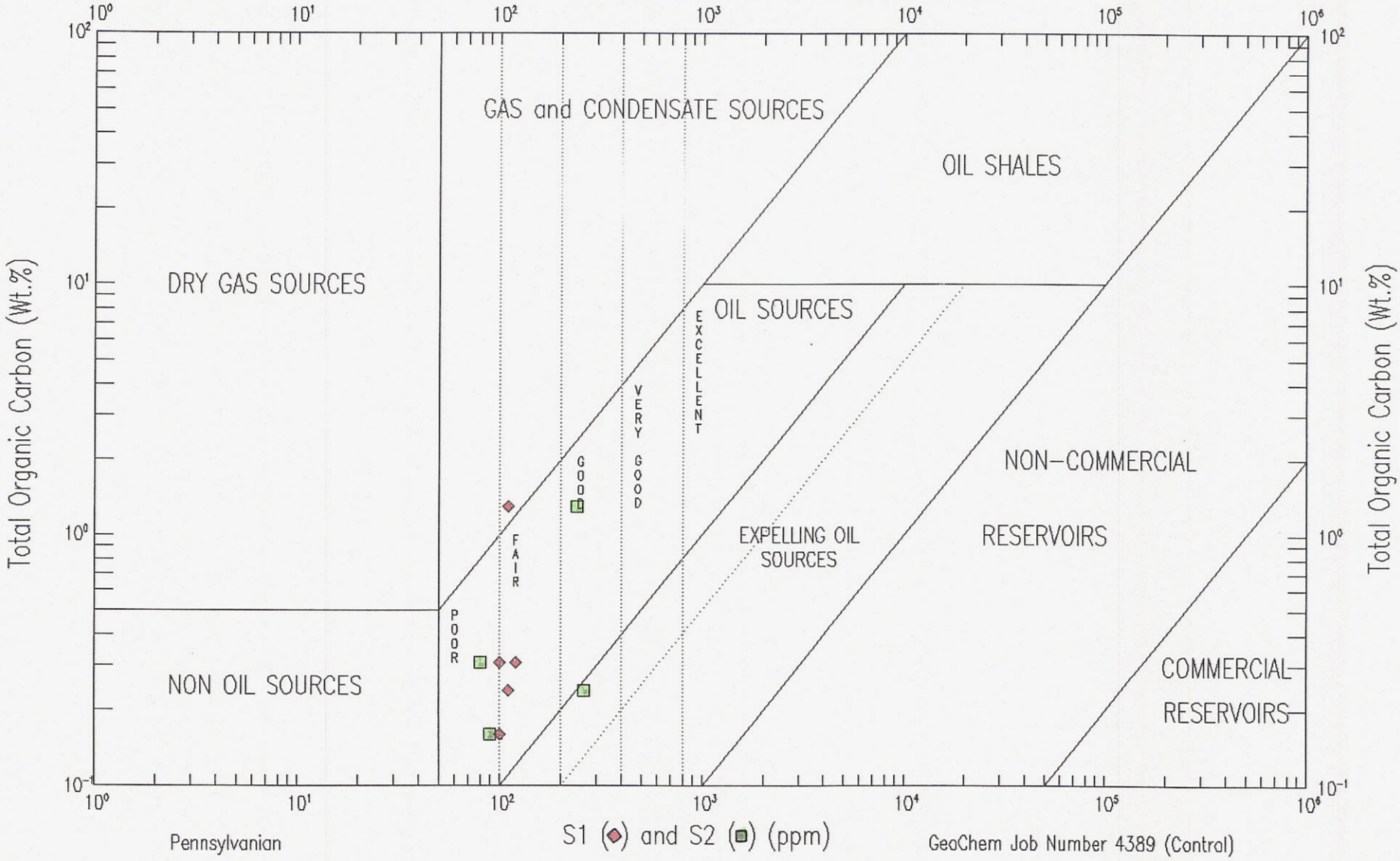


FIGURE 3-E2
HYDROCARBON SOURCE RICHNESS BY STRATIGRAPHIC SECTION - CONTROL SAMPLES - PARADOX

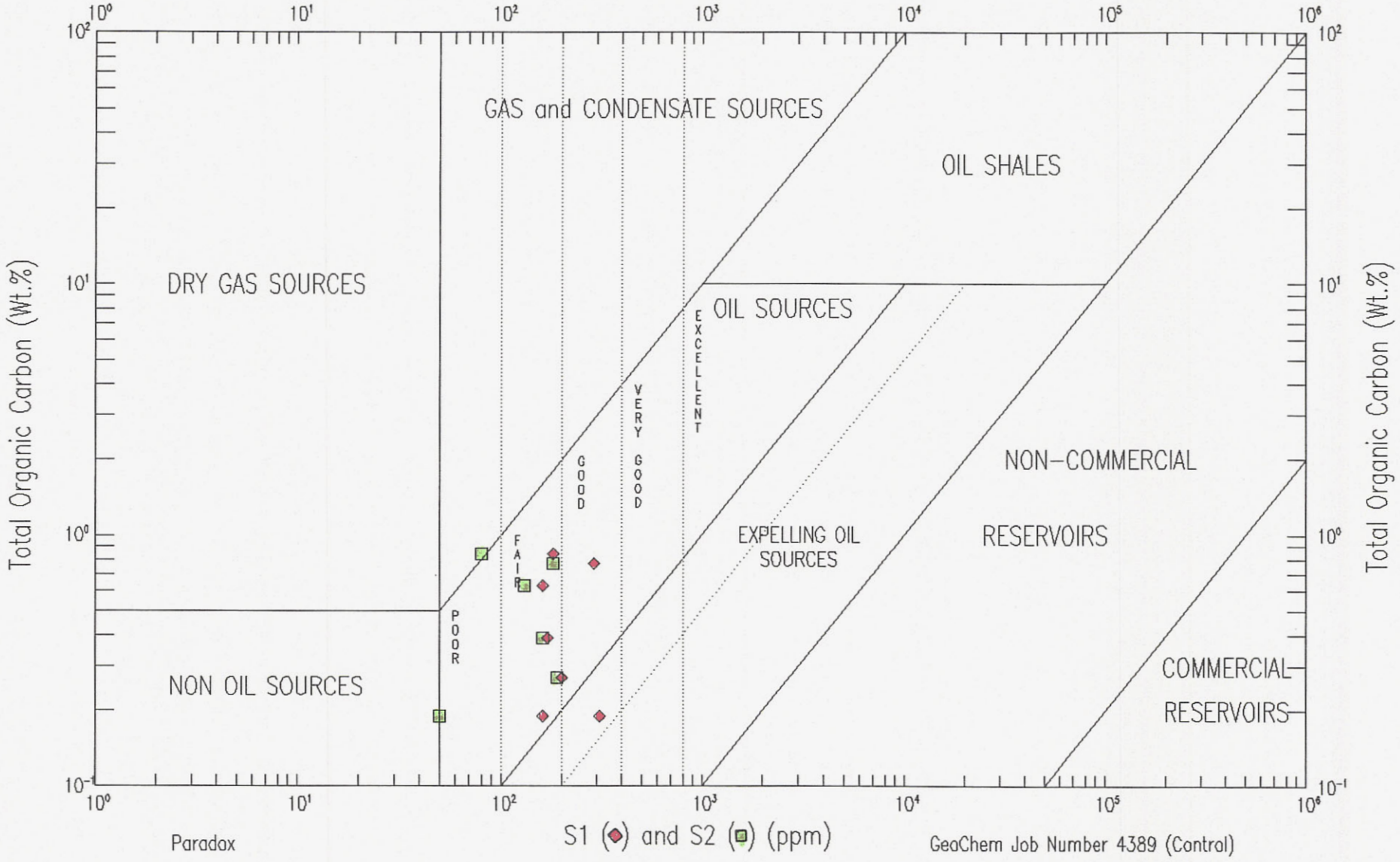


FIGURE 3-E3
HYDROCARBON SOURCE RICHNESS BY STRATIGRAPHIC SECTION - CONTROL SAMPLES - MISSISSIPPIAN

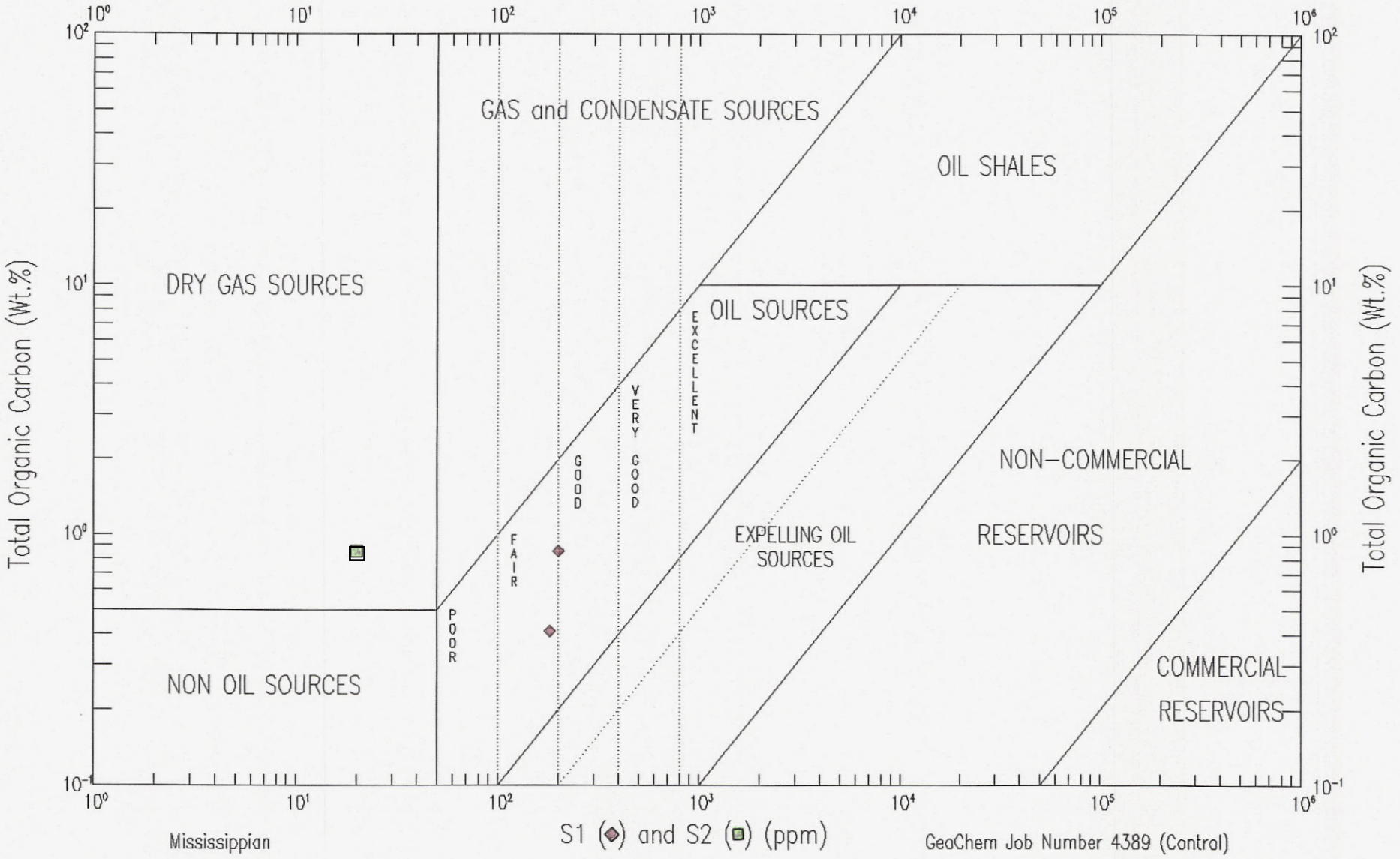


TABLE I

SAMPLE LITHOLOGICAL DESCRIPTION

GeoChem Sample Number	Depth (feet)	Lithological Description	GSA Color Code
4389-001	11300	A. 40% Shale, dark reddish brown. B. 40% Shale, blackish red. C. 20% Shale, medium dark gray. Trace Limestone, white.	10R 3/4 5R 2/2 N4
4389-011	11350	A. 20% Shale, dark reddish brown. B. 60% Shale, blackish red. C. 20% Shale, medium gray.	10R 3/4 5R 2/2 N5
4389-021	11400	A. 30% Shale, dark reddish brown. B. 30% Shale, blackish red. C. 30% Shale, medium gray. D. 10% Limestone, light gray to white.	10R 3/4 5R 2/2 N5 N7
4389-031	11450	A. 20% Shale, dark reddish brown. B. 30% Shale, blackish red. C. 50% Shale, medium gray.	10R 3/4 5R 2/2 N5
4389-041/042	11500-11505	A. 20% Shale, dark reddish brown. B. 40% Shale, blackish red. C. 40% Shale, olive gray.	10R 3/4 5R 2/2 5Y 4/1
4389-051	11550	A. 10% Shale, pale red. B. 60% Shale, blackish red. C. 30% Shale, dark gray.	10R 6/2 5R 2/2 N3
4389-061	11600	A. 30% Shale, dark reddish brown. B. 30% Shale, blackish red. C. 40% Shale, medium dark gray.	10R 3/4 5R 2/2 N4
4389-073	11660	A. 20% Shale, dark reddish brown. B. 40% Shale, blackish red. C. 40% Shale, brownish black.	10R 3/4 5R 2/2 5YR 2/1
4389-081	11700	A. 20% Shale, dark reddish brown. B. 40% Shale, blackish red. C. 40% Shale, medium dark gray.	10R 3/4 5R 2/2 N4

TABLE I

SAMPLE LITHOLOGICAL DESCRIPTION

GeoChem Sample Number	Depth (feet)	Lithological Description	GSA Color Code
4389-090	11745	A. 30% Shale, dark reddish brown. B. 40% Shale, blackish red. C. 30% Shale, medium dark gray.	10R 3/4 5R 2/2 N4
4389-096	11780	A. 20% Shale, dark reddish brown. B. 60% Shale, blackish red. C. 20% Shale, olive gray and greenish gray.	10R 3/4 5R 2/2 5Y 4/1 and 5G 6/1
4389-108	11835	A. 10% Shale, dark reddish brown. B. 70% Shale, blackish red. C. 20% Shale, light olive gray.	10R 3/4 5R 2/2 5Y 6/1
4389-113	11860	A. 10% Shale, dark reddish brown. B. 70% Shale, blackish red. C. 20% Shale, light olive gray.	10R 3/4 5R 2/2 5Y 6/1
4389-121	11900	A. 10% Shale, dark reddish brown. B. 70% Shale, blackish red. C. 20% Shale, light brownish gray.	10R 3/4 5R 2/2 5YR 6/1
4389-131	11950	A. 30% Shale, dark reddish brown. B. 20% Shale, blackish red. C. 50% Shale, brownish gray.	10R 3/4 5R 2/2 5YR 4/1
4389-141	12000	A. 10% Shale, dark reddish brown. B. 50% Shale, blackish red. C. 40% Shale, medium dark gray.	10R 3/4 5R 2/2 N4
4389-151	12050	A. 10% Shale, dark reddish brown. B. 50% Shale, blackish red. C. 40% Shale, brownish gray.	10R 3/4 5R 2/2 5YR 4/1
4389-162	12105	A. 10% Shale, dark reddish brown. B. 60% Shale, blackish red. C. 30% Shale, brownish gray.	10R 3/4 5R 2/2 5YR 4/1
4389-177	12180	A. 70% Shale, blackish red. B. 30% Shale, brownish gray.	5R 2/2 5YR 4/1

TABLE I

SAMPLE LITHOLOGICAL DESCRIPTION

GeoChem Sample Number	Depth (feet)	Lithological Description	GSA Color Code
4389-184	12215	A. 80% Shale, blackish red. B. 20% Shale, brownish gray.	5R 2/2 5YR 4/1
4389-191	12250	A. 20% Shale, grayish red. B. 70% Shale, blackish red. C. 10% Shale, brownish gray.	10R 4/2 5R 2/2 5YR 4/1
4389-202	12305	A. 10% Shale, moderate red. B. 50% Shale, grayish red. C. 40% Shale, olive gray.	5R 5/4 5R 4/2 5Y 4/1
4389-217	12380	A. 60% Shale, grayish red. B. 40% Shale, brownish gray.	10R 4/2 5YR 4/1
4389-228	12435	A. 70% Shale, grayish red. B. 30% Shale, olive gray.	5R 4/2 5Y 4/1
4389-230	12495	A. 50% Shale, grayish red. B. 40% Shale, moderate red. C. 10% Shale, light brownish gray.	5R 4/2 5R 5/4 5YR 6/1
4389-248	12535	A. 30% Shale, dark reddish brown. B. 30% Shale, olive gray. C. 40% Siltstone, white and light gray.	10R 3/4 5Y 4/1 N7
4389-254	12565	A. 40% Shale, blackish red. B. 30% Shale, dusky red. C. 30% Shale, brownish gray.	5R 2/2 5R 3/4 5YR 4/1
4389-261	12600	A. 40% Shale, light olive gray. B. 40% Shale, grayish red. C. 20% Limestone, white.	5Y 6/1 5R 4/2
4389-272	12655	A. 10% Shale, pale red. B. 10% Shale, grayish red. C. 40% Shale, grayish red. D. 40% Shale, medium light gray.	10R 6/2 10R 4/2 5R 4/2 N6
4389C-005C	12710	100% Siltstone, brownish gray.	5YR 4/1

TABLE I

SAMPLE LITHOLOGICAL DESCRIPTION

GeoChem Sample Number	Depth (feet)	Lithological Description	GSA Color Code
4389C-007C	12736	100% Shale, silty, brownish gray.	5YR 4/1
4389-295	12770	A. 30% Shale, dark reddish brown. B. 30% Shale, blackish red. C. 40% Shale, light olive gray.	10R 3/4 5R 2/2 5Y 6/1
4389-301	12800	A. 30% Shale, grayish red. B. 60% Shale, medium dark gray. C. 10% Limestone, white.	10R 4/2 N4
4389-310	12845	A. 10% Shale, grayish red. B. 60% Shale, medium gray. C. 30% Limestone, white and light gray.	5R 4/2 N5 N7
4389C-030C	12875	100% Shale, silty, brownish gray.	5YR 4/1
4389C-033C	12878	100% Shale, silty, dark gray.	N3
4389C-037C	12882	100% Shale, dark gray.	N3
4389C-042C	12887	100% Shale, dark gray.	N3
4389C-048C	12893	100% Shale, olive gray.	5Y 4/1
4389-327	12930	A. 20% Shale, grayish red. B. 20% Shale, grayish red. C. 20% Shale, olive black. D. 20% Shale, olive gray. E. 20% Limestone, white and light gray.	10R 4/2 5R 4/2 5Y 2/1 5Y 4/1 N7
4389-338	12985	A. 20% Shale, grayish red. B. 70% Limestone, medium gray. C. 10% Limestone, white and light gray.	10R 4/2 N5 N7
4389-343	13010	A. 30% Shale, dark gray. B. 50% Limestone, medium light gray. C. 20% Limestone, grayish pink.	N3 N6 5R 8/2

TABLE I

SAMPLE LITHOLOGICAL DESCRIPTION

GeoChem Sample Number	Depth (feet)	Lithological Description	GSA Color Code
4389-350	13045	A. 10% Shale, pale red. B. 40% Shale, brownish gray. C. 50% Limestone, medium light gray. Trace Limestone, white.	5R 6/2 5YR 4/1 N6
4389-360	13095	A. 30% Shale, pale yellowish brown. B. 30% Shale, moderate reddish brown. C. 40% Limestone, pinkish gray.	10YR 6/2 10R 4/6 5YR 8/1
4389-370	13145	A. 30% Shale, grayish red. B. 20% Shale, dark gray. C. 30% Shale, brownish gray. D. 20% Limestone, medium light gray.	10R 4/2 N3 5YR 4/1 N6
4389-381	13200	A. 20% Shale, pale red. B. 40% Limestone, white and light gray. C. 40% Shale, brownish gray.	5R 6/2 N7 5YR 4/1
4389-390	13245	A. 20% Shale, grayish red. B. 40% Shale, olive gray. C. 40% Limestone, medium gray.	10R 4/2 5Y 4/1 N6
4389-400	13295	A. 10% Shale, grayish red. B. 45% Shale, medium dark gray. C. 45% Limestone, medium light gray.	10R 4/2 N4 N6
4389-406	13325	A. 10% Shale, grayish red. B. 45% Shale, medium dark gray. C. 45% Limestone, medium light gray.	10R 4/2 N4 N6
4389-418	13385	A. 50% Limestone, very pale orange. B. 10% Shale, pale red. C. 10% Limestone, medium dark gray. D. 20% Limestone, medium light gray. E. 10% Limestone, white.	10YR 8/2 5R 6/2 N4 N6

TABLE I

SAMPLE LITHOLOGICAL DESCRIPTION

GeoChem Sample Number	Depth (feet)	Lithological Description	GSA Color Code
4389-432	13455	A. 30% Shale, dark reddish brown. B. 30% Shale, grayish red. C. 30% Shale, dark gray. D. 10% Limestone, white and light gray.	10R 3/4 5R 4/2 N3 N7
4389-441	13500	A. 20% Shale, grayish red. B. 30% Shale, dark gray. C. 50% Limestone, medium dark gray.	5R 4/2 N3 N4
4389-456	13575	A. 10% Shale, grayish red. B. 50% Limestone, light gray and white. C. 40% Limestone, medium gray.	5R 4/2 N7 N5
4389-470	13645	A. 10% Shale, grayish red. B. 40% Shale, dark gray. C. 40% Limestone, medium light gray. D. 10% Limestone, white and light gray.	5R 4/2 N3 N6 N7
4389-481	13700	A. 10% Shale, grayish red. B. 40% Shale, dark gray. C. 40% Limestone, medium light gray. D. 10% Limestone, white and light gray.	5R 4/2 N3 N6 N7
4389-491	13750	A. 10% Shale, grayish red. B. 30% Shale, dark gray. C. 50% Limestone, medium light gray. D. 10% Limestone, white and light gray.	5R 4/2 N3 N6 N7
4389-501	13800	A. 10% Shale, grayish red. B. 10% Shale, dark gray. C. 70% Limestone, medium light gray. D. 10% Limestone, white and light gray.	5R 4/2 N3 N6 N7
4389-506	13825	A. 20% Shale, grayish red. B. 20% Shale, dark gray. C. 20% Limestone, medium light gray. D. 40% Limestone, white and light gray.	5R 4/2 N3 N6 N7

TABLE I

SAMPLE LITHOLOGICAL DESCRIPTION

GeoChem Sample Number	Depth (feet)	Lithological Description	GSA Color Code
4389-514	13865	A. 10% Shale, grayish red. B. 30% Limestone, light brownish gray. C. 60% Limestone, white and light gray.	5R 4/2 5YR 6/1 N7
4389-526	13925	A. 20% Shale, grayish red. B. 40% Limestone, brownish gray. C. 40% Limestone, white and light gray.	5R 4/2 5YR 4/1 N7
4389-541	14000	A. 20% Shale, grayish red. B. 30% Limestone, medium dark gray. C. 50% Limestone, white and grayish orange pink.	10R 4/2 N4 5YR 7/2
4389-581	14200	100% Limestone, white and light gray.	N7
4389-621	14400	A. 20% Limestone, medium light gray. B. 80% Quartzite, clear, crystalline, white.	N6

