UGR File #210
W.Va.Geological & Economic Survey

Report of Petrologic Characterization of Wise 253

(Consolidated Gas Supply Co. Well 20338)

Submitted by

West Virginia Geological and Economic Survey

to

U. S. Department of Energy

under

Contract No. EY-76-C-05-5199

Robert B. Erwin

Director and State Geologist

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Abstract

Wise 253 (Consolidated Gas Supply Co. Well #20338) was characterized by 70 samples from the 400' core. Stratigraphic units sampled include the Cleveland Shale, Three Lick Bed, upper-middle portion of the Huron Member and the lower portion of the Huron Member.

Twenty-six variables were measured on each sample, and associations between variables were examined by means of correlation matrices, Associations are examined in terms of the overall well, in terms of specific lithotypes, and in terms of stratigraphic units. Analysis of variance procedures were utilized to detect differences in compositional and petrophysical parameters among stratigraphic units and lithologic types.

Supportive data in terms of illustrations, graphs, statistical analysis and raw data are given in the appendices; summary conclusions and recommendations are presented at the end of the text.

Numerous natural fractures were present in the core, but no gas shows were indicated by the temperature log. The well later proved productive after cryogenic fracing indicating that productively and the presence of natural fractures are not always associated. Most natural fractures were low angle-slickensided. These fractures had some porosity as evidenced by micro-mineralization revealed by SEM. The fracture surfaces were seen by SEM to be tightly sealed making recharge of any porosity associated with the fracture virtually impossible. High angle near vertical fractures were seen to be tightly mineralized and unproductive. No evidence of a microfracture system exists. Shale wells located in areas dominated by low angle thrusting seem to offer no advantage in terms of fracture permeability or porosity.

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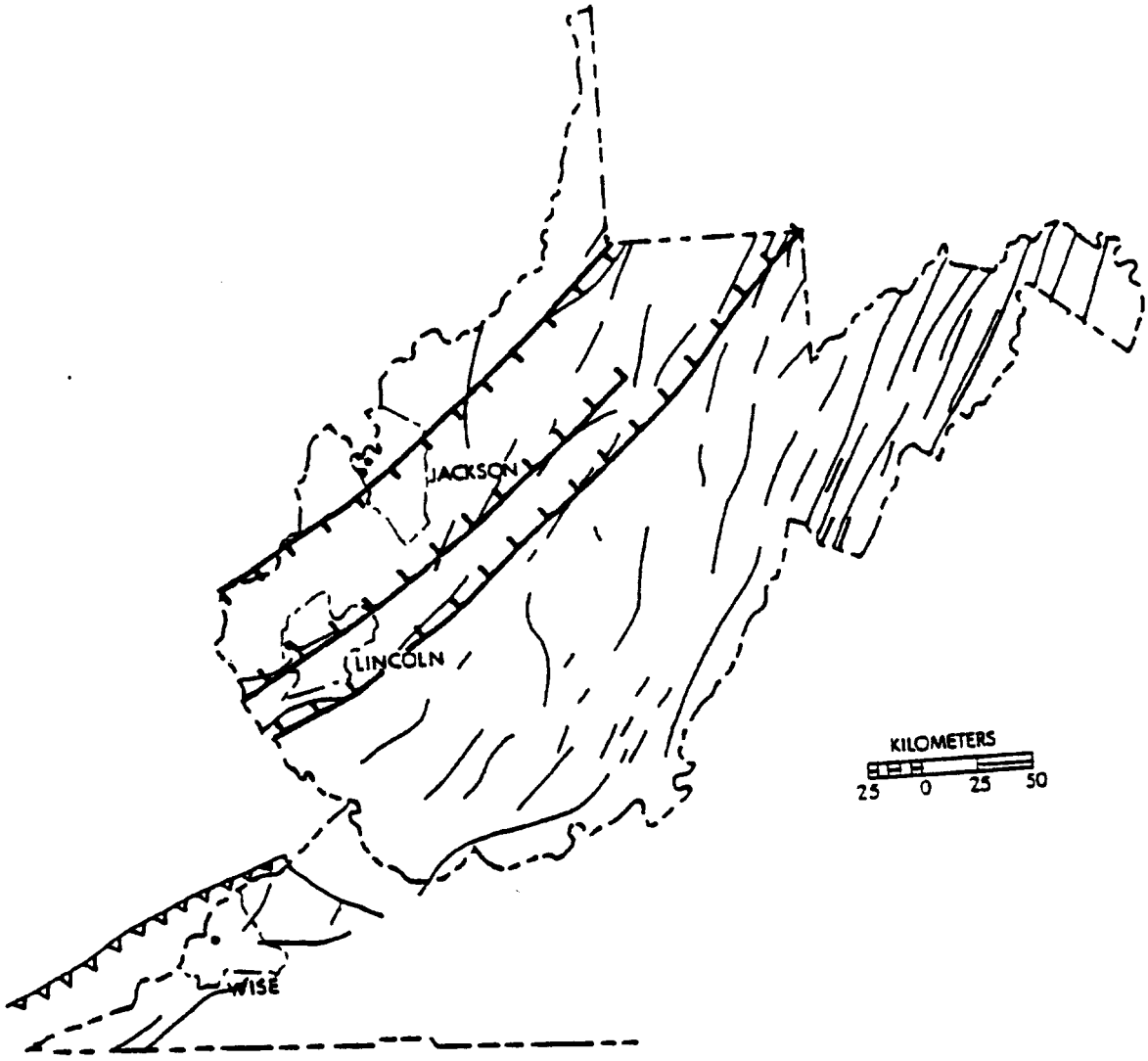

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Figure 1. Location map showing distribution of Consolidated Gas Supply Corp. wells studied by the West Virginia Geological and Economic Survey under the Eastern Gas Shales Project. This report deals with CGTC well #20338 (Wise-253) located on the Pine Mt. Thrust plate.

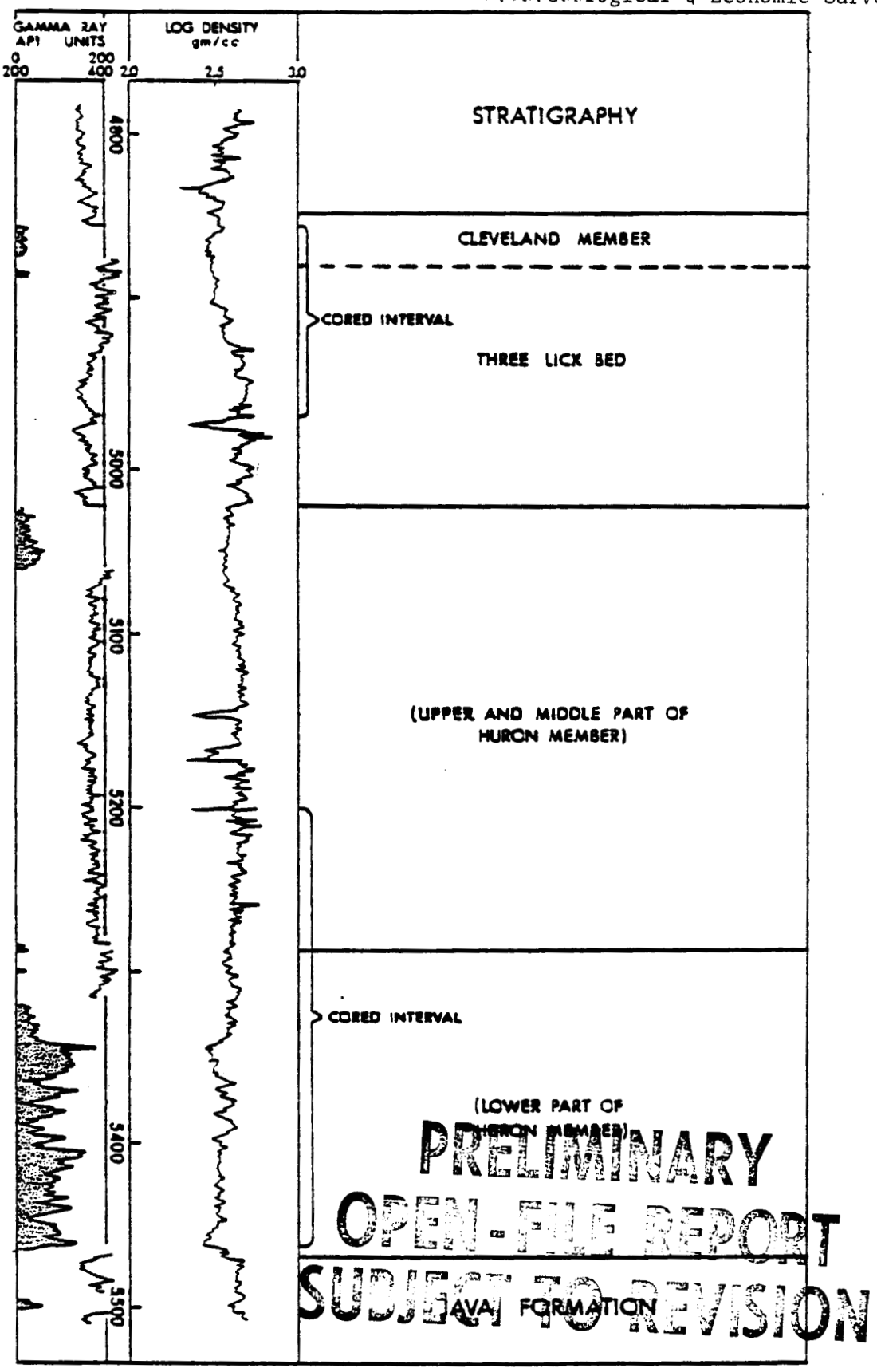

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Figure 2. Vertical profile of Wise 253 with stratigraphic divisions shown in right hand column (Joe Schwietering, personal comm.). No gas shows were indicated by the temperature log, but the well was productive after stimulation.

Evaluation of Analytical Methodology

Bulk Density - Precision of bulk density is better than 0.005 g/cc. It is reported to two decimal places, both being valid and reliable.

Matrix Density - Precision of matrix density is better than 0.01 g/cc. Several methods of densitydetermination were examined, but the vacuum crucible method devised by Nuhfer was as reproducible as any ASTM method examined and was much faster. Rock powders dried at room temperature were utilized. It was proven by examination of sample on individual thermograms that ground shales dried at high temperatures (80-100°C), even at atmospheric pressure, lose hydrocarbon material, a factor which will result in erroneously high porosity being calculated from density measurements. Comparison with material balance density shows only a few variations which might be caused by erroneous data.

Porosity - Precision is better than 0.5%; calculated from bulk and matrix density. The low range of porosity values available generally prevents linear correlations from being estabilished with any other variables.

Loss on Ignition - Measured on a high precision (±0.001 g) balance on samples at least 2 g in weight. Precision appears to be ±5% per determination, with variations being caused by sample inhomogeneity and non-uniform heating of the muffle furnace. Organic matter is approximated by LOI between 100°- 550°C, a second LOI from 550-1000°C reflects loss of CO_2 from carbonates, some S from sulfides, and some tightly bound waters in clay minerals.

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X-ray Diffraction Mineralogy - Precision estimated as ±10% per determination on mineralogy > 10% in total concentration; ±50% on minerals present in concentration between 5%-10% and as much as ±100% on low concentration materials. At this time, uncertainty with respect to stoichiometric composition, amounts of any amorphous mineralloids and further lack of information with respect to effects of matrix differences

(arising from compositional changes between thinly laminated lithotypes at one end, and non-banded lithotypes at the other) prevent one from making complete estimates of the accuracy of determination of each mineral. Comparisons of X-ray diffraction data with preliminary geochemical data and of X-ray diffraction-based material balance density with matrix density are still in progress.

Total Sulfur-Precision is apparently ±15% per determination from analyses of ground sample.

Thin Section Point Counts - As discussed in Nuhfer, Vinopal and Hohn (1978), point counting of shales appears imprecise relative to estimating amounts of mineralogic and organic components in Devonian Shales. The percent of silt, assumed to be proportional to the amount of thin section quartz-feldspar, is useful in making sedimentologic interpretations and was determined for each sample. Additionally, thin section petrography was used extensively in fabric analysis of shale lithotypes and in examining crystal textures in filled fractures. Reproducability depends on consistence of microscopist. It is advisable to have only one microscopist do all of the point counts for a sigle well in order to yield the best between-sample comparisons.

Sample Selection - Samples must be selected and carefully prepared so that truly equivalent rock material is compared on all tests. This was accomplished by vertical slabbing of material from the thin-section blank for petrophysical, mineralogical, and geochemical analyses. The necessity of adhering to a scheme to produce equivalent samples cannot be overemphasized. It is imperative that only a skilled, conscientious technician be entrusted with responsibility for initial subsampling. Samples which yielded apparently anomalous results were run in replicate. Where replications reconfirmed the anomalous values, the data were retained. The chance, however, still exists in these cases that an abrupt lateral variation caused inconsistent materials to be compared, producing anomalous values.

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Characterization of Overall Core

Petrophysical and Log Parameters

Five types of density were derived for each sample from the subject well:

1) bulk density - measured by immersion of krylon-coated sawed blocks of whole sample in kerosene.

2) matrix density - the density of the ground whole - sample as measured by the vacuum-crucible method described by Nuhfer (1978).

3) grain density - the density of the crystalline component of the shales as determined from X-ray mineralogy and established mineral density values tabulated in a number of reference sources. Note that this density excludes organic matter and any amorphous (to X-ray) mineralloids.

4) material balance density - a density computed from the whole rock composition as established by estimates of organic matter from loss on ignition between 100°C and 550°C; from non-pyritic mineralogy as determined by X-ray diffraction and pyritic mineralogy as back-calculated from total sulfur (LECO) analyses. This was used only as a check against matrix density to locate samples with an unacceptable disparity between a directly measured matrix density and a density calculated from composition. Material balance density is not used as a correlation variable.

5) log density - the density taken from the bulk-density log at the log depth subjectively selected as corresponding to the sample depth taken from the core.

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Porosity was calculated from bulk and matrix density. Precision of bulk and matrix density is about ±0.01 g/cc. This yields a corresponding porosity precision of about ±0.5%.

Statistical Correlations from Overall Core - Petrophysical Parameters

A discussion on the interpretation of correlation matrices is present in Nuhfer, Vinopal, and Hohn (1979) and should be read by parties examining the series of open file well reports prepared by us. Only correlations with a probability greater than 95% are discussed here.

Bulk Density - Sample derived bulk density shows a weak negative correlation (-.56) with LOI100-550°C reflecting the low density of organic matter. The low correlation is likely due to the circumstance that pyrite content (high density component which greatly effects density) is not directly proportional to the organic content. A high positive correlation with matrix density (+.85) is explained by the low porosity of the shale and documents good precision in measurements of densities in the laboratory.

Matrix Density - Correlations of matrix density mimic those of bulk density due to the low porosity of the shales and are discussed above.

Porosity - Porosity shows a negative correlation with bulk density (-.58). Similar trends show up within individual lithologies. This trend might be thought to reflect the expected lower bulk density with higher porosity, but the fact that matrix densities of 2.50 to 2.60 seem to be associated with higher porosity shales may indicate that an organic component or silt lenses noted in organic rich shales are associated with porosity. The association between pyrite and porosity noted by us in the non banded shales of the 3 other wells studied is also present in this well (+.58).

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Log Density - A positive correlation with 14°A clay (+.58) may reflect more clay (less organic matter) in higher density shales. Correlation with bulk density is low (+.51) as the sample depth could not be corrected to log depth. LOI100-550°C shows an expected negative correlation (-.63) with log density, but the uncorrected sample depth limits the correlation.

Gamma Ray Log Response - Negative correlation between this variable and log density (-.46) is predictable as a consequence of the well documented association of higher radioactivity and organic matter in shales. LOI100-550°C shows a weak negative correlation (-.30) with gamma may response due to uncorrected sample depths.

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Statistical Correlation from

Overall Core - Analytical Parameters

Sample depth - Correlations with sample depth generally arise from a parameter having a higher value within a specific strategraphic unit. As such, the correlations of sample (depth) with LOI 550-1000°C (+.49), silt (-.63), quartz (-.46), and plagioclase (-.48) do not indicate continuous trends with depth. Analyses of significant differences in parameters by lithologic types and stratigraphic units is presented under analysis of variance.

Loss on Ignition 100-550°C - Negative correlations with bulk density (-.56), matrix density (-.50) and log density (-.63) reflect the low density of organic matter. Positive correlations with pyrite (+.48) and sulfur (+.43) are explained by preservation of organic matter and formation of pyrite being favored under low Eh conditions. The negative correlation of LOI100-550°C with 14°A clay (-.56) reflects the dilution of clays by quartz in organic-rich shales.

Loss on Ignition 550-1000°C- The positive correlation with matrix density (+.46) reflects partial loss of sulfur from sulfides as SO_2 (Nuhfer and Renton, 1979). The correlation with plagioclase (-.54) is likely due to dilution of pyrite by quartz and the strong correlation between quartz and plagroclase (+.77).

Sulfur - Sulfur shows a stong correlation with pyrite (+.84) indicating that the bulk of the sulfur is present as pyrite. A negative correlation with siderite (-.49) is due to the inverse relationship between pyrite and siderite (-.43).

Silt - Petrographic quartz - feldspar (silt) has a low positive correlation with total quartz (+.67) suggesting that much of the quartz in the shales is clay sized. The positive correlation with plagioclase (+.90) reflects plagioclase traveling as a detrital mineral with quartz.

Illite - Illite has a positive correlation with 14 °A clays (+.52) due to the clay size fraction traveling together.

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Plagioclase - Plagioclase has a weak correlation with calcite (+.48). This correlation is meaningless, being produced by a few samples high in calcite.

The following correlations are produced by dilution effects in a closed data set.

Silt - Illite (-.61)

Silt - 14°A Clay (-.48)

Quartz- Illite (-.92)

Plagioclase - Illite (-.60)

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Statistical Correlations by Lithologic Type

Four lithologic types occur in sufficient abundance to allow statistical analysis; sharply - banded shale, thinly-laminated shale, lenticularly-laminated shale and non banded shale. The shale lithotypes are described in detail in Nuhfer, Vinopal, and Hohn (1978) and Vinopal, Nuhfer, and Hohn (1979) and will not be detailed here. The small sample size limits the usefullness of the correlations. Only correlations with a probability greater than 95% are discussed here.

Sharply-Banded Shale

Bulk Density - Bulk density shows a negative (-.71) correlation with LOI100-550°C due to the low density of organic matter. A negative correlation with calcite (-.62) may be related the weak positive correlation (+.52) between LOI100-550°C and calcite. Bulk density has a good correlation (+.78) with log density, which is the highest for any lithotype. The negative correlation (-.65) with porosity is reflected in the trend for the overall well.

Log Density - Log density shows a weak (-.65) negative correlation with LOI100-550°C reflecting the low density of organic matter. The correlations with matrix density (+.82) and bulk density are surprisingly high considering that sample depth was uncorrected to the log depth. Positive correlation with LOI550-1000° C reflects association of pyrite and higher density. Negative correlations with plagioclase (-.67) and calcite (-.61) are produced by a few outlying data points in an overall trend of no correlation.

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Resistivety - Resistivity has an expected correlation (+.70) with gamma ray response due to the higher radioactivity of black shales.

Matrix Density - Matrix density yields weak correlations with LOI 550-1000°C (.+46), calcite (-.65) and kaolinite (+.56). Examination of scatter plots indicates these correlations are meaningless, being produced by a few outlying points. Negative correlation (-.74) with LOI100-550°C is expected due to the density of organic matter.

Porosity - The negative correlation with 14°A clay (-.76) may reflect the lower abundance of 14°A clay in less dense samples as shown by the (-.70) correlation between LOI100-550°C and 14°A clay.

LOI100-550°C - Negative correlations with density parameters are discussed above.

Sulfur - Sulfur shows a strong correlation (+.84) with pyrite indicating that most sulfur is in pyrite. The negative correlation (-.60) with anhydrite is produced by a few outlying points.

Pyrite - As in the overall well, pyrite shows a negative correlation (-.55) with siderite reflecting varying Eh-Ph environments.

Thin section silt - Petrographic quartz-feldspar (silt) shows a weak (+.58) correlation with total quartz indicating that an appreciable amount of clay sized quartz is present. The positive (+.67) correlation with plagioclose is expected since silt-sized plagioclase is included in this variable. The correlation with LOI 550-1000°C is fortutous.

Quartz - X-ray quartz show a strong correlation (+.88) with plagioclase indicating that both detrital minerals are transported together.

Illite - The positive correlation (+.80) with 14°A clays indicates that both minerals travel together.

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The following correlations with sample depth indicate that the properties of the non-banded shales change stratigraphically. Such changes are better analyzed by analysis of variance and are discussed latter

Sample - LOI550-1000°C	(+.68)
Sample - Thin Section Silt	(-.61)
Sample - 14°Clay	(+.60)
Sample - Plagioclase	(-.67)
Sample - Log Density	(+.59)
Sample - Gamma	(+.57)

Dilution of one mineral by another produced the following correlations.

Thin Section Silt - Calcite	(-.58)
Quartz - Illite	(-.85)

Plagioclase - Illite	(-.64)
Plagioclase - 14°A clay	(-.72)

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Thinly- Laminated Shale

Bulk Density - Reflecting the low density of organic matter, bulk density has a negative correlation (-.74) with LOI100-550°C. The correlation (+.79) with matrix density reflects the low porosity of the shales. The negative correlations with resistivity (-.54) and gamma ray response (-.48) reflect the association of these two variables with organic matter. A correlation with 14°A clay is fortuitous.

Log Density - Log density shows an expected weak correlation with LOI100-550°C (-.59). The correlation with bulk density, measured in the lab, is moderate (+.71) considering that the sample depth is not corrected to the log depth. A similiar correlation (+70) exists with matrix density. A fortuitous correlation (-.57) exists with anhydrite.

Porosity - As in the overall well, porosity shows a negative correlation (-.64) with bulk density.

Resistivity - The correlation (+57) with gamma ray response reflects their mutual association with organic content. The negative correlations with bulk density (-.54) and matrix density (-.54) are again related to the effect of organic matter. A negative correlation with illite (-.62) and a positive one with quartz (+.52) is likely due to organic rich shales containing slightly more quartz. Correlations with 14°A clay (-.63) and dolomite (+.55) are produced by one or two outlying points in an overall trend of no correlation.

Gamma Ray Response - The highest correlation with gamma ray response is that of LOI 100-550°C (+.73) reflecting the higher radioactivity of organic rich shales. The negative correlation (-.48) with matrix density is also organic related. A weak correlation (+.47) between LOI100-550°C produces the low correlation (+.53) between gamma ray response and LOI 550-1000°C. A moderate correlation (+.74) with szmolnokite is fortuitous.

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Loss on Ignition 100-550°C - This variable which is basically a measure of organic content is negatively correlated with density parameters discussed above.

Sulfur - Sulfur has weak correlations with LOI550-1000°C (+.48) and pyrite (+.54). Apparently, much of the sulfur is not bound in pyrite.

Thin Section Silt - As in the overall well, thin section quartz-feldspor (silt) is positively correlated with total quartz (+.82) and plagioclase (+.84). A weak negative correlation (-.53) with LOI550-1000°C is fortuitous.

Quartz - Quartz shows a positive correlation with kaolinite (+.61). This may represent diagenetic alteration of feldspar as kaolinite is positively correlated (+.71) with plagioclase.

Illite - The positive (+.73) correlation with 14°A clay, as noted before, probably reflects the two clay minerals traveling together. A correlation (+.47) with LOI 550-1000°C is fortuitous.

Orthoclase- A correlation (+.54) with calcite is fortuitous.

14°A Clay - A correlation (+.50) with matrix density is produced by one outlying data point.

Correlations with sample depth reflect differences between stratigraphic units and are discussed under analysis of variance.