TABLE I

SAMPLE IDENTIFICATION AND TOTAL ORGANIC CARBON RESULTS

GeoChem Sample Number	Client Identification Number	Total Organic Carbon (% of Rock)
4389-001	11300-11305	0.38
4389-011	11350-11355	0.18
4389-021	11400-11405	0.20
4389-031	11450-11455	0.20
4389-041/042	11500-11510	0.35
4389-051	11550-11555	0.21
4389-061	11600-11605	0.19
4389-073	11660-11665	0.20
4389-081	11700-11705	0.20
4389-090	11745-11750	0.18
4389-096	11775-11780	0.18
4389-108	11835-11840	0.28
4389-113	11860-11865	0.19
4389-121	11900-11905	0.43
4389-131	11950-11955	0.34
4389-141	12000-12005	0.68
4389-151	12050-12055	0.23 ; 0.24R
4389-162	12105-12110	0.17
4389-177	12180-12185	0.29
4389-184	12215-12220	0.22
4389-191	12250-12255	0.23
4389-202	12305-12310	0.22
4389-217	12380-12385	0.22
4389-228	12435-12440	0.16
4389-230	12445-12450	0.16
4389-248	12535-12540	0.16
4389-254	12565-12570	0.65
4389-261	12600-12605	0.24
4389-272	12655-12660	0.34
4389C-005C	12710	0.63 ; 0.70R
4389C-007C	12736	1.15
4389-295	12770-12775	0.29
4389-301	12800-12805	0.38
4389-310	12845-12850	0.40

TABLE I

SAMPLE IDENTIFICATION AND TOTAL ORGANIC CARBON RESULTS

GeoChem Sample Number	Client Identification Number	Total Organic Carbon (% of Rock)
4389C-030C	12875	0.28
4389C-033C	12878	0.94
4389C-037C	12882	0.52
4389C-042C	12887	1.10
4389C-048C	12893	0.52
4389-327	12930-12935	0.33
4389-338	12985-12990	0.26
4389-343	13010-13015	0.39 ; 0.43R
4389-350	13045-13050	0.29
4389-360	13095-13100	0.34
4389-370	13145-13150	0.31
4389-381	13200-13205	0.30
4389-390	13245-13250	0.20
4389-400	13295-13300	0.37
4389-406	13325-13330	0.23
4389-418	13385-13390	0.21
4389-432	13455-13460	0.30
4389-441	13500-13505	0.35 ; 0.46R
4389-456	13575-13580	0.23
4389-470	13645-13650	0.62
4389-481	13700-13705	0.42
4389-491	13750-13755	0.72
4389-501	13800-13805	0.45
4389-506	13825-13830	0.39
4389-514	13865-13870	0.30
4389-526	13925-13930	0.22
4389-541	14000-14005	0.27 ; 0.31R
4389-581	14200-14205	0.13
4389-621	14400-14405	0.33

TABLE II-A
RESULTS OF ROCK-EVAL PYROLYSIS
(mgm/gram)

GeoChem Sample No.	Client Identification	Tmax (°c)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	PI	PC*	T.O.C. (wt%)	Hydrogen Index	Oxygen Index
4389-001	11300-11305	260	0.04	0.00	0.34	1.00	0.00	0.38	0	89
4389-011	11350-11355	218	0.02	0.00	0.40	1.00	0.00	0.18	0	218
4389-021	11400-11405	260	0.05	0.00	0.21	1.00	0.00	0.20	0	104
4389-031	11450-11455	260	0.03	0.05	0.09	0.37	0.00	0.20	25	44
4389-041/042	11500-11510	266	0.05	0.09	0.28	0.36	0.01	0.35	26	80
4389-051	11550-11555	292	0.13	0.38	0.28	0.26	0.04	0.21	181	133
4389-061	11600-11605	236	0.02	0.00	0.19	1.00	0.00	0.19	0	100
4389-073	11660-11665	267	0.05	0.14	0.32	0.28	0.01	0.20	71	163
4389-081	11700-11705	200	0.04	0.01	0.26	1.00	0.00	0.20	5	132
4389-090	11745-11750	210	0.03	0.00	0.40	1.00	0.00	0.18	0	225
4389-096	11775-11780	266	0.02	0.00	0.33	1.00	0.00	0.18	0	183
4389-108	11835-11840	264	0.04	0.00	0.49	1.00	0.00	0.28	0	173
4389-113	11860-11865	349	0.04	0.01	0.65	1.00	0.00	0.19	5	342
4389-121	11900-11905	206	0.04	0.01	0.24	1.00	0.00	0.43	2	56
4389-131	11950-11955	646	0.06	0.05	0.36	0.60	0.00	0.34	15	106
4389-141	12000-12005	646	0.03	0.03	0.19	0.50	0.00	0.68	4	28
4389-151	12050-12055	646	0.05	0.02	0.11	0.83	0.00	0.23	9	48
4389-162	12105-12110	646	0.03	0.00	0.09	1.00	0.00	0.17	0	52
4389-177	12180-12185	646	0.02	0.01	0.15	1.00	0.00	0.29	3	51
4389-184	12215-12220	646	0.02	0.01	0.49	1.00	0.00	0.22	5	223
4389-191	12250-12255	646	0.01	0.01	0.14	0.50	0.00	0.23	4	60
4389-202	12305-12310	646	0.02	0.00	0.11	1.00	0.00	0.22	0	49
4389-217	12380-12385	646	0.14	0.31	0.40	0.32	0.03	0.22	139	180
4389-228	12435-12440	646	0.02	0.00	0.39	1.00	0.00	0.16	0	240
4389-230	12445-12450	646	0.03	0.00	0.37	1.00	0.00	0.16	0	238
4389-248	12535-12540	646	0.04	0.01	0.34	1.00	0.00	0.16	6	213
4389-254	12565-12570	646	0.03	0.01	0.47	0.75	0.00	0.65	2	72
4389-261	12600-12605	646	0.03	0.02	0.52	0.75	0.00	0.24	8	213
4389-272	12655-12660	646	0.01	0.03	0.63	0.25	0.00	0.34	9	184
4389C-005C	12710	646	0.04	0.00	0.17	1.00	0.00	0.63	0	27
4389C-007C	12736	646	0.02	0.01	0.07	1.00	0.00	1.15	1	6
4389-295	12770-12775	646	0.02	0.01	0.20	1.00	0.00	0.29	3	69
4389-301	12800-12805	436	0.01	0.01	0.26	0.50	0.00	0.38	3	68
4389-310	12845-12850	374	0.03	0.02	0.61	0.75	0.00	0.40	5	154
4389C-030C	12875	266	0.05	0.13	0.39	0.28	0.01	0.28	46	137
4389C-033C	12878	266	0.04	0.05	0.00	0.50	0.00	0.94	5	137

T.O.C. = Total organic carbon, wt.%
S1 = Free Hydrocarbons, mg HC/g of rock
S2 = Residual hydrocarbon potential (mg HC/g of rock)
S3 = CO2 produced from kerogen pyrolysis (mg CO2/g of rock)
PC* = 0.083 (S1 + S2)
Hydrogen Index = mg HC/g organic carbon
Oxygen Index = mg CO2/g organic carbon
PI = S1/(S1+S2)
Tmax = Temperature Index, °C.

TABLE II-A
RESULTS OF ROCK-EVAL PYROLYSIS
(mgm/gram)

GeoChem Sample No.	Client Identification	Tmax (°c)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	PI	PC*	T.O.C. (wt%)	Hydrogen Index	Oxygen Index
4389C-037C	12882	266	0.06	0.11	0.17	0.37	0.01	0.52	21	33
4389C-042C	12887	266	0.11	0.17	0.12	0.39	0.02	1.10	15	11
4389C-048C	12893	400	0.03	0.08	0.17	0.30	0.00	0.52	15	33
4389-327	12930-12935	290	0.03	0.07	0.17	0.30	0.00	0.33	21	51
4389-338	12985-12990	266	0.04	0.12	0.14	0.25	0.01	0.26	46	54
4389-343	13010-13015	288	0.04	0.16	0.25	0.20	0.01	0.39	41	64
4389-350	13045-13050	266	0.03	0.13	0.44	0.19	0.01	0.29	45	154
4389-360	13095-13100	269	0.21	0.08	0.47	0.73	0.02	0.34	23	141
4389-370	13145-13150	287	0.05	0.13	0.34	0.28	0.01	0.31	42	109
4389-381	13200-13205	266	0.07	0.15	0.40	0.32	0.01	0.30	49	132
4389-390	13245-13250	192	0.01	0.02	0.30	0.50	0.00	0.20	10	147
4389-400	13295-13300	266	0.04	0.01	0.49	1.00	0.00	0.37	3	134
4389-406	13325-13330	263	0.02	0.03	0.16	0.50	0.00	0.23	13	71
4389-418	13385-13390	200	0.02	0.03	0.31	0.50	0.00	0.21	14	149
4389-432	13455-13460	208	0.03	0.02	0.17	0.75	0.00	0.30	7	57
4389-441	13500-13505	221	0.01	0.02	0.12	0.50	0.00	0.35	6	34
4389-456	13575-13580	167	0.02	0.02	0.42	0.50	0.00	0.23	9	179
4389-470	13645-13650	227	0.02	0.02	0.35	0.50	0.00	0.62	3	56
4389-481	13700-13705	199	0.02	0.01	0.32	1.00	0.00	0.42	2	77
4389-491	13750-13755	183	0.03	0.02	0.40	0.75	0.00	0.72	3	56
4389-501	13800-13805	349	0.03	0.01	0.36	0.75	0.00	0.45	2	80
4389-506	13825-13830	214	0.14	0.00	0.60	1.00	0.01	0.39	0	152
4389-514	13865-13870	186	0.01	0.02	0.03	0.50	0.00	0.30	7	10
4389-526	13925-13930	179	0.04	0.03	0.22	0.67	0.00	0.22	14	101
4389-541	14000-14005	153	0.08	0.02	0.28	0.80	0.00	0.27	7	104
4389-581	14200-14205	174	0.02	0.00	0.00	1.00	0.00	0.13	0	0
4389-621	14400-14405	171	0.02	0.00	0.01	1.00	0.00	0.33	0	3

T.O.C. = Total organic carbon, wt.%
S1 = Free Hydrocarbons, mg HC/g of rock
S2 = Residual hydrocarbon potential (mg HC/g of rock)
S3 = CO_2 produced from kerogen pyrolysis (mg CO_2/g of rock)
PC* = 0.083 (S1 + S2)
Hydrogen Index = mg HC/g organic carbon
Oxygen Index = mg CO_2/g organic carbon
PI = S1/(S1+S2)
Tmax = Temperature Index, °C.

TABLE II-B
RESULTS OF ROCK-EVAL PYROLYSIS
(ppm wt/wt)

GeoChem Sample No.	Client Identification	Tmax (°c)	S1 (ppm)	S2 (ppm)	S3 (ppm)	PI	PC*	T.O.C. (wt%)	Hydrogen Index	Oxygen Index
4389-001	11300-11305	260	40	0	340	1.00	0.00	0.38	0	89
4389-011	11350-11355	218	20	0	400	1.00	0.00	0.18	0	218
4389-021	11400-11405	260	50	0	210	1.00	0.00	0.20	0	104
4389-031	11450-11455	260	30	50	90	0.37	0.00	0.20	25	44
4389-041/042	11500-11510	266	50	90	280	0.36	0.01	0.35	26	80
4389-051	11550-11555	292	130	380	280	0.26	0.04	0.21	181	133
4389-061	11600-11605	236	20	0	190	1.00	0.00	0.19	0	100
4389-073	11660-11665	267	50	140	320	0.28	0.01	0.20	71	163
4389-081	11700-11705	200	40	10	260	1.00	0.00	0.20	5	132
4389-090	11745-11750	210	30	0	400	1.00	0.00	0.18	0	225
4389-096	11775-11780	266	20	0	330	1.00	0.00	0.18	0	183
4389-108	11835-11840	264	40	0	490	1.00	0.00	0.28	0	173
4389-113	11860-11865	349	40	10	650	1.00	0.00	0.19	5	342
4389-121	11900-11905	206	40	10	240	1.00	0.00	0.43	2	56
4389-131	11950-11955	646	60	50	360	0.60	0.00	0.34	15	106
4389-141	12000-12005	646	30	30	190	0.50	0.00	0.68	4	28
4389-151	12050-12055	646	50	20	110	0.83	0.00	0.23	9	48
4389-162	12105-12110	646	30	0	90	1.00	0.00	0.17	0	52
4389-177	12180-12185	646	20	10	150	1.00	0.00	0.29	3	51
4389-184	12215-12220	646	20	10	490	1.00	0.00	0.22	5	223
4389-191	12250-12255	646	10	10	140	0.50	0.00	0.23	4	60
4389-202	12305-12310	646	20	0	110	1.00	0.00	0.22	0	49
4389-217	12380-12385	646	140	310	400	0.32	0.03	0.22	139	180
4389-228	12435-12440	646	20	0	390	1.00	0.00	0.16	0	240
4389-230	12445-12450	646	30	0	370	1.00	0.00	0.16	0	238
4389-248	12535-12540	646	40	10	340	1.00	0.00	0.16	6	213
4389-254	12565-12570	646	30	10	470	0.75	0.00	0.65	2	72
4389-261	12600-12605	646	30	20	520	0.75	0.00	0.24	8	213
4389-272	12655-12660	646	10	30	630	0.25	0.00	0.34	9	184
4389C-005C	12710	646	40	0	170	1.00	0.00	0.63	0	27
4389C-007C	12736	646	20	10	70	1.00	0.00	1.15	1	6
4389-295	12770-12775	646	20	10	200	1.00	0.00	0.29	3	69
4389-301	12800-12805	436	10	10	260	0.50	0.00	0.38	3	68
4389-310	12845-12850	374	30	20	610	0.75	0.00	0.40	5	154
4389C-030C	12875	266	50	130	390	0.28	0.01	0.28	46	137
4389C-033C	12878	266	40	50	0	0.50	0.00	0.94	5	137

T.O.C. = Total organic carbon, wt.%
S1 = Free Hydrocarbons, mg HC/g of rock
S2 = Residual hydrocarbon potential (mg HC/g of rock)
S3 = CO2 produced from kerogen pyrolysis (mg CO2/g of rock)
PC* = 0.083 (S1 + S2)
Hydrogen Index = mg HC/g organic carbon
Oxygen Index = mg CO2/g organic carbon
PI = S1/(S1+S2)
Tmax = Temperature Index, °C.

TABLE II-B
RESULTS OF ROCK-EVAL PYROLYSIS
(ppm wt/wt)

GeoChem Sample No.	Client Identification	Tmax (°c)	S1 (ppm)	S2 (ppm)	S3 (ppm)	PI	PC*	T.O.C. (wt%)	Hydrogen Index	Oxygen Index
4389C-037C	12882	266	60	110	170	0.37	0.01	0.52	21	33
4389C-042C	12887	266	110	170	120	0.39	0.02	1.10	15	11
4389C-048C	12893	400	30	80	170	0.30	0.00	0.52	15	33
4389-327	12930-12935	290	30	70	170	0.30	0.00	0.33	21	51
4389-338	12985-12990	266	40	120	140	0.25	0.01	0.26	46	54
4389-343	13010-13015	288	40	160	250	0.20	0.01	0.39	41	64
4389-350	13045-13050	266	30	130	440	0.19	0.01	0.29	45	154
4389-360	13095-13100	269	210	77	473	0.73	0.02	0.34	23	141
4389-370	13145-13150	287	50	130	340	0.28	0.01	0.31	42	109
4389-381	13200-13205	266	70	150	400	0.32	0.01	0.30	49	132
4389-390	13245-13250	192	10	20	300	0.50	0.00	0.20	10	147
4389-400	13295-13300	266	40	10	490	1.00	0.00	0.37	3	134
4389-406	13325-13330	263	20	30	160	0.50	0.00	0.23	13	71
4389-418	13385-13390	200	20	30	310	0.50	0.00	0.21	14	149
4389-432	13455-13460	208	30	20	170	0.75	0.00	0.30	7	57
4389-441	13500-13505	221	10	20	120	0.50	0.00	0.35	6	34
4389-456	13575-13580	167	20	20	420	0.50	0.00	0.23	9	179
4389-470	13645-13650	227	20	20	350	0.50	0.00	0.62	3	56
4389-481	13700-13705	199	20	10	320	1.00	0.00	0.42	2	77
4389-491	13750-13755	183	30	20	400	0.75	0.00	0.72	3	56
4389-501	13800-13805	349	30	10	360	0.75	0.00	0.45	2	80
4389-506	13825-13830	214	140	0	600	1.00	0.01	0.39	0	152
4389-514	13865-13870	186	10	20	30	0.50	0.00	0.30	7	10
4389-526	13925-13930	179	40	30	220	0.67	0.00	0.22	14	101
4389-541	14000-14005	153	80	20	280	0.80	0.00	0.27	7	104
4389-581	14200-14205	174	20	0	0	1.00	0.00	0.13	0	0
4389-621	14400-14405	171	20	0	10	1.00	0.00	0.33	0	3

T.O.C. = Total organic carbon, wt.%
S1 = Free Hydrocarbons, mg HC/g of rock
S2 = Residual hydrocarbon potential (mg HC/g of rock)

S3 = CO_2 produced from kerogen pyrolysis (mg CO_2/g of rock)
PC* = 0.083 (S1 + S2)
Hydrogen Index = mg HC/g organic carbon

Oxygen Index = mg CO_2/g organic carbon
PI = S1/(S1+S2)
Tmax = Temperature Index, °C.

TABLE III
SAMPLE LITHOLOGICAL DESCRIPTION, SAMPLE IDENTIFICATION AND TOTAL ORGANIC CARBON RESULTS
(Picked Control Samples)

GeoChem Sample Number	Depth (feet)	Lithological Description	GSA Color Code
4389-001A	11300	Shale, slightly calcareous, pale yellowish brown.	10YR 6/2
4389-001B	11300	Shale, slightly calcareous, pale reddish brown.	10R 5/4
4389-051A	11550	Shale, noncalcareous, light gray.	N7
4389-051B	11550	Shale, noncalcareous, pale reddish brown.	10Y 5/4
4389-177A	12180	Shale, noncalcareous, very light gray.	N8
4389-177B	12180	Shale, moderate reddish brown.	10R 4/6
4389-228A	12435	Shale, noncalcareous, very light gray.	N8
4389-228B	12435	Shale, slightly calcareous, moderate reddish brown.	10R 4/6
4389-272A	12655	Shale, noncalcareous, yellowish gray.	5Y 8/1
4389-272B	12655	Shale, noncalcareous, pale reddish brown.	10R 5/4
4389-327A	12930	Shale, noncalcareous, light brownish gray.	5YR 6/1
4389-327B	12930	Shale, noncalcareous, moderate reddish brown.	10R 4/6
4389-360A	13095	Shale, calcareous, pale yellowish brown.	10YR 6/2
4389-360B	13095	Shale, slightly calcareous, moderate reddish brown.	10R 4/6
4389-360C	13095	Limestone, slightly argillaceous, pinkish gray.	5YR 8/1
4389-506A	13825	Shale, calcareous, pale yellowish brown.	10YR 6/2
4389-506B	13825	Limestone, argillaceous, pale red.	10R 6/2

* Note: Color of ground picked sample.

TABLE III
SAMPLE LITHOLOGICAL DESCRIPTION, SAMPLE IDENTIFICATION AND TOTAL ORGANIC CARBON RESULTS
(Picked Control Samples)

GeoChem Sample Number	Client Identification Number	Total Organic Carbon (% of Rock)
4389-001A	11300	0.99
4389-001B	11300	0.47
4389-051A	11550	1.30
4389-051B	11550	0.16
4389-177A	12180	0.31
4389-177B	12180	0.08
4389-228A	12435	0.31
4389-228B	12435	0.24
4389-272A	12655	0.84
4389-272B	12655	0.39
4389-327A	12930	0.77
4389-327B	12930	0.27
4389-360A	13095	0.63
4389-360B	13095	0.19
4389-360C	13095	0.19
4389-506A	13825	0.86
4389-506B	13825	0.41

TABLE III-A
RESULTS OF ROCK-EVAL PYROLYSIS (mgm/gram) - PICKED CONTROL SAMPLES

GeoChem Sample No.	Client Identification	Tmax (°c)	S1 (mg/g)	S2 (mg/g)	S3 (mg/g)	PI	PC*	T.O.C. (wt%)	Hydrogen Index	Oxygen Index
4389-001A	11300	396	0.21	0.35	0.43	0.37	0.04	0.99	35	43
4389-001B	11300	360	0.23	0.31	0.36	0.43	0.04	0.47	67	77
4389-051A	11550	370	0.11	0.24	0.28	0.32	0.02	1.30	18	22
4389-051B	11550	401	0.10	0.09	0.07	0.56	0.01	0.16	56	44
4389-177A	12180	263	0.12	0.00	0.17	1.00	0.01	0.31	0	54
4389-177B	12180	263	0.08	0.00	0.26	1.00	0.00	0.08	0	326
4389-228A	12435	345	0.10	0.08	0.50	0.56	0.01	0.31	26	161
4389-228B	12435	512	0.11	0.26	0.58	0.31	0.03	0.24	106	237
4389-272A	12655	397	0.18	0.08	0.48	0.69	0.02	0.84	10	57
4389-272B	12655	323	0.17	0.16	0.43	0.53	0.02	0.39	41	109
4389-327A	12930	266	0.29	0.18	0.75	0.63	0.03	0.77	23	97
4389-327B	12930	257	0.20	0.19	0.59	0.53	0.03	0.27	70	218
4389-360A	13095	260	0.16	0.13	0.77	0.57	0.02	0.63	21	123
4389-360B	13095	312	0.16	0.05	0.29	0.80	0.01	0.19	26	154
4389-360C	13095	236	0.31	0.05	0.36	0.86	0.03	0.19	26	187
4389-506A	13825	227	0.20	0.02	0.45	0.91	0.01	0.86	2	52
4389-506B	13825	224	0.18	0.00	0.38	1.00	0.01	0.41	0	93

T.O.C. = Total organic carbon, wt.%
S1 = Free Hydrocarbons, mg HC/g of rock
S2 = Residual hydrocarbon potential (mg HC/g of rock)
S3 = CO_2 produced from kerogen pyrolysis (mg CO_2/g of rock)
PC* = 0.083 (S1 + S2)
Hydrogen Index = mg HC/g organic carbon
Oxygen Index = mg CO_2/g organic carbon
PI = S1/(S1+S2)
Tmax = Temperature Index, °C.

TABLE III-B
RESULTS OF ROCK-EVAL PYROLYSIS (ppm wt/wt) - PICKED CONTROL SAMPLES

GeoChem Sample No.	Client Identification	Tmax (°c)	S1 (ppm)	S2 (ppm)	S3 (ppm)	PI	PC*	T.O.C. (wt%)	Hydrogen Index	Oxygen Index
4389-001A	11300	396	210	350	430	0.37	0.04	0.99	35	43
4389-001B	11300	360	230	310	360	0.43	0.04	0.47	67	77
4389-051A	11550	370	110	240	280	0.32	0.02	1.30	18	22
4389-051B	11550	401	100	90	70	0.56	0.01	0.16	56	44
4389-177A	12180	263	120	0	170	1.00	0.01	0.31	0	54
4389-177B	12180	263	80	0	260	1.00	0.00	0.08	0	326
4389-228A	12435	345	100	80	500	0.56	0.01	0.31	26	161
4389-228B	12435	512	110	260	580	0.31	0.03	0.24	106	237
4389-272A	12655	397	180	80	480	0.69	0.02	0.84	10	57
4389-272B	12655	323	170	160	430	0.53	0.02	0.39	41	109
4389-327A	12930	266	290	180	750	0.63	0.03	0.77	23	97
4389-327B	12930	257	200	190	590	0.53	0.03	0.27	70	218
4389-360A	13095	260	160	130	770	0.57	0.02	0.63	21	123
4389-360B	13095	312	160	50	290	0.80	0.01	0.19	26	154
4389-360C	13095	236	310	50	360	0.86	0.03	0.19	26	187
4389-506A	13825	227	200	20	450	0.91	0.01	0.86	2	52
4389-506B	13825	224	180	0	380	1.00	0.01	0.41	0	93

T.O.C. = Total organic carbon, wt.%
S1 = Free Hydrocarbons, mg HC/g of rock
S2 = Residual hydrocarbon potential (mg HC/g of rock)

S3 = CO_2 produced from kerogen pyrolysis (mg CO_2/g of rock)
PC* = 0.083 (S1 + S2)
Hydrogen Index = mg HC/g organic carbon

Oxygen Index = mg CO_2/g organic carbon
PI = S1/(S1+S2)
Tmax = Temperature Index, °C.