Sample - LOI550-1000°C(+.62)

Sample - Quartz (-.82)

Sample - Kaolinite (-.61)

Sample - Plagioclase (-.71)

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The following correlations reflect dilution of one mineral by another

Illite - Silt (-.75)

Illite - Quartz (-.96)

Illite - Pyrite (-.53)

Quartz - 14°Clay (-.72)

Lenticularly-Laminated Shale

Bulk Density - Bulk density shows an expected negative correlation (-.60) with LOI100-550°C due to the low density of organic matter. A negative correlation (-.54) with gamma ray response is also related to organic matter. The positive correlation with LOI550-1000°C (+.57) is produced by the association of that variable (SO_2 evolved from pyrite) with pyrite. The low porosity of the shales causes the high correlation (+.86) with matrix density.

Log Density - Log density is weakly correlated (+.56) with bulk density due to uncorrected sample depths. As similar situation exists with respect to matrix density (+.52). Correlations with gamma ray response (-.54), LOI100-550°C (-.61) and LOI550-1000°C (+.62) have the same explanation as bulk density above.

Matrix Density- In addition to the correlations with the density parameters discussed above, matrix density has a positive correlation (+.70) with sulfur and with LOI550-1000°C (+.62). Both are due to the correlation (+.60) between sulfur and pyrite (.60). A negative correlation (-.61) with plagioclase is fortuitous.

Loss on Ignition 100-550°C - Aside from the above mentioned correlation with density, this variable shows a weak negative (-.64) correlation with LOI 550-1000°C. Examination of scatter plots indicates this correlation is fortuitous.

Thin Section Silt - Petrographic quartz-feldspar has a weak (+.47) correlation with total quartz suggesting that much quartz is clay sized. A positive correlation (+.57) with plagioclase indicates that some plagioclase travels with the detrital silt fraction. A correlation (+.67) with kaolinite may be related to diagenetic alteration of feldspar.

Quartz - Quartz is positively correlated with orthoclase (+.60) and plagioclase (+.77) as all are detrital components of similar size and density. Orthoclase and plagioclase show a positive (+.61) correlation. Correlations with siderite (+.52) and hemihydrate (+.83) are produced by a few outlying points in a data set with many zero values.

Illite - A correlation (+.62) with dolomite is fortuitous.

14°A clay - This variable has correlations with siderite (+.56) and LOI 550 -1000°C (+.60) which are induced by a few points on an overall trend of no correlation.

Hemihydrate - Many correlations are present with this variable due to its imprecise measurement and near zero values. As such 2 or 3 points of higher value will produce meaningless correlations such as with illite (-.79), calcite (+.74), orthoclase (+.81), plagioclase (+.77).

Calcite - Correlations with pyrite (+.56) and orthoclase (+.72) are fortuitous.

Dolomite - The correlation with siderite (+.68) probably reflects a chemical environment favorable for the formation of carbonate minerals. A correlation (+.82) with szmolnokite is fortuitous, resulting from a data set with many zeros. The following correlations with sample depth reflect differences in stratigraphic units and are discussed under analysis of variance.

Sample - Quartz (-.60)

Sample - Kaolinite(- .52)

Sample - Gamma (-.75)

Dilution effects in a closed data set produced the negative correlations with illite.

Illite - Quartz (-.95)

Illite - Pyrite (-.67)

Illite - Calcite(-.63)

Illite - Orthoclase (-.69)

Illite - Plogioclase (-.70)

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Nonbanded Shale

Bulk Density - Bulk Density shows a positive correlation (+.59) with matrix density due to the low porosity of the shales. A negative correlation (-.49) with porosity follows the trend of the overall well. A fortuitous correlation (+.53) is present with szmolnokite.

Log Density - Negative correlations with LOI100-550°C (-.72) and pyrite (-.71) reflect the low density of organic matter and the association of pyrite and organic matter in this lithotype. Negative correlations with resistivity (-.51) and gamma ray response (-.53) are again related to organic matter. Positive correlations with 14°A clay (+.57) and illite (+.69) are due to less organic matter in clay rich shales. Fortuituous correlations are produced with kaolinite (+.64) and szmolnokite (-.56). Negative correlations with quartz (-.60) and sulfur (-.71) reflect greater quartz and pyrite in organic rich shales.

Matrix Density - Correlations with LOI 550-1000°C (+.59) and sulfur (+.59) are due to the association of these variables with high density pyrite. Correlations with mineral components hemihydrate (-.71), calcite (-.51), anhydrite (-.54) are fortuitous.

Porosity- In addition to the aforementioned correlation with bulk density, porosity shows a positive association (+.58) with pyrite. This association has been documented by us in the 3 other contracted wells. A correlation with calcite (+.70) is fortuitous.

Resistivity - A negative correlation with illite (-.53) reflects less organic matter in clay rich shales. The positive association with gamma ray response is due to both varying as a function of organic content.

Gamma Ray Response - A negative correlation (-.51) with illite reflects less organic matter in clay rich shales.

Loss on Ignition 100-550°C - Negative correlations with illite (-.84) and 14°A clay (-.72) are due to the higher quartz (+.79) content of organic-rich shales. Positive correlations with pyrite (+.82) and sulfur (+.77) probably reflect chemical conditions

conducive to the preservation of organic matter and the formation of pyrite. A correlation (+.73) with szmolnokite likely reflects its formation as an alteration product of pyrite.

Loss on Ignition 550-1000°C - Along with the aforementioned correlation with matrix density, a positive correlation exists with ankerite (+.68) due to the loss of CO_2 on heating. A correlation with hemihydrate (-.68) is fortuitous.

Pyrite, Sulfur - A strong positive correlation with pyrite (+.99) indicates that most sulfur is in pyrite. A positive correlation (+.83) between quartz and pyrite produces the correlation (+.76) between sulfur and quartz. Correlations of szmolnokite with pyrite (+.71) and sulfur (+.72) may reflect its formation as an alteration product of pyrite. The negative correlation (-.68) between siderite and pyrite produces the negative correlation (-.66) between sulfur and siderite. Pyrite and 14°A clay have a negative (-.63) correlation due to clay diluting the organic content of the shale. The negative (-.59) correlation between pyrite and hemihydrate is fortuitous.

Thin Section Silt - Petrographic (quartz-feldspar) is as expected positively correlated (+.83) with total quartz . A correlation (+.63) with pyrite reflects the correlation of quartz with pyrite.

Quartz - Correlation with szmolnokite (+.64) is produced by the positive correlations between quartz and pyrite and pyrite and szmolnokite. Positive correlations with calcite (+.55) and dolomite (+.58) are fortuitous.

Illite - Positive correlation (+.79) with 14°A clay reflects association of clay minerals probably due to similar hydraulic properties. Positive correlation with siderite is caused by negative correlations between illite-pyrite and pyrite - siderite.

14°Clay - A negative (-.60) correlation with szmolnokite is produced by a few points in a data set with many zero values.

Ankerite - A positive (+.59) correlation with hemihydrate is produced by a few points in a data set with many zero values.

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The following correlations reflect stratigraphic differences and are discussed under analysis of variance.

Sample - Kaolinite (-.50)

Sample - Thin Section Silt (-.80)

Sample - 14°A Clay (+.78)

Sample - Gamma Ray (+.76)

Dilution of one mineral by another produced the resulting correlations

Thin Section Silt	-	14°A Clay	(-.80)
Quartz	-	14°A Clay	(-.83)
Quartz	-	Illite	(-.97)
Thin Section Silt	-	Illite	(-.80)
Pyrite	-	Illite	(-.92)
Sulfur	-	Illite	(-.88)

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Statistical Correlations by Stratigraphic Unit

Three stratigraphic units contained enough samples to allow statistical analysis; Three Lick Bed, Upper-Middle portion of Huron Member, Lower Portion of Huron Member. Comparisons between units are discussed under analysis of variance . Only correlations (probability > 95%) within units are discussed here.

Three Lick Bed

Bulk Density - Bulk density is positively correlated (+.90) to matrix density due to the low porosity of the shales. The high correlation also documents good precision in density measurements. Correlations with 14°A clay (+.50), calcite (-.51), and plagioclase (-.50) are produced by a few outlying data points and are meaningless. The correlation of sulfur with bulk density (+.48) is also reflected in the correaltion of LOI 550-1000°C (+.57) with bulk density (SO_2 evolved at high temperature).

Log Density LOI 100-550°C is negatively correlated with log density (-.59) reflecting the low density of organic matter. Negative correlations with gamma ray (-.68) and resistivity (-.67) are again related to organic matter. The correlations with porosity (-.48) and kaolinite (+.53) are fortuitous, having no predictive value.

Matrix Density - Matrix density is positively correlated with high density pyrite and its associated variables sulfur (+.74) and LOI 550-1000°C (+.76). A negative correlation with siderite (-.55) reflects siderite's negative association with pyrite. The correlation with anhydrite (-.48) is produced by a few high values and is meaningless.

Porosity - Porosity his a weak correlation (+.53) with LOI 100-550°C probably due to its correlation with pyrite. A correlation (-.50) with 14°A clay is fortuitous.

Resistivity - Resistivity is negatively correlated with log density due to organic content. A weak negative correlation (-.51) with illite may be caused by lower organic content of clay rich shale.

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Gamma Ray Response - Gamma ray shows a positive correlation (+.49) with LOI 100-550°C, but uncorrected sample depth limits the correlation. A correlation with 14°A clay is fortuitous.

Loss on Ignition 100-550°C - Aside from aforementioned correlations with density, a positive relationship between organic content and pyrite (+.69) and sulfur (+.63) is present. Correlations with 14°clay (-.51) and illite (-.57) may reflect dilution. A correlation with hemihydrate (-.57) is fortuitous.

Sulfur, Pyrite - Sulfur and pyrite show a strong positive correlation (+.92) indicating most sulfur occurs in pyrite. Pyrite (+.52) and sulfur (+.71) are both correlated with LOI 550-1000°C refecting the loss of SO_2 on heating. Pyrite (+.58), sulfur (+.63), and LOI 550-1000°C (+.55) show correlations with szmolnokite, probably due to the formation of this iron sulfate from pyrite. Pyrite and siderite have a strong negative (-.80) correlation reflecting changing Eh-Ph conditions. This correlation produces the negative correlation (-.75) between siderite and sulfur.

Thin Section Silt - Petrographic quartz-feldspar (silt) is positively (+.81) correlated with total quartz. A positive correlation (+.68) with plagioclase indicates that it travels with quartz as a detritalcomponent.

Quartz - Total quartz also strongly correlates (+.83) with plagioclase.

Illite - Illite shows a positive correlation (+.55) with 14°A clay due to the clay minerals traveling together.

Calcite - Calcite shows positive correlations with three detrital components; quartz (+.63), orthoclase (+.68) and plagioclase (+.61) which may represent shell fragments mixed in with siltier zones.

Hemihydrate - Correlation with kaolinite (+.68), dolomite (-.71), and sample depth (+.61) are fortuitous, being produced by a few high values in a data set with many zeros.

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Sample depth - Correlations with LOI100-550 (-.62), gamma ray (-.64), silt (-.71), log density (+.89), and 14°A clay (+.68) reflect less organic matter in the lower portion of the cored interval of the Three Lick Bed. See strip log of LOI 100-550°C.

Dilution of one mineral by another produced the following correlations

Silt	-	14°A Clay	(-.58)
Silt	-	Illite	(-.71)
Illite	-	Plagioclase	(-.59)
Illite	-	Calcite	(-.51)
Illite	-	Pyrite	(-.63)
Illite	-	Quartz	(-.90)
Quartz	-	14°Clay	(-.65)
Plagioclase	-	14°Clay	(-.53)

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Upper -Middle Huron

Bulk Density - Bulk density has a negative correlation (-.76) with porosity as discussed in the overall well. A negative correlation (-.64) with quartz reflects the correlation of quartz and organic content. The correlation with hemihydrate (-.87) is fortuitous, representing a few high values in the data set. Bulk density has a negative correlation (-.66) with LOI100-550°C reflecting the low density of organic matter.

Porosity - In addition to the correlation with bulk density, porosity show a fortuitous correlation (+.66) with hemihydrate.

Resistivity - A negative correlation (-.84) with sulfur reflects the problem of comparing log data to depth uncorrected point samples. Although significant, the correlation is meaningless.

Loss on Ignition 100-550°C - This variable is positively correlated with pyrite (+.75) and sulfur (+.64) probably because the chemical condition favorable for preserving organic matter favors pyrite formation. Correlations with quartz (+.71) and illite (-.75) reflect greater quartz and less clay in organic rich shales.

Quartz - Quartz has a positive correlation with plagioclase (+.68) as both detrital minerals travel together. A similar correlation exists with silt (petrographic quartz-feldspar) and plagioclase (+.72). A correlation (+.86) with hemihydrate is meaningless, reflecting a few high values. The correlation between quartz and organic content produces the correlation (+.77) between quartz and pyrite.

Illite - A correlation (-.83) with hemihydrate is meaningless, produced by a few high values.

Sample Depth - As shown on the strip charts, resistivity increases (+.91) while sulfur (-.84) and szmolnokite (-.66) decrease with depth within the cored interval.

The following correlations reflect dilution of one mineral by another

Illite - LOI550-1000°C	(-.75)
Illite - Pyrite	(-.76)
Illite -Quartz	(-.98)

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Illite	- Plagioclase	(-.66)
Illite	- Siderite	(-.65)

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Lower Huron

Bulk Density - A positive correlation with matrix density (+.77) reflects the low porosity of the shales. Porosity shows a negative correlation (-.67) as in the trend for the overall well. A negative correlation with LOI 100-550 (-.60) is due to the low density of organic matter.

Log Density - Log density shows an expected negative correlation (-.73) with gamma ray response. LOI 100-550°C has a negative correlation (-.57) with log density due the low density of organic matter. A correlation with 14°A clay (+.69) may be related to the greater clay content of less organic rich shales as LOI 100-550 is negatively correlated (-.59) with 14°A clay.

Loss on Ignition 100-550°C - As with bulk density and log density, this variable shows a negative correlation with matrix density (-.69). Positive correlations exist with pyrite (+.54) and sulfur (.58).

Sulfur - Sulfur is positively correlated (+.74) with pyrite indicating most sulfur is in pyrite. A weak correlation with porosity (+.49) may reflect the association previously described by us between pyrite and porosity.

Quartz - Quartz has a positive correlation with plagioclase (+.75) as both are detrital minerals of similar densities.

Sample Depth - Log density decreases (-.59) and gamma ray response increases (+.60) due to the greater thickness of black shales in the basal portion of the lower Huron. The following correlations are fortuitous, being produced by few extreme values commonly in data sets having many zero points.

14°A Clay -	Anhydrite	(-.57)
14°A Clay -	Matrix Density	(-.57)
Calcite -	Orthoclase	(+.50)
Hemihydrate	Quartz	(+.62)
Hemihydrate -	Calcite	(+.57)
Hemihydrate -	Orthoclase	(+.51)
Hemihydrate -	Plagioclase	(+.75)

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Dilution of one mineral by another produced the following correlations.

Illite	- Silt	(-.45)
Illite	- Quartz	(-.91)
Illite	- Pyrite	(-.58)
Illite	- Orthoclase	(-.49)
Illite	- Plagioclase	(-.54)

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Analysis of Variance

In analyzing the stratigraphic units and lithologic types, one important question is, do the analytical and petrophysical parameters show stratigraphic and or lithologic differences. A preliminary step to answering this question is the univariate analysis of variance which looks for differences for a given variable in stratigraphic and lithologic divisions. Results from Wise 253 are given below. Probabilities greater than 95% are marked with an asterisk and indicate that at least one stratigraphic unit or lithologic type has a significant difference for the parameter under consideration.

Parameter	Stratigraphic	Lithologic
14°Clay	.0001 *	.0043 *
Illite	.0046 *	.5753
Quartz	.0002 *	.2148
Pyrite	.3200	.3592
LOI 100 - 550 °C	.0004 *	.0812
LOI 550 - 1000°C	.0001 *	.3715
Sulfur	.5755	.4667
Bulk Density	.0002 *	.0001 *
Matrix Density	.0001 *	.0004
Log Density	.0001 *	.0361 *
Porosity	.2463	.1336
Gamma Ray	.0001 *	.6266
Resistivity	.0107 *	.3857
Silt	.0001 *	.4882

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The univariate analysis of variance, indicates that most differences are stratigraphic, that is at least one of the stratigraphic units is different. All parameters except sulfur, pyrite, and porosity show a stratigraphic difference. The only differences between lithologic types are 14^0 clay, bulk density, matrix density, and log density. LOI 100-500 ^oC approaches significance and it is this variable which induces the differences in density. The fact that compositional between differences between the lithologic types is not great supports a classification by fabric elements.

In order to determine which specific stratigraphic unit(s) and lithologic type(s) showed a significant difference for a given parameter, Duncan's Multiple Range Test was run. Results are discussed for each parameter below.

14^oA Clay- Three Lick Bed and Cleveland Shale have significantly lower 14° clay content than upper-middle Huron and lower Huron.

Illite- Three Lick Bed is significantly lower in illite content than upper-middle Huron and lower Huron.

Quartz - Although the analysis of variance indicated a significant difference, Duncan's test does not indicate an appreciable difference, this is likely due to the small sample size of some of the stratigraphic units. A trend exists, however, with the Cleveland Shale and Lick Bed having higher quartz content than the Huron Member.

LOI 100-550^oC - Three Lick Bed and lower Huron are significantly higher in organic matter than upper-middle Huron.

LOI 550-1000^oC - Three Lick Bed and Cleveland Shale are significantly lower than upper-middle Huron and lower Huron.

Bulk Density- The Cleveland Shale has a significantly lower bulk density due to its high organic content. The non banded lithologic type has significantly higher bulk density.

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Matrix Density - The Cleveland Shale has a significantly lower matrix density due to its higher organic content.

Log Density - The Cleveland Shale has a significantly lower log density due to its higher organic content. The upper-middle Huron has a significantly higher log density than other stratigraphic units. Siltstones have a higher log density than the shale lithotypes.

Gamma Ray Response - The lower Huron has a significantly higher gamma may response than other stratigraphic units.

Resistivity - The Three Lick Bed and lower Huron have a significantly higher resistivity

Silt - The Cleveland Shale and Three Lick Bed have a significantly higher silt content than the upper-middle Huron and Lower Huron.

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Petrologic Examination of Fractures in Wise 253

The Wise 253 core exhibited numerous natural fractures and a sufficient thickness of black shale,but failed to have a natural open flow as measured by the temperature log. Examination of the natural fractures provides possible explanations. The vertical fractures in the core were mineralized. In contrast to some of the partially mineralized fractures seen in the Lincoln 1637 and Jackson 1369 cores, these fractures were tightly mineralized by carbonates and sulfates and could not be impregnated with colored epoxy. As such, porosity and permeability is interpreted to be very low.

Most fractures in core were low angle slickensided fractures. Some contained megascopic fibrous mineralization which appear very tight in thin section. Fibrous fillings are interpreted by Durney and Ramsey (1973) to represent syntectonic crystallization of a progressing opening fracture. Many slickensided fractures lacked megascopic crystallization, but examination by scanning election microscopy revealed minute euhedral carbonates and sulfates. Apparently some porosity can be associated with tightly appealing slickensided fractures, yet no gas shows are associated. Two possible explanations are put forth. First, although some porosity is present, perhaps it is not very well interconnected. Many of the slickensided surfaces are irregular and isolated pockets of porosity may be created by movement and propping along an uneven surface. A second factor may be the sealing effect of the fracture. Examination of their surfaces by scanning election microscopy revealed in impermeable looking surface that locked grain to grain boundaries. Even if some porosity is present, gas diffusion from the matrix will be greatly inhibited. This observation lends support to the contention of Schletter (1978) that free gas in the fractures can be depleted in a matter of days and that most

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production represents diffusion from the matrix.

After cryogenic stimulation of the lower Huron interval, Wise 253 had recorded production of 134 MCF per day. One question is yet unanswered; was this gas from some "fracture(s)" located beyond the wellbore or did it diffuse from the matrix into the artificially created open fracture? The production from this well is not much different from that of Jackson 1371. Jackson 1371 had a comperable thickness of black shale and only 1 slickensided fracture present. It had no recorded natural open flow but produced 173 MCF per day after hydraulic fracing. One conclusion that can be drawn is that the presence or absence of slickensided fractures does not appear to greatly influence the productivity of a shale well. Vertical fractures associated with thrusting in this well are tightly mineralized, probably reflecting precipitation from the pore fluids that helped initiate thrusting. Areas of low angle faulting may offer no great advantage for locating shale wells. Representative illustrations of the fractures found in Wise 253 are given on the following pages.

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Figure 3. A) High-angle vertical fractures in black shale. Fractures are mineralized giving them greater density in the radiograph. B) Photomicrograph of dolomite minerial filling showing tight nature of mineralization. No gas show was associated with this vertical fracture. From a core depth of 4914 feet.

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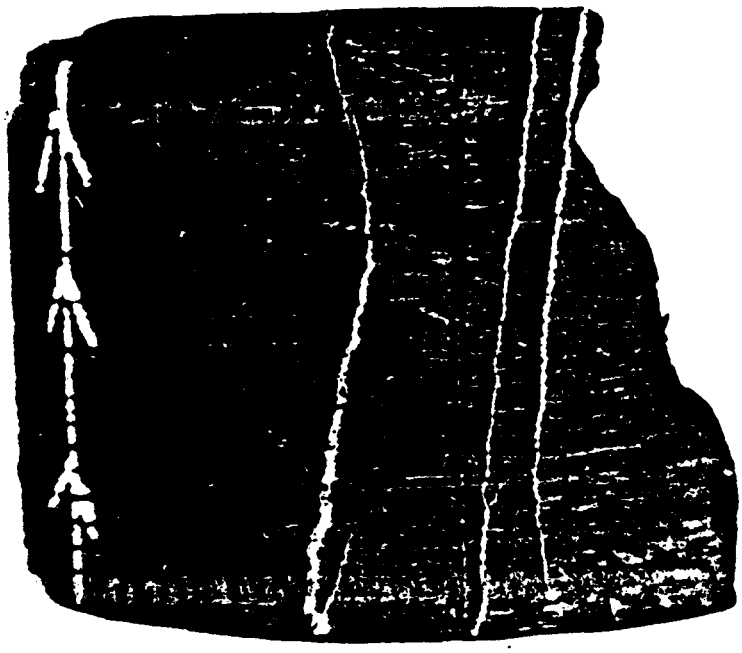

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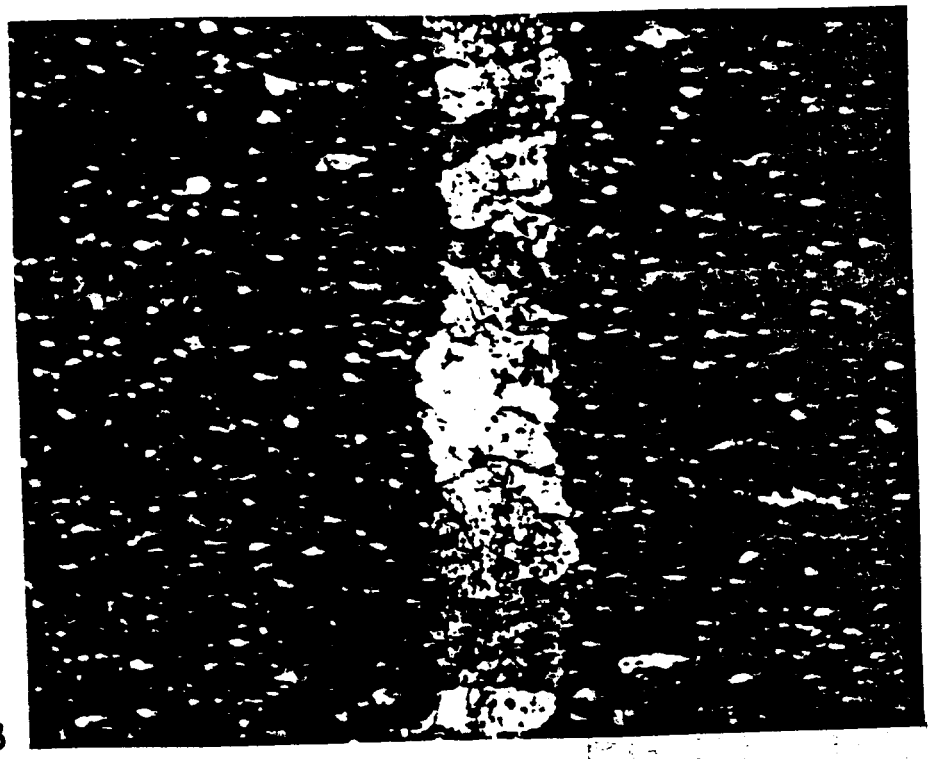

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Figure 4. A) Complexly fractured laminated shale as seen in radiograph. Apparently,initial fracturing was related to tight folding. After these fractures were filled by carbonates and sulfates, they were offset along bedding planes at places. From a core depth of 4928 feet. B). Photo of 4 inch diameter core showing array of en-echelon mineral filled fractures formed in a shear zone. Fractures are tightly mineralized by carbonates and sulfates. From a core depth of 4931 feet.