TABLE IV-A
SUMMARY OF ORGANIC CARBON AND VISUAL KEROGEN DATA

GEOCHEM SAMPLE NUMBER	CLIENT IDENTIFICATION NUMBER	TOTAL ORGANIC CARBON	ORGANIC MATTER TYPE	VISUAL ABUNDANCE NORMALIZED PERCENT					ALTERATION STAGE	THERMAL ALTERATION INDEX
				AL	AM	H	W	I		
4389-041/042	11500-11505	0.35	W-I;H;-	0	0	27	36	36	2+ to 3-	2.8
4389-131	11950-11955	0.34	H-W-I;-;-	0	0	33	33	33	2+ to 3-	2.8
4389-248	12535-12540	0.16	H-W;I;-	0	0	36	36	27	2+ to 3-	2.9
4389-261	12600-12605	0.24	H-W;I;Am	0	8	33	33	25	2+ to 3-	2.9
4389C-005C	12710	0.63; 0.70R	W-I;H;-	0	0	27	36	36	3 to 3+	3.5
4389-310	12845-12850	0.40	W-I;H;-	0	0	27	36	36	3 to 3+	3.5
4389C-042C	12887	1.10	W-I;-;H	0	0	11	44	44	3 to 3+	3.5
4389-350	13045-13050	0.29	W-I;H;-	0	0	27	36	36	3 to 3+	3.5
4389-400	13295-13300	0.37	W-I;H;-	0	0	27	36	36	3 to 3+	3.5
4389-456	13575-13580	0.23	W-I;H;-	0	0	27	36	36	3 to 3+	3.5
4389-501	13800-13805	0.45	H-W-I;-;-	0	0	33	33	33	3 to 3+	3.5
4389-526	13925-13930	0.22	H-I;W;-	0	0	40	20	40	3 to 3+	3.5
4389-581	14200-14205	0.13	H-I;-;-	0	0	50	0	50	3+	3.8

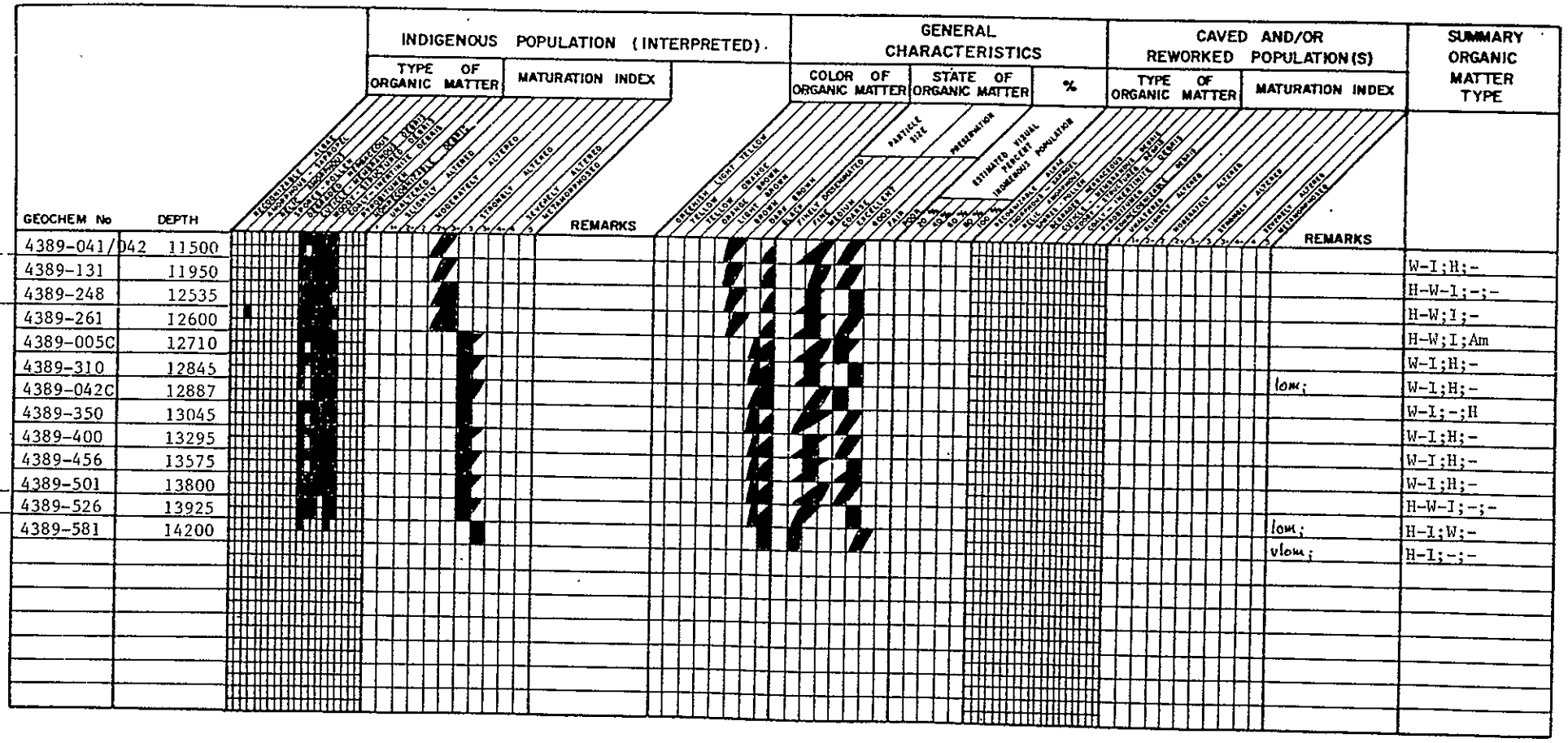
LEGEND:

KEROGEN KEY

Predominant;	Secondary;	Trace
60-100%	20-40%	0-20%

Al	=	Algal	W	=	Woody-Structured
Am	=	Amorphous-Sapropel	U	=	Unidentified Material
Am**	=	Relic Amorphous-Sapropel	I	=	Inertinite
H	=	Herbaceous-Spore/Pollen	C	=	Coaly
H*	=	Degraded Herbaceous			

TABLE IV-B
VISUAL KEROGEN ASSESSMENT WORKSHEET



GEOCHEM No	DEPTH	REMARKS	SUMMARY ORGANIC MATTER TYPE
4389-041/042	11500		W-I;H;-
4389-131	11950		H-W-I;-;-
4389-248	12535		H-W;I;-
4389-261	12600		H-W;I;Am
4389-005C	12710		W-I;H;-
4389-310	12845		W-I;H;-
4389-042C	12887	low;	W-I;H;-
4389-350	13045		W-I;-;H
4389-400	13295		W-I;H;-
4389-456	13575		W-I;H;-
4389-501	13800		W-I;H;-
4389-526	13925		H-W-I;-;-
4389-581	14200	low;	H-I;W;-
		vlow;	H-I;-;-

TABLE IV - C - 4389
OIL AND GAS FACTORS BASED ON ORGANIC FACIES TYPE

GeoChem Sample Number	Depth (feet)	Am(Al)	H	W	I	Oil * Factor (OF)	Gas ** Factor (GF)
4389-041/042	11500-11505	-	16.2	10.8	3.6	30.6	69.4
4389-131	11950-11955	-	19.8	9.9	3.3	33.0	67.0
4389-248	12535-12540	-	21.6	10.8	2.7	35.1	64.9
4389-261	12600-12605	7.2	19.8	9.9	2.5	39.4	60.6
4389-005C	12710	-	16.2	10.8	3.6	30.6	69.4
4389-310	12845-12850	-	16.2	10.8	3.6	30.6	69.4
4389-042C	12887	-	6.6	13.2	4.4	24.2	75.8
4389-350	13045-13050	-	16.2	10.8	3.6	30.6	69.4
4389-400	13295-13300	-	16.2	10.8	3.6	30.6	69.4
4389-456	13575-13580	-	16.2	10.8	3.6	30.6	69.4
4389-501	13800-13805	-	19.8	9.9	3.3	33.0	67.0
4389-526	13925-13930	-	24.0	6.0	4.0	34.0	66.0
4389-581	14200-14205	-	30.0	0.0	5.0	35.0	65.0

* Oil Factor (OF) = (%Am(Al)*0.9)+(%H*0.6)+(%W*0.3)+(I*0.1)
** Gas Factor (GF) = (100 - Oil Factor (OF)

APPENDIX I
SAMPLE IDENTIFICATION

APPENDIX I

Sample Identification

GeoChem Sample Number	Depth (feet)
4389-001	11300-11305
4389-002	11305-11310
4389-003	11310-11315
4389-004	11315-11320
4389-005	11320-11325
4389-006	11325-11330
4389-007	11330-11335
4389-008	11335-11340
4389-009	11340-11345
4389-010	11345-11350
4389-011	11350-11355
4389-012	11355-11360
4389-013	11360-11365
4389-014	11365-11370
4389-015	11370-11375
4389-016	11375-11380
4389-017	11380-11385
4389-018	11385-11390
4389-019	11390-11395
4389-020	11395-11400
4389-021	11400-11405
4389-022	11405-11410
4389-023	11410-11415
4389-024	11415-11420
4389-025	11420-11425
4389-026	11425-11430
4389-027	11430-11435
4389-028	11435-11440
4389-029	11440-11445
4389-030	11445-11450
4389-031	11450-11455
4389-032	11455-11460
4389-033	11460-11465
4389-034	11465-11470
4389-035	11470-11475
4389-036	11475-11480
4389-037	11480-11485
4389-038	11485-11490

GeoChem Sample Number	Depth (feet)
4389-039	11490-11495
4389-040	11495-11500
4389-041	11500-11505
4389-042	11505-11510
4389-043	11510-11515
4389-044	11515-11520
4389-045	11520-11525
4389-046	11525-11530
4389-047	11530-11535
4389-048	11535-11540
4389-049	11540-11545
4389-050	11545-11550
4389-051	11550-11555
4389-052	11555-11560
4389-053	11560-11565
4389-054	11565-11570
4389-055	11570-11575
4389-056	11575-11580
4389-057	11580-11585
4389-058	11585-11590
4389-059	11590-11595
4389-060	11595-11600
4389-061	11600-11605
4389-062	11605-11610
4389-063	11610-11615
4389-064	11615-11620
4389-065	11620-11625
4389-066	11625-11630
4389-067	11630-11635
4389-068	11635-11640
4389-069	11640-11645
4389-070	11645-11650
4389-071	11650-11655
4389-072	11655-11660
4389-073	11660-11665
4389-074	11665-11670
4389-075	11670-11675
4389-076	11675-11680

GeoChem Sample Number	Depth (feet)
4389-077	11680-11685
4389-078	11685-11690
4389-079	11690-11695
4389-080	11695-11700
4389-081	11700-11705
4389-082	11705-11710
4389-083	11710-11715
4389-084	11715-11720
4389-085	11720-11725
4389-086	11725-11730
4389-087	11730-11735
4389-088	11735-11740
4389-089	11740-11745
4389-090	11745-11750
4389-091	11750-11755
4389-092	11755-11760
4389-093	11760-11765
4389-094	11765-11770
4389-095	11770-11775
4389-096	11775-11780
4389-097	11780-11785
4389-098	11785-11790
4389-099	11790-11795
4389-100	11795-11800
4389-101	11800-11805
4389-102	11805-11810
4389-103	11810-11815
4389-104	11815-11820
4389-105	11820-11825
4389-106	11825-11830
4389-107	11830-11835
4389-108	11835-11840
4389-109	11840-11845
4389-110	11845-11850
4389-111	11850-11855
4389-112	11855-11860
4389-113	11860-11865
4389-114	11865-11870

APPENDIX I

Sample Identification

GeoChem Sample Number	Depth (feet)
4389-115	11870-11875
4389-116	11875-11880
4389-117	11880-11885
4389-118	11885-11890
4389-119	11890-11895
4389-120	11895-11900
4389-121	11900-11905
4389-122	11905-11910
4389-123	11910-11915
4389-124	11915-11920
4389-125	11920-11925
4389-126	11925-11930
4389-127	11930-11935
4389-128	11935-11940
4389-129	11940-11945
4389-130	11945-11950
4389-131	11950-11955
4389-132	11955-11960
4389-133	11960-11965
4389-134	11965-11970
4389-135	11970-11975
4389-136	11975-11980
4389-137	11980-11985
4389-138	11985-11990
4389-139	11990-11995
4389-140	11995-12000
4389-141	12000-12005
4389-142	12005-12010
4389-143	12010-12015
4389-144	12015-12020
4389-145	12020-12025
4389-146	12025-12030
4389-147	12030-12035
4389-148	12035-12040
4389-149	12040-12045
4389-150	12045-12050
4389-151	12050-12055
4389-152	12055-12060
4389-153	12060-12065
4389-154	12065-12070
4389-155	12070-12075
4389-156	12075-12080
4389-157	12080-12085
4389-158	12085-12090
4389-159	12090-12095
4389-160	12095-12100
4389-161	12100-12105
4389-162	12105-12110
4389-163	12110-12115
4389-164	12115-12120
4389-165	12120-12125
4389-166	12125-12130
4389-167	12130-12135
4389-168	12135-12140
4389-169	12140-12145
4389-170	12145-12150
4389-171	12150-12155
4389-172	12155-12160
4389-173	12160-12165
4389-174	12165-12170
4389-175	12170-12175
4389-176	12175-12180
4389-177	12180-12185
4389-178	12185-12190
4389-179	12190-12195
4389-180	12195-12200
4389-181	12200-12205
4389-182	12205-12210
4389-183	12210-12215
4389-184	12215-12220
4389-185	12220-12225
4389-186	12225-12230
4389-187	12230-12235
4389-188	12235-12240
4389-189	12240-12245
4389-190	12245-12250
4389-191	12250-12255
4389-192	12255-12260
4389-193	12260-12265
4389-194	12265-12270
4389-195	12270-12275
4389-196	12275-12280
4389-197	12280-12285
4389-198	12285-12290
4389-199	12290-12295
4389-200	12295-12300
4389-201	12300-12305
4389-202	12305-12310
4389-203	12310-12315
4389-204	12315-12320
4389-205	12320-12325
4389-206	12325-12330
4389-207	12330-12335
4389-208	12335-12340
4389-209	12340-12345
4389-210	12345-12350
4389-211	12350-12355
4389-212	12355-12360
4389-213	12360-12365
4389-214	12365-12370
4389-215	12370-12375
4389-216	12375-12380
4389-217	12380-12385
4389-218	12385-12390
4389-219	12390-12395
4389-220	12395-12400
4389-221	12400-12405
4389-222	12405-12410
4389-223	12410-12415
4389-224	12415-12420
4389-225	12420-12425
4389-226	12425-12430
4389-227	12430-12435
4389-228	12435-12440

APPENDIX I

Sample Identification

GeoChem Sample Number	Depth (feet)
4389-229	12440-12445
4389-230	12445-12450
4389-231	12450-12455
4389-232	12455-12460
4389-233	12460-12465
4389-234	12465-12470
4389-235	12470-12475
4389-236	12475-12480
4389-237	12480-12485
4389-238	12485-12490
4389-239	12490-12495
4389-240	12495-12500
4389-241	12500-12505
4389-242	12505-12510
4389-243	12510-12515
4389-244	12515-12520
4389-245	12520-12525
4389-246	12525-12530
4389-247	12530-12535
4389-248	12535-12540
4389-249	12540-12545
4389-250	12545-12550
4389-251	12550-12555
4389-252	12555-12560
4389-253	12560-12565
4389-254	12565-12570
4389-255	12570-12575
4389-256	12575-12580
4389-257	12580-12585
4389-258	12585-12590
4389-259	12590-12595
4389-260	12595-12600
4389-261	12600-12605
4389-262	12605-12610
4389-263	12610-12615
4389-264	12615-12620
4389-265	12620-12625
4389-266	12625-12630

GeoChem Sample Number	Depth (feet)
4389-267	12630-12635
4389-268	12635-12640
4389-269	12640-12645
4389-270	12645-12650
4389-271	12650-12655
4389-272	12655-12660
4389-273	12660-12665
4389-274	12665-12670
4389-275	12670-12675
4389-276	12675-12680
4389-277	12680-12685
4389-278	12685-12690
4389-279	12690-12695
4389-280	12695-12700
4389-281	12700-12705
4389-282	12705-12710
4389-283	12710-12715
4389-284	12715-12720
4389-285	12720-12725
4389-286	12725-12730
4389-287	12730-12735
4389-288	12735-12740
4389-289	12740-12745
4389-290	12745-12750
4389-291	12750-12755
4389-292	12755-12760
4389-293	12760-12765
4389-294	12765-12770
4389-295	12770-12775
4389-296	12775-12780
4389-297	12780-12785
4389-298	12785-12790
4389-299	12790-12795
4389-300	12795-12800
4389-301	12800-12805
4389-302	12805-12810
4389-303	12810-12815
4389-304	12815-12820

GeoChem Sample Number	Depth (feet)
4389-305	12820-12825
4389-306	12825-12830
4389-307	12830-12835
4389-308	12835-12840
4389-309	12840-12845
4389-310	12845-12850
4389-311	12850-12855
4389-312	12855-12860
4389-313	12860-12865
4389-314	12865-12870
4389-315	12870-12875
4389-316	12875-12880
4389-317	12880-12885
4389-318	12885-12890
4389-319	12890-12895
4389-320	12895-12900
4389-321	12900-12905
4389-322	12905-12910
4389-323	12910-12915
4389-324	12915-12920
4389-325	12920-12925
4389-326	12925-12930
4389-327	12930-12935
4389-328	12935-12940
4389-329	12940-12945
4389-330	12945-12950
4389-331	12950-12955
4389-332	12955-12960
4389-333	12960-12965
4389-334	12965-12970
4389-335	12970-12975
4389-336	12975-12980
4389-337	12980-12985
4389-338	12985-12990
4389-339	12990-12995
4389-340	12995-13000
4389-341	13000-13005
4389-342	13005-13010

APPENDIX I

Sample Identification

GeoChem Sample Number	Depth (feet)
4389-343	13010-13015
4389-344	13015-13020
4389-345	13020-13025
4389-346	13025-13030
4389-347	13030-13035
4389-348	13035-13040
4389-349	13040-13045
4389-350	13045-13050
4389-351	13050-13055
4389-352	13055-13060
4389-353	13060-13065
4389-354	13065-13070
4389-355	13070-13075
4389-356	13075-13080
4389-357	13080-13085
4389-358	13085-13090
4389-359	13090-13095
4389-360	13095-13100
4389-361	13100-13105
4389-362	13105-13110
4389-363	13110-13115
4389-364	13115-13120
4389-365	13120-13125
4389-366	13125-13130
4389-367	13130-13135
4389-368	13135-13140
4389-369	13140-13145
4389-370	13145-13150
4389-371	13150-13155
4389-372	13155-13160
4389-373	13160-13165
4389-374	13165-13170
4389-375	13170-13175
4389-376	13175-13180
4389-377	13180-13185
4389-378	13185-13190
4389-379	13190-13195
4389-380	13195-13200

GeoChem Sample Number	Depth (feet)
4389-381	13200-13205
4389-382	13205-13210
4389-383	13210-13215
4389-384	13215-13220
4389-385	13220-13225
4389-386	13225-13230
4389-387	13230-13235
4389-388	13235-13240
4389-389	13240-13245
4389-390	13245-13250
4389-391	13250-13255
4389-392	13255-13260
4389-393	13260-13265
4389-394	13265-13270
4389-395	13270-13275
4389-396	13275-13280
4389-397	13280-13285
4389-398	13285-13290
4389-399	13290-13295
4389-400	13295-13300
4389-401	13300-13305
4389-402	13305-13310
4389-403	13310-13315
4389-404	13315-13320
4389-405	13320-13325
4389-406	13325-13330
4389-407	13330-13335
4389-408	13335-13340
4389-409	13340-13345
4389-410	13345-13350
4389-411	13350-13355
4389-412	13355-13360
4389-413	13360-13365
4389-414	13365-13370
4389-415	13370-13375
4389-416	13375-13380
4389-417	13380-13385
4389-418	13385-13390

GeoChem Sample Number	Depth (feet)
4389-419	13390-13395
4389-420	13395-13400
4389-421	13400-13405
4389-422	13405-13410
4389-423	13410-13415
4389-424	13415-13420
4389-425	13420-13425
4389-426	13425-13430
4389-427	13430-13435
4389-428	13435-13440
4389-429	13440-13445
4389-430	13445-13450
4389-431	13450-13455
4389-432	13455-13460
4389-433	13460-13465
4389-434	13465-13470
4389-435	13470-13475
4389-436	13475-13480
4389-437	13480-13485
4389-438	13485-13490
4389-439	13490-13495
4389-440	13495-13500
4389-441	13500-13505
4389-442	13505-13510
4389-443	13510-13515
4389-444	13515-13520
4389-445	13520-13525
4389-446	13525-13530
4389-447	13530-13535
4389-448	13535-13540
4389-449	13540-13545
4389-450	13545-13550
4389-451	13550-13555
4389-452	13555-13560
4389-453	13560-13565
4389-454	13565-13570
4389-455	13570-13575
4389-456	13575-13580

APPENDIX I

Sample Identification

GeoChem Sample Number	Depth (feet)
4389-457	13580-13585
4389-458	13585-13590
4389-459	13590-13595
4389-460	13595-13600
4389-461	13600-13605
4389-462	13605-13610
4389-463	13610-13615
4389-464	13615-13620
4389-465	13620-13625
4389-466	13625-13630
4389-467	13630-13635
4389-468	13635-13640
4389-469	13640-13645
4389-470	13645-13650
4389-471	13650-13655
4389-472	13655-13660
4389-473	13660-13665
4389-474	13665-13670
4389-475	13670-13675
4389-476	13675-13680
4389-477	13680-13685
4389-478	13685-13690
4389-479	13690-13695
4389-480	13695-13700
4389-481	13700-13705
4389-482	13705-13710
4389-483	13710-13715
4389-484	13715-13720
4389-485	13720-13725
4389-486	13725-13730
4389-487	13730-13735
4389-488	13735-13740
4389-489	13740-13745
4389-490	13745-13750
4389-491	13750-13755
4389-492	13755-13760
4389-493	13760-13765
4389-494	13765-13770

GeoChem Sample Number	Depth (feet)
4389-495	13770-13775
4389-496	13775-13780
4389-497	13780-13785
4389-498	13785-13790
4389-499	13790-13795
4389-500	13795-13800
4389-501	13800-13805
4389-502	13805-13810
4389-503	13810-13815
4389-504	13815-13820
4389-505	13820-13825
4389-506	13825-13830
4389-507	13830-13835
4389-508	13835-13840
4389-509	13840-13845
4389-510	13845-13850
4389-511	13850-13855
4389-512	13855-13860
4389-513	13860-13865
4389-514	13865-13870
4389-515	13870-13875
4389-516	13875-13880
4389-517	13880-13885
4389-518	13885-13890
4389-519	13890-13895
4389-520	13895-13900
4389-521	13900-13905
4389-522	13905-13910
4389-523	13910-13915
4389-524	13915-13920
4389-525	13920-13925
4389-526	13925-13930
4389-527	13930-13935
4389-528	13935-13940
4389-529	13940-13945
4389-530	13945-13950
4389-531	13950-13955
4389-532	13955-13960

GeoChem Sample Number	Depth (feet)
4389-533	13960-13965
4389-534	13965-13970
4389-535	13970-13975
4389-536	13975-13980
4389-537	13980-13985
4389-538	13985-13990
4389-539	13990-13995
4389-540	13995-14000
4389-541	14000-14005
4389-542	14005-14010
4389-543	14010-14015
4389-544	14015-14020
4389-545	14020-14025
4389-546	14025-14030
4389-547	14030-14035
4389-548	14035-14040
4389-549	14040-14045
4389-550	14045-14050
4389-551	14050-14055
4389-552	14055-14060
4389-553	14060-14065
4389-554	14065-14070
4389-555	14070-14075
4389-556	14075-14080
4389-557	14080-14085
4389-558	14085-14090
4389-559	14090-14095
4389-560	14095-14100
4389-561	14100-14105
4389-562	14105-14110
4389-563	14110-14115
4389-564	14115-14120
4389-565	14120-14125
4389-566	14125-14130
4389-567	14130-14135
4389-568	14135-14140
4389-569	14140-14145
4389-570	14145-14150