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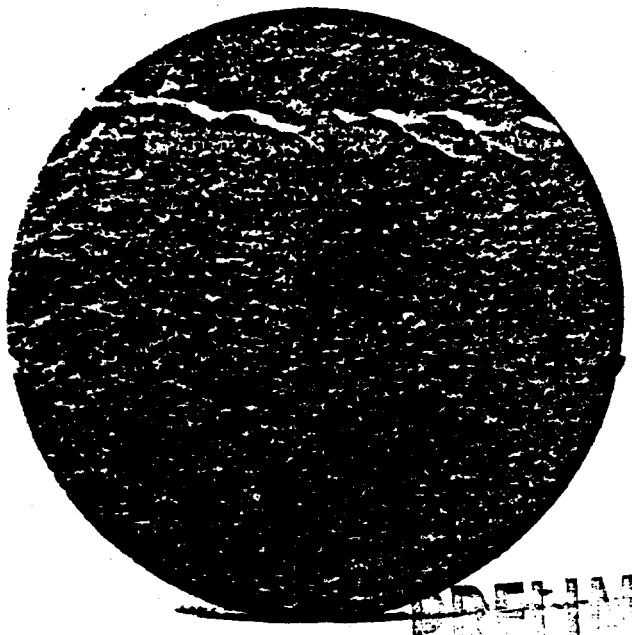

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Figure 5. A) Photo of 4 inch core showing typical appearance of slickensided fracture. Such fractures are very common in this core, but are not associated with gas shows. From a core depth of 5393'. B) Radiograph of black shale with fibrous mineralization (darkest tone at bottom of sample) developed at contact with slickensided fractures. From a core depth of 5305 feet. C) Photomicrograph of fibrous mineral filling. Dolomite crystals extend perpendicular to the fracture walls. Little porosity is present. From a core depth of 5305 feet.

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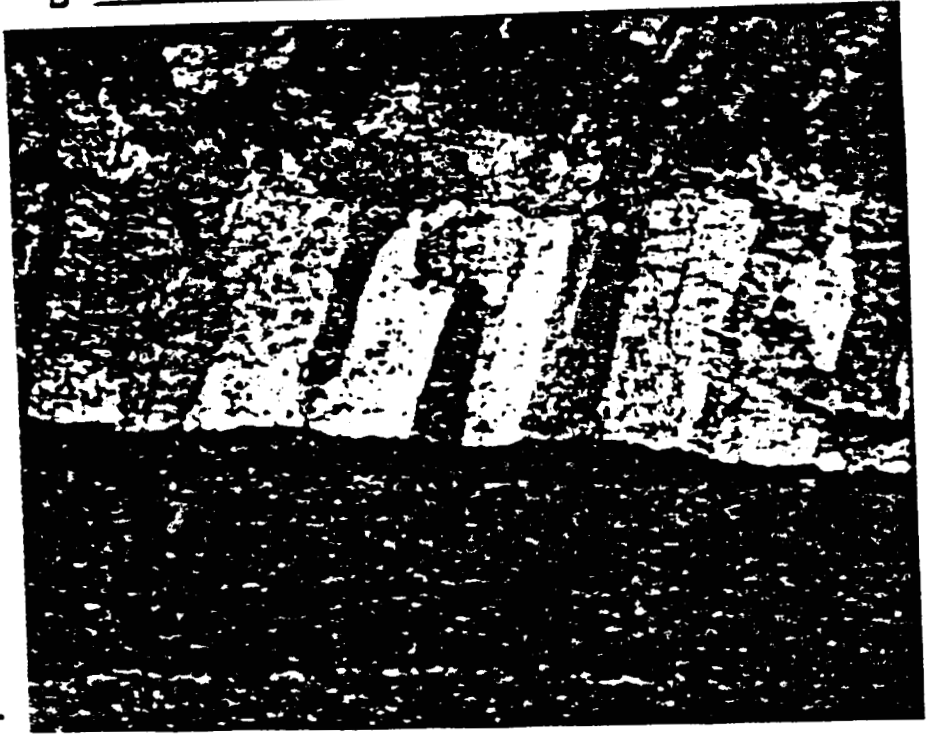

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Figure 6. A) Scanning election microscope photomicrograph of slickensided fracture showing enhedral gypsum crystal. Apparently, some porosity is associated even with slickensided fractures. Note smooth glassy surface of fracture. From a core depth of 5325 feet. B) Scanning electron microscope photomicrograph illustrating sealing effect of slickensided fracture. Surface on left is artificially fractured, but is not greatly different in appearance from unmineralized natural vertical fractures. Slickensided surface shows complete obliteration of grain to grain boundaries. From a core depth of 5331 feet.

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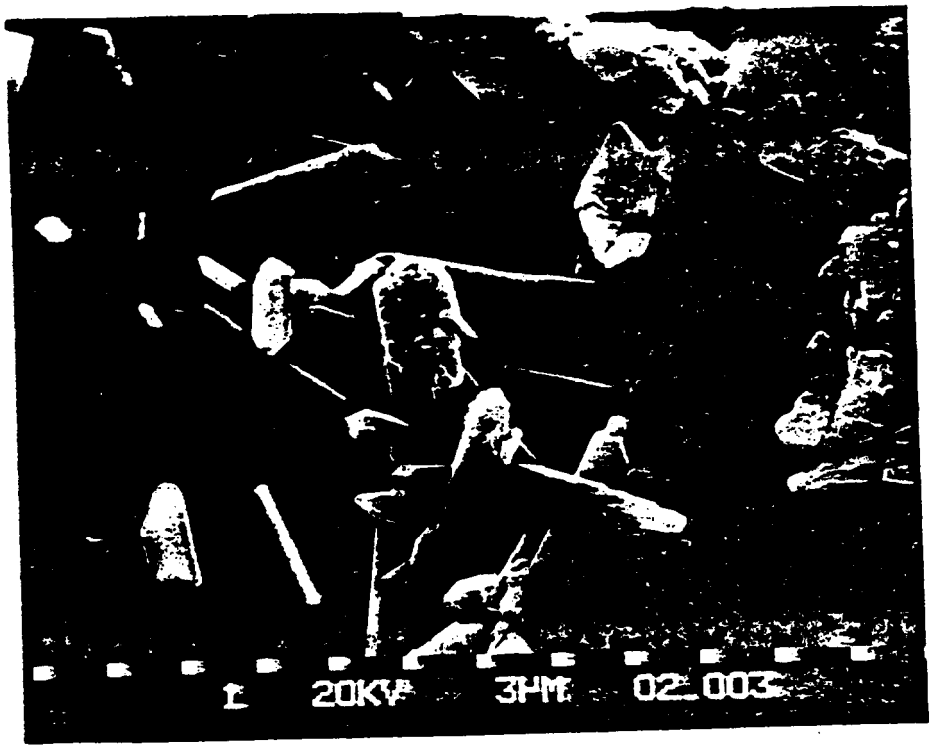

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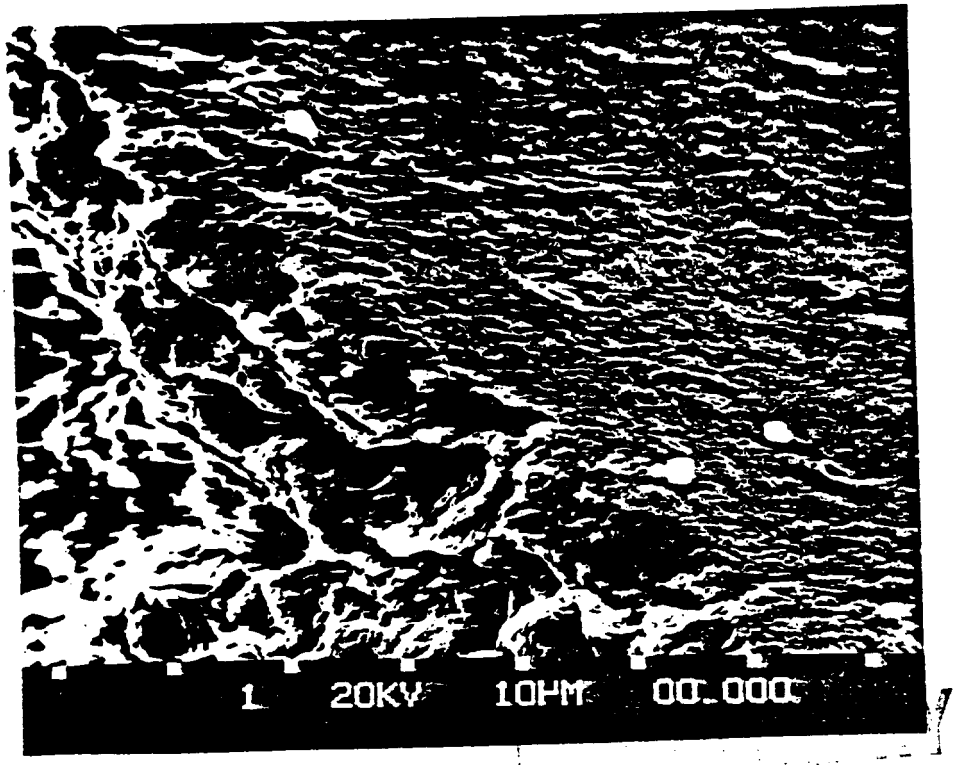

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Conclusions and Recommendations

1) The lower Huron of Wise County is characterized by an assemblage of different shale lithotypes. It is not dominated by any specific lithotype. Compositional differences between shale lithotypes defined by fabric elements are minor. As such, difinition of lithotypes by fabric elements, yields a type of information that is overlooked by a strict compositional classification.

2) The shale lithotypes reflect differing arrangements of organic and mineral constituents and likely have different degrassing properties. To date, no pearmeability or diffusion determinations have been performed on specific lithotypes, but on vauge categories as "grey" or "black" shale. In order to better understand the gas sorping capacities and transmission proporties of the shale it is recommended that a portion of the core on which these tests are run be retained for description by a petrologist. It has been shown by us in previous reports Nuhfer, Vinopal, and Hohn (1978) Vinopal, Huhfer and Hohn (1979) that these lithotypes have different geographical distribution within the lower Huron.

3) Association of pyrite with matrix porosity is again confirmed. About 1/3 to 1/2 of the total matrix porosity present in Devonian shales is pyritic-related. Matrix porosity appears to be of little importance in predicting productivity and gas content of the shale.

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4) Numerous slickensided fractures and a smaller number of mineralized vertical fractures were found in the core. No gas shows were associated with any fracture. Even slickensided fractures have some porosity associated with them, but appreciable recharge of gas from the shale matrix through the slickensided "skin" to any fracture appears virtually impossible. Thus, areas dominated by low-angle deformation appear to offer no advantage for locating shale wells. One issue unresolved is whether shale wells which produces at a modest rate after stimulation do so because the

natural fracture system was tapped or because the artificial fractures drain gas from the matrix. Wise 253 and Jackson 1371 both had no open flow, but had modest production after stimulation. It seems somewhat unrealistic to envision that both cores "missed" nearly open fractures.

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References Cited

Durney D.W., and Ramsey J.G., (1973), Incremental Strains Measured by Syntectonic Crystal Growths; in Gravity and Tectonics, De Jong, Kee A. ed., New York, Wiley and Sons, 502p.

Nuhfer, E.B., 1978, Methods for geochemical and petrographic characterization of sediment-trap samples: unpublished manuscript, 33p.

Nuhfer, E.B., Vinopal, R.J., Hohn, M.E., and others, 1978, Report of petrologic characterization of Lincoln 1637 (C.G.T.C. #20403):

Vinopal, R.J., Nuhfer, E.B., Hohn, M.E., and others, 1979, Report of petrologic characterization of Jackson 1369 (C.G.T.C. #11940): U.S. Dept. Energy Open File Rept., 140p.

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Key to Abbreviations in Appendices

SAMPLE - Sample number, depth in feet

LOSIG 100 - weight % loss on ignition, 100-550°C

LOSIG 500 - weight % loss on ignition, 550-1000°C

SULFUR - total weight % sulfur from LECO method

BULKDEN - bulk density (g/cc) measured on core sample

MATRXDEN - matrix density (g/cc) measured on core sample

LOGDEN - bulk density (g/cc) from density log

POROSITY - percent porosity of samples from matrix and bulk density measurements

GAMMA - API units from gamma ray log

QUARTZ - percent quartz-feldspar (silt) measured in thin section

EXP - relative amount of 14°A clay mineral by X-ray diffraction

ILL - " " " illite " "

COQ - " " " coquimbite " "

KAO - " " " kaolinite " "

HEM - " " " hemi-hydrate " "

ANH - " " " anhydrite " "

SZM - " " " szmolnokite " "

QTZ - " " " quartz " "

PYR - " " " pyrite " "

CAL - " " " calcite " "

DOL - " " " dolomite " "

ORT - " " " orthoclase " "

PLA - " " " plagioclase " "

SID - " " " siderite " "

ANK - " " " ankerite " "

GRDEN - computed grain density (g/cc) of sample using compositional percentages

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Appendix A : Strip Logs of Measured Parameters

Lithotype Abbreviations

1. Siltstones
2. Sharply-banded shale
3. Thinly-laminated shale
4. Lenticularly-laminated shale
5. Combination types
6. Non banded shale
7. Concretions

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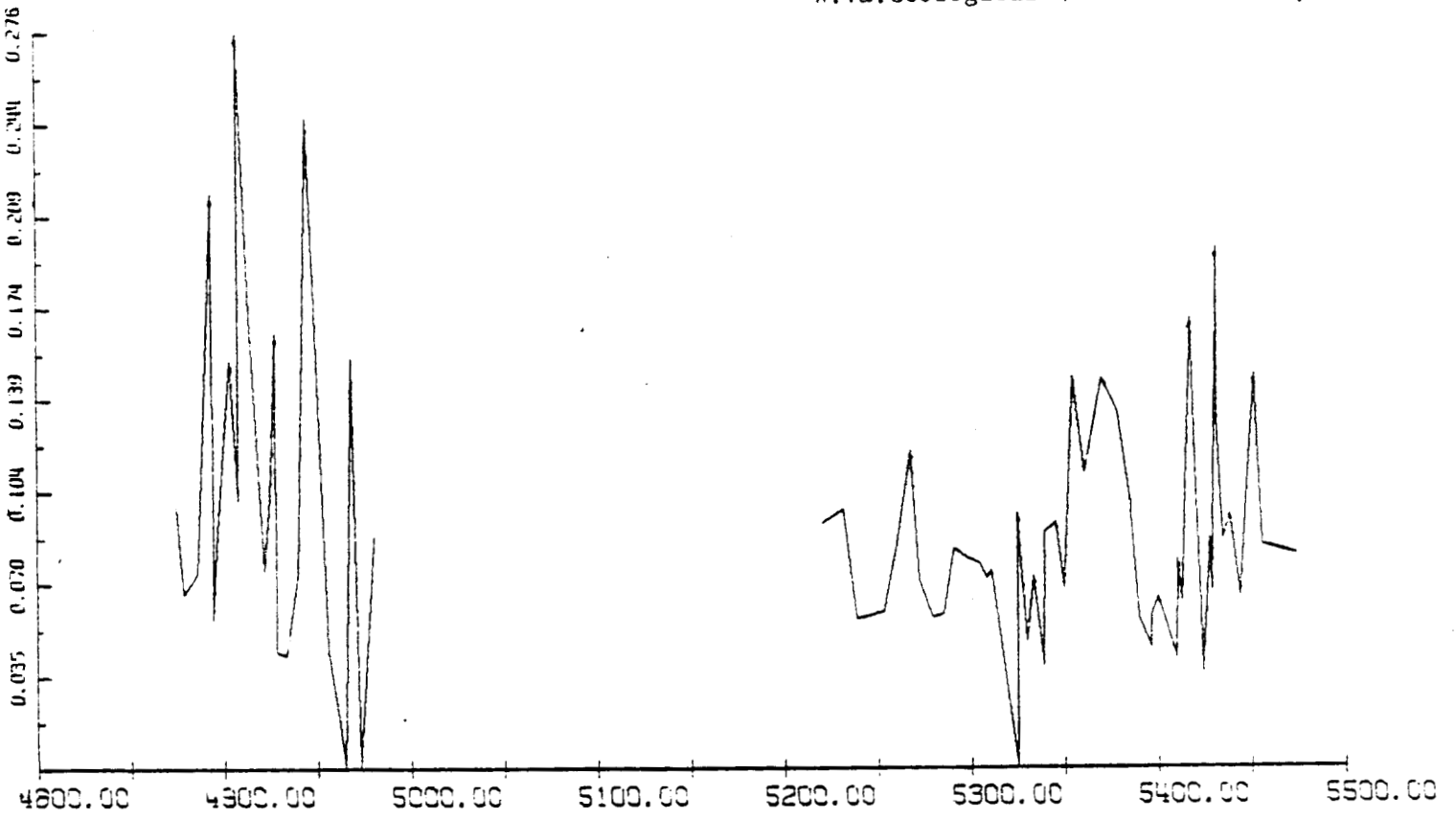

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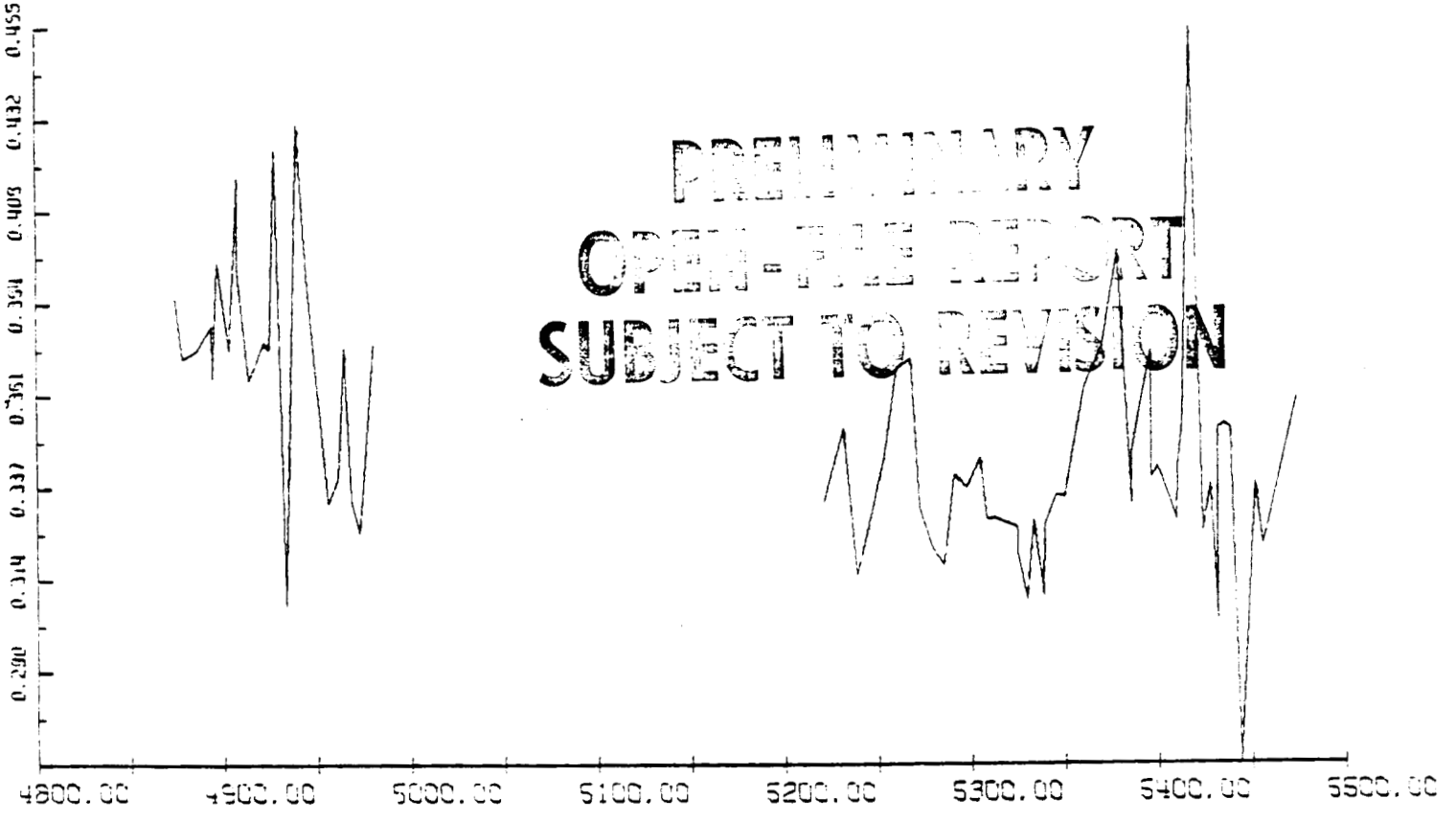

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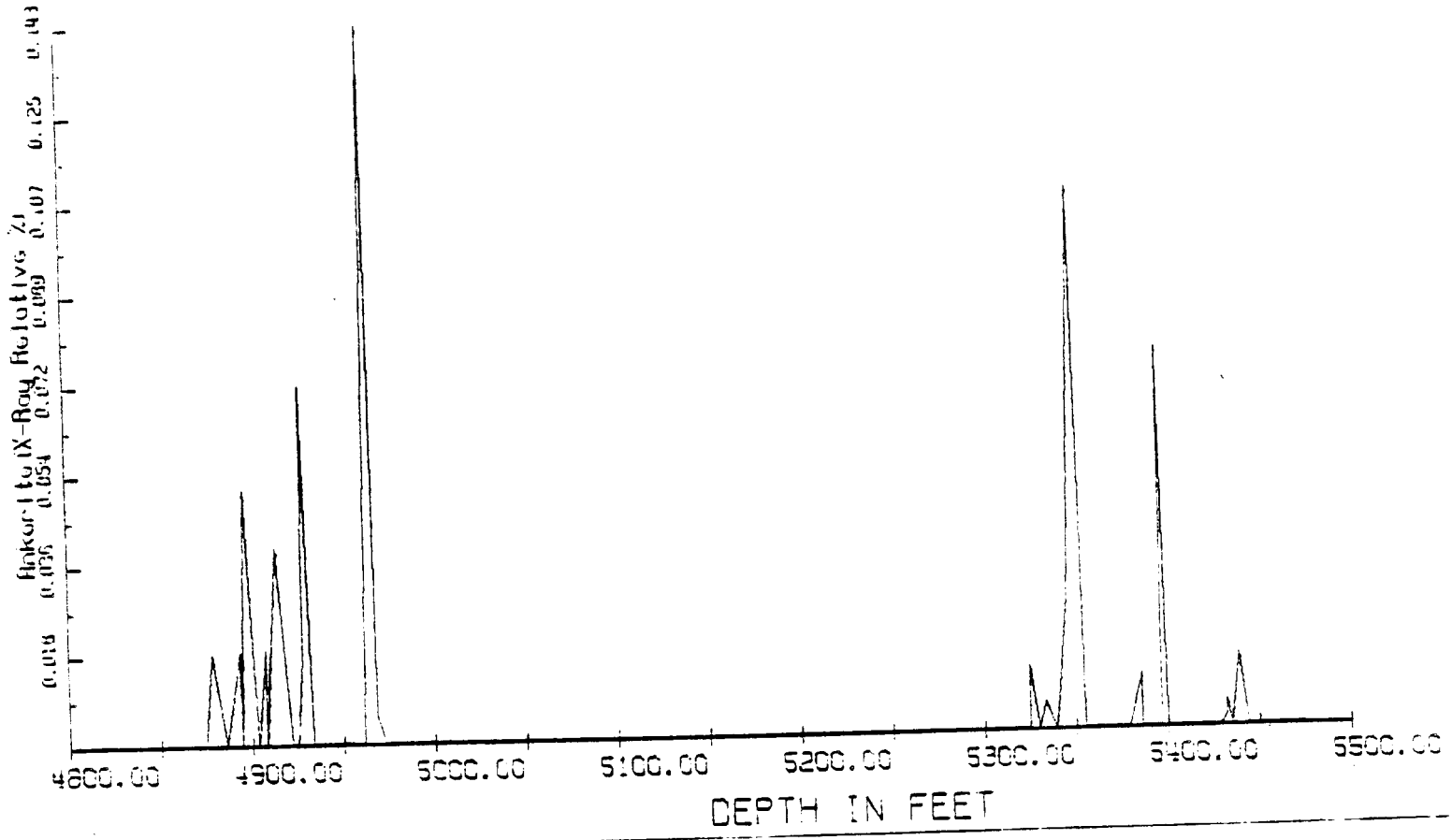

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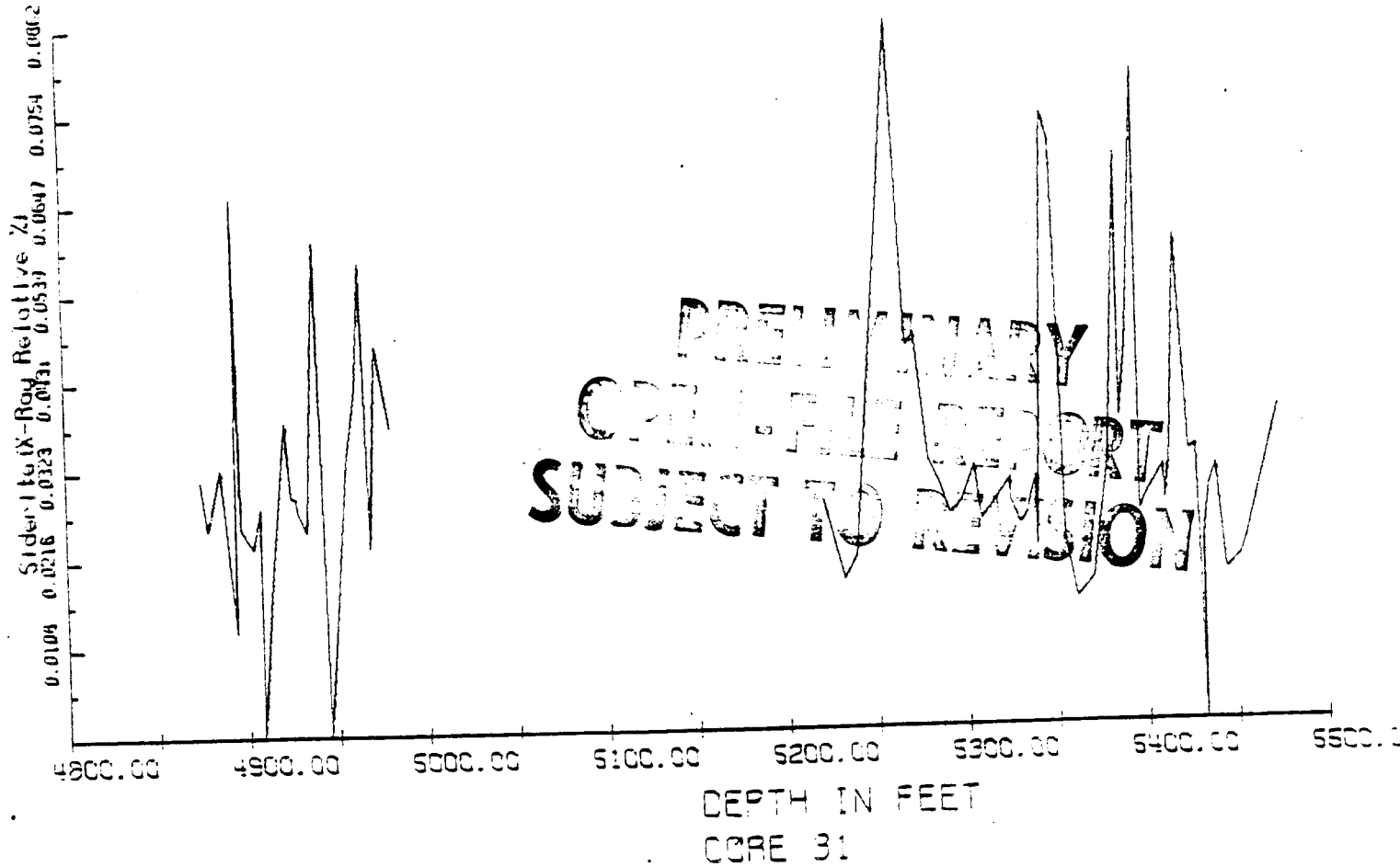

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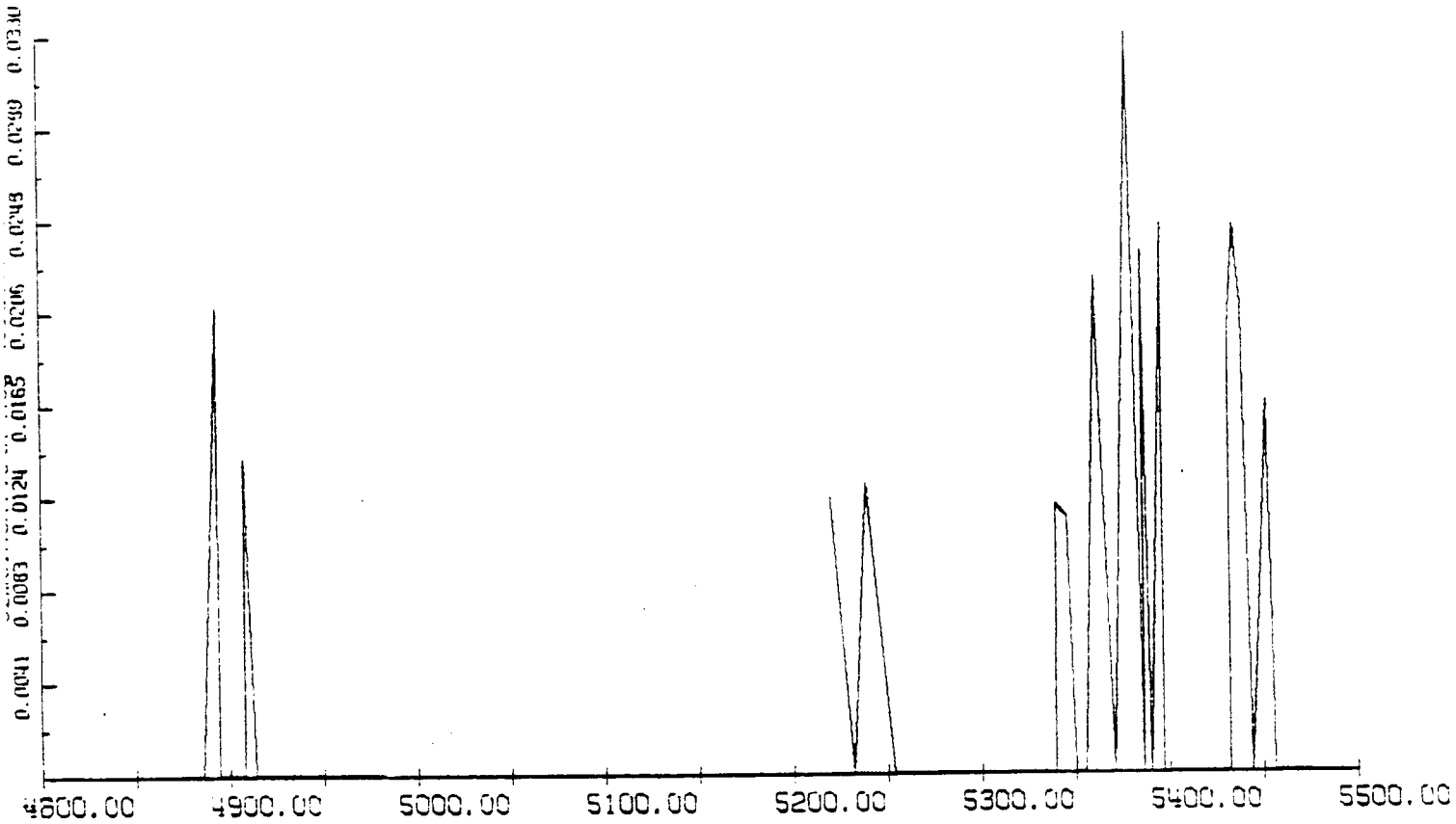

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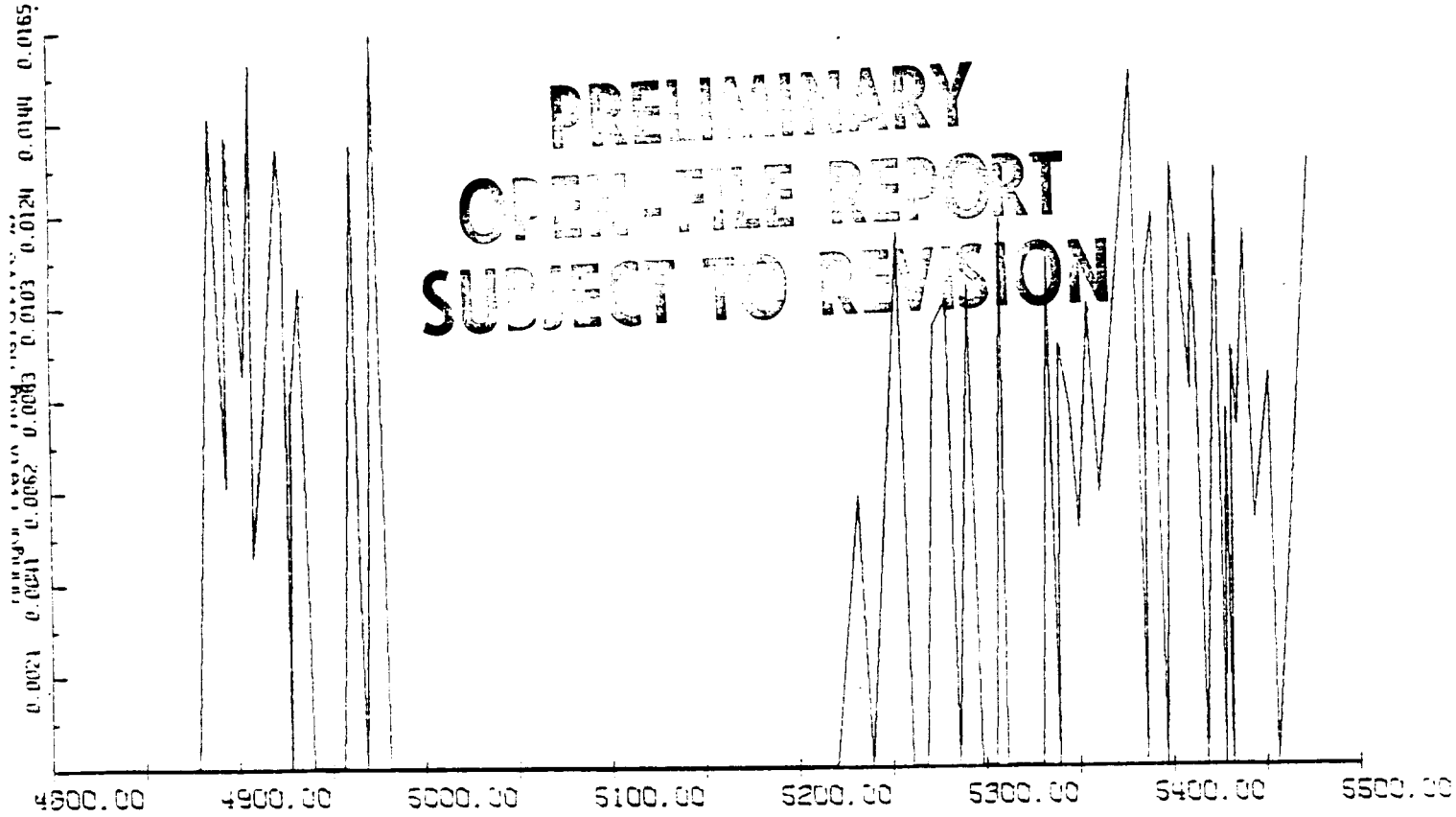

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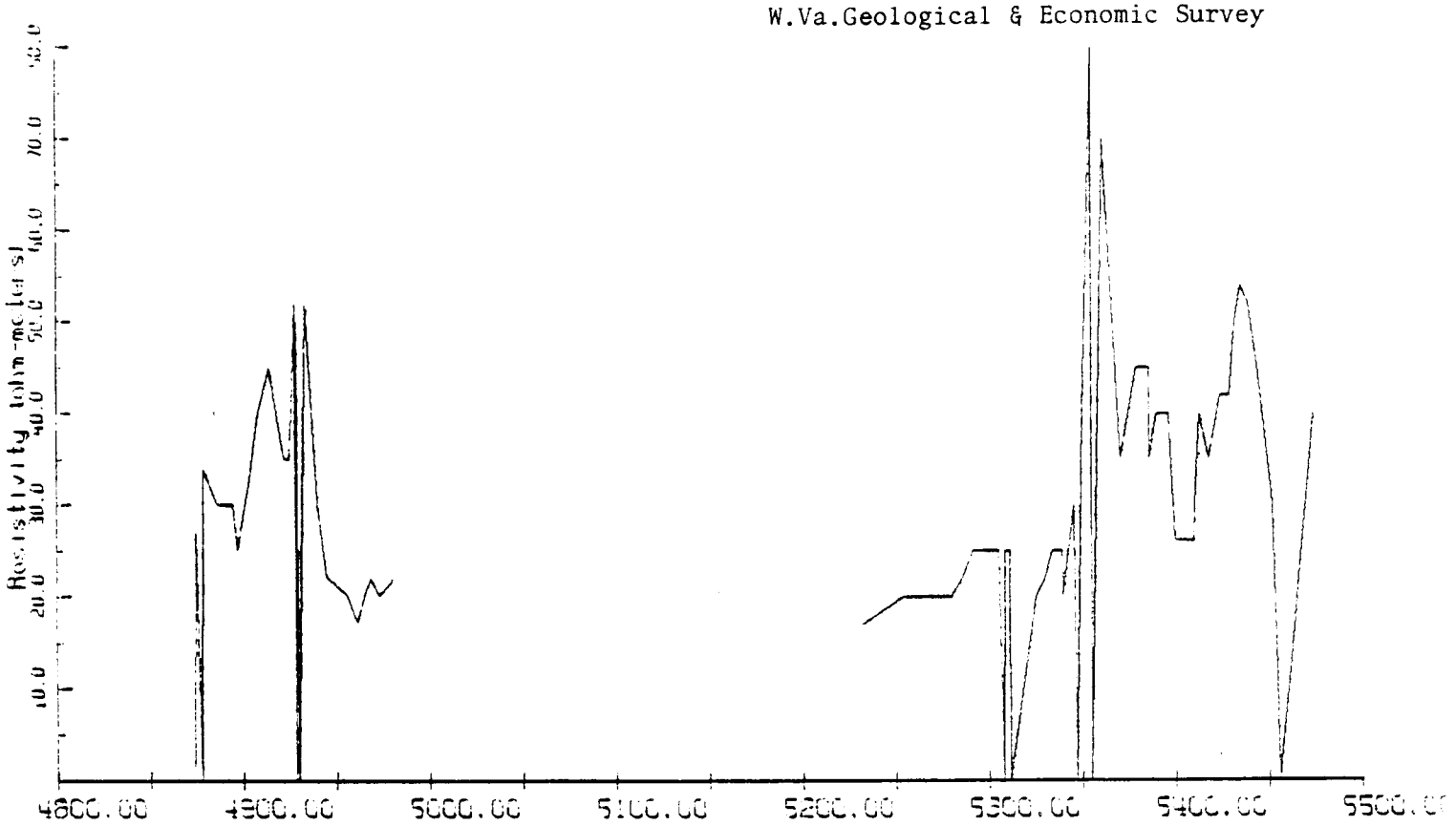

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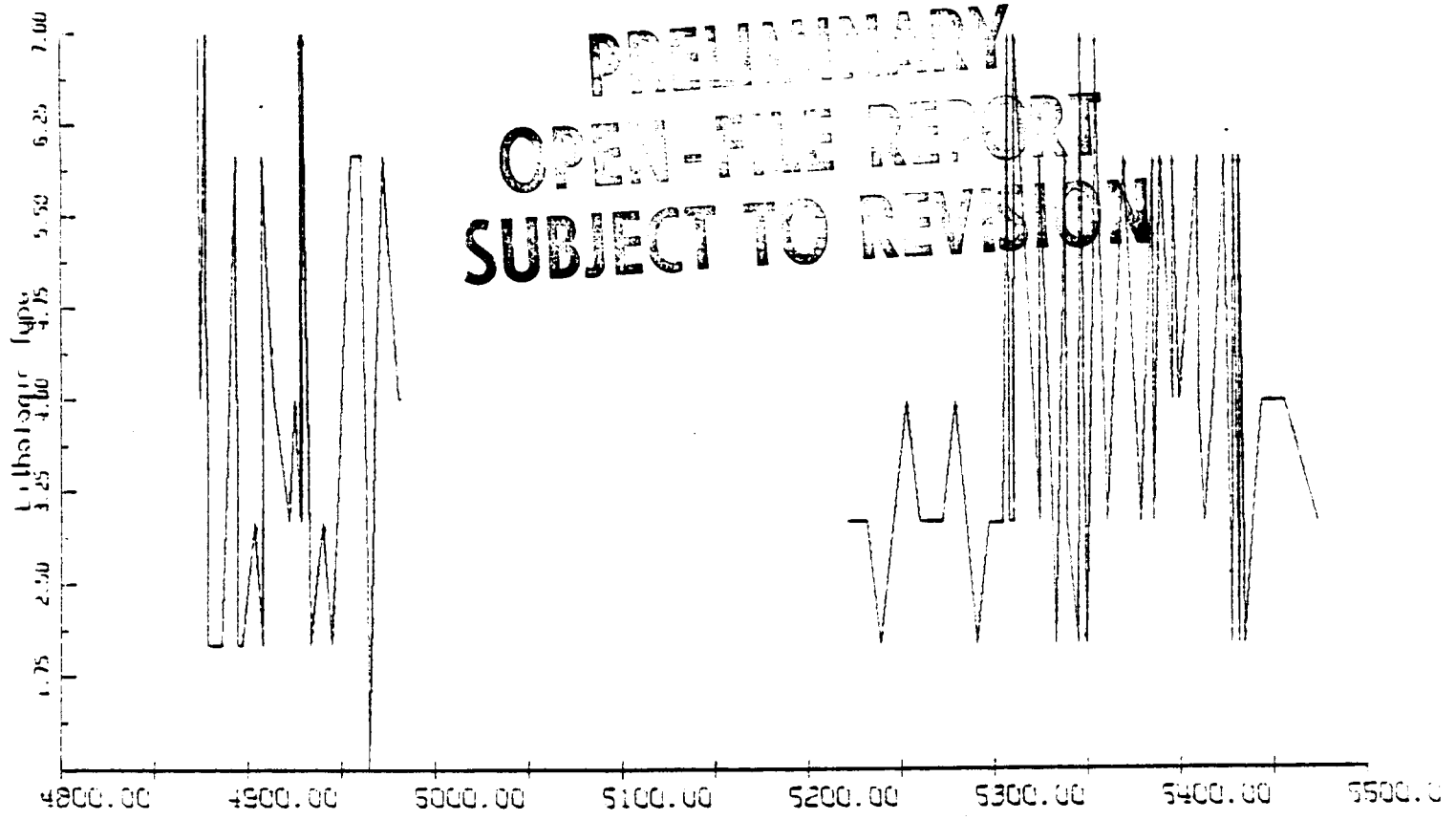

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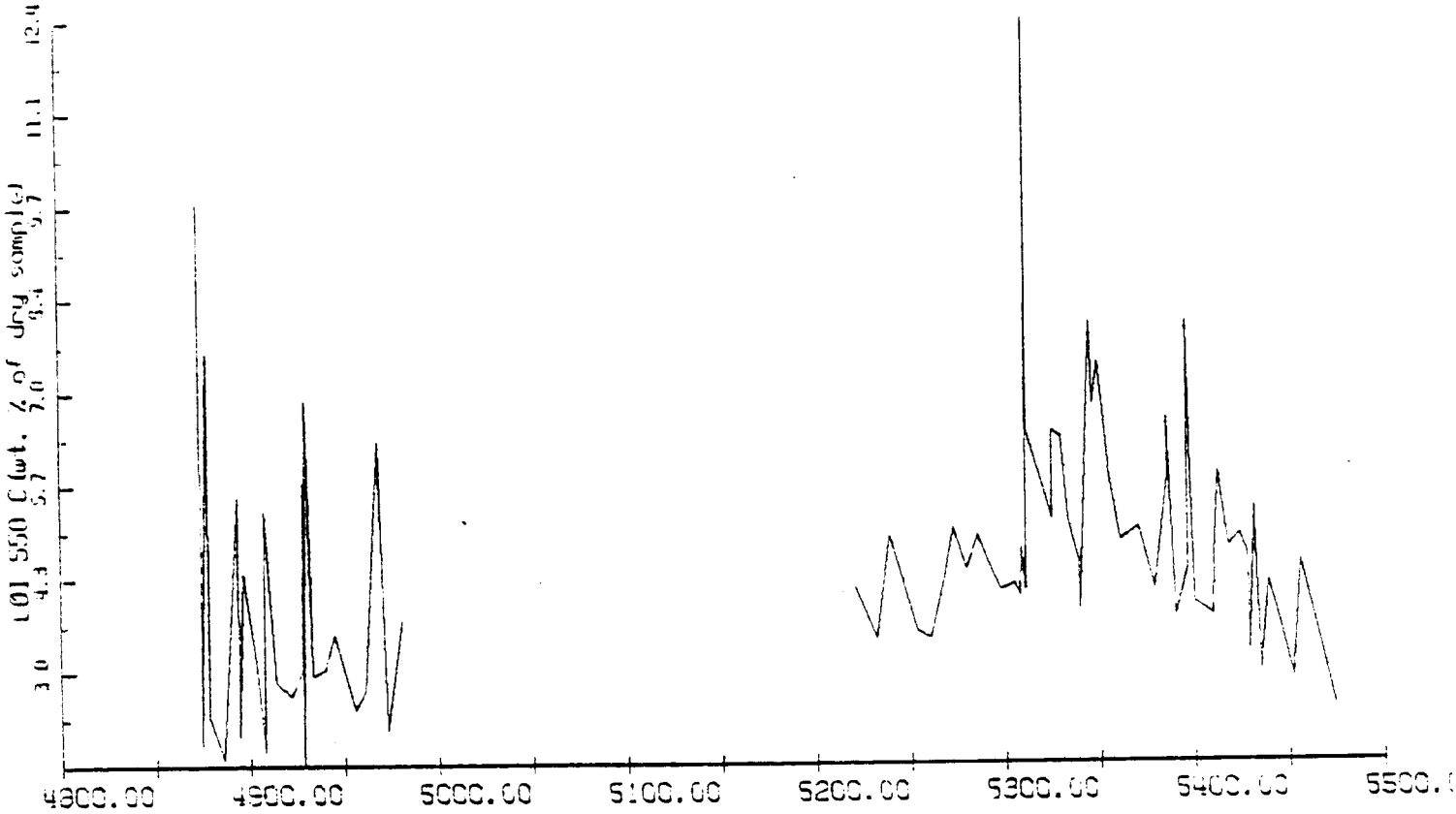