APPENDIX I

Sample Identification

GeoChem Sample Number	Depth (feet)
4389-571	14150-14155
4389-572	14155-14160
4389-573	14160-14165
4389-574	14165-14170
4389-575	14170-14175
4389-576	14175-14180
4389-577	14180-14185
4389-578	14185-14190
4389-579	14190-14195
4389-580	14195-14200
4389-581	14200-14205
4389-582	14205-14210
4389-583	14210-14215
4389-584	14215-14220
4389-585	14220-14225
4389-586	14225-14230
4389-587	14230-14235
4389-588	14235-14240
4389-589	14240-14245
4389-590	14245-14250
4389-591	14250-14255
4389-592	14255-14260
4389-593	14260-14265
4389-594	14265-14270
4389-595	14270-14275
4389-596	14275-14280
4389-597	14280-14285
4389-598	14285-14290
4389-599	14290-14295
4389-600	14295-14300
4389-601	14300-14305
4389-602	14305-14310
4389-603	14310-14315
4389-604	14315-14320
4389-605	14320-14325
4389-606	14325-14330
4389-607	14330-14335
4389-608	14335-14340

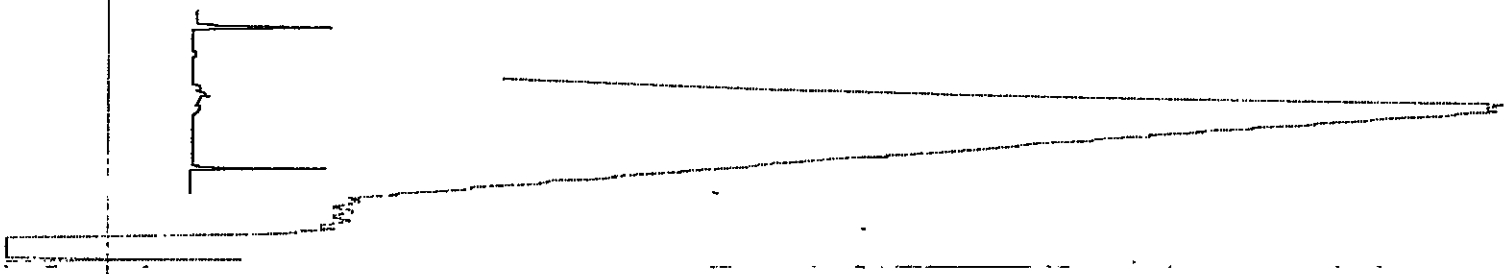
GeoChem Sample Number	Depth (feet)
4389-609	14340-14345
4389-610	14345-14350
4389-611	14350-14355
4389-612	14355-14360
4389-613	14360-14365
4389-614	14365-14370
4389-615	14370-14375
4389-616	14375-14380
4389-617	14380-14385
4389-618	14385-14390
4389-619	14390-14395
4389-620	14395-14400
4389-621	14400-14405
4389-622	14405-14410
4389-623	14410-14415
4389-624	14415-14420

GeoChem Sample Number	Depth (feet)

APPENDIX II
ROCK-EVAL PYROGRAMS
(Picked Control Samples)

[redacted] INIT [redacted] TEMP [redacted] - [redacted] 250 [redacted] [redacted] ISO [redacted] TIME [redacted] = 5 [redacted] TEMP [redacted] GRADIENT [redacted] =25 [redacted] [redacted] TRAP [redacted] STOP [redacted] T [redacted] =390 [redacted]

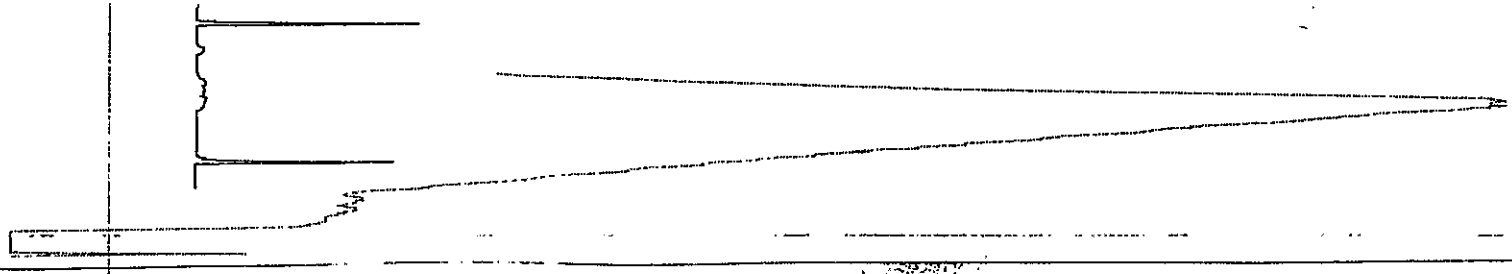
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-051A	98.4	370	0.11	0.24	0.28	0.32	0.85	0.02	1.30	18	22



DATE: 17-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

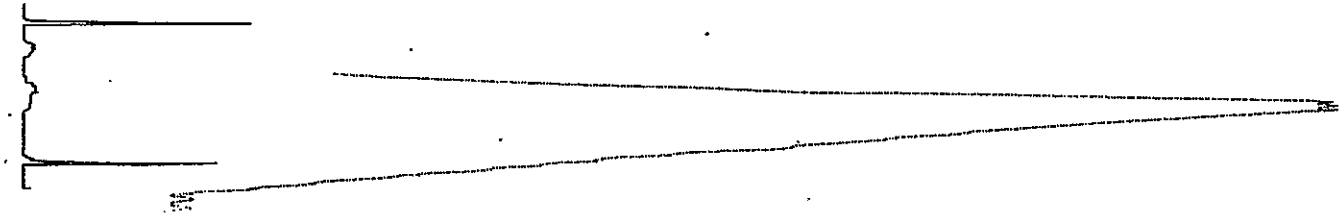
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-001B	94.1	360	0.23	0.31	0.36	0.43	0.86	0.04	0.47	67	77



DATE: 15-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-001A	93.9	396	0.21	0.35	0.43	0.37	0.81	0.04	0.99	35	43



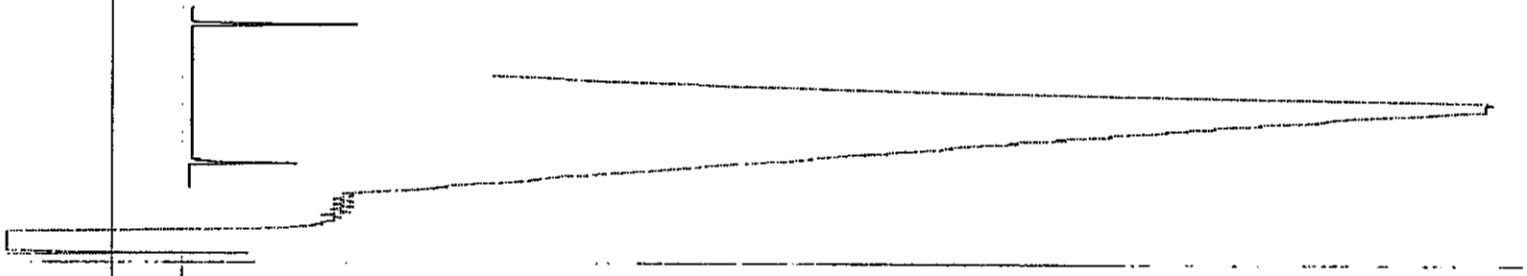
[redacted] INI[redacted] EM[redacted] [redacted]50 [redacted] [redacted]50 [redacted]ME [redacted]5 [redacted] TE[redacted] GR[redacted] EN[redacted]25 [redacted] [redacted] TRA[redacted] ST[redacted]T [redacted]39[redacted]

:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I	:
4389-177B	94.1	263:	0.08:	0.00:	0.26:	1.00:	0.00:	0.00:	0.08	0	326	

DATE: 17-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

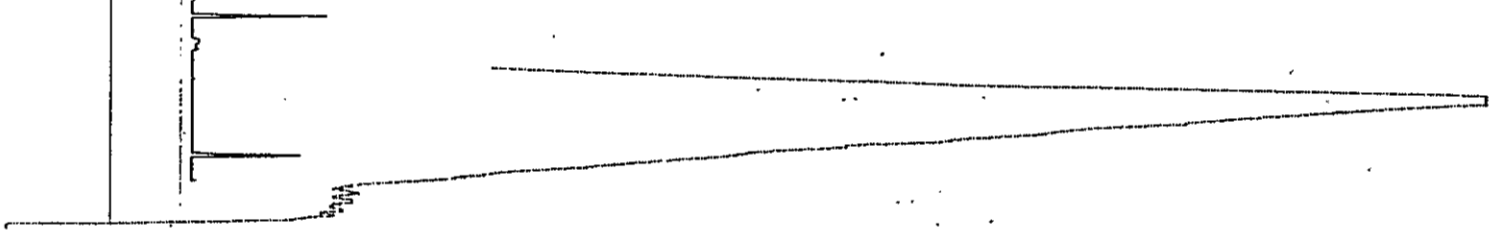
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I	:
4389-177A	92.8	263:	0.12:	0.00:	0.17:	1.00:	0.00:	0.01:	0.31	0	54	



DATE: 17-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

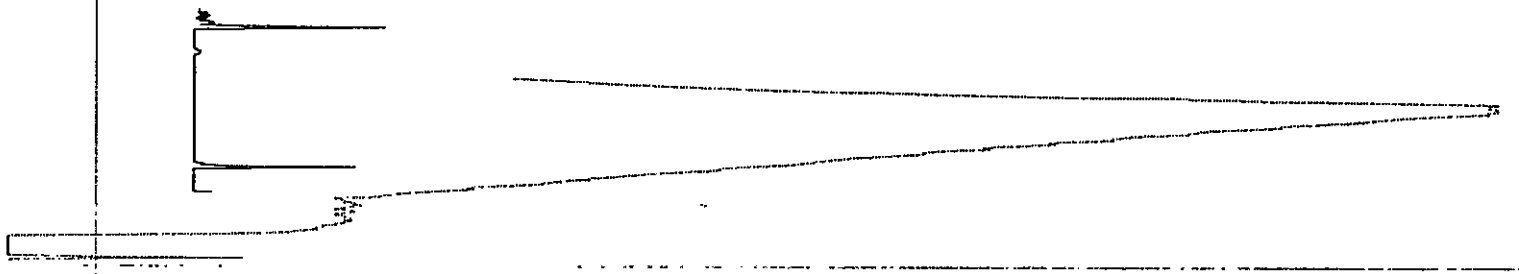
INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I	:
4389-051B	94.4	401:	0.10:	0.09:	0.07:	0.56:	1.28:	0.01:	0.16	56	44	



[redacted]IN[redacted]TE[redacted] - [redacted]35[redacted] [redacted]IS[redacted]IM[redacted] 5[redacted] T[redacted] G[redacted]IE[redacted]25[redacted] [redacted]TA[redacted] ST[redacted] T[redacted] 3[redacted]

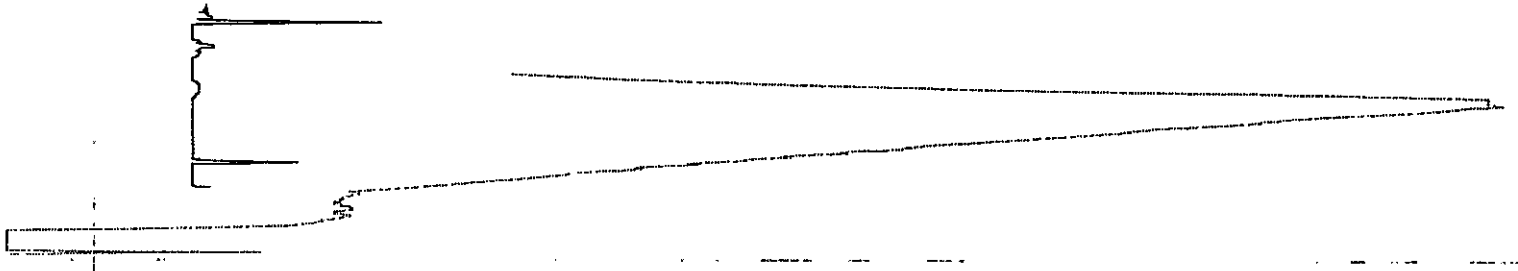
	DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-272A		99.7	397	0.18	0.08	0.48	0.69	0.16	0.02	0.84	10	57



DATE: 17-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

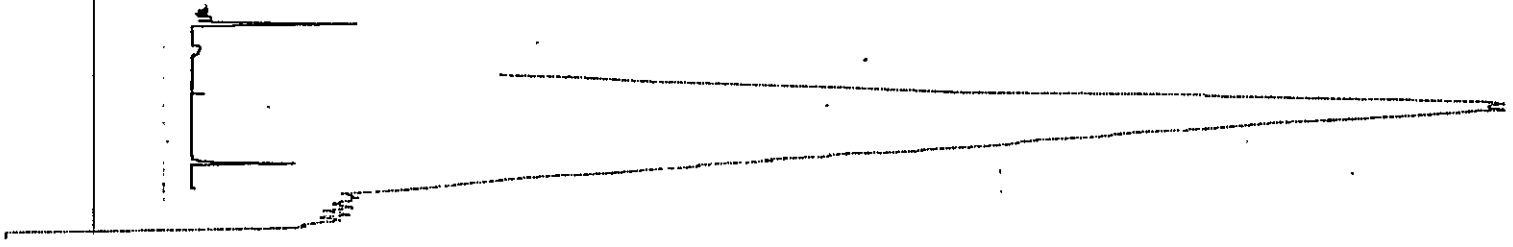
	DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-228B		93.8	512	0.11	0.26	0.58	0.31	0.44	0.03	0.24	106	237



DATE: 17-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

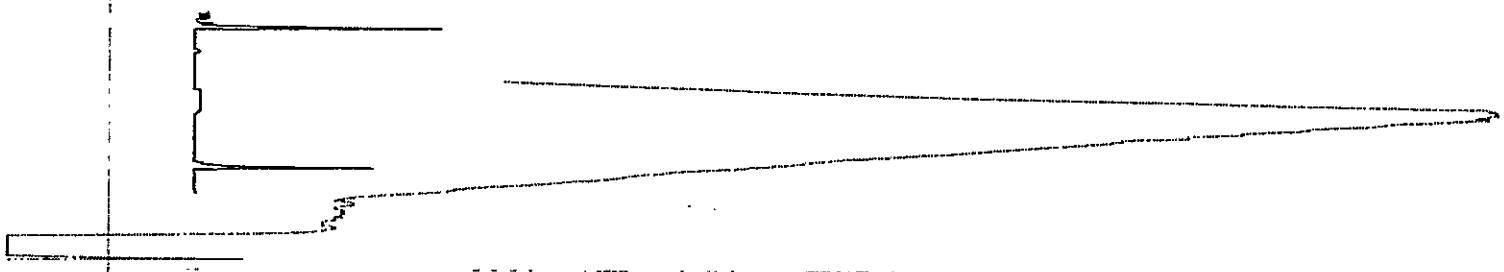
INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

	DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-228A		97.7	345	0.10	0.08	0.50	0.56	0.16	0.01	0.31	26	161



[redacted]IN[redacted]TE[redacted]- [redacted]250[redacted] [redacted]ISO[redacted]ME[redacted]5[redacted] TI[redacted] G[redacted]IE[redacted]25[redacted] [redacted]TR[redacted]ST[redacted]T [redacted]39[redacted]

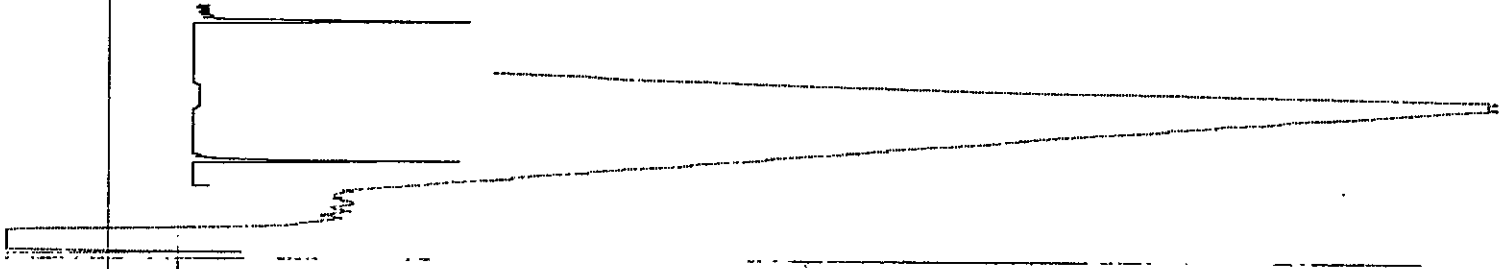
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-327B	98.1	257	0.20	0.19	0.59	0.53	0.32	0.03	0.27	70	218



DATE: 17-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

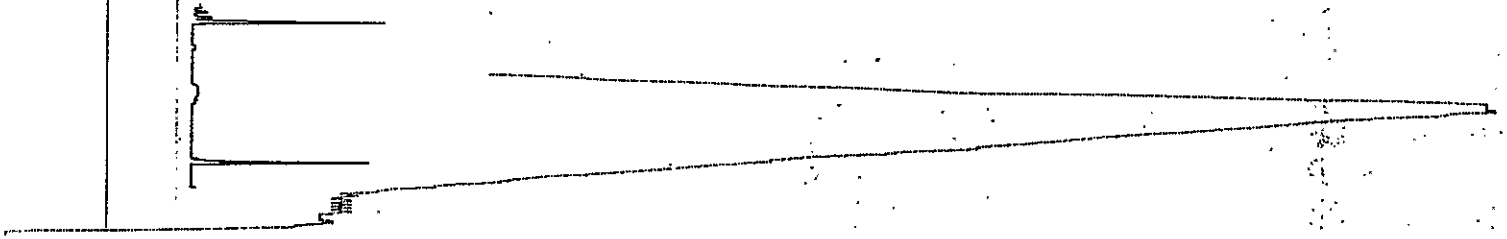
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-327A	99.9	266	0.29	0.18	0.75	0.63	0.24	0.03	0.77	23	97



DATE: 17-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

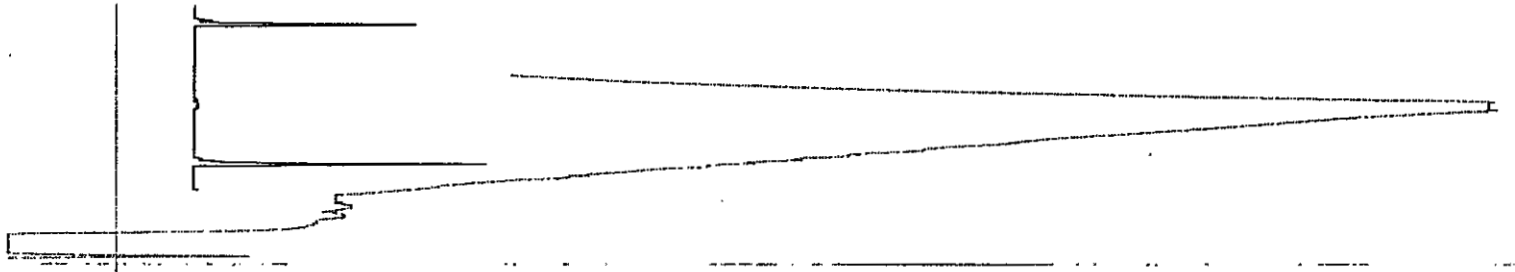
INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-272B	95.8	323	0.17	0.16	0.43	0.53	0.37	0.02	0.39	41	109



[redacted]

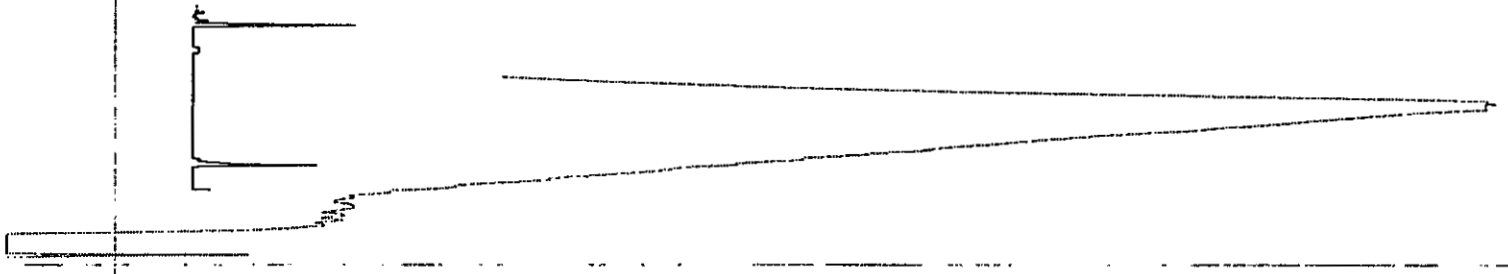
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-360C	98.9:	236:	0.31:	0.05:	0.36:	0.86:	0.13:	0.03:	0.19	26	187



DATE: 17-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

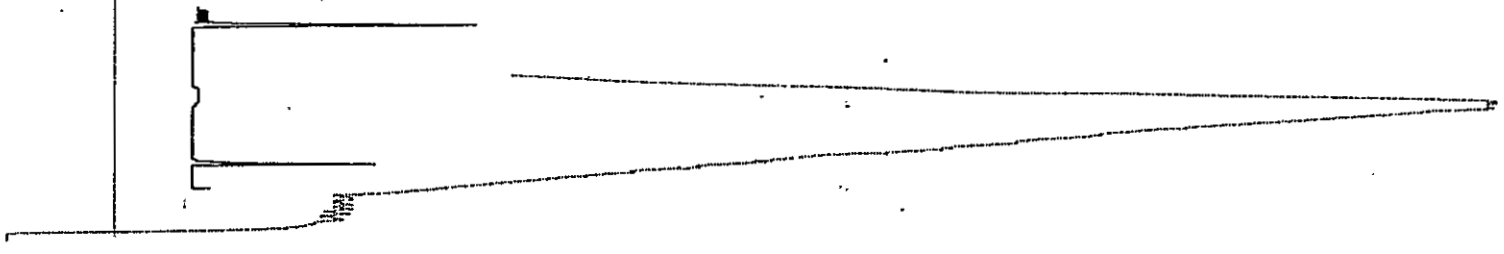
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-360B	99.7:	312:	0.16:	0.05:	0.29:	0.80:	0.17:	0.01:	0.19	26	154



DATE: 17-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

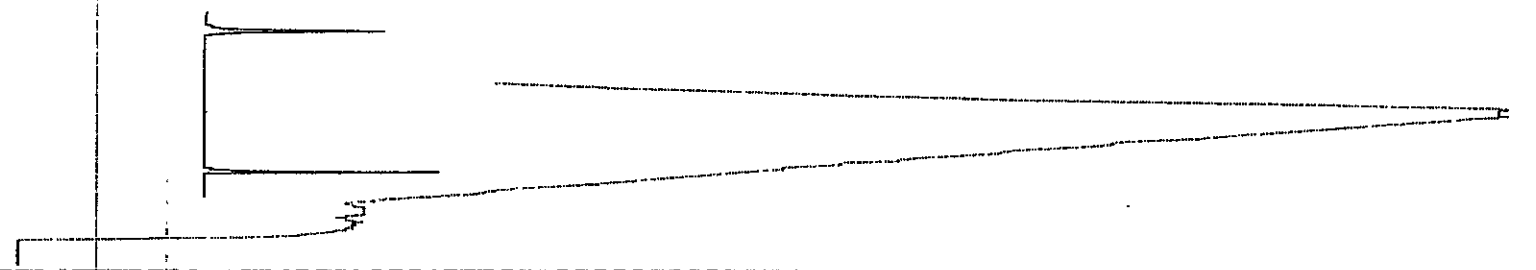
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-360A	94.4:	260:	0.16:	0.13:	0.77:	0.57:	0.16:	0.02:	0.63	21	123