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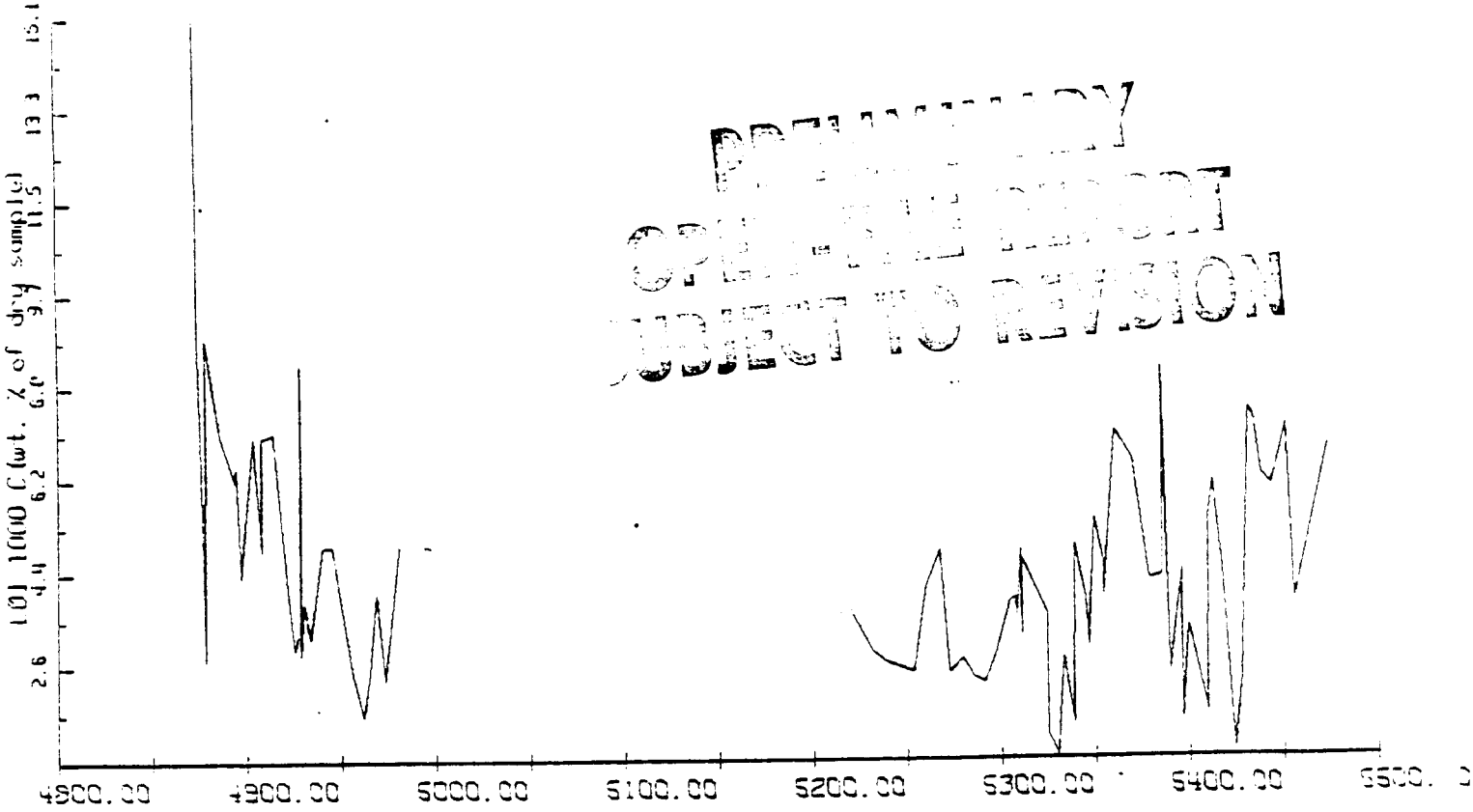

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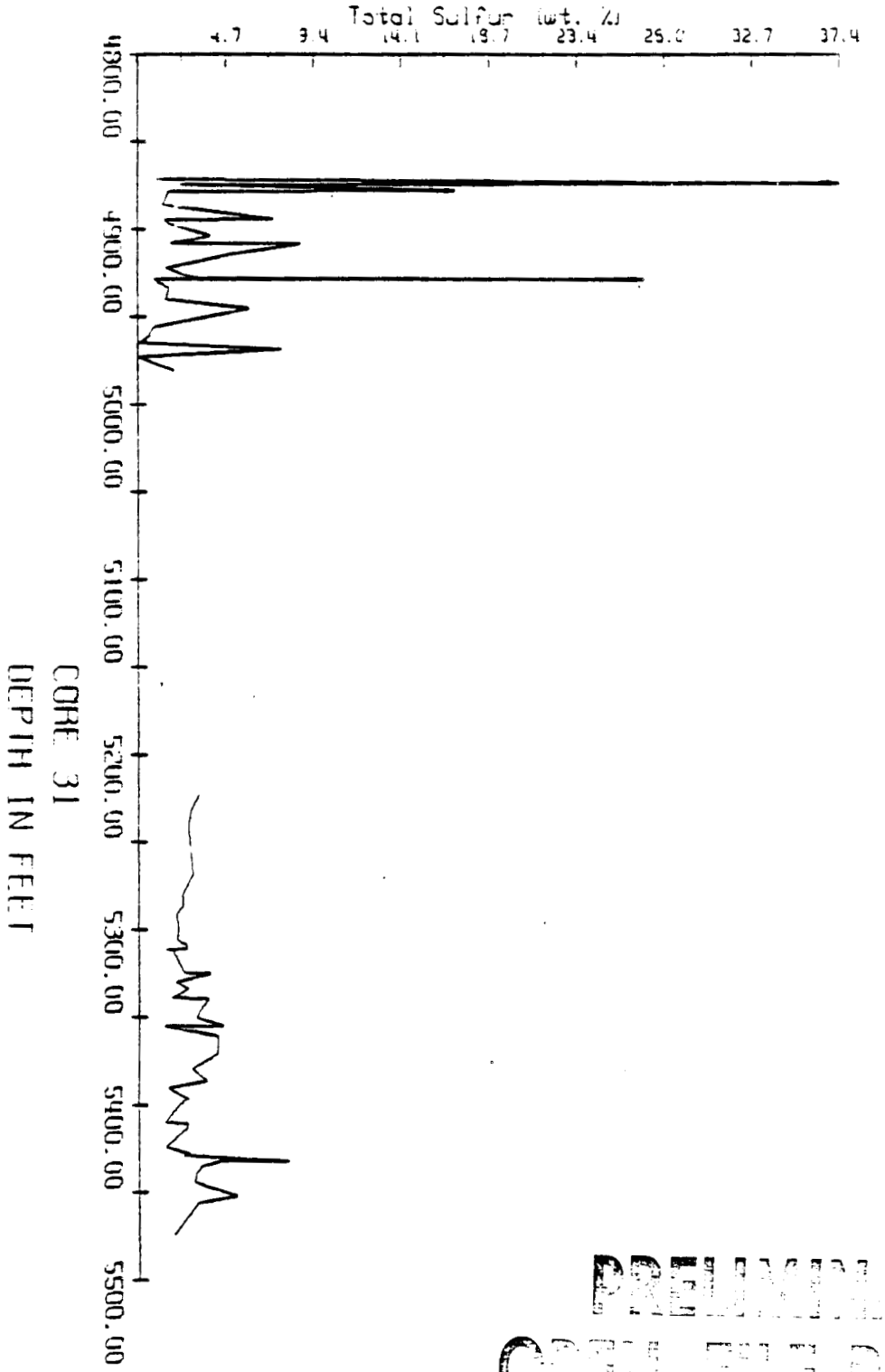

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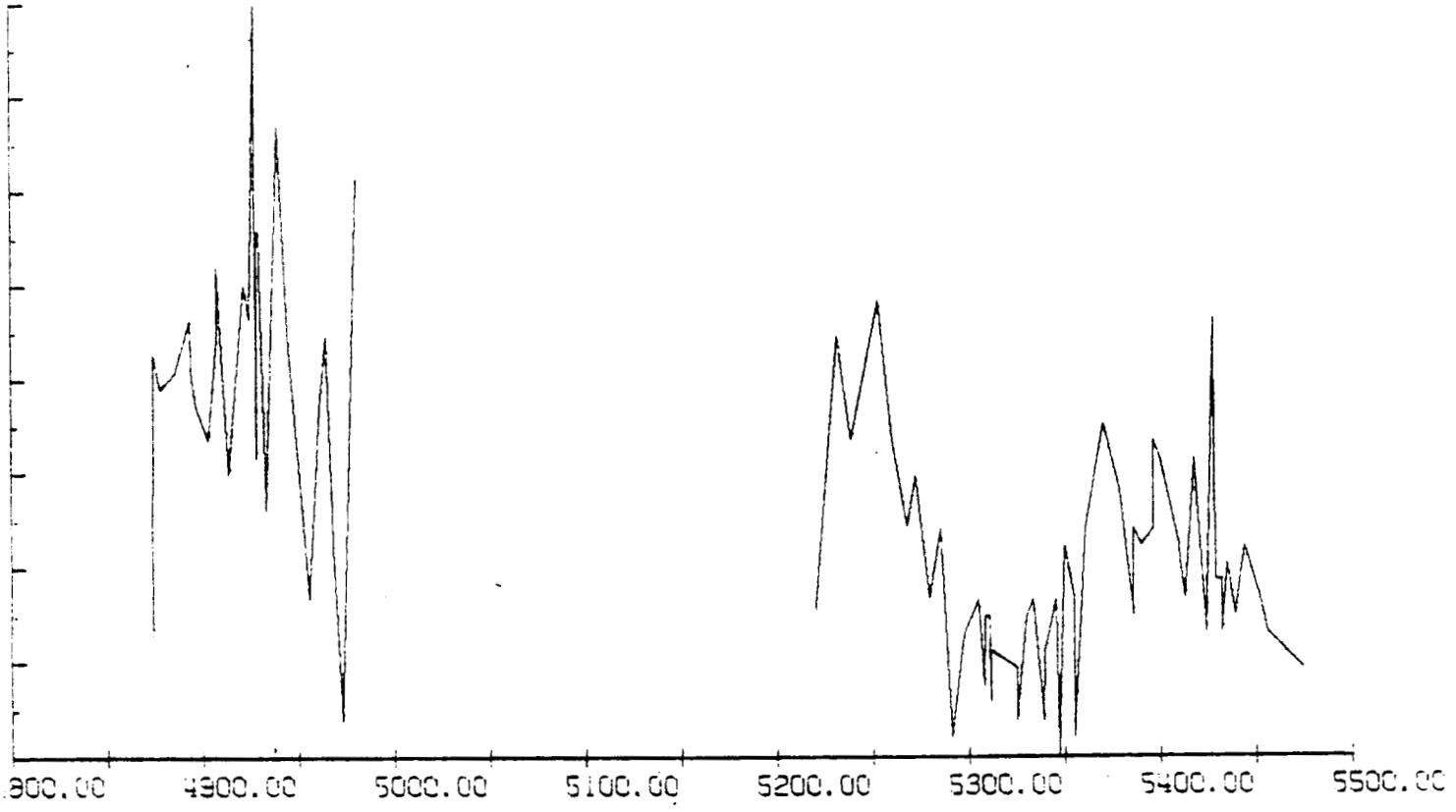

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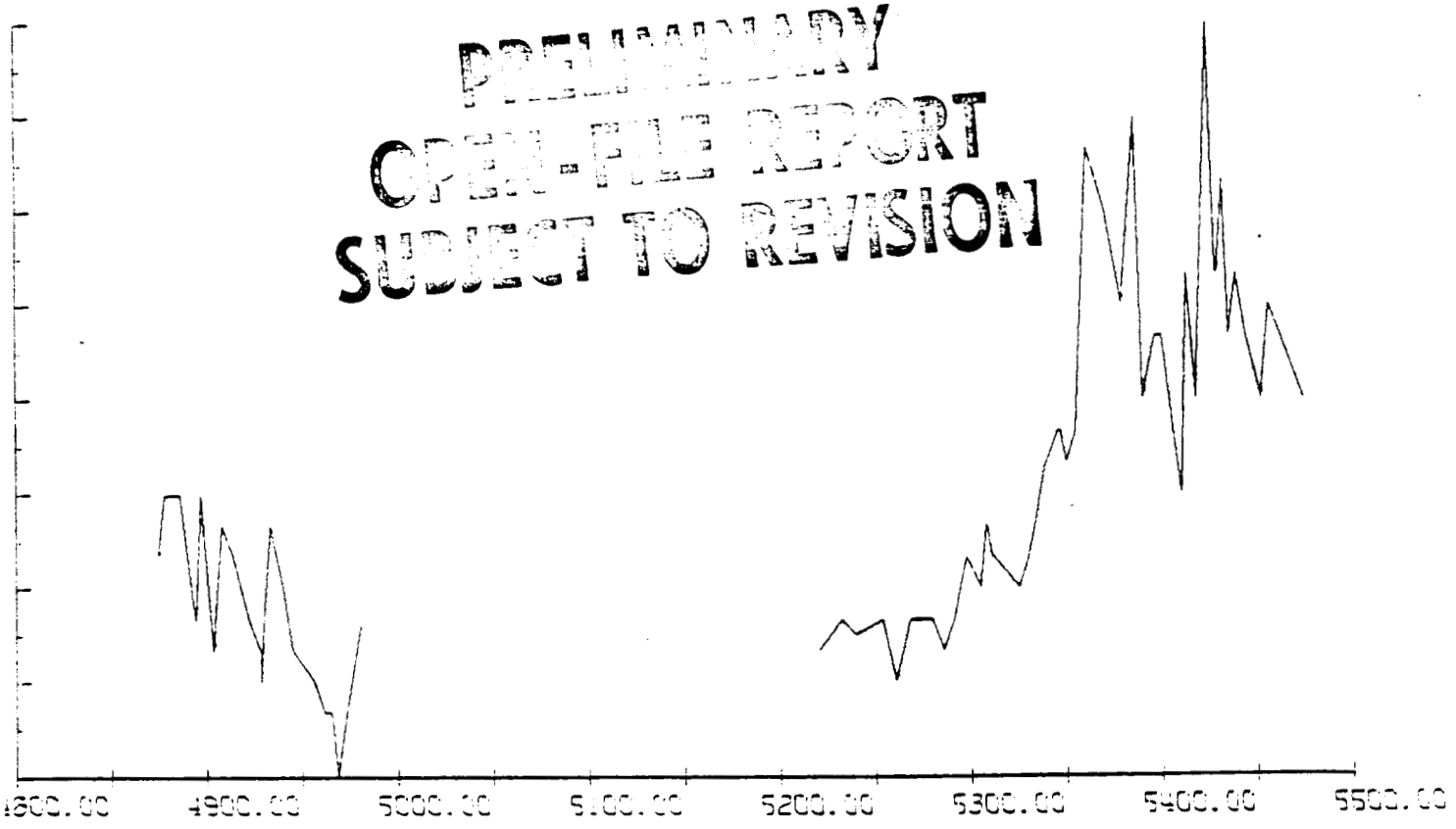

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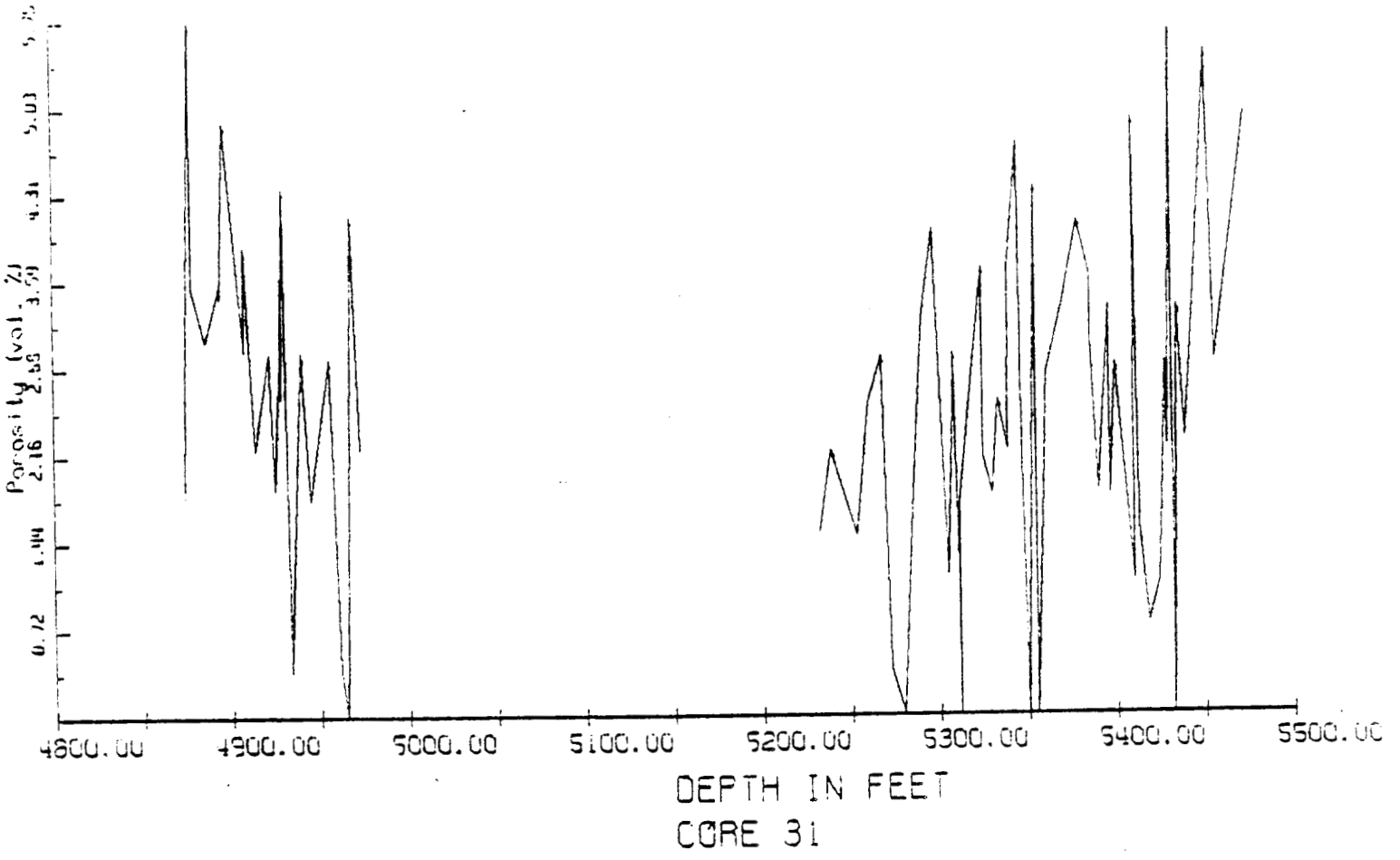