DATE: 17-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

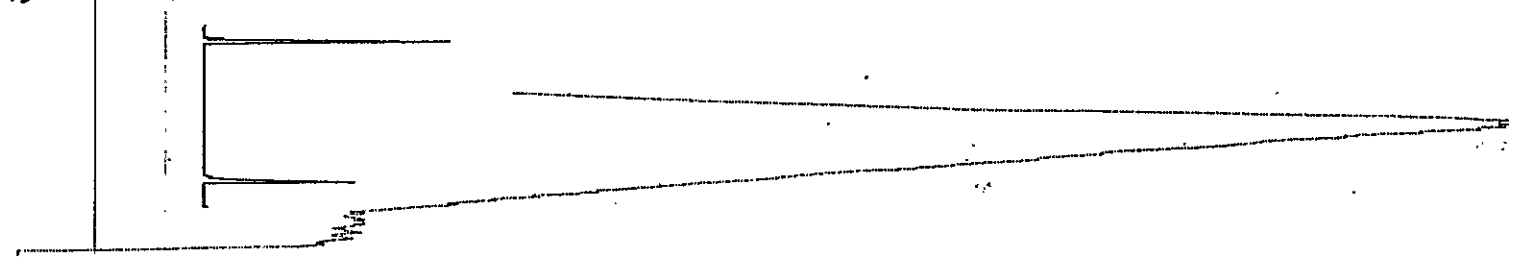
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-506B	99.6	224	0.18	0.00	0.38	1.00	0.00	0.01	0.41	0	93



DATE: 17-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

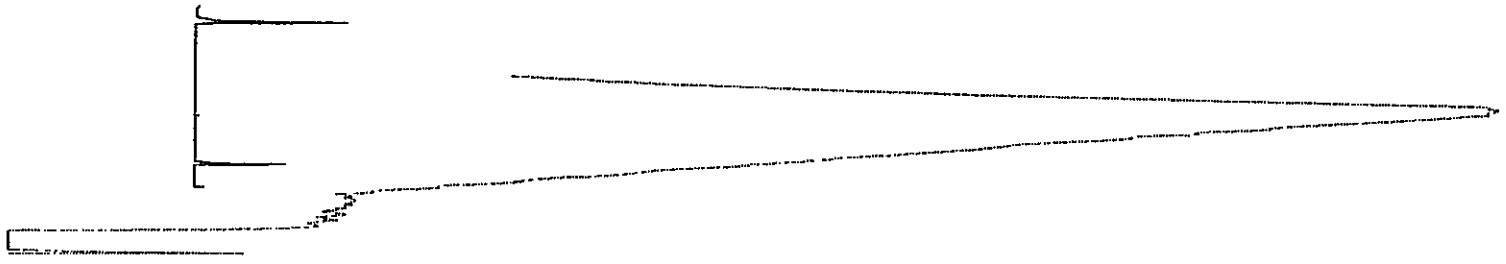
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-506A	94.8	227	0.20	0.02	0.45	0.91	0.04	0.01	0.86	2	52



APPENDIX III
ROCK-EVAL PYROGRAMS
(Total Data Base)

[redacted]

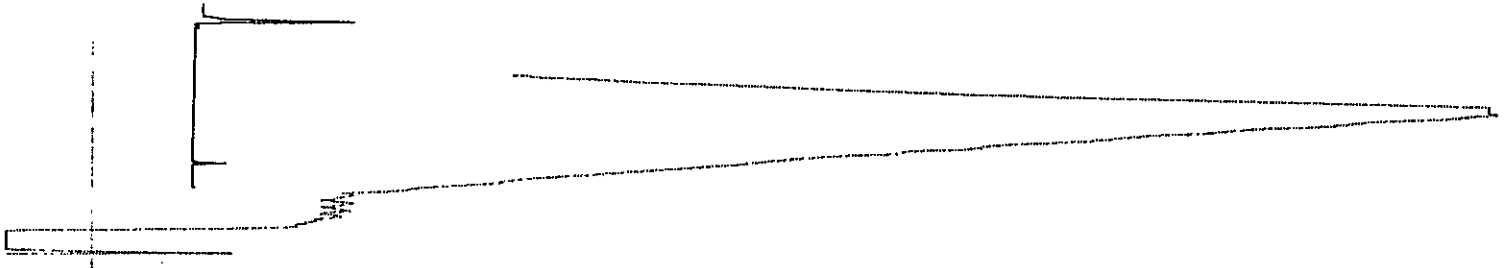
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-021:	97.7:	260:	0.05:	0.00:	0.21:	1.00:	0.00:	0.00:	0.20	0	104



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

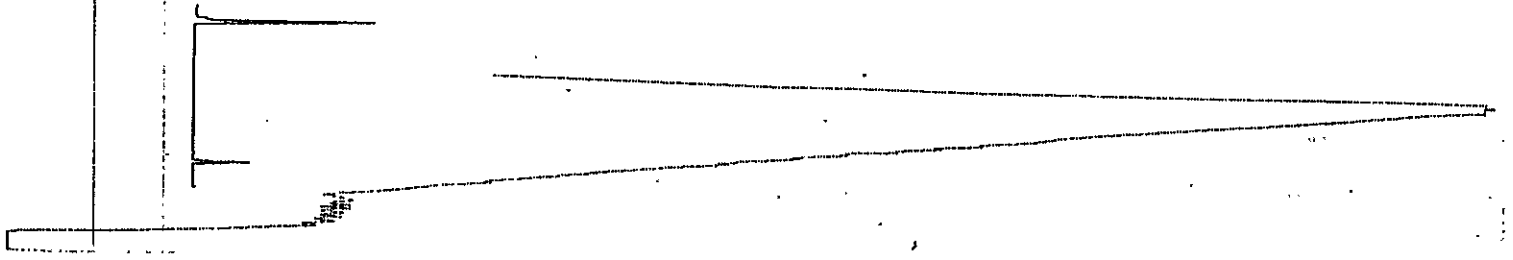
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-011:	96.3:	219:	0.02:	0.00:	0.40:	1.00:	0.00:	0.00:	0.18	0	218



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

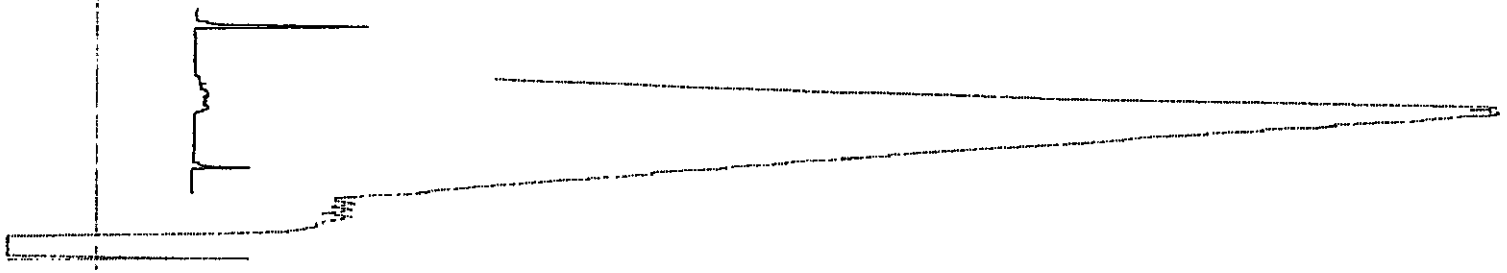
INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-001:	94.3:	260:	0.04:	0.00:	0.34:	1.00:	0.00:	0.00:	0.38	0	89



[redacted]

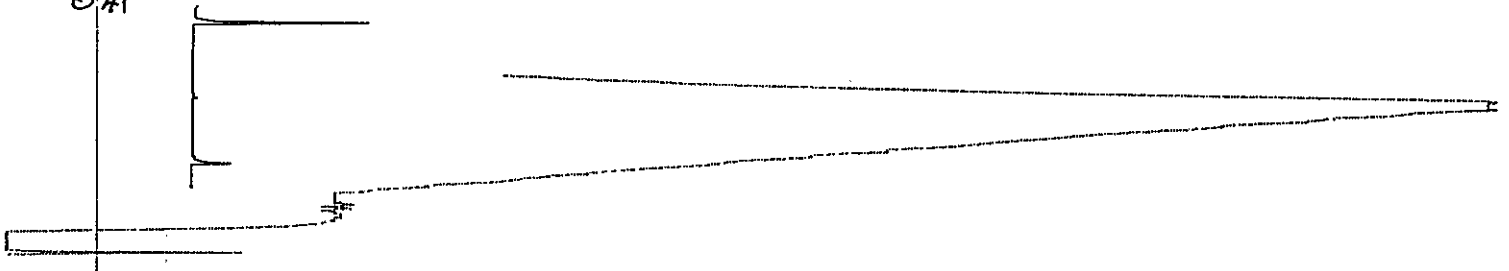
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-051:	95.X:	292:	0.13:	0.38:	0.28:	0.26:	1.35:	0.04:	0.21	: 181	: 133



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

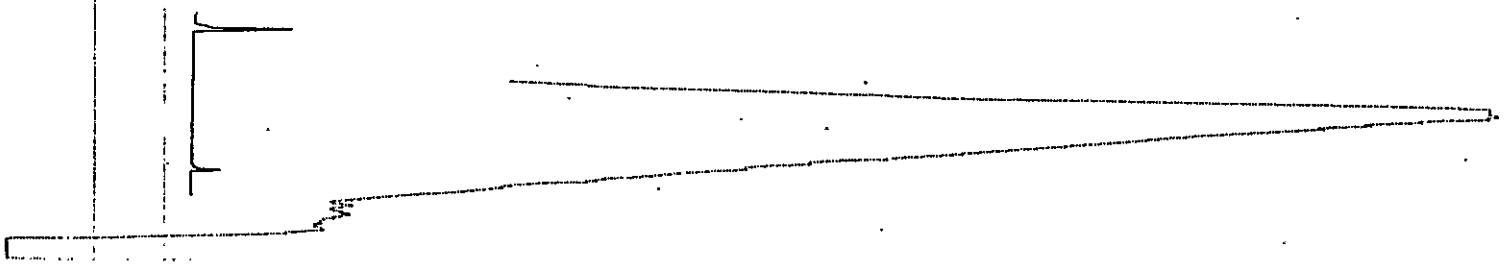
:DEPTH:	QTV	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-042/041:	97.4:	266:	0.05:	0.09:	0.28:	0.36:	0.32:	0.01:	0.35	: 26	: 80



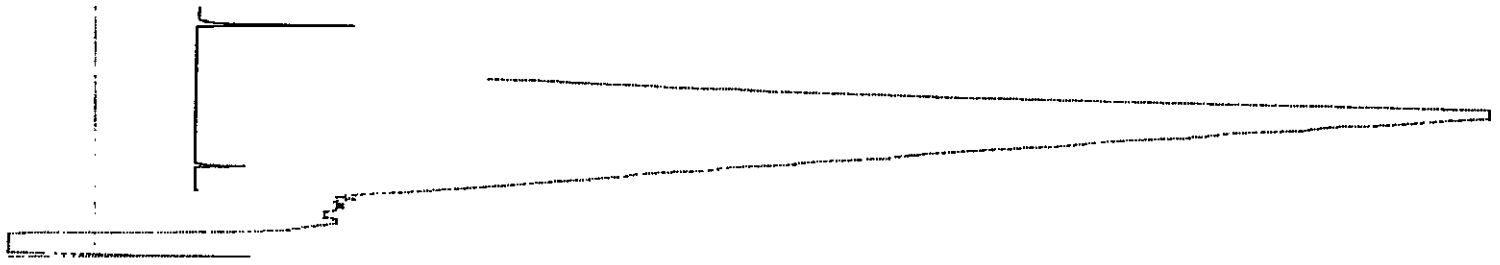
DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

:DEPTH:	QTV	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-031:	95.9:	260:	0.03:	0.05:	0.09:	0.37:	0.55:	0.00:	0.20	: 25	: 44



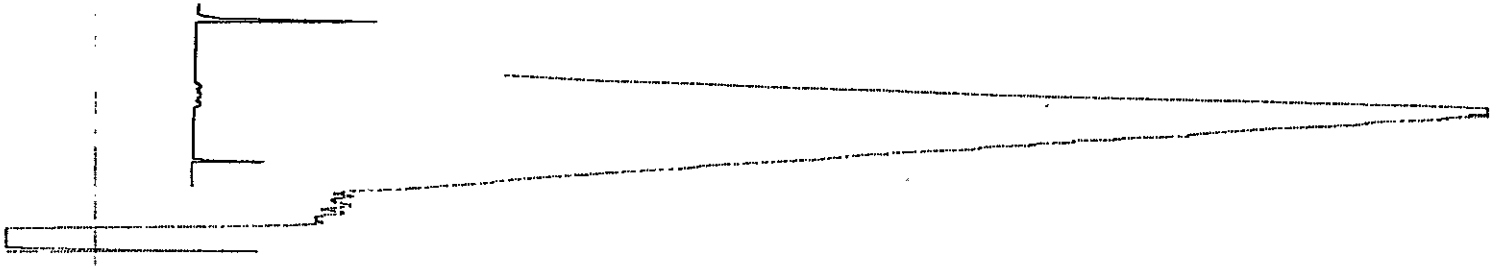
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-081	97.2	200	0.04	0.01	0.26	1.00	0.03	0.00	0.20	5	132



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

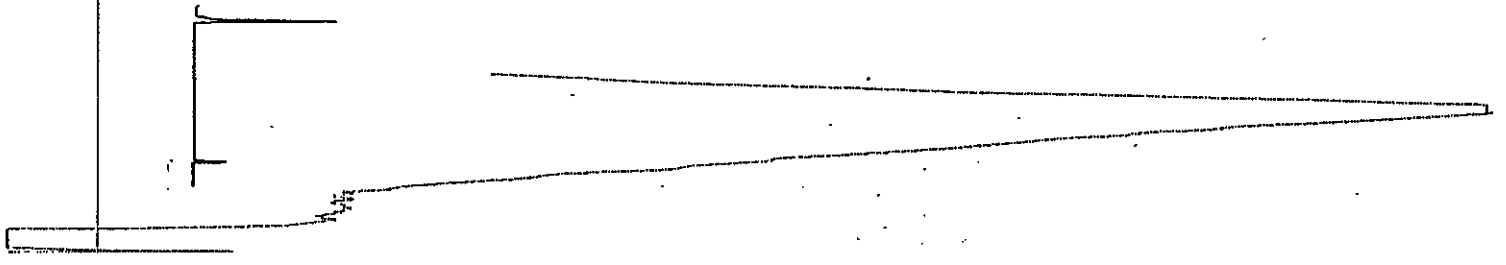
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-073	95.X	267	0.05	0.14	0.32	0.28	0.43	0.01	0.21	71	163



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

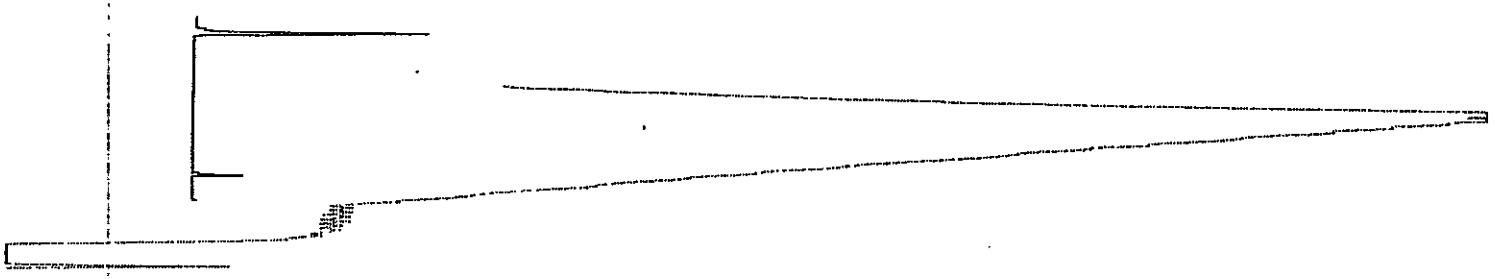
INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-061	97.9	236	0.02	0.00	0.19	1.00	0.00	0.00	0.19	0	100



[redacted]

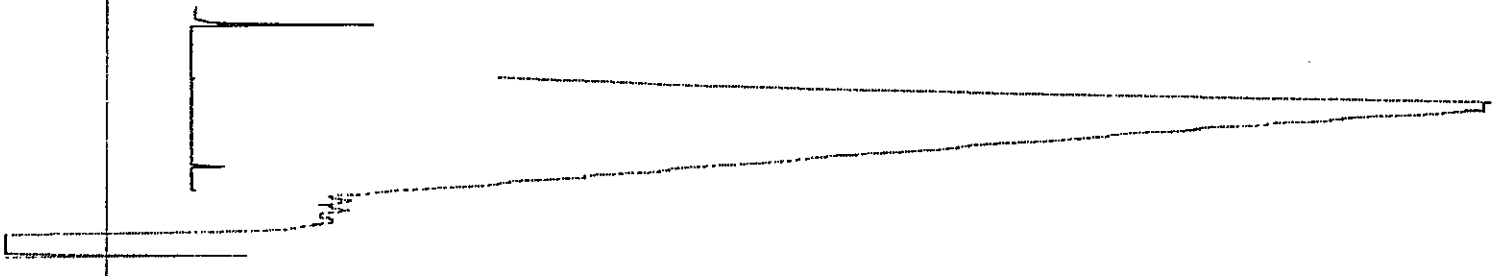
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389 108	95.8	264	0.04	0.00	0.49	1.00	0.00	0.00	0.28	0	173



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

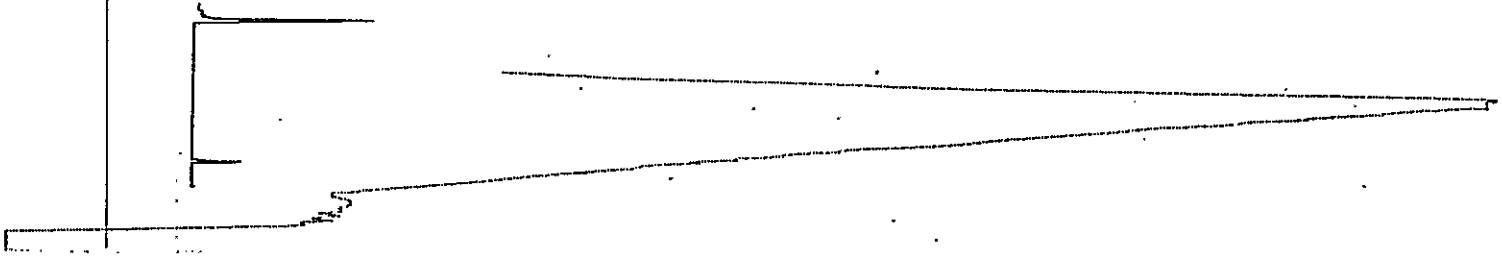
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-0 96	97.8	266	0.02	0.00	0.33	1.00	0.00	0.00	0.18	0	183



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

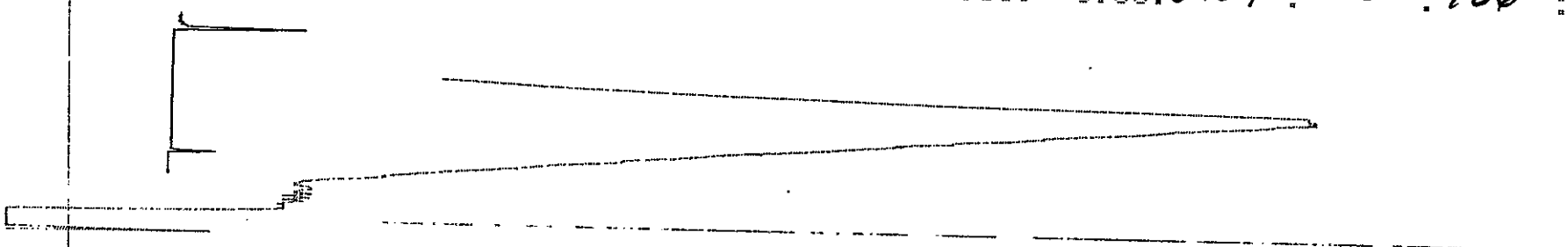
INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-0 90	98.5	210	0.03	0.00	0.40	1.00	0.00	0.00	0.18	0	225



[redacted] TEMP [redacted] DI[redacted]=2[redacted] [redacted] [redacted] [redacted]

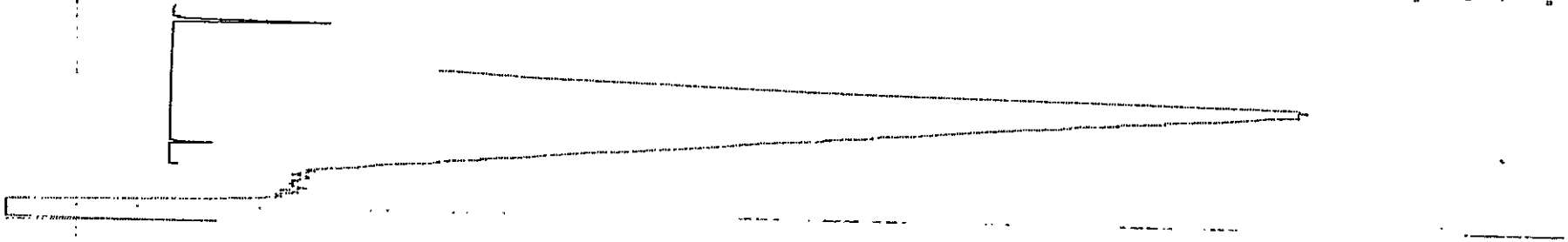
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389	131	94.6	646	0.06	0.05	0.36	0.60	0.13	0.00	0.34	15	106



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

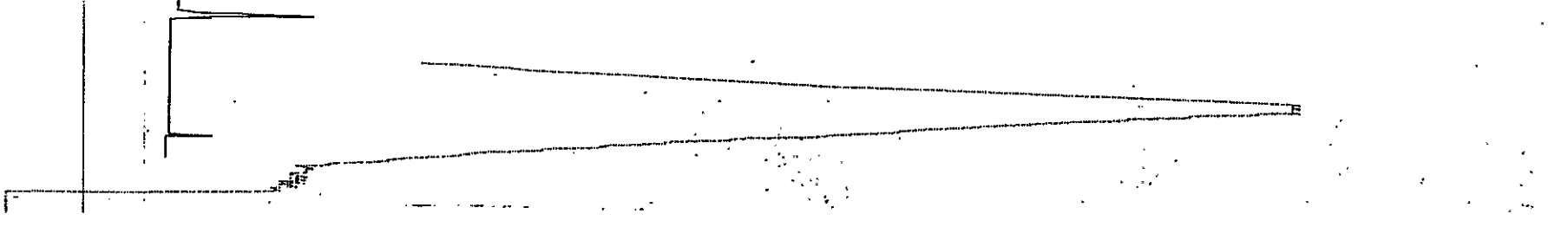
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389	121	96.2	206	0.04	0.01	0.24	1.00	0.04	0.00	0.43	2	56



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

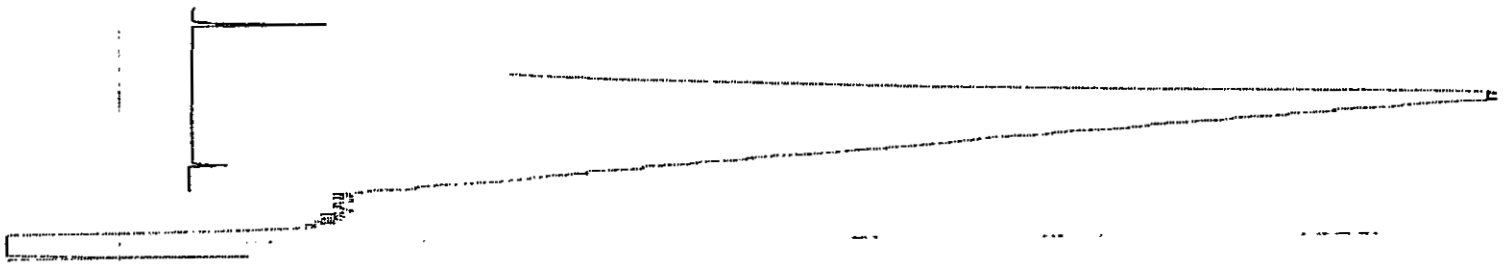
INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389	113	97.7	349	0.04	0.01	0.65	1.00	0.01	0.00	0.19	5	342



[redacted]

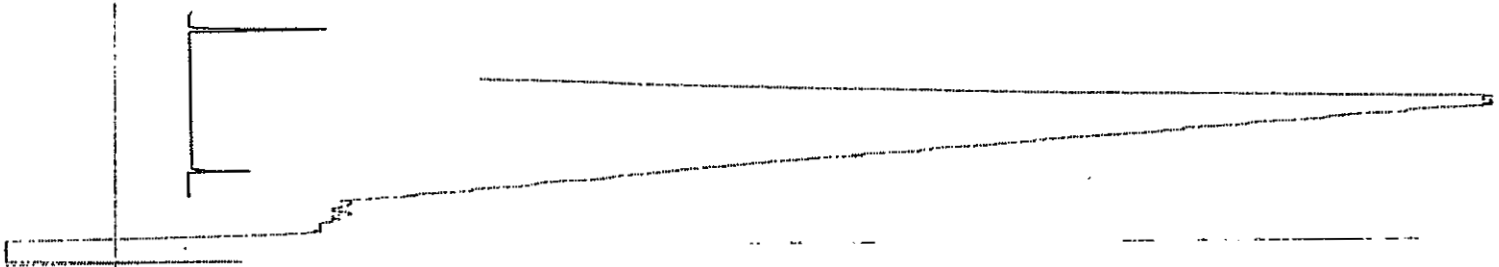
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389- 162:	97.3:	446:	0.03:	0.00:	0.09:	1.00:	0.00:	0.00:	0.17	0	52



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

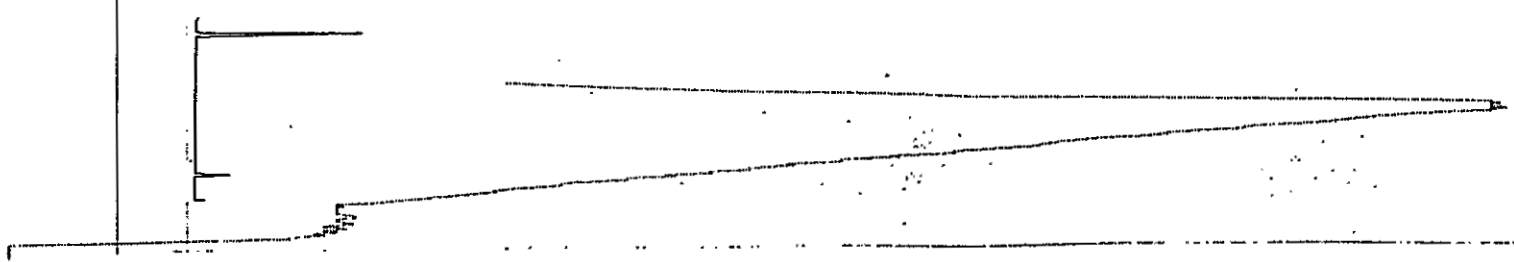
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-151:	95.2:	446:	0.05:	0.02:	0.11:	0.83:	0.18:	0.00:	0.23	9	48



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

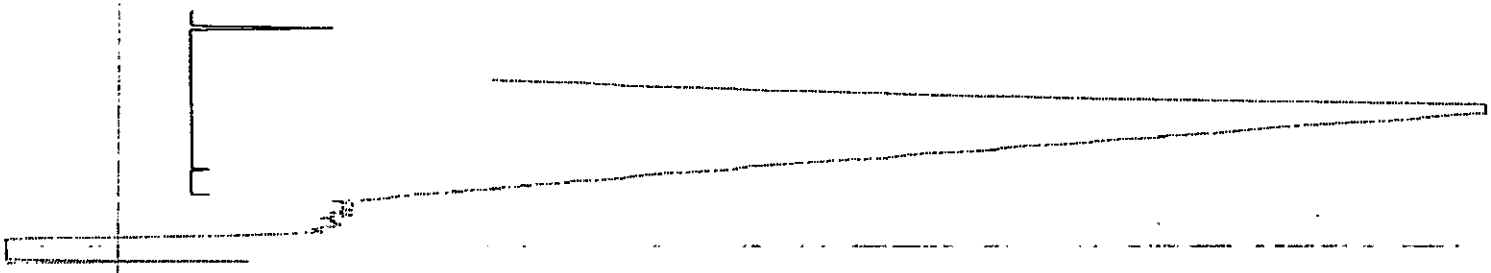
INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-141:	98.7:	446:	0.03:	0.03:	0.19:	0.50:	0.15:	0.00:	0.68	4	28



[redacted]

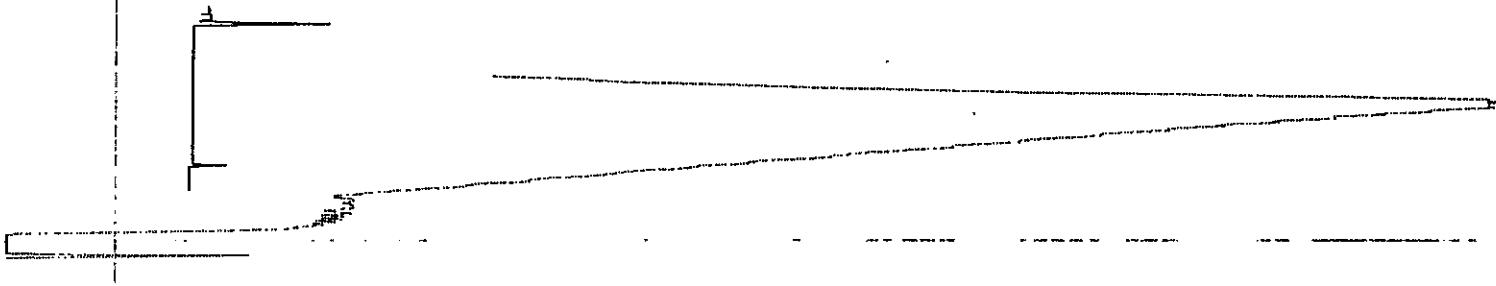
:DEPTH:	QTV	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-191:	96.7:	616:	0.01:	0.01:	0.14:	0.50:	0.07:	0.00:	0.23	: 4	: 60



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

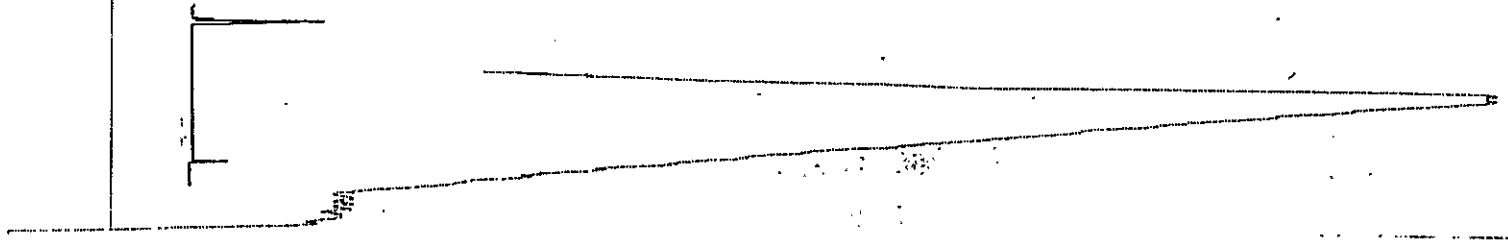
:DEPTH:	QTV	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-184:	93.6:	616:	0.02:	0.01:	0.49:	1.00:	0.02:	0.00:	0.22	: 5	: 223



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

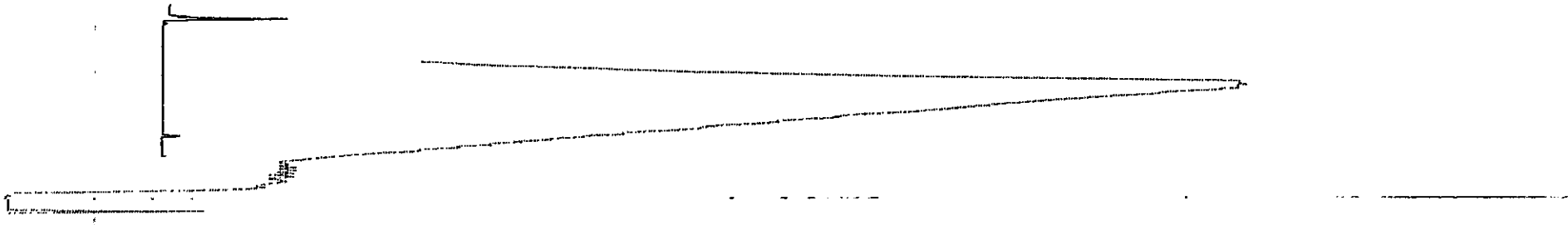
INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

:DEPTH:	QTV	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-177:	92.9:	616:	0.02:	0.01:	0.15:	1.00:	0.06:	0.00:	0.29	: 3	: 51



[redacted] TEMP = 350 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

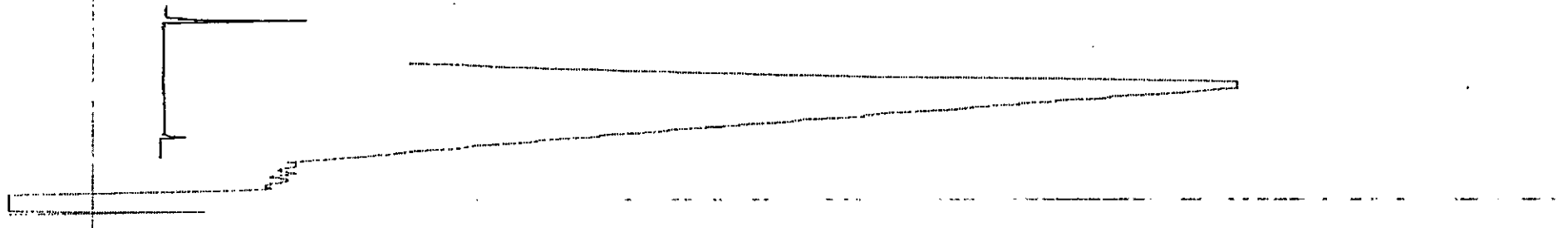
	DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-	228	95.2	646	0.02	0.00	0.39	1.00	0.00	0.00	0.16	0	240



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 350 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

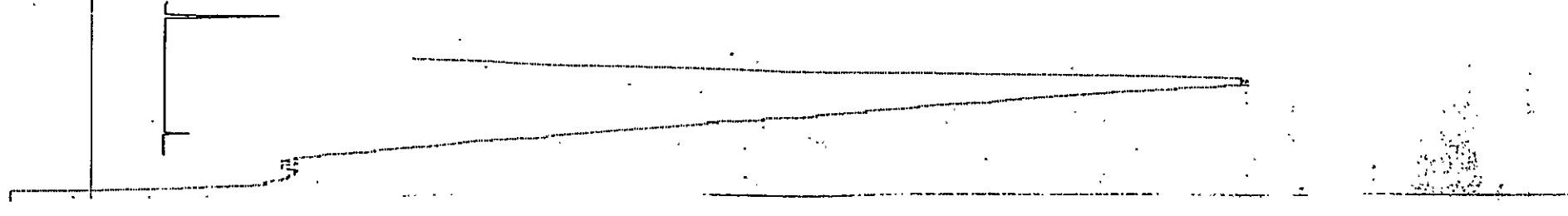
	DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-	217	94.5	646	0.14	0.31	0.40	0.32	0.77	0.03	0.22	139	180



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

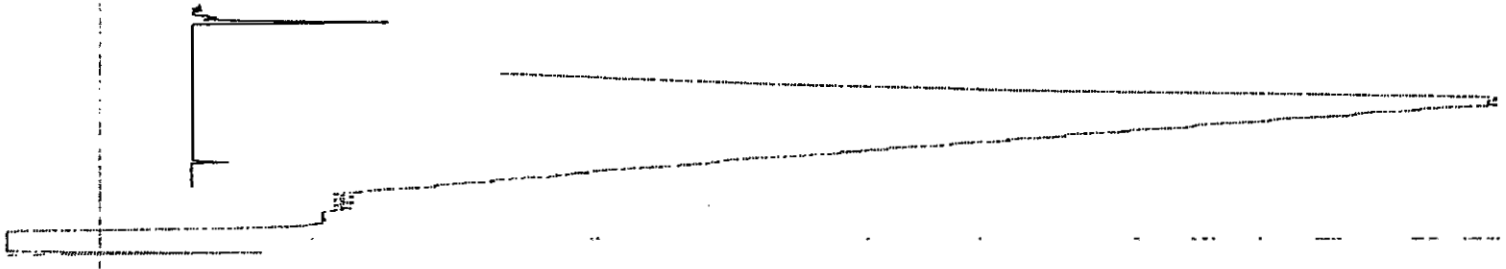
INIT TEMP = 350 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

	DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-	202	98.3	646	0.02	0.00	0.11	1.00	0.00	0.00	0.22	0	49



[redacted]IN[redacted]TE[redacted]= [redacted]250[redacted] [redacted]SO[redacted]ME[redacted]5 [redacted]TE[redacted]GR[redacted]IE[redacted]25[redacted] [redacted]TR[redacted]ST[redacted]T [redacted]39[redacted]

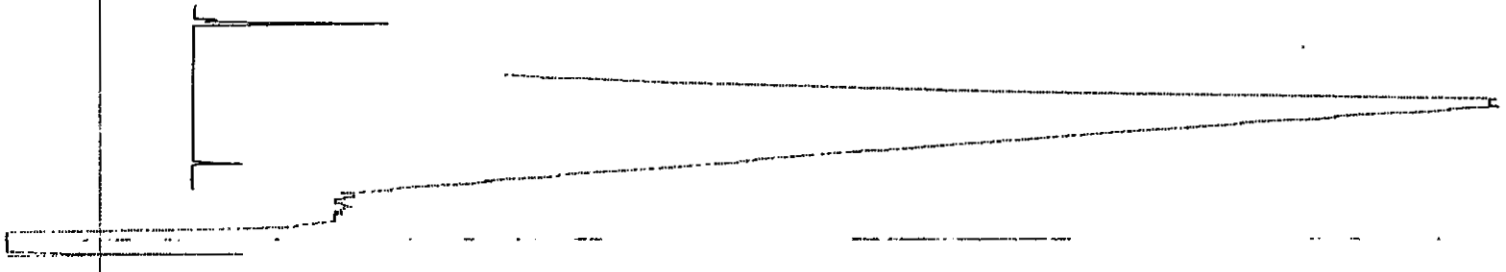
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-254	94.7	646	0.03	0.01	0.47	0.75	0.02	0.00	0.65	2	72



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

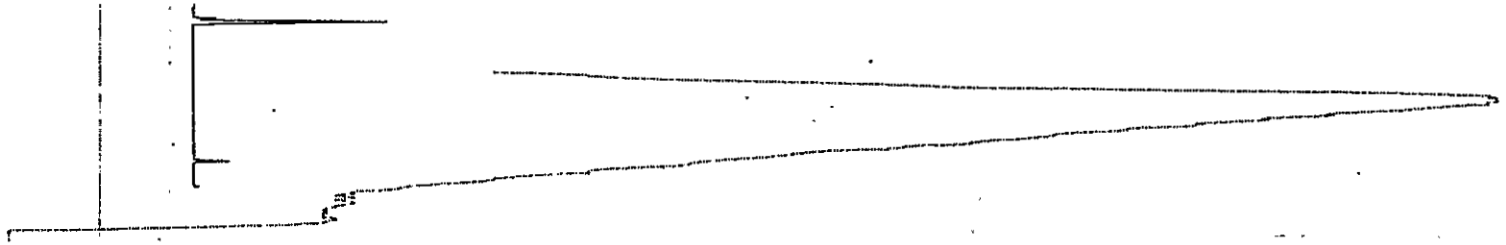
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-248	98.1	646	0.04	0.01	0.34	1.00	0.02	0.00	0.16	6	213



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

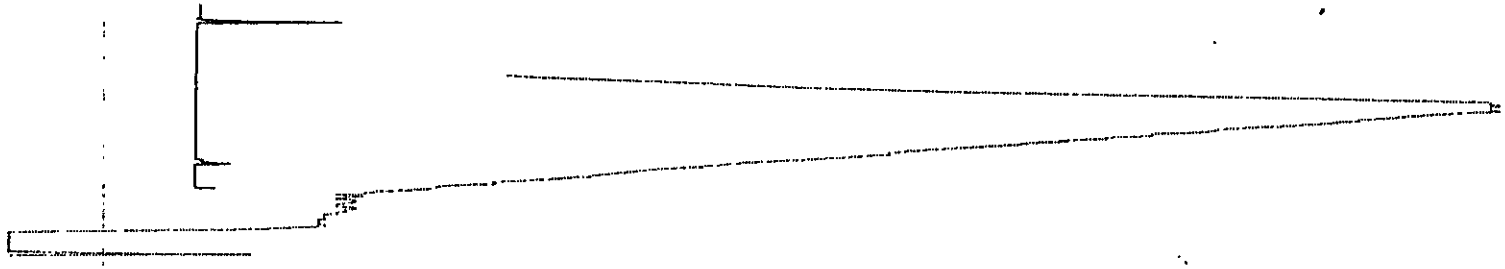
INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-230	98.8	646	0.03	0.00	0.37	1.00	0.00	0.00	0.16	0	238



[redacted]

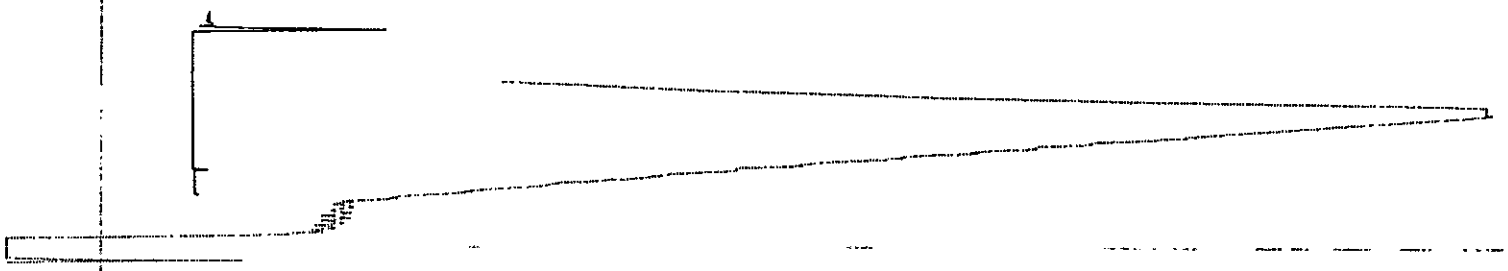
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-005€	97.3:	646:	0.04:	0.00:	0.17:	1.00:	0.00:	0.00:	0.63	0	27



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

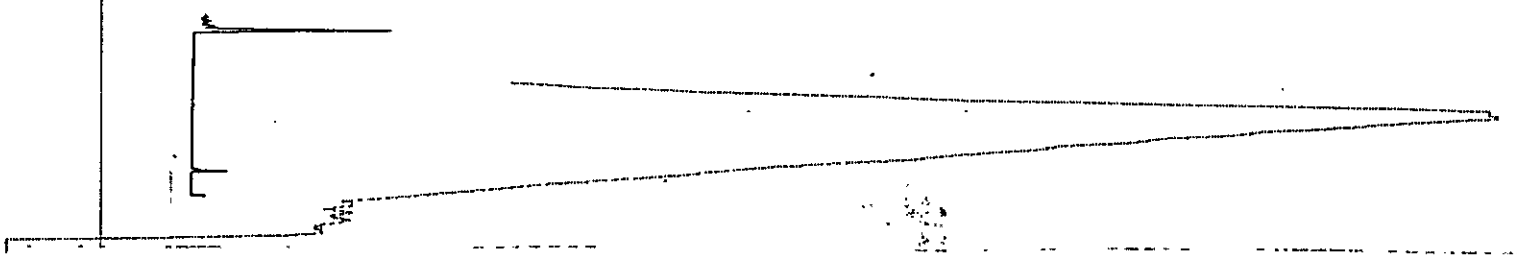
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-272:	98.8:	646:	0.01:	0.03:	0.63:	0.25:	0.04:	0.00:	0.34	9	184



DATE: 20-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

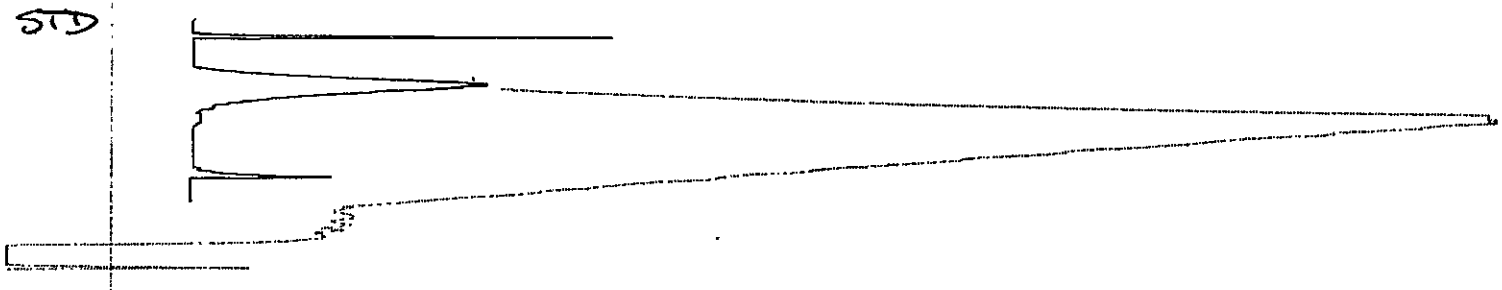
INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-261:	98.7:	646:	0.03:	0.02:	0.52:	0.75:	0.03:	0.00:	0.24	8	213



DEPTH	ØTV	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
1111	100.0	430	0.24	2.81	0.83	0.08	3.38	0.25	2.89	97	28