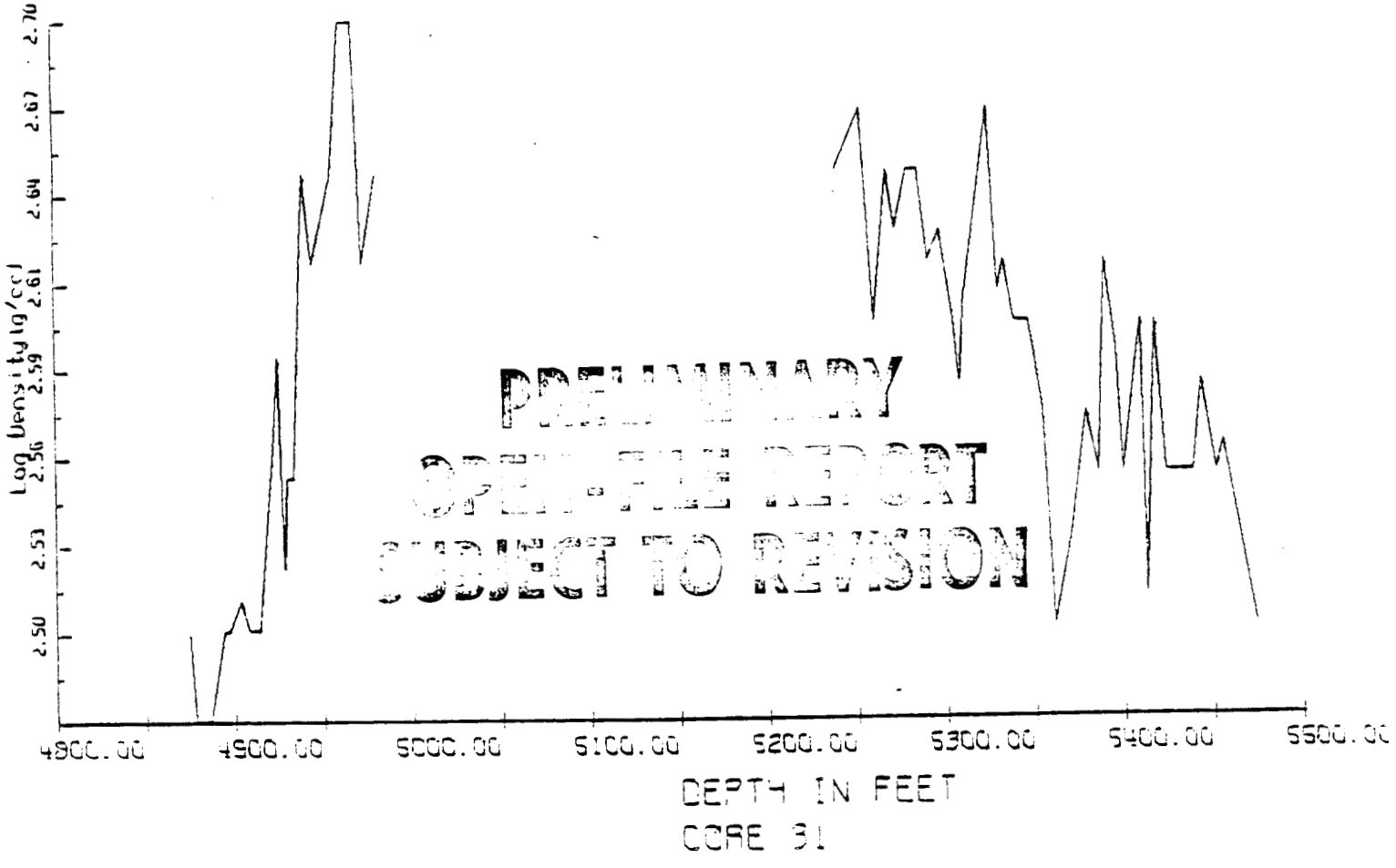

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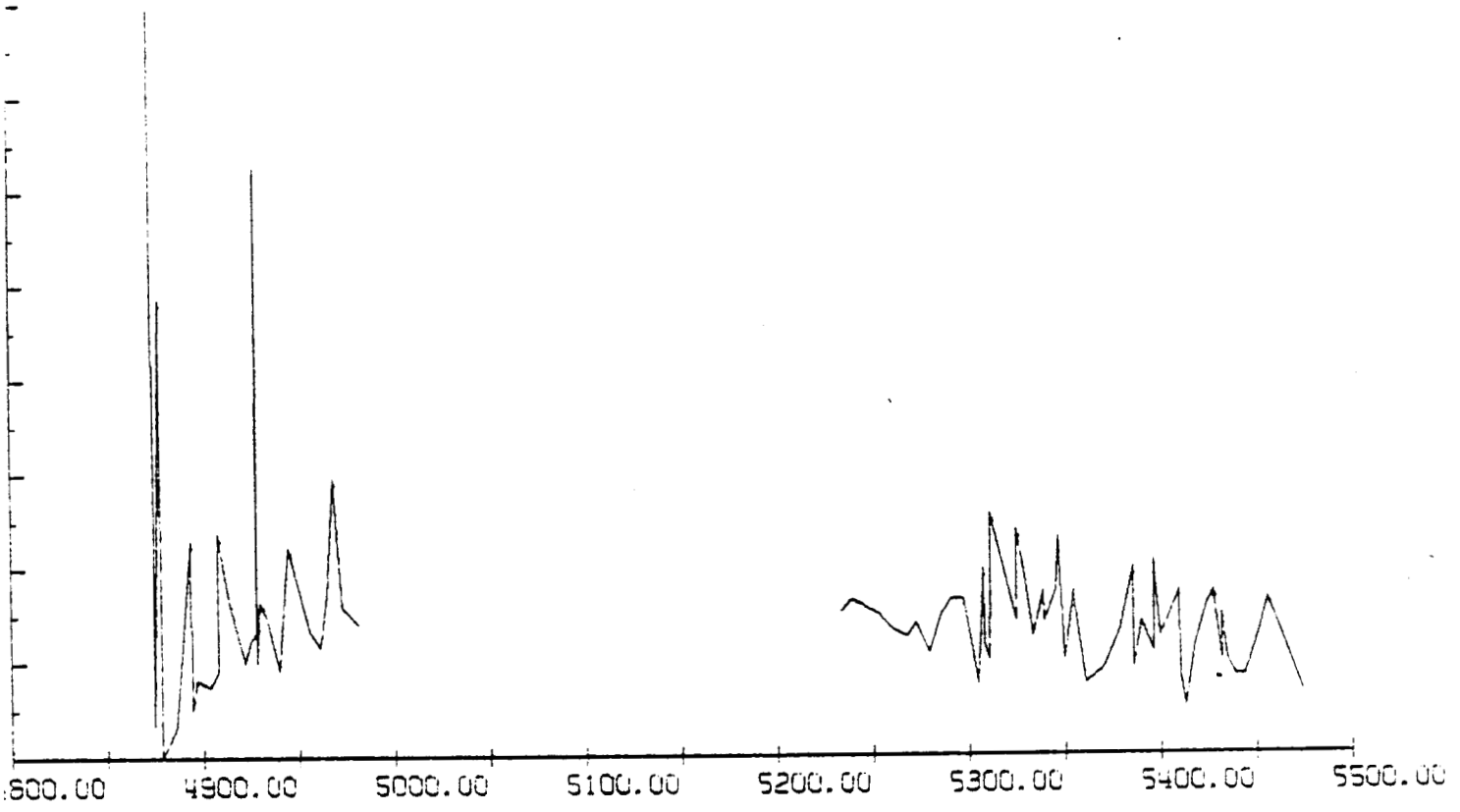
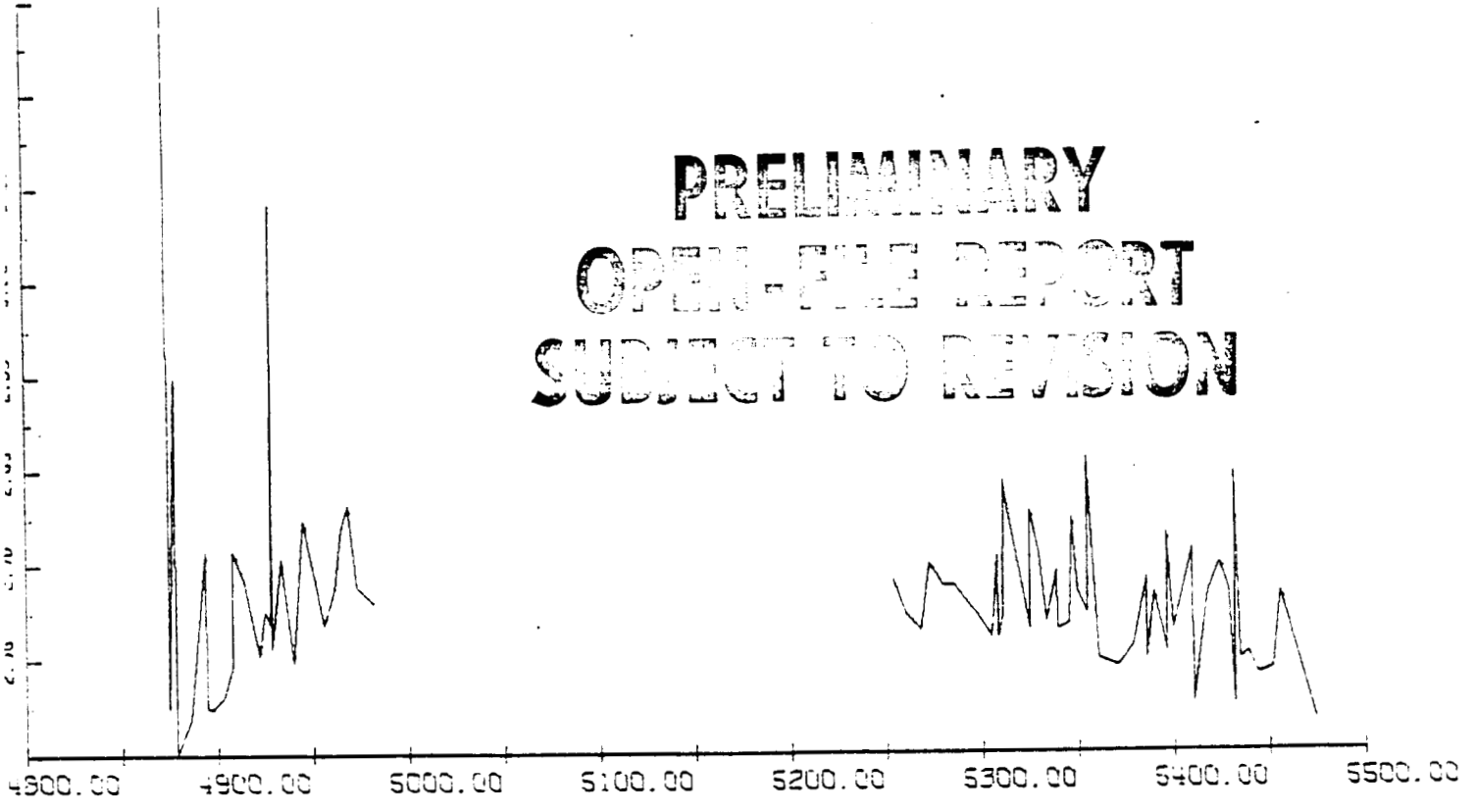


DEPTH IN FEET
CORE 31



PRELIMINARY
OPEN-FILE REPORT
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DEPTH IN FEET
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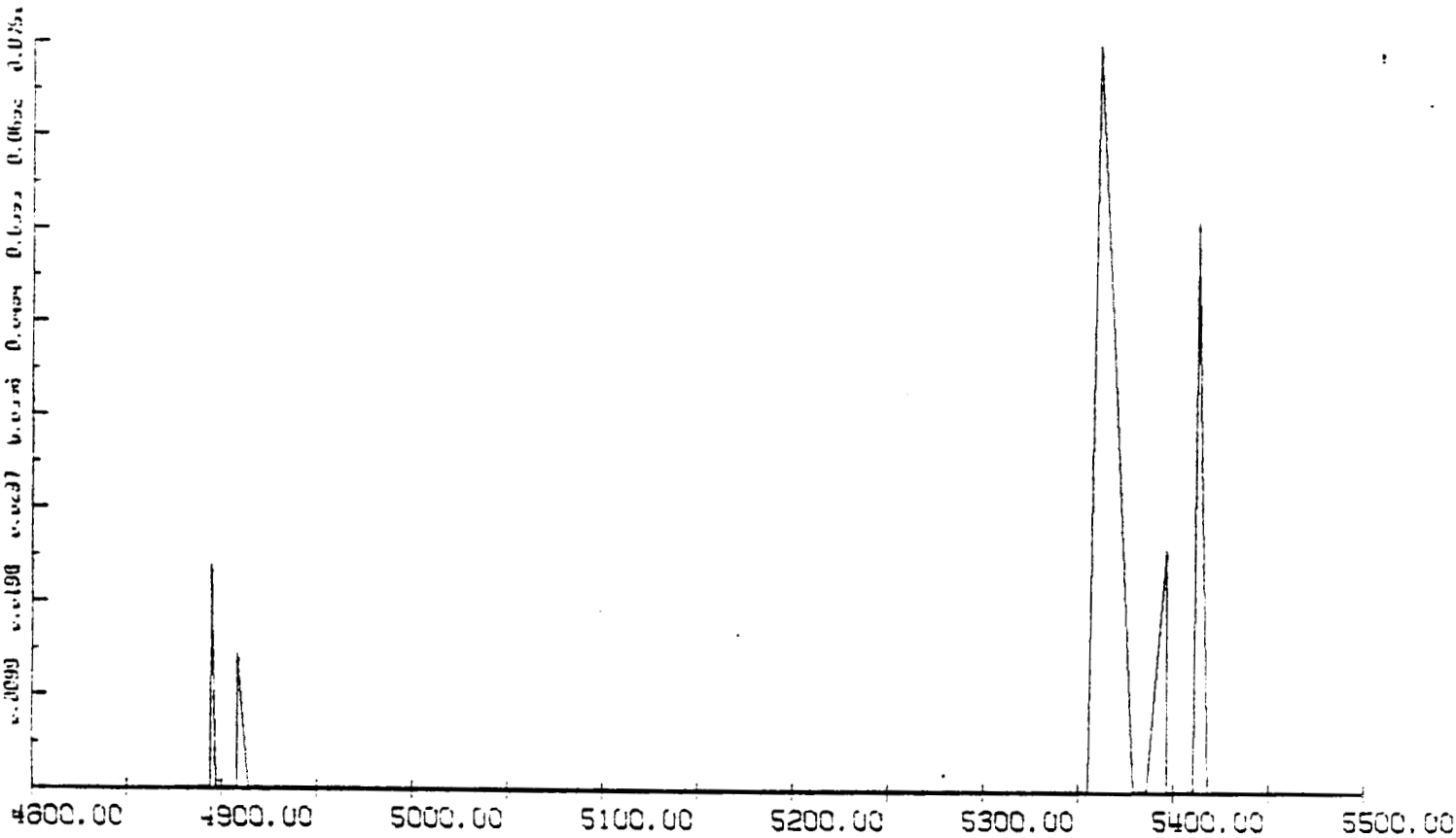

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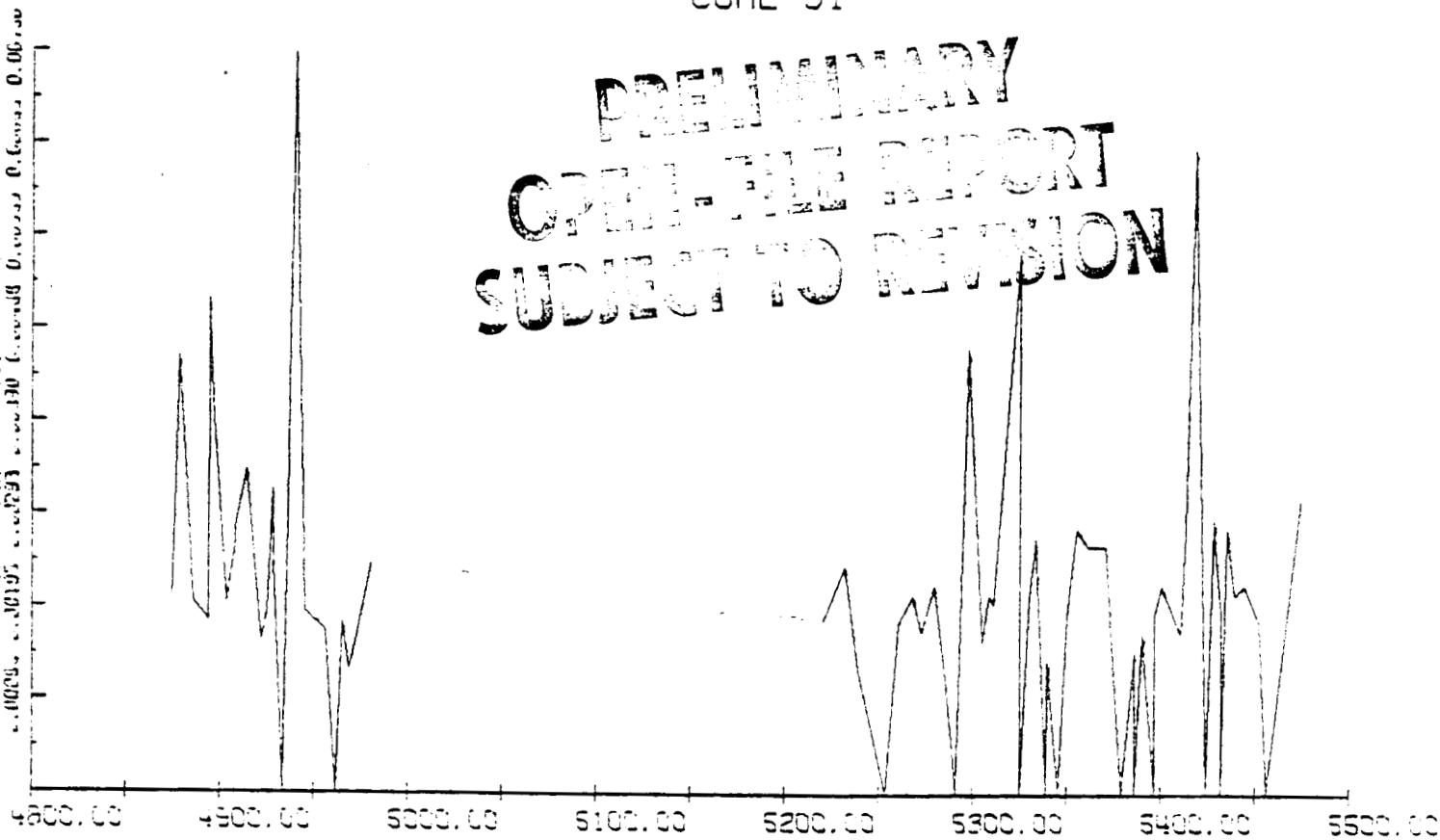

PRELIMINARY
OPEN-FILE REPORT
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DEPTH IN FEET
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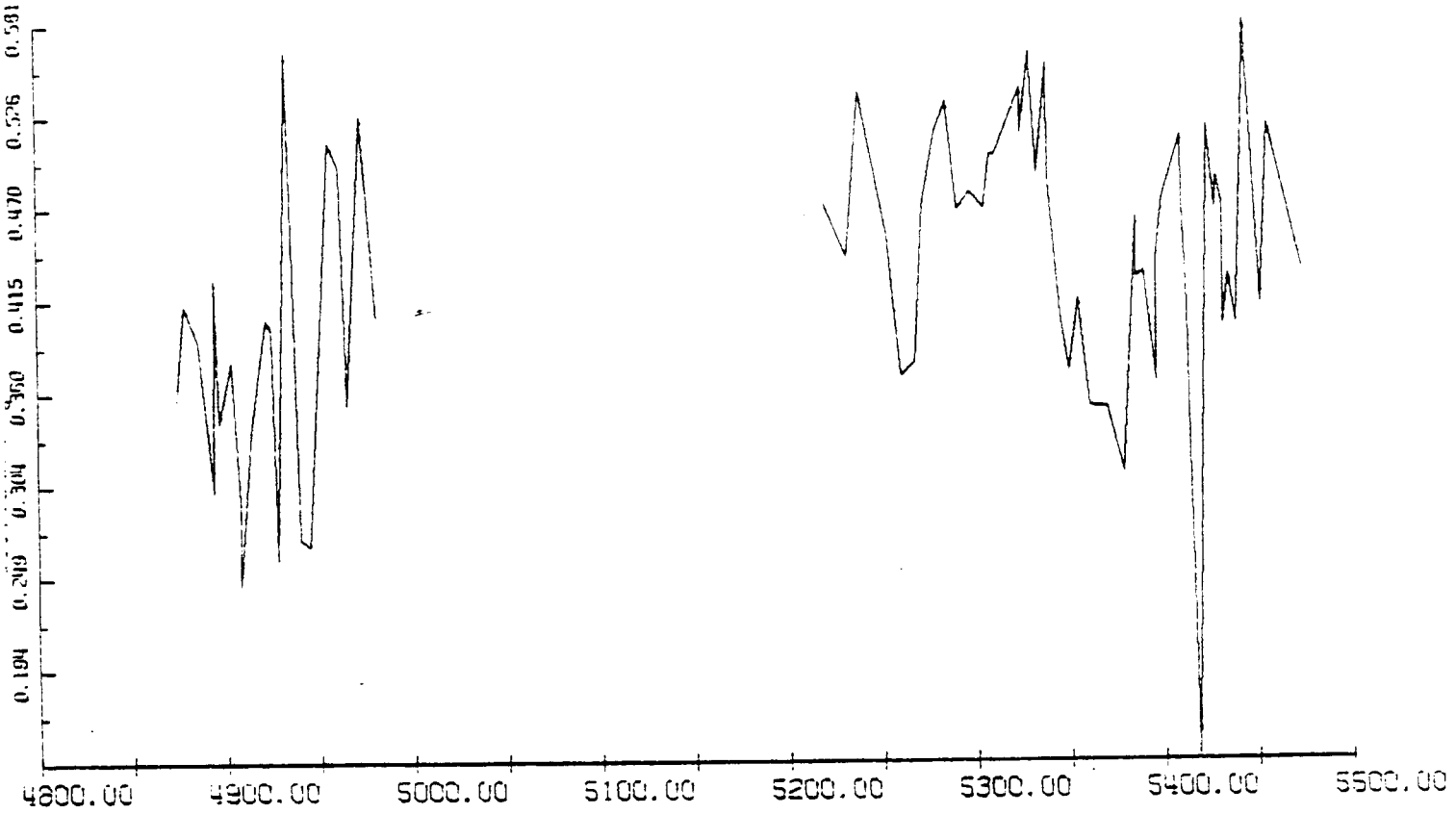

DEPTH IN FEET
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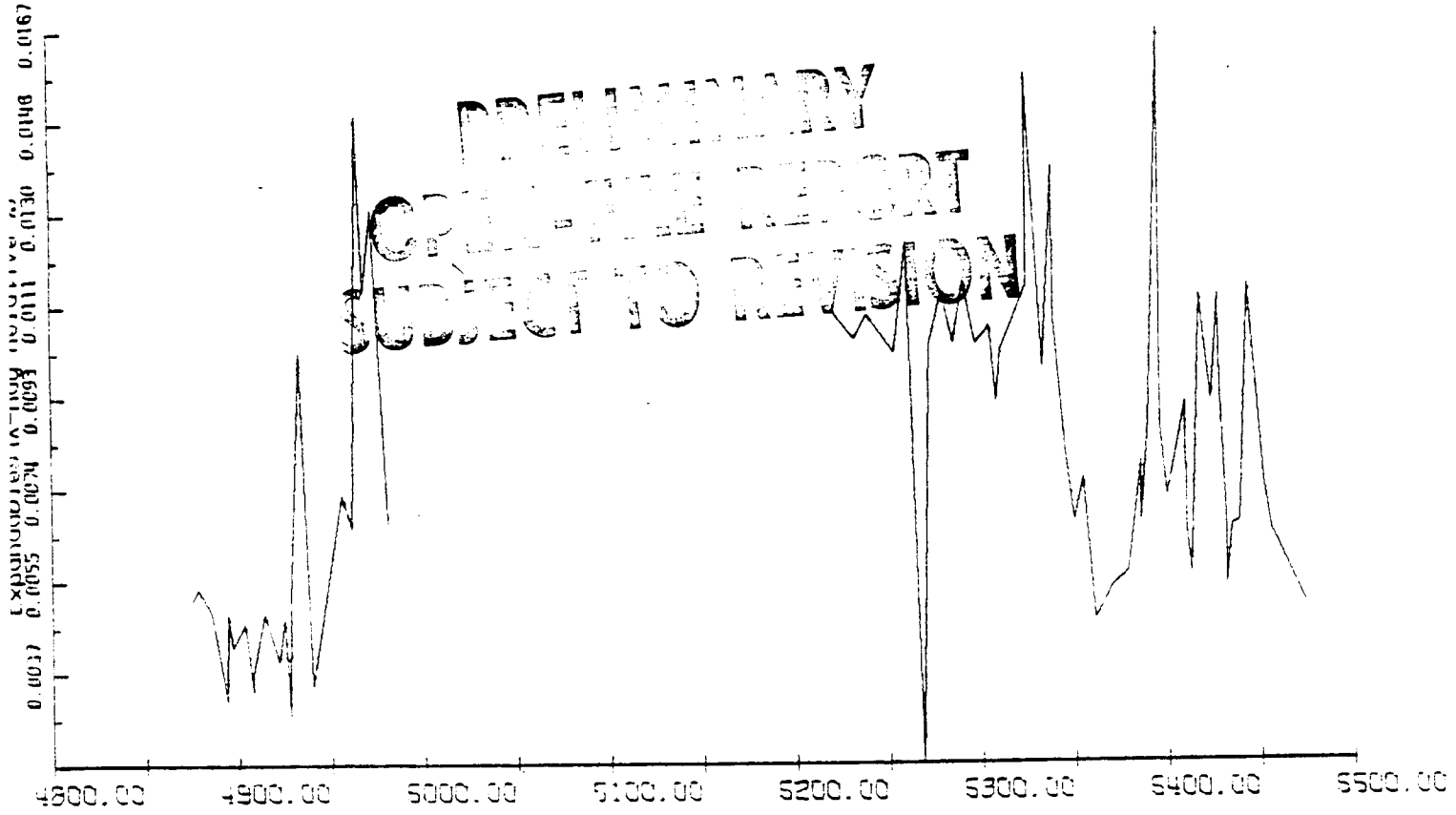