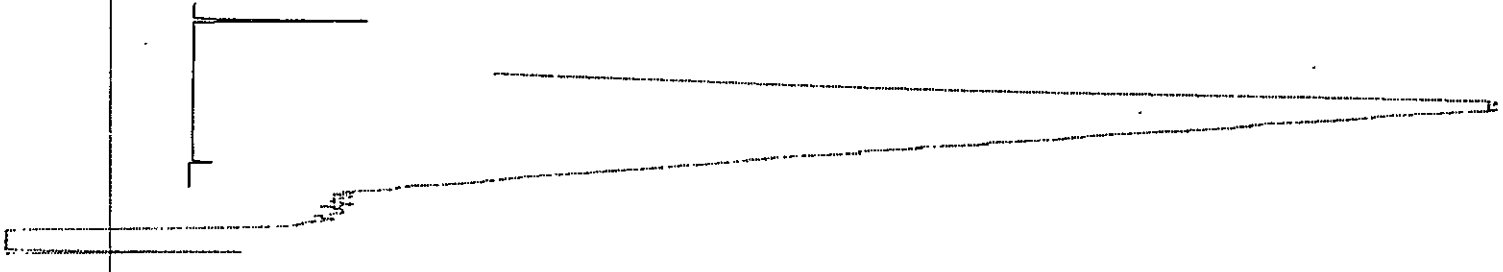
STD



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

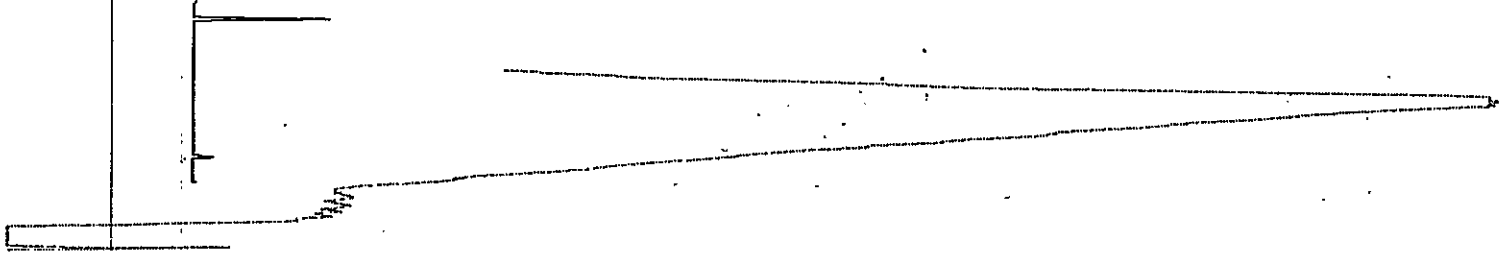
DEPTH	ØTV	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-295	99.0	646	0.02	0.01	0.20	1.00	0.05	0.00	0.29	3	69



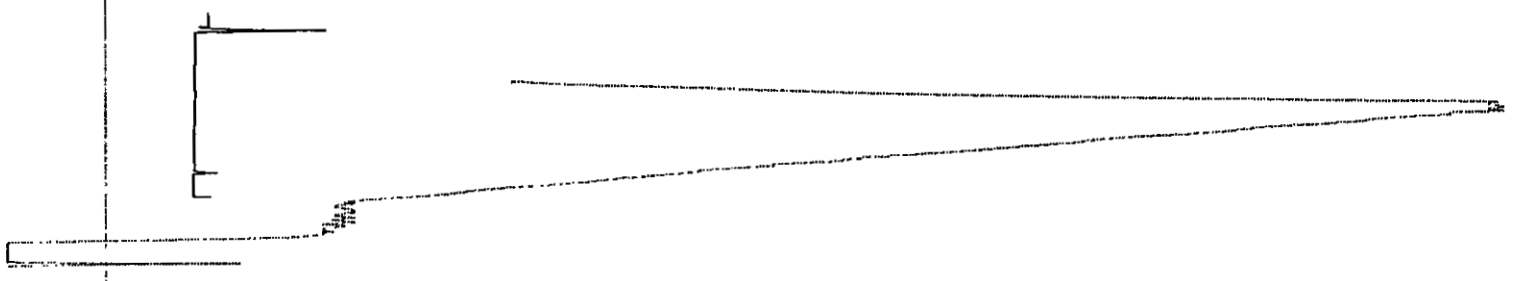
DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	ØTV	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-007C	95.7	646	0.02	0.01	0.07	1.00	0.14	0.00	1.15	1	6



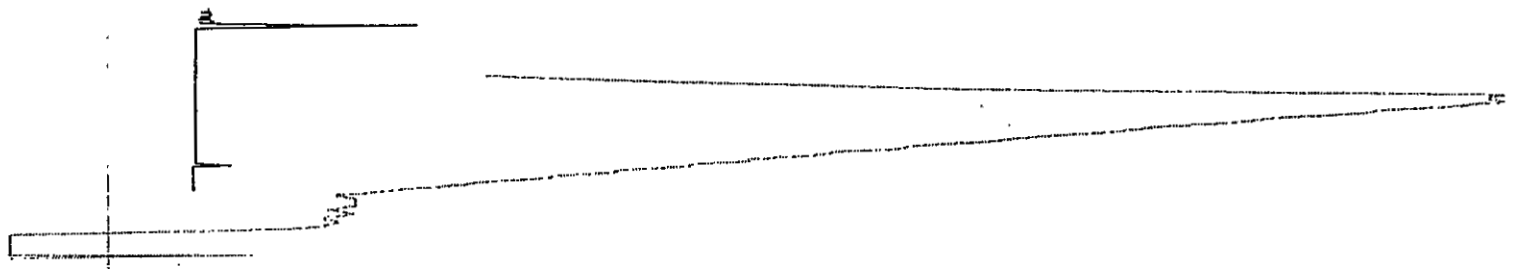
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-0[illegible]0C	96.4	266	0.05	0.13	0.39	0.28	0.33	0.01	0.28	46	137



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

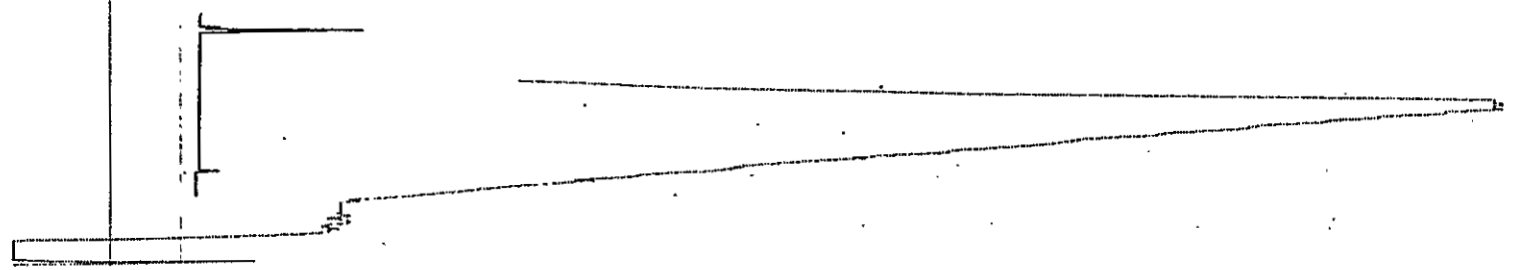
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-310	98.[illegible]	374	0.03	0.02	0.61	0.75	0.03	0.00	0.40	5	154



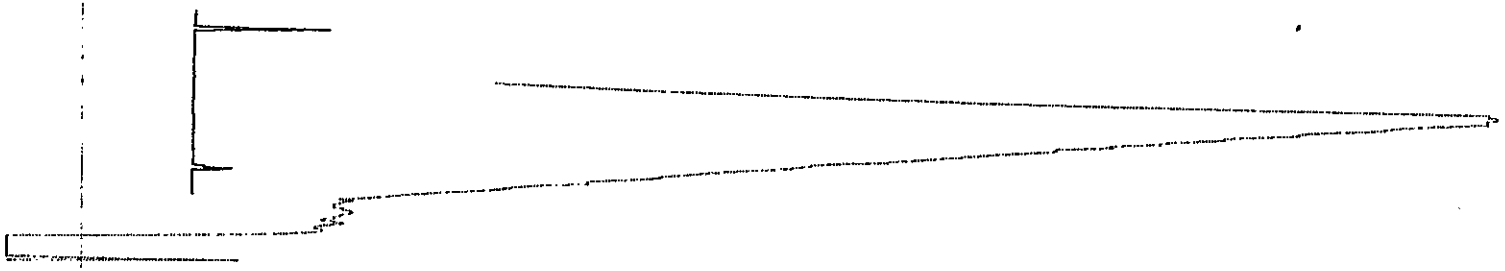
DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-301	94.1	435	0.01	0.01	0.26	0.50	0.03	0.00	0.38	3	68



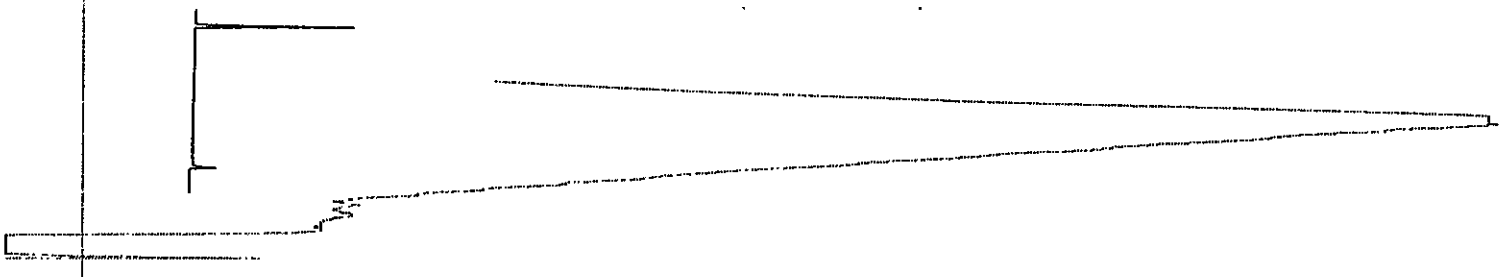
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-042C	93.7:	266:	0.11:	0.17:	0.12:	0.39:	1.41:	0.02:	1.10	15	11



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

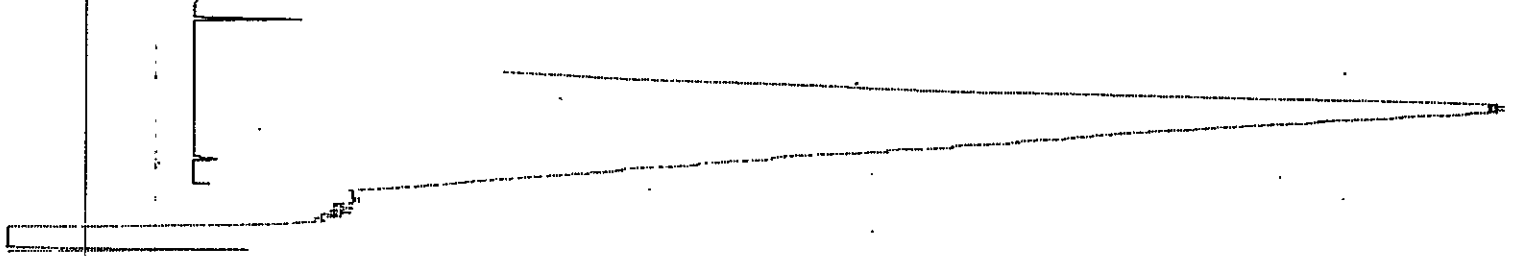
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-037C	97.8:	266:	0.06:	0.11:	0.17:	0.37:	0.64:	0.01:	0.52	21	33



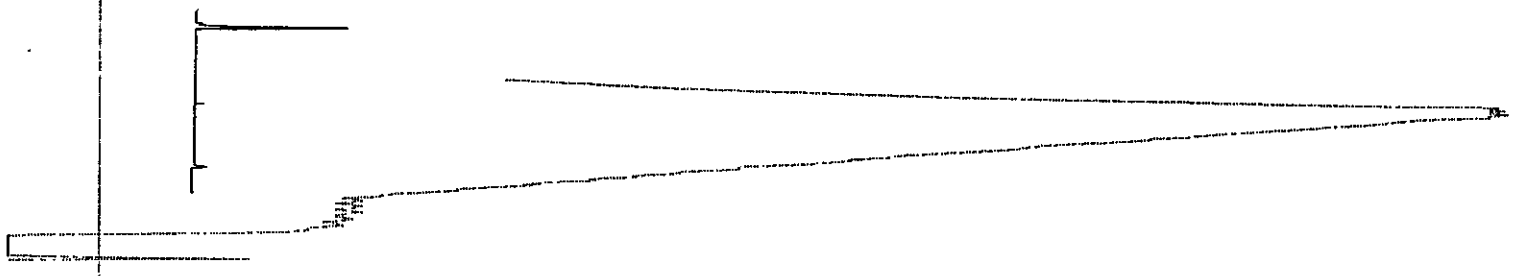
DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-033C	98.7:	266:	0.04:	0.05:	0.00:	0.50:	0.00:	0.00:	0.94	5	137



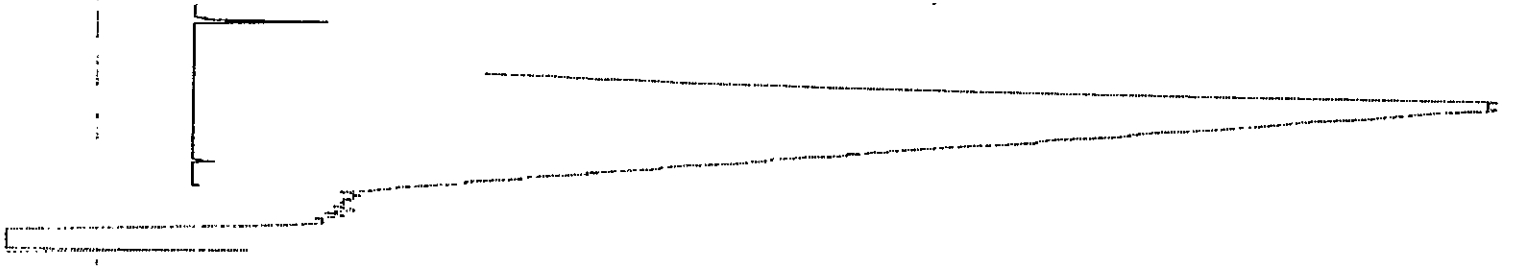
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389- 327:	92.1:	290:	0.03:	0.07:	0.17:	0.30:	0.41:	0.00:	0.33	: 21	: 51



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 350 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

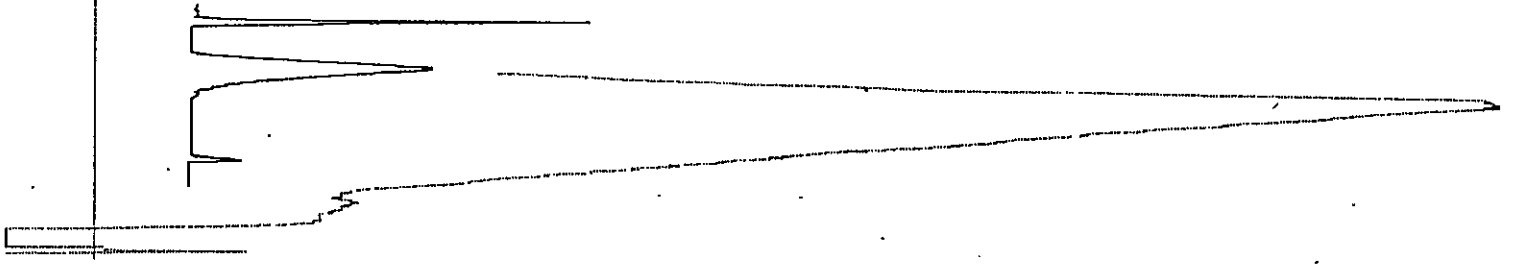
:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
4389-0485	97.1:	400:	0.03:	0.08:	0.17:	0.30:	0.47:	0.00:	0.52	: 15	: 33



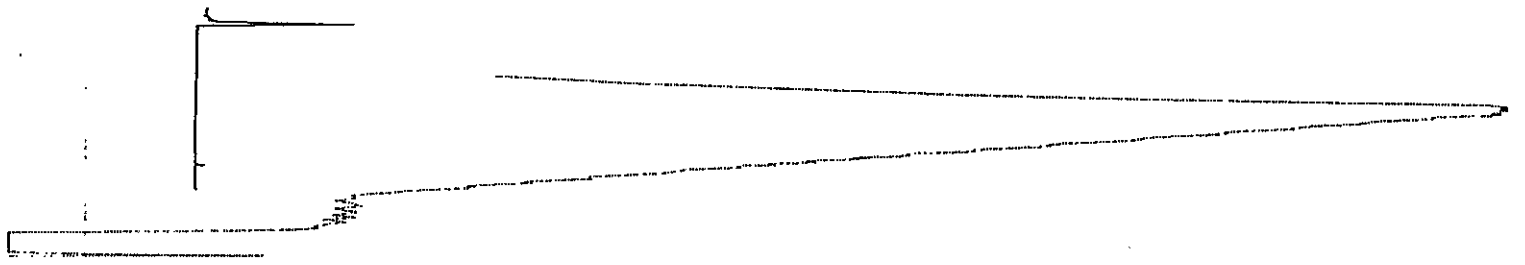
DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 350 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

:DEPTH:	QTY	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
STD 1111:	100.0:	433:	0.11:	2.22:	1.47:	0.05:	1.51:	0.19:	2.89:	76 :	50 :



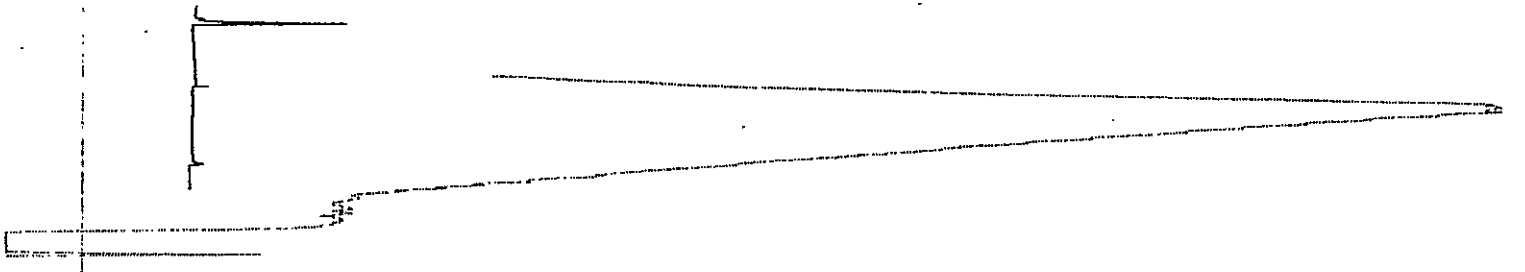
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-350	92.9	266	0.03	0.13	0.44	0.19	0.29	0.01	0.29	45	154



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

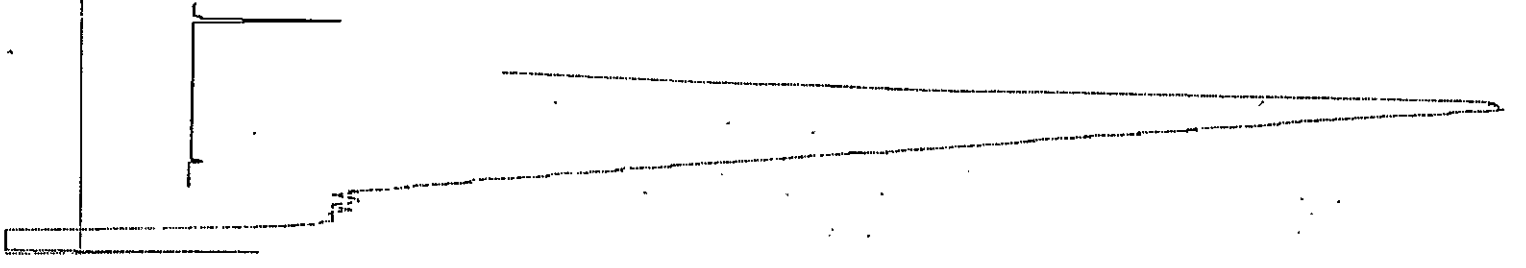
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-343	99.8	288	0.04	0.16	0.25	0.20	0.64	0.01	0.39	41	64



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

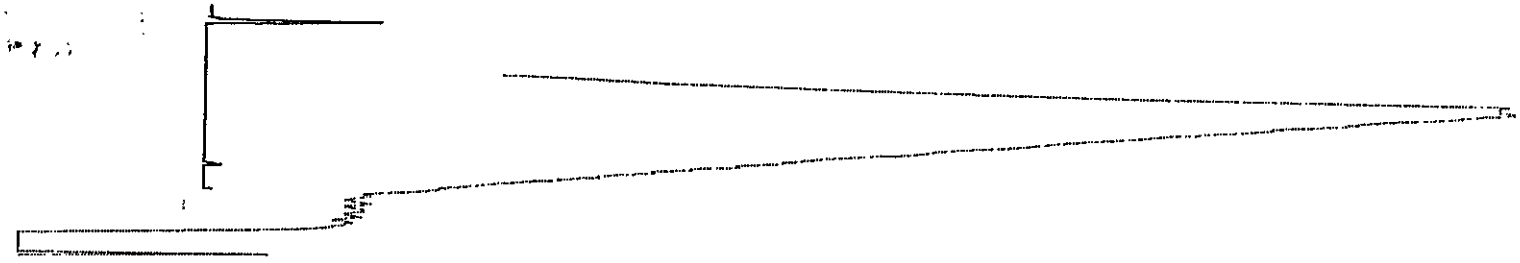
INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-338	97.8	266	0.04	0.12	0.14	0.25	0.85	0.01	0.26	46	54



INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

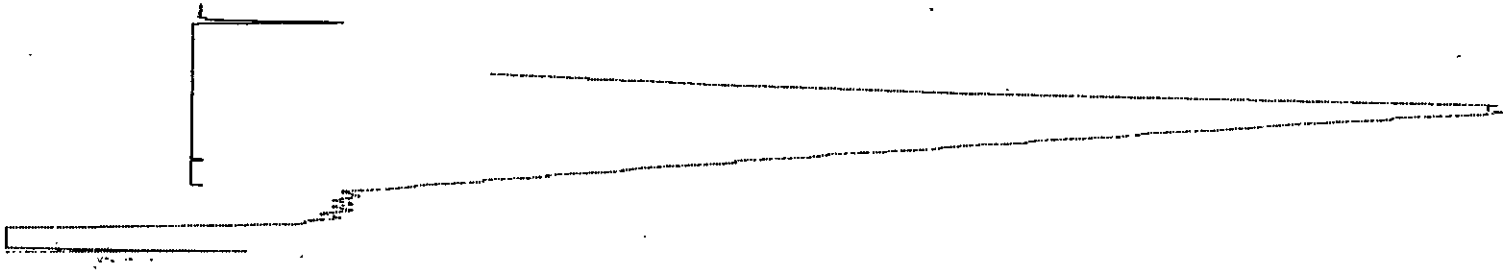
DEPTH	OTV	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-381	97.2	266	0.07	0.15	0.40	0.32	0.37	0.01	0.30	49	132



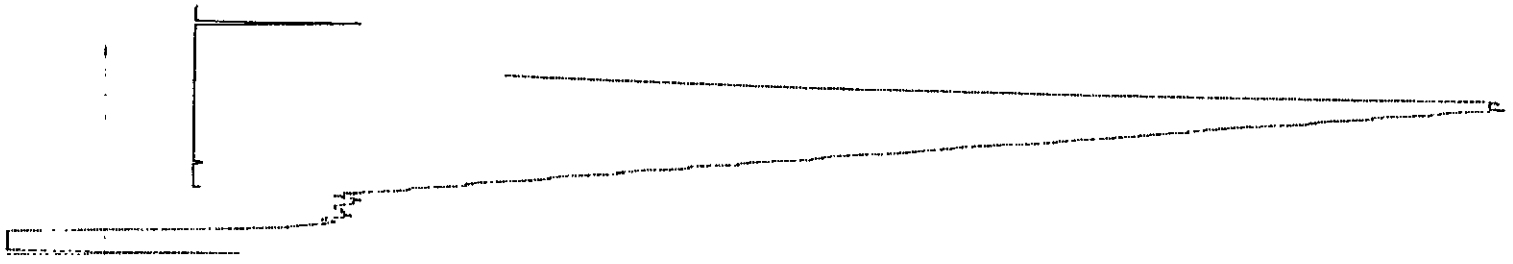
DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	OTV	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-370	98.8	287	0.05	0.13	0.34	0.28	0.38	0.01	0.31	42	109



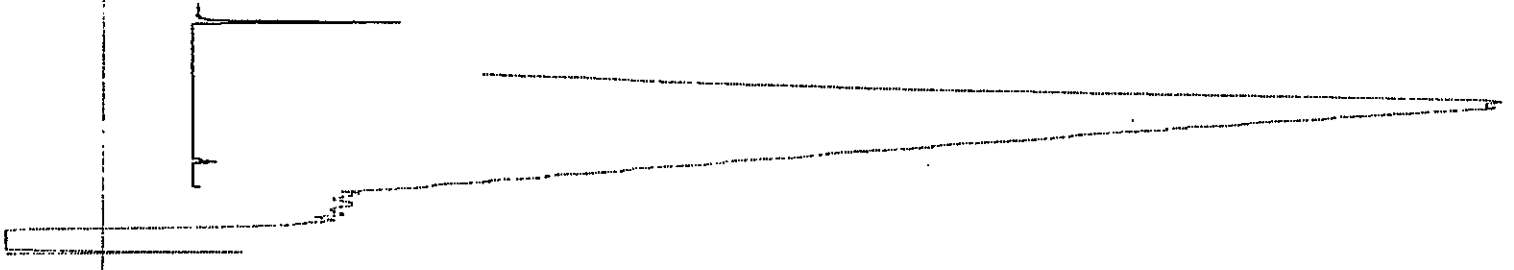
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-406	96.8	263	0.02	0.03	0.16	0.50	0.18	0.00	0.23	13	71



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

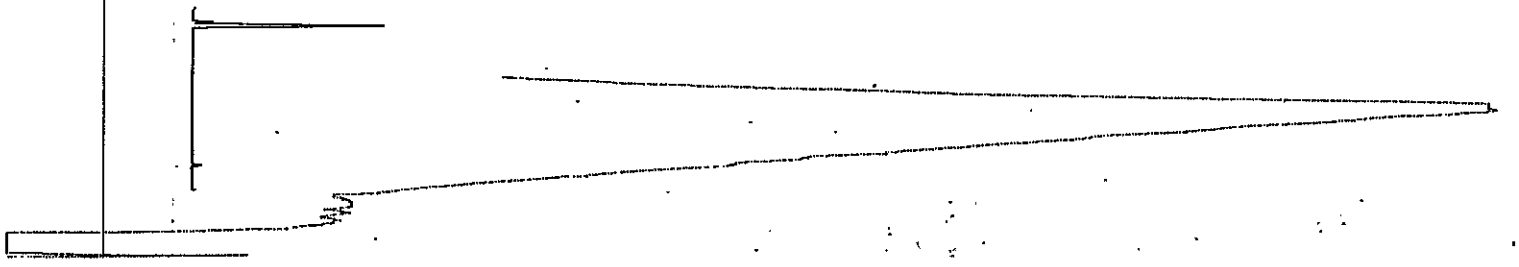
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-400	97.8	265	0.04	0.01	0.49	1.00	0.02	0.00	0.37	3	134



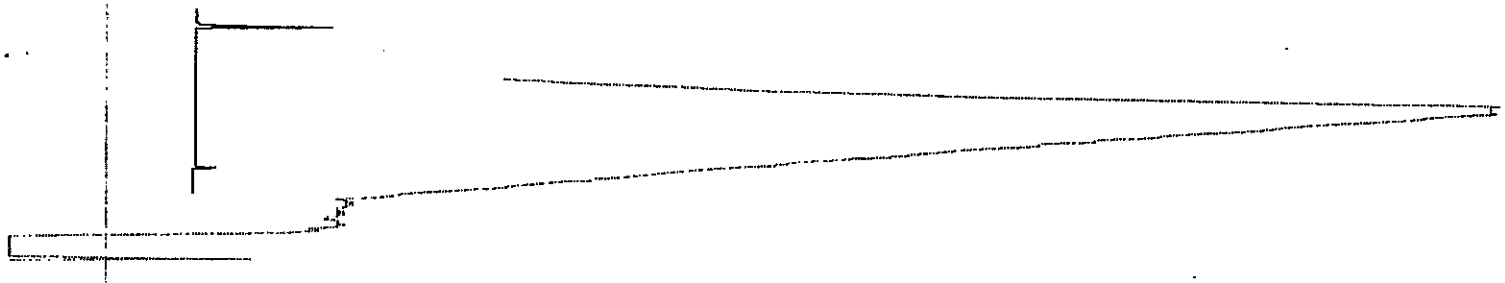
DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-390	94.7	192	0.01	0.02	0.30	0.50	0.06	0.00	0.20	10	147



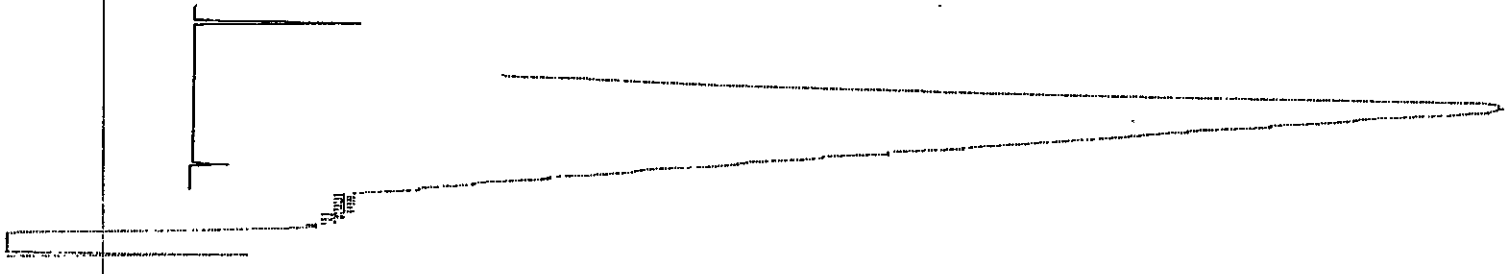
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-4A1	97.0	221	0.01	0.02	0.12	0.50	0.16	0.00	0.35	6	34



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

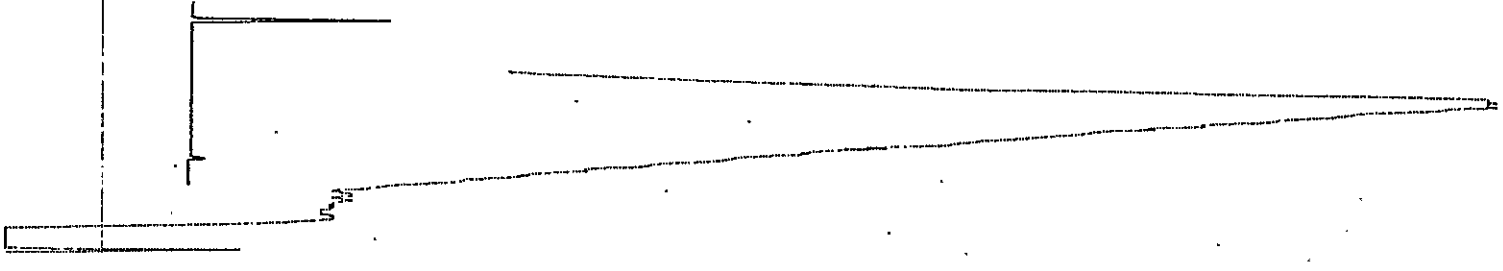
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-432	97.9	209	0.03	0.02	0.17	0.75	0.11	0.00	0.30	7	57



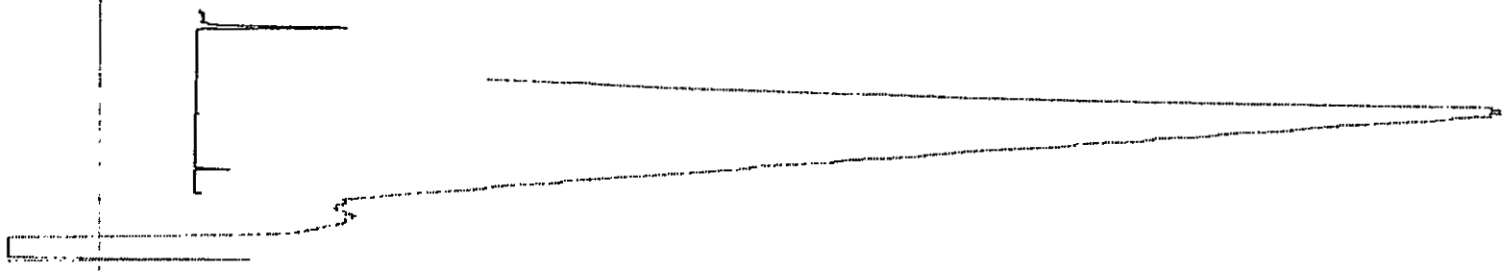
DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-418	95.4	200	0.02	0.03	0.31	0.50	0.09	0.00	0.21	14	149



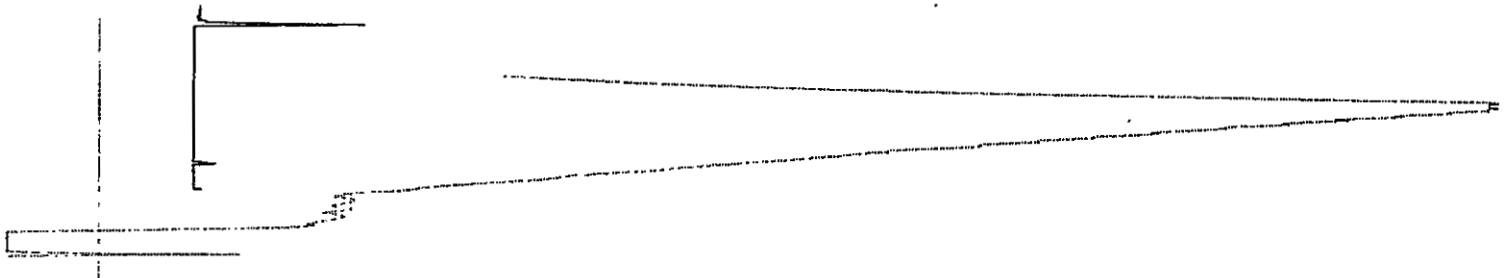
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-481	98.4	199	0.02	0.01	0.32	1.00	0.03	0.00	0.42	2	77



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

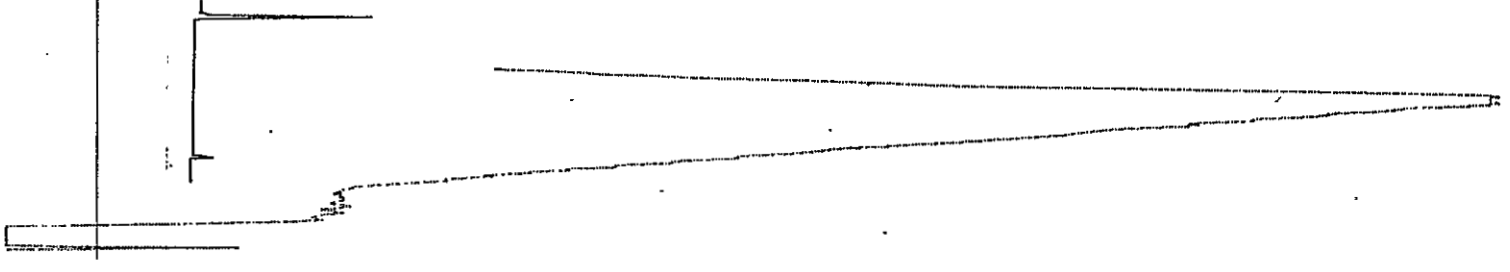
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-470	95.8	227	0.02	0.02	0.35	0.50	0.05	0.00	0.62	3	56



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

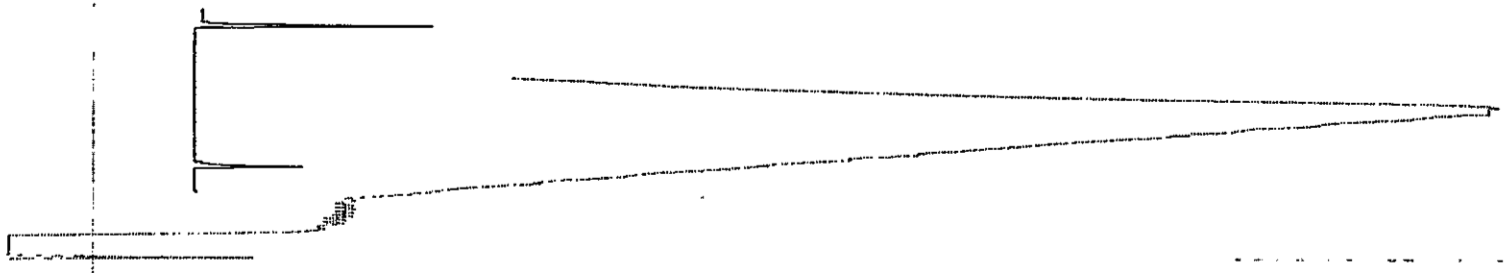
INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-456	95.8	167	0.02	0.02	0.42	0.50	0.04	0.00	0.23	9	179



[redacted] TE[redacted] - [redacted]250[redacted] [redacted]ISO[redacted]IM[redacted] 5[redacted] T[redacted] G[redacted]IE[redacted]25[redacted] [redacted] TA[redacted] ST[redacted] T[redacted] 3[redacted]

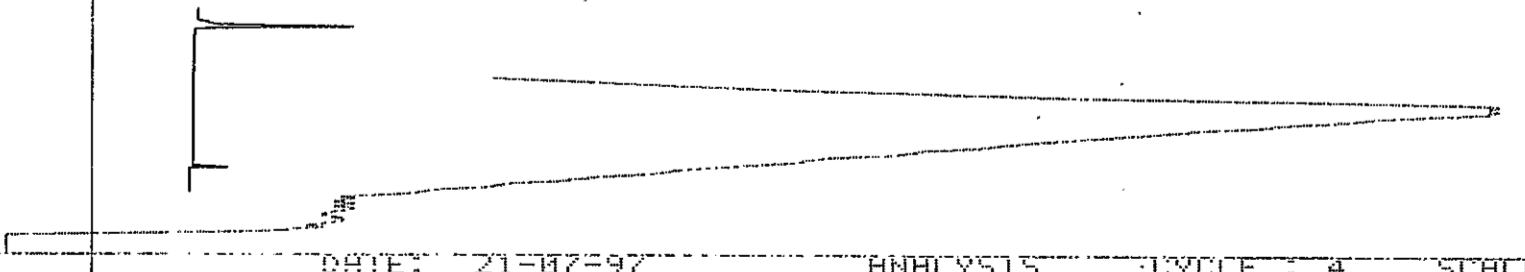
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-506	98.8	214	0.14	0.00	0.60	1.00	0.00	0.01	0.39	0	152



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

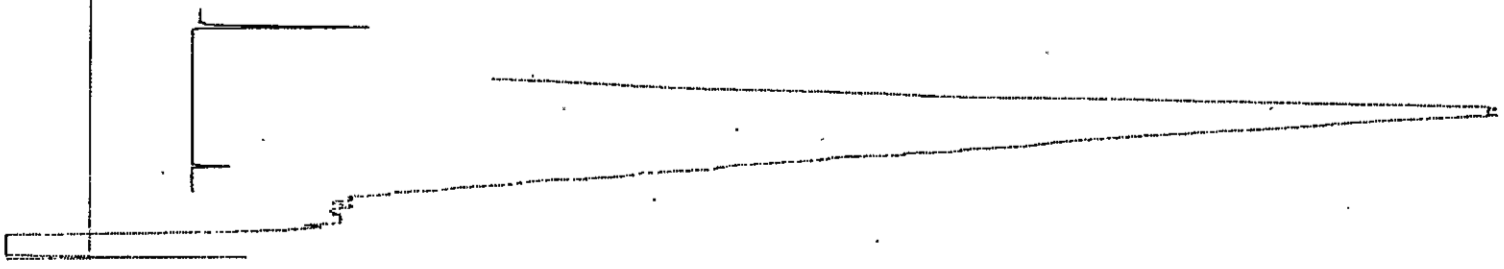
DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-501	97.4	349	0.03	0.01	0.36	0.75	0.02	0.00	0.45	2	80



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

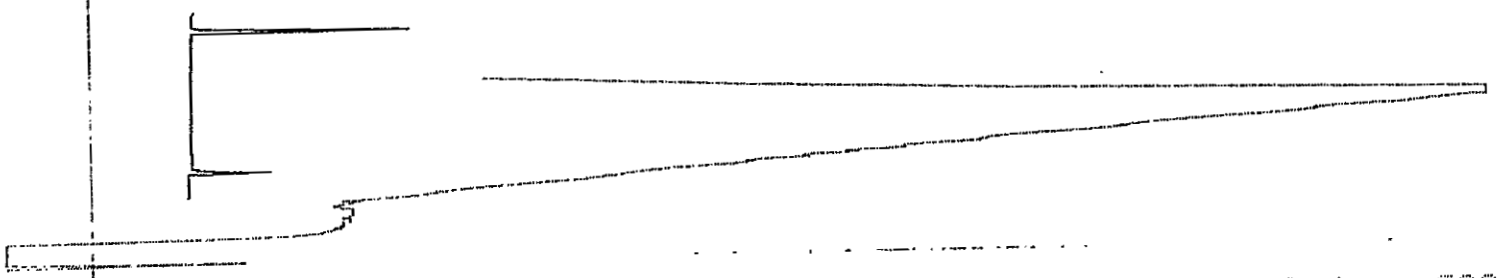
INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	QTY	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-491	98.5	193	0.03	0.02	0.40	0.75	0.05	0.00	0.72	3	56



[redacted]

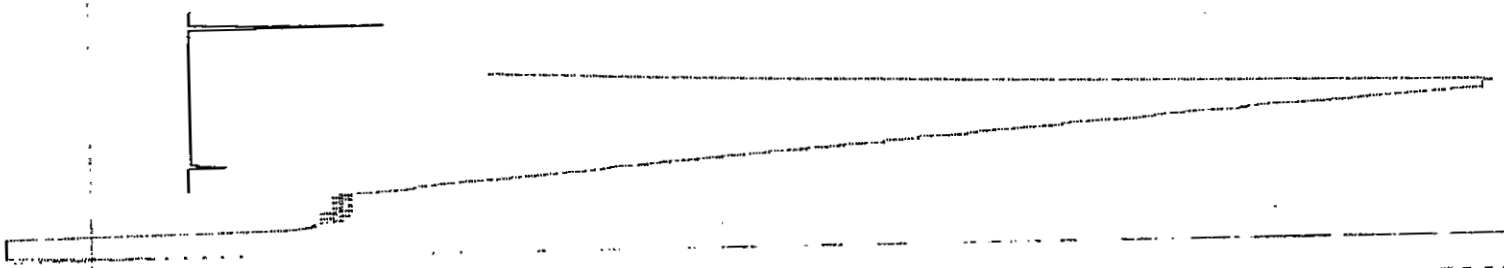
:DEPTH:	DTV	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
1389- 541:	98.7:	153:	0.08:	0.02:	0.28:	0.80:	0.07:	0.00:	0.27	7	104



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

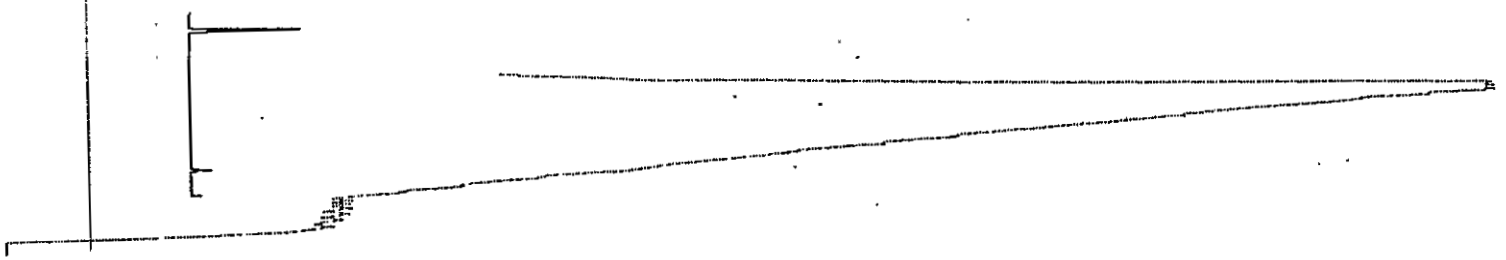
:DEPTH:	DTV	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
1389- 526:	97.8:	179:	0.04:	0.03:	0.22:	0.67:	0.13:	0.00:	0.22	14	101



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP = 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

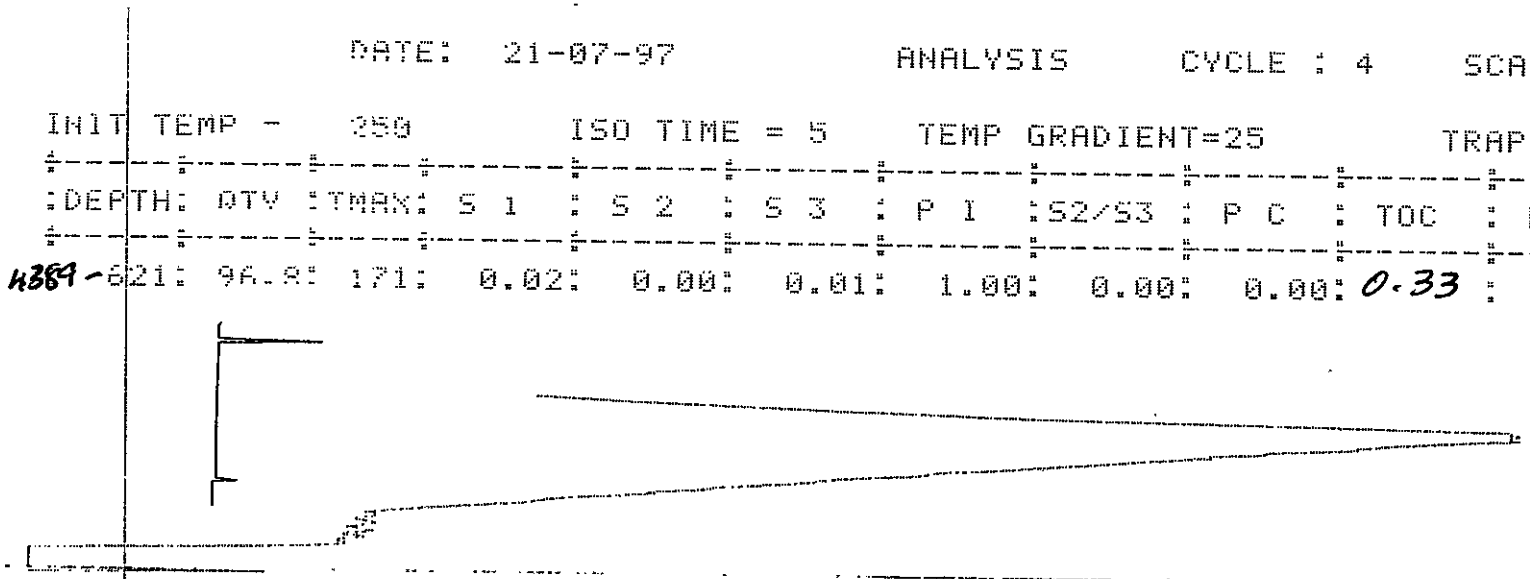
:DEPTH:	DTV	:TMAX:	S 1	: S 2	: S 3	: P I	:S2/S3	: P C	: TOC	: H I	: O I
1389- 514:	96.7:	186:	0.01:	0.02:	0.03:	0.50:	0.66:	0.00:	0.30	7	10



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	DTV	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-621	98.8	171	0.02	0.00	0.01	1.00	0.00	0.00	0.33	0	3



DATE: 21-07-97 ANALYSIS CYCLE : 4 SCALE = 1/32

INIT TEMP - 250 ISO TIME = 5 TEMP GRADIENT=25 TRAP STOP T = 390

DEPTH	DTV	TMAX	S 1	S 2	S 3	P I	S2/S3	P C	TOC	H I	O I
4389-581	98.6	174	0.02	0.00	0.00	1.00	0.00	0.00	0.13	0	0