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DEPTH IN FEET
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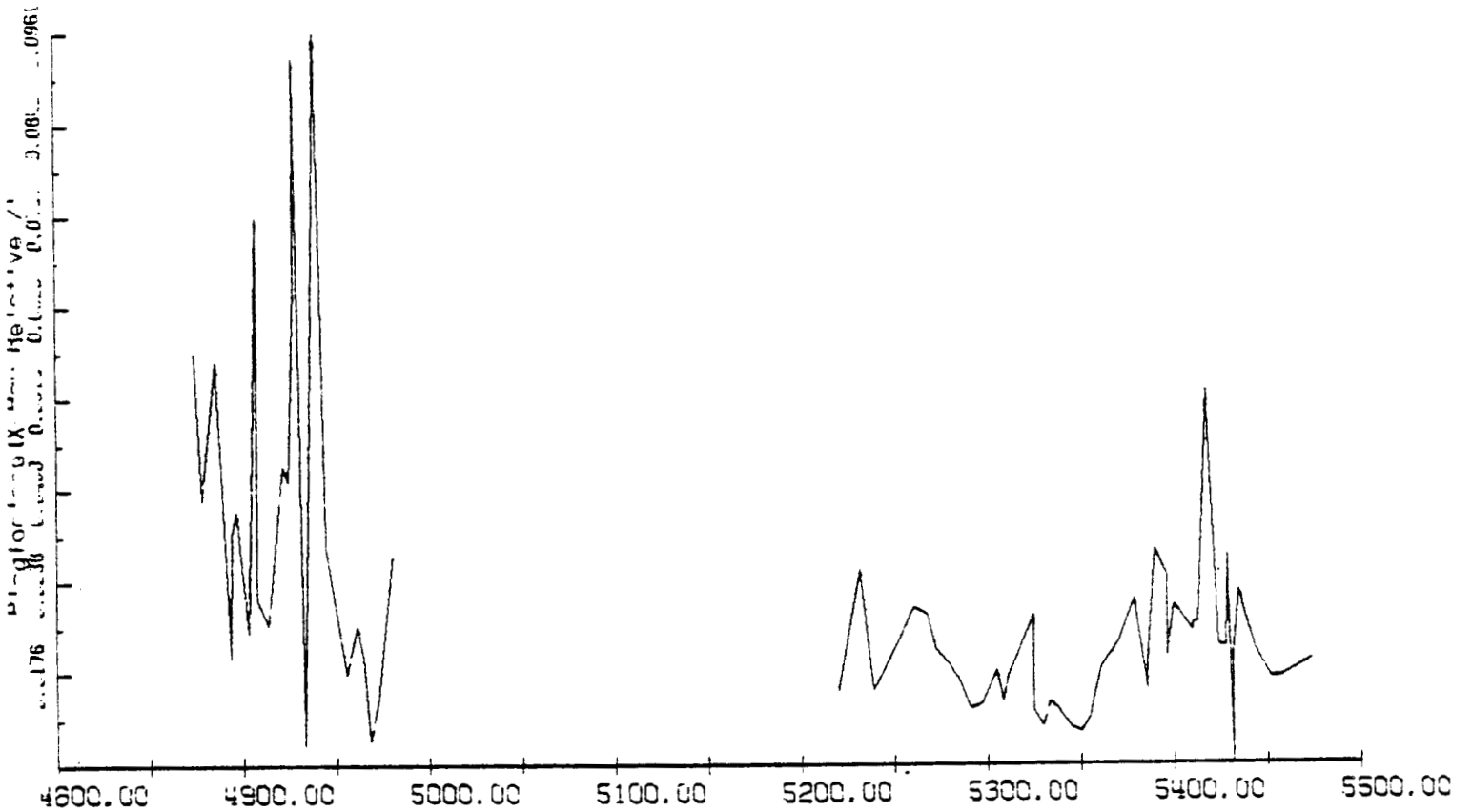
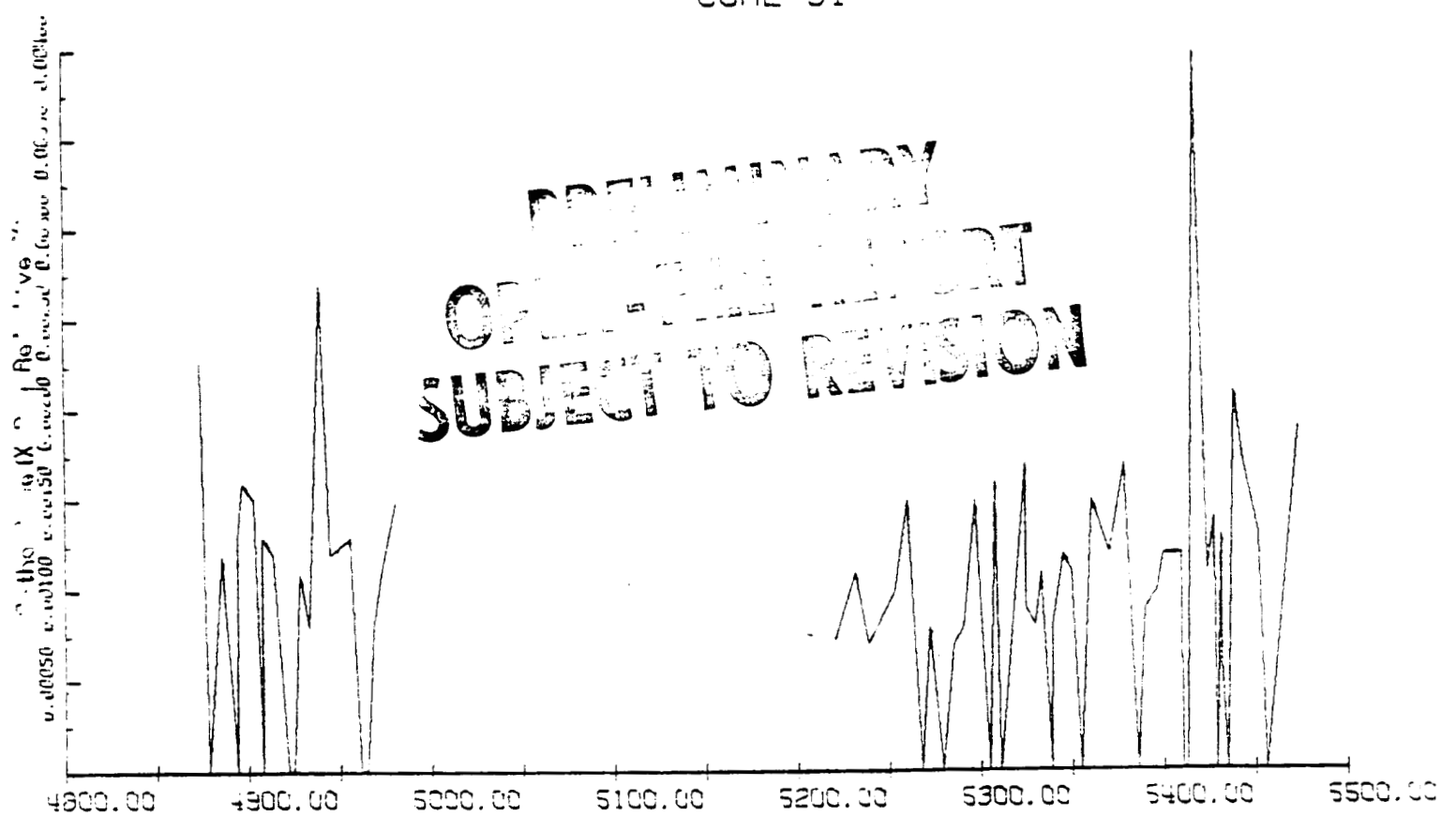


DEPTH IN FEET
CORE 31



PRELIMINARY
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DEPTH IN FEET
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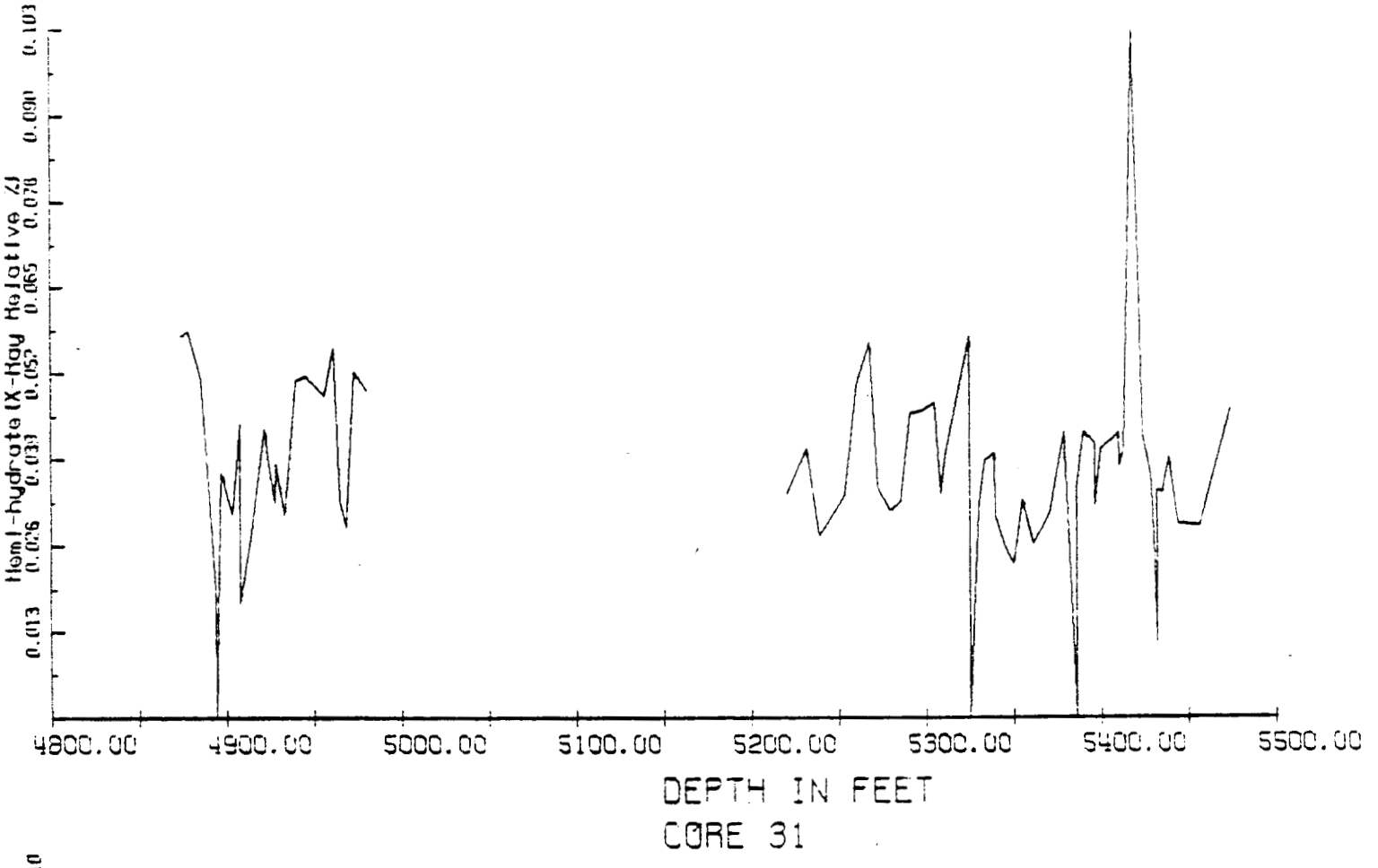

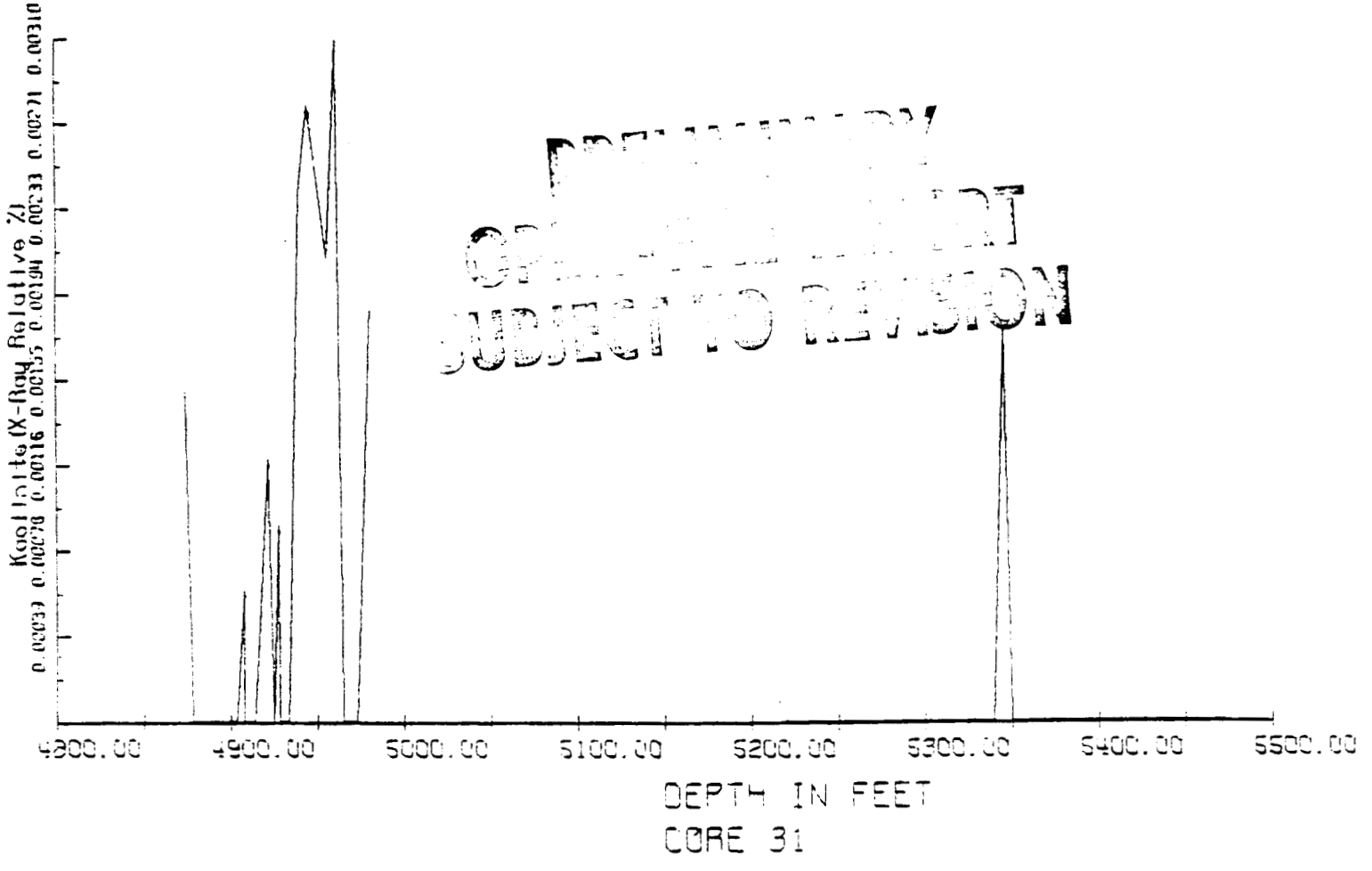

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Appendix B. Correlations within

the Three Lick Bed

PRELIMINARY
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VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
SAMPLE	20	4932.31000000	27.81156329	98646.20000000	4894.10000000	4981.00000000
LOSIG100	20	4.32000000	1.72248291	86.40000000	1.60000000	7.10000000
LOSIG500	20	3.30500000	1.99268183	66.10000000	1.60000000	6.30000000
STRAT	20	9.00000000	0	180.00000000	9.00000000	9.00000000
BULKDEN	20	2.64250000	0.08264641	52.85000000	2.51000000	2.78000000
MATRXDEN	20	2.71350000	0.07693299	54.27000000	2.60000000	2.90000000
LOGDEN	20	2.57700000	0.07705774	51.54000000	2.50000000	2.70000000
POROSITY	20	2.61700000	1.29129515	52.34000000	0	4.92000000
LITYPE	20	3.60000000	1.63514043	72.00000000	1.00000000	6.00000000
RESIST	20	32.00000000	11.37402396	640.00000000	17.00000000	52.00000000
GAMMA	20	187.25000000	24.83259048	3745.00000000	140.00000000	230.00000000
QUARTZ	20	0.27600000	0.09455714	5.52000000	0.07000000	0.48000000
EXP	20	0.00618924	0.00350413	0.12378486	0.00279212	0.01502480
ILL	20	0.37524319	0.09601524	7.50486382	0.24413721	0.56488754
COQ	20	0	0	0	0	0
GYP	20	0	0	0	0	0
KAO	20	0.00075043	0.00109025	0.01500860	0	0.00309670
HEM	20	0.03622427	0.01395520	0.72448533	0	0.05545728
ANH	20	0.00752470	0.00805516	0.15049406	0	0.01654619
SZN	20	0.00175221	0.00550042	0.03504425	0	0.02085332
QTZ	20	0.37456667	0.03406419	7.48933345	0.30697868	0.43092341
PYR	20	0.10640961	0.07988480	2.12819211	0	0.27843040
CAL	20	0.00247542	0.00171815	0.04950838	0	0.00777609
DOL	20	0.00189860	0.00603817	0.03797208	0	0.02367029
ORT	20	0.00091665	0.00073141	0.01831094	0	0.00272845
PLA	20	0.03676096	0.02577026	0.73521917	0.00876511	0.09608049
SID	20	0.03114712	0.01768643	0.62294242	0	0.06574919
ANK	20	0.01824207	0.03559609	0.36484044	0	0.14302423
GRDEN	20	2.96009604	0.16714837	59.20192077	2.73481140	3.32363865
S	20	2.89590000	2.63104580	57.91800000	0.07000000	8.73300000

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 20

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
SAMPLE	1.00000 0.0000	-0.61655 0.0038	0.04403 0.8537	0.00000 1.0000	0.48903 0.0287	0.30313 0.1939	0.89179 0.0001	-0.51298 0.0207	0.19800 0.4027	-0.50344 0.0236	-0.64169 0.0023	-0.20378 0.3888	0.68392 0.0009
LOSIG100	-0.61655 0.0038	1.00000 0.0000	0.25831 0.2715	0.00000 1.0000	-0.15048 0.5266	0.00047 0.7359	-0.58678 0.0065	0.52004 0.0167	-0.05868 0.8059	0.21545 0.3616	0.48835 0.0289	0.17469 0.4613	-0.50838 0.0221
LOSIG500	0.04403 0.8537	0.25831 0.2715	1.00000 0.0000	0.00000 1.0000	0.56642 0.0092	0.75714 0.0001	0.18139 0.4441	0.26931 0.2509	0.15289 0.5199	-0.27635 0.2382	-0.07323 0.7690	0.02385 0.9205	0.16986 0.4740
STRAT	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
BULKDEN	0.48903 0.0287	-0.15048 0.5266	0.56642 0.0092	0.00000 1.0000	1.00000 0.0000	0.90497 0.0001	0.45909 0.0417	-0.43915 0.0527	0.26484 0.2591	-0.16965 0.4746	-0.34879 0.1318	-0.19397 0.4126	0.49681 0.0259
MATRXDEN	0.30313 0.1939	0.00047 0.7359	0.75714 0.0001	0.00000 1.0000	0.90497 0.0001	1.00000 0.0000	0.28596 0.2216	-0.01525 0.9491	0.35061 0.1296	-0.16601 0.4842	-0.27634 0.2382	-0.19102 0.4450	0.31696 0.1733
LOGDEN	0.89179 0.0001	-0.58678 0.0065	0.18139 0.4441	0.00000 1.0000	0.45909 0.0417	0.28596 0.2216	1.00000 0.0000	-0.47910 0.0326	0.14870 0.5315	-0.68678 0.0008	-0.67399 0.0011	-0.19593 0.4326	0.62125 0.0035
POROSITY	-0.51298 0.0207	0.52004 0.0167	0.26931 0.2509	0.00000 1.0000	-0.43915 0.0527	-0.01525 0.9491	-0.47910 0.0326	1.00000 0.0000	0.10858 0.6486	0.04598 0.8474	0.24174 0.3045	0.07261 0.7609	-0.49737 0.0257
LITYPE	0.19800 0.4027	-0.05868 0.8059	0.15289 0.5199	0.00000 1.0000	0.26484 0.2591	0.35061 0.1296	0.14870 0.5315	0.10858 0.6486	1.00000 0.0000	-0.24903 0.2897	-0.24376 0.3004	-0.29003 0.2148	-0.02079 0.9307
RESIST	-0.50344 0.0236	0.21545 0.3616	-0.27635 0.2382	0.00000 1.0000	-0.16965 0.4746	-0.16601 0.4842	-0.68678 0.0008	0.04598 0.8474	-0.24903 0.2897	1.00000 0.0000	-0.47462 0.0345	0.37290 0.1054	-0.39574 0.0841
GAMMA	-0.64169 0.0023	0.48835 0.0289	-0.07323 0.7690	0.00000 1.0000	-0.34879 0.1318	-0.27634 0.2382	-0.67399 0.0011	0.24174 0.3045	-0.24376 0.3004	-0.47462 0.0345	1.00000 0.0000	0.22420 0.3420	-0.53061 0.0161
QUARTZ	-0.20378 0.3888	0.17469 0.4613	0.02385 0.9205	0.00000 1.0000	-0.19397 0.4126	-0.19102 0.4450	-0.19593 0.4326	0.07261 0.7609	-0.29003 0.2148	0.37290 0.1054	0.22420 0.3420	1.00000 0.0000	-0.57576 0.0079
EXP	0.68392 0.0009	-0.50838 0.0221	-0.16986 0.4740	0.00000 1.0000	0.49681 0.0259	0.31696 0.1733	0.62125 0.0035	-0.49737 0.0257	-0.02079 0.9307	-0.39574 0.0841	-0.53061 0.0161	-0.57576 0.0079	1.00000 0.0000
ILL	0.49213 0.0624	-0.48374 0.0307	-0.33974 0.3299	0.00000 1.0000	0.05279 0.8251	-0.11100 0.6413	0.20556 0.0932	-0.36160 0.1181	0.23459 0.3197	-0.30365 0.1932	-0.39711 0.2033	-0.71344 0.0004	0.58918 0.0063
COQ	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
GYP	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
KAO	0.44608 0.0487	-0.25813 0.2715	-0.19404 0.4124	0.00000 1.0000	0.03929 0.8694	-0.08959 0.7198	0.53369 0.0154	-0.27810 0.2403	0.15140 0.5240	-0.41078 0.0720	-0.17958 0.4487	0.22736 0.3350	-0.19406 0.4123
HEM	0.54340 0.0040	-0.57430 0.0081	-0.30654 0.1887	0.00000 1.0000	0.03570 0.8812	-0.11720 0.6224	0.56211 0.0116	-0.33396 0.1524	-0.12036 0.5897	-0.35184 0.1282	-0.21971 0.3520	-0.05198 0.8278	0.12120 0.6107
ANH	-0.16775 0.4814	-0.11196 0.6384	-0.45605 0.0433	0.00000 1.0000	-0.39831 0.0820	-0.48139 0.0316	-0.35681 0.1226	-0.08210 0.7308	-0.03945 0.8688	0.09523 0.6896	0.23568 0.3172	-0.35386 0.1259	0.00901 0.9699
SZM	-0.39186 0.0875	0.41747 0.0650	0.54838 0.0123	0.00000 1.0000	0.31445 0.1769	0.48105 0.0314	-0.33507 0.1487	-0.27804 0.2353	0.49218 0.0275	0.06042 0.8002	0.20788 0.3792	0.12819 0.5902	-0.27167 0.2466
QTZ	-0.38628 0.0953	0.29317 0.2097	-0.06896 0.7727	0.00000 1.0000	-0.37556 0.1027	-0.25536 0.2772	-0.36135 0.1175	0.34652 0.1345	-0.33569 0.1479	0.32062 0.1681	0.31058 0.1826	0.81430 0.0001	-0.64814 0.0020
PYR	-0.41160 0.0714	0.68889 0.0008	-0.51816 0.0193	0.00000 1.0000	0.40208 0.1955	0.54621 0.0129	-0.39712 0.0830	0.44480 0.0494	0.15553 0.5126	0.22119 0.3487	0.27414 0.2422	0.27432 0.2418	-0.52533 0.0174
CAL	-0.31514 0.1759	0.43479 0.0654	-0.10777 0.6511	0.00000 1.0000	-0.50803 0.0222	-0.35872 0.1204	-0.22492 0.3404	0.43944 0.0528	-0.25350 0.2808	0.08927 0.7082	0.34167 0.1404	0.44709 0.0481	-0.42963 0.0587
DOL	-0.39005 0.0891	0.44311 0.0504	-0.01590 0.9470	0.00000 1.0000	-0.21388 0.3652	-0.11561 0.6274	-0.33073 0.1544	0.25759 0.2729	-0.01891 0.9369	0.05140 0.8296	0.19349 0.4137	0.05810 0.8078	-0.16352 0.4909

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CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 20

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
ORT	0.01555	0.35341	-0.05504	0.00000	-0.31788	-0.17739	0.04975	0.37631	-0.06395	0.00395	0.20953	0.11843	-0.19027
	0.9481	0.1264	0.8177	1.0000	0.1720	0.4543	0.8350	0.1020	0.7888	0.9868	0.3753	0.6190	0.4217
PLA	-0.20960	-0.02182	-0.43360	0.00000	-0.50497	-0.47687	-0.22421	0.17729	-0.32078	0.40455	0.20522	0.67924	-0.52869
	0.3751	0.9272	0.0561	1.0000	0.0232	0.0335	0.3420	0.4546	0.1679	0.0769	0.3864	0.0010	0.0165
SID	0.27664	-0.34218	-0.38734	0.00000	-0.39186	-0.55262	0.36594	-0.24914	-0.21196	-0.28756	-0.26878	0.01136	0.33636
	0.2377	0.1397	0.0915	1.0000	0.0875	0.0115	0.1126	0.2895	0.3697	0.2189	0.2518	0.9621	0.1470
ANK	0.04470	-0.20191	0.14012	0.00000	0.12132	0.00489	0.06424	-0.26774	-0.42856	0.01623	-0.10810	0.10895	0.37830
	0.8516	0.3933	0.5557	1.0000	0.6104	0.9837	0.7879	0.2538	0.0594	0.9459	0.6501	0.6475	0.1000
GRDEN	-0.42676	-0.71703	-0.53610	0.00000	0.29550	-0.54079	-0.39701	-0.45100	-0.14106	-0.20575	-0.26716	-0.28971	-0.51736
	0.0613	0.0004	0.0148	1.0000	0.2059	0.0138	0.0831	0.0459	0.5508	0.3842	0.2548	0.2154	0.0195
S	-0.28322	0.62542	0.70597	0.00000	0.48359	0.74303	-0.24090	0.43280	0.26453	0.11808	0.10673	0.07093	-0.27706
	0.2263	0.0032	0.0005	1.0000	0.0308	0.0002	0.3062	0.0566	0.2597	0.6200	0.6542	0.7663	0.2370

	ILL	COQ	GYP	KAO	HEM	ANH	BZM	QTZ	PYR	CAL	DOL	ORT	PLA
SAMPLE	0.42411	0.00000	0.00000	0.44608	0.61340	-0.35735	-0.39186	-0.38629	-0.41160	-0.31514	-0.39005	0.01555	-0.20960
	0.0624	1.0000	1.0000	0.0487	0.0040	0.1219	0.0875	0.0925	0.0714	0.1759	0.0891	0.9481	0.3751
LOSIG100	-0.48374	0.00000	0.00000	-0.25813	-0.57430	-0.11196	0.41747	0.29317	0.60889	0.43479	0.44311	0.35341	-0.02182
	0.0307	1.0000	1.0000	0.2719	0.0081	0.6384	0.0670	0.2097	0.0008	0.0554	0.0504	0.1264	0.9272
LOSIG500	-0.22974	0.00000	0.00000	-0.19404	-0.30654	-0.45605	0.54838	-0.06896	0.51816	-0.10777	-0.01590	-0.05504	-0.43360
	0.3299	1.0000	1.0000	0.4124	0.1887	0.0433	0.0123	0.7727	0.0193	0.6511	0.9470	0.8177	0.0561
STRAT	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
BULKDEN	0.05279	0.00000	0.00000	0.03929	0.03570	-0.39831	0.31445	-0.37556	0.30208	-0.50803	-0.21388	-0.31788	-0.50497
	0.8251	1.0000	1.0000	0.8694	0.8812	0.0820	0.1769	0.1027	0.1955	0.0222	0.3652	0.1720	0.0232
MATRXDEN	-0.11100	0.00000	0.00000	-0.08559	-0.11728	-0.48139	0.48106	-0.25836	0.54521	-0.35878	-0.14561	-0.17739	-0.47687
	0.6413	1.0000	1.0000	0.7198	0.6224	0.0316	0.0314	0.2772	0.0129	0.1204	0.6274	0.4543	0.0335
LOGDEN	0.38556	0.00000	0.00000	0.53369	0.55211	-0.35681	-0.33507	-0.36135	-0.39712	-0.22497	-0.33073	-0.04975	-0.22421
	0.0932	1.0000	1.0000	0.0154	0.0116	0.1226	0.1487	0.1176	0.0830	0.3404	0.1544	0.8350	0.3420
POROSITY	-0.36360	0.00000	0.00000	-0.27618	-0.33226	-0.08210	0.27804	0.34652	0.44480	0.43944	0.25759	0.37631	0.17729
	0.1151	1.0000	1.0000	0.2403	0.1524	0.7308	0.2353	0.1345	0.0494	0.0525	0.2729	0.1020	0.4546
LITYPE	0.23450	0.00000	0.00000	0.15140	0.12836	-0.03945	0.49218	-0.33569	0.15553	-0.25350	-0.01891	-0.06395	-0.32078
	0.3197	1.0000	1.0000	0.5240	0.5897	0.8688	0.0275	0.1479	0.5126	0.2808	0.9369	0.7888	0.1679
RESIST	-0.30366	0.00000	0.00000	-0.41078	-0.35184	0.09523	0.06042	0.32062	0.22119	0.08927	0.05140	0.00395	0.40455
	0.1932	1.0000	1.0000	0.0720	0.1282	0.6896	0.8002	0.1681	0.3487	0.7082	0.8296	0.9868	0.0769
GAMMA	-0.29713	0.00000	0.00000	-0.17958	-0.21971	0.23568	0.20788	0.31058	0.27414	0.34167	0.19349	0.20953	0.20522
	0.2032	1.0000	1.0000	0.4487	0.3520	0.3172	0.3798	0.1826	0.2422	0.1404	0.4137	0.3753	0.3864
QUARTZ	-0.71344	0.00000	0.00000	0.22736	-0.05195	-0.35386	0.12819	0.81430	0.27432	0.44709	0.05810	0.11843	0.67924
	0.0004	1.0000	1.0000	0.3350	0.8278	0.1259	0.5902	0.0001	0.2418	0.0481	0.8078	0.6190	0.0010
EXP	0.58918	0.00000	0.00000	0.19404	0.12120	0.00901	-0.27167	-0.64814	-0.52523	-0.42963	-0.16352	-0.19027	-0.52869
	0.0063	1.0000	1.0000	0.4124	0.6107	0.9699	0.2466	0.0020	0.0174	0.0587	0.4909	0.4217	0.0165
ILL	1.00000	0.00000	0.00000	0.02083	0.16170	0.35220	-0.34021	-0.90427	-0.62824	-0.50847	-0.05502	-0.18407	-0.58844
	0.0000	1.0000	1.0000	0.9305	0.4958	0.1278	0.1422	0.0001	0.0030	0.0221	0.8178	0.4372	0.0063
COQ	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GYP	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
KAO	0.02083	0.00000	0.00000	1.00000	0.67809	-0.34734	-0.23081	0.09118	-0.06390	0.04651	-0.22782	0.18400	0.18202
	0.9305	1.0000	1.0000	0.0000	0.0010	0.1335	0.3276	0.7022	0.7890	0.8456	0.3340	0.4374	0.4425

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CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 20

	ILL	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
HEM	0.10170 0.4958	0.00000 1.0000	0.00000 1.0000	0.67809 0.0010	1.00000 0.0000	-0.07307 0.7595	-0.42831 0.0596	0.01318 0.9560	-0.33605 0.1464	-0.17613 0.4576	-0.70574 0.0005	0.04930 0.8365	0.21271 0.3679
ANH	0.35220 0.1270	0.00000 1.0000	0.00000 1.0000	-0.34734 0.1335	-0.07307 0.7595	1.00000 0.0000	-0.10198 0.6688	-0.21869 0.3543	-0.40235 0.0786	-0.19489 0.4103	0.17099 0.4711	-0.43354 0.0562	-0.05269 0.8254
SZM	-0.34021 0.1422	0.00000 1.0000	0.00000 1.0000	-0.23081 0.3276	-0.42831 0.0596	-0.10198 0.6688	1.00000 0.0000	0.10002 0.6748	0.57051 0.0086	-0.04853 0.8390	0.21618 0.3600	-0.18648 0.4312	-0.18747 0.4287
QTZ	-0.90437 0.0001	0.00000 1.0000	0.00000 1.0000	0.09118 0.7022	0.01318 0.9560	-0.21869 0.3543	0.10002 0.6748	1.00000 0.0000	0.32271 0.1652	0.62962 0.0029	0.01112 0.9629	0.24506 0.2977	0.83776 0.0001
PYR	-0.62824 0.0030	0.00000 1.0000	0.00000 1.0000	-0.06390 0.7890	-0.33605 0.1464	-0.40235 0.0786	0.57051 0.0086	0.32271 0.1652	1.00000 0.0000	0.08166 0.7322	-0.13791 0.5620	-0.11362 0.6334	-0.09175 0.7637
CAL	-0.50847 0.0221	0.00000 1.0000	0.00000 1.0000	0.04651 0.8456	-0.17613 0.4576	-0.19489 0.4103	-0.04853 0.8390	0.62962 0.0029	0.08166 0.7322	1.00000 0.0000	0.34527 0.1360	0.67738 0.0010	0.60513 0.0047
DOL	-0.05502 0.8176	0.00000 1.0000	0.00000 1.0000	-0.22782 0.3340	-0.70574 0.0005	0.17099 0.4711	0.21618 0.3600	0.01112 0.9629	0.13791 0.5620	0.34527 0.1360	1.00000 0.0000	0.15486 0.5144	-0.06327 0.7810
ORT	-0.18407 0.4372	0.00000 1.0000	0.00000 1.0000	0.18400 0.4374	0.04930 0.8365	-0.43354 0.0562	-0.18648 0.4312	0.24506 0.2977	0.11362 0.6334	0.67738 0.0010	0.15486 0.5144	1.00000 0.0000	0.21417 0.2421
PLA	-0.50844 0.0063	0.00000 1.0000	0.00000 1.0000	0.18202 0.4426	0.21271 0.3679	-0.05269 0.8254	-0.18747 0.4287	0.83776 0.0001	0.09175 0.7637	0.60513 0.0047	-0.06327 0.7810	0.21417 0.2421	1.00000 0.0000
SID	0.35201 0.1200	0.00000 1.0000	0.00000 1.0000	0.10810 0.6501	-0.07890 0.7409	0.22513 0.3395	-0.44766 0.0478	-0.06788 0.7765	-0.60168 0.0001	0.36081 0.1181	0.19413 0.4303	-0.08121 0.7334	0.19622 0.4070
ANK	-0.26265 0.2632	0.00000 1.0000	0.00000 1.0000	-0.33541 0.1483	-0.10487 0.6599	-0.03811 0.8733	-0.06652 0.7805	0.22561 0.3389	-0.27241 0.2452	-0.00137 0.9954	-0.16962 0.4747	-0.21493 0.3628	0.10239 0.6675
GRDEN	-0.64254 0.0022	0.00000 1.0000	0.00000 1.0000	-0.08242 0.7298	-0.18316 0.0954	-0.40397 0.0771	-0.58510 0.0007	0.33346 0.1509	0.96681 0.0001	0.12141 0.6101	-0.18371 0.4382	0.11704 0.6231	-0.07878 0.7509
S	-0.44216 0.0509	0.00000 1.0000	0.00000 1.0000	-0.14019 0.4219	-0.43361 0.0561	-0.40290 0.0782	-0.[illegible] 0.[illegible]	-0.[illegible] 0.7866	-0.92404 0.0001	-0.03984 0.8676	-0.16148 0.4971	0.04140 0.8624	-0.06553 0.2579

	SID	ANK	GRDEN	S
SAMPLE	0.27664 0.2377	0.04470 0.8516	-0.42576 0.0613	-0.28322 0.2263
LOSIG100	-0.34218 0.1397	-0.20191 0.3933	0.71703 0.0004	0.62542 0.0032
LOSIG500	-0.38734 0.0915	-0.14012 0.5557	0.53610 0.0148	0.70597 0.0005
STRAT	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
BULKDEN	-0.39186 0.0875	0.12132 0.6104	0.29550 0.2059	0.48359 0.0308
MATRXDEN	-0.55262 0.0115	0.00489 0.9837	0.54079 0.0138	0.74303 0.0002
LOGDEN	0.36594 0.1126	0.06424 0.7879	-0.39701 0.0831	-0.24090 0.3062
POROSITY	-0.24914 0.2895	-0.26774 0.2538	0.45108 0.0459	0.43280 0.0566
LITYPE	-0.21196 0.3697	-0.42856 0.0594	0.14186 0.5508	0.26453 0.2597
RESIST	-0.28756 0.2189	0.01623 0.9459	0.20575 0.3842	0.11808 0.6200

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CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 20

	SID	ANK	GRDEN	S
GAMMA	-0.26870 0.2518	-0.10810 0.6501	0.26716 0.2548	0.10673 0.6542
QUARTZ	0.01136 0.9621	0.10895 0.6475	0.28971 0.2154	0.07093 0.7663
EXP	0.33636 0.1470	0.37830 0.1000	-0.51736 0.0195	-0.27706 0.2370
ILL	0.35201 0.1280	-0.26265 0.2632	-0.64254 0.0022	-0.44216 0.0509
COQ	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
GYP	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
KAO	0.10810 0.6501	-0.33541 0.1483	-0.08242 0.7298	-0.19019 0.4219
HEM	0.07890 0.7409	-0.10487 0.6599	-0.38316 0.0954	-0.43361 0.0561
ANH	0.23533 0.3395	-0.03811 0.8733	-0.40397 0.0773	-0.40299 0.0782
SZN	-0.44768 0.0478	-0.06652 0.7805	0.58510 0.0067	0.62957 0.0029
QTZ	-0.06782 0.7763	0.22561 0.3389	0.33346 0.1508	0.08024 0.7366
PYR	-0.80168 0.0001	-0.27241 0.2452	0.99681 0.0001	0.92404 0.0001
CAL	0.36083 0.1181	-0.00137 0.9954	0.12141 0.6101	-0.03984 0.8676
DOL	0.18443 0.4363	-0.18962 0.4747	0.18371 0.4382	0.16122 0.4971
ORT	0.08127 0.7334	-0.21493 0.3628	0.11704 0.6231	0.04140 0.8624
PLA	0.19622 0.4070	0.10239 0.6675	-0.07575 0.7509	-0.26553 0.2579
SID	1.00000 0.0000	0.18966 0.4235	-0.75789 0.0001	-0.75272 0.0001
ANK	0.18965 0.4236	1.00000 0.0000	-0.24960 0.2888	-0.24417 0.2995
GRDEN	-0.75789 0.0001	-0.24960 0.2888	1.00000 0.0000	0.92596 0.0001
S	-0.75272 0.0001	-0.24417 0.2995	0.92596 0.0001	1.00000 0.0000

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Appendix C. Correlations within the upper-middle portion of the Huron Member

PRELIMINARY
OPEN-FILE REPORT
SUBJECT TO REVISION

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
SAMPLE	11	5263.51818182	25.19403970	57890.70000000	5220.00000000	5297.00000000
LOSIG100	11	2.97272727	0.83557278	32.70000000	2.20000000	4.00000000
LOSIG500	11	4.23636364	0.59175530	46.60000000	3.40000000	5.00000000
STRAT	11	2.00000000	0	22.00000000	2.00000000	2.00000000
BULKDEN	11	2.66181818	0.02706330	29.20000000	2.61000000	2.70000000
MATRXDEN	11	2.71545455	0.02207425	29.87000000	2.67000000	2.74000000
LAGDEN	11	2.64090909	0.01921174	29.05000000	2.60000000	2.67000000
POROSITY	11	1.96909091	1.20491871	21.66000000	0	4.01000000
LITYPE	11	3.00000000	0.63245553	33.00000000	2.00000000	4.00000000
RESIST	11	20.36363636	2.73030135	224.00000000	17.00000000	25.00000000
GAMMA	11	187.72727273	9.83962305	2065.00000000	170.00000000	210.00000000
QUARTZ	11	0.18909091	0.07489386	2.08000000	0.06000000	0.31000000
EXP	11	0.01005271	0.00201795	0.11057900	0.00187168	0.01242112
ILL	11	0.46544251	0.05538338	5.11986765	0.36921757	0.53919931
COQ	11	0	0	0	0	0
GYP	11	0	0	0	0	0
KAO	11	0	0	0	0	0
HEM	11	0.03915067	0.00923817	0.43065732	0.02724113	0.05643995
ANH	11	0.00448208	0.00534073	0.04930291	0	0.01200700
SZM	11	0.00232681	0.00517559	0.02558411	0	0.01301328
QTB	11	0.33941825	0.01085463	3.73382079	0.31487651	0.37070085
PYR	11	0.07815995	0.02042859	0.85975941	0.05637904	0.12019151
CAL	11	0.00175909	0.00127278	0.01927300	0	0.00471762
DOL	11	0	0	0	0	
ORT	11	0.00079632	0.00049313	0.00876950	0	0.00152364
PLA	11	0.01963551	0.00556730	0.21599060	0.01112595	0.03043535
SID	11	0.03876408	0.02469796	0.42640490	0.01504270	0.08515491
ANK	11	0	0	0	0	0
GRDEN	11	2.90284704	0.05119782	31.93132622	2.83670929	3.00375996
S	9	2.60300000	0.42088656	23.42700000	2.02100000	3.37600000

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CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
SAMPLE	1.00000 0.0000 11	-0.25302 0.4528 11	0.32424 0.3307 11	0.00000 1.0000 11	-0.41145 0.2087 11	-0.04227 0.9018 11	-0.35767 0.2802 11	0.31682 0.3425 11	0.02008 0.9533 11	0.90820 0.0001 11	0.43604 0.1800 11	-0.51385 0.1059 11	-0.05249 0.8702 11
LOSIG100	-0.25302 0.4528 11	1.00000 0.0000 11	-0.33038 0.3211 11	0.00000 1.0000 11	-0.66341 0.0261 11	-0.45739 0.1572 11	-0.18518 0.5857 11	0.26616 0.4209 11	0.05677 0.8603 11	-0.29329 0.3814 11	-0.20804 0.3904 11	0.01554 0.9638 11	-0.59787 0.0521 11
LOSIG500	0.32424 0.3307 11	-0.33038 0.3211 11	1.00000 0.0000 11	0.00000 1.0000 11	0.26156 0.4372 11	0.11306 0.7407 11	0.05810 0.8651 11	-0.14923 0.6614 11	-0.33944 0.2236 11	0.20076 0.5539 11	0.07547 0.8265 11	-0.45344 0.1613 11	-0.08077 0.8134 11
STRAT	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11
BULKDEN	-0.41145 0.2087 11	-0.66341 0.0261 11	0.26156 0.4372 11	0.00000 1.0000 11	1.00000 0.0000 11	0.14485 0.6709 11	0.40759 0.2134 11	-0.75502 0.0072 11	0.11349 0.7397 11	-0.45649 0.1581 11	-0.12932 0.7047 11	0.33152 0.3193 11	0.49266 0.1237 11
MATRXDEN	-0.04227 0.9018 11	-0.45739 0.1572 11	0.11306 0.7407 11	0.00000 1.0000 11	0.14485 0.6709 11	1.00000 0.0000 11	-0.06002 0.8608 11	0.53935 0.0868 11	-0.64465 0.0322 11	0.29564 0.3774 11	0.26996 0.4221 11	-0.08743 0.7982 11	0.29520 0.3782 11
LOGDEN	-0.35767 0.2802 11	-0.18518 0.5857 11	0.05810 0.8651 11	0.00000 1.0000 11	0.40759 0.2134 11	-0.06002 0.8608 11	1.00000 0.0000 11	-0.38530 0.2419 11	0.41160 0.2086 11	-0.40728 0.2138 11	0.19717 0.5616 11	0.36203 0.2739 11	-0.33637 0.3273 11
POROSITY	0.31682 0.3425 11	0.26616 0.4209 11	-0.14923 0.6614 11	0.00000 1.0000 11	-0.75502 0.0072 11	0.53935 0.0868 11	-0.38530 0.2419 11	1.00000 0.0000 11	-0.52489 0.0973 11	0.57917 0.0619 11	0.28321 0.3987 11	-0.33434 0.3149 11	-0.22783 0.5005 11
LITYPE	0.02008 0.9533 11	0.05677 0.8603 11	-0.33944 0.2236 11	0.00000 1.0000 11	0.11349 0.7397 11	-0.64465 0.0322 11	0.41160 0.2086 11	-0.52489 0.0973 11	1.00000 0.0000 11	-0.17373 0.6094 11	0.08035 0.8143 11	0.33779 0.3097 11	-0.06085 0.8589 11
RESIST	0.90820 0.0001 11	-0.29329 0.3814 11	0.20076 0.5539 11	0.00000 1.0000 11	-0.45649 0.1581 11	0.29564 0.3774 11	-0.40728 0.2138 11	0.57917 0.0619 11	-0.17373 0.6094 11	1.00000 0.0000 11	0.48051 0.1346 11	-0.59485 0.0536 11	0.05165 0.8801 11
GAMMA	0.43604 0.1800 11	-0.20804 0.3904 11	0.07547 0.8265 11	0.00000 1.0000 11	-0.12932 0.7047 11	0.26996 0.4221 11	0.19717 0.5616 11	0.28321 0.3987 11	0.08035 0.8143 11	0.48051 0.1346 11	1.00000 0.0000 11	-0.23377 0.4890 11	-0.20964 0.5361 11
QUARTZ	-0.51385 0.1059 11	0.01554 0.9638 11	-0.45344 0.1613 11	0.00000 1.0000 11	0.33152 0.3193 11	-0.08743 0.7982 11	0.36203 0.2739 11	-0.33434 0.3149 11	0.33779 0.3097 11	-0.59485 0.0536 11	-0.23377 0.4890 11	1.00000 0.0000 11	-0.04474 0.8961 11
EXP	-0.05249 0.8702 11	-0.59787 0.0521 11	-0.08077 0.8134 11	0.00000 1.0000 11	0.49266 0.1237 11	0.29520 0.3782 11	-0.33637 0.3273 11	-0.22783 0.5005 11	-0.06085 0.8589 11	0.05165 0.8801 11	-0.20964 0.5361 11	-0.04474 0.8961 11	1.00000 0.0000 11
ILL	0.11670 0.7326 11	-0.75089 0.0077 11	0.64338 0.0327 11	0.00000 1.0000 11	0.58988 0.0561 11	0.31035 0.3530 11	0.38242 0.2458 11	-0.30099 0.3684 11	-0.11183 0.7434 11	0.08471 0.8044 11	0.19831 0.5589 11	-0.21597 0.5236 11	0.41130 0.2088 11
CDQ	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11
GYP	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11
KAO	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11
HEM	0.30181 0.3671 11	0.65815 0.0277 11	-0.28754 0.2390 11	0.00000 1.0000 11	-0.87214 0.0005 11	-0.12202 0.7208 11	-0.50706 0.1114 11	0.66311 0.0261 11	-0.14613 0.6681 11	0.36255 0.2732 11	0.11568 0.7348 11	-0.19665 0.5622 11	-0.51013 0.1089 11

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CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
ANH	0.17657 0.6035 11	0.55573 0.0759 11	0.05790 0.8657 11	0.00000 1.0000 11	0.44667 0.1684 11	-0.15672 0.6454 11	0.16268 0.6327 11	-0.40777 0.1280 11	0.34728 0.2954 11	0.12102 0.7212 11	0.21323 0.5290 11	0.09002 0.7906 11	0.24121 0.4749 11
BBM	0.66423 0.0258 11	0.07018 0.8375 11	0.26615 0.4289 11	0.00000 1.0000 11	0.32256 0.3333 11	0.32960 0.3223 11	0.23391 0.4888 11	0.05451 0.8735 11	0.39755 0.2260 11	-0.51698 0.1035 11	0.26044 0.4393 11	0.05430 0.8740 11	0.15630 0.6463 11
QTZ	0.07365 0.8296 11	0.70708 0.0150 11	0.68059 0.0212 11	0.00000 1.0000 11	0.63501 0.0350 11	0.25551 0.4483 11	0.32834 0.3242 11	0.37538 0.2553 11	0.03402 0.7815 11	0.02721 0.9365 11	0.10629 0.7550 11	0.23141 0.4936 11	0.45195 0.1628 11
PYR	0.20256 0.5503 11	0.74967 0.0079 11	0.34877 0.2932 11	0.00000 1.0000 11	0.56398 0.0707 11	0.12469 0.7149 11	0.10350 0.5890 11	0.40130 0.2212 11	0.17802 0.5988 11	0.12406 0.7145 11	0.02610 0.9391 11	0.10929 0.7491 11	0.61432 0.0443 11
CAL	0.16096 0.6364 11	0.27368 0.4155 11	0.09860 0.7730 11	0.00000 1.0000 11	0.34225 0.3029 11	0.05584 0.8705 11	0.16909 0.6176 11	0.25114 0.4543 11	0.10264 0.7639 11	0.09934 0.7714 11	0.52636 0.0962 11	0.17136 0.6144 11	0.12719 0.7094 11
DOL	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11
ORT	0.01528 0.9644 11	0.16897 0.6194 11	0.45994 0.1546 11	0.00000 1.0000 11	0.04835 0.8877 11	0.56178 0.0721 11	0.40061 0.1348 11	0.41370 0.2069 11	0.14775 0.6616 11	0.23741 0.4821 11	0.05444 0.8737 11	0.21321 0.5269 11	0.51056 0.1022 11
PLA	0.37192 0.2600 11	0.42219 0.1958 11	0.63333 0.0364 11	0.00000 1.0000 11	0.07437 0.8280 11	0.45342 0.1613 11	0.03671 0.9147 11	0.23192 0.4926 11	0.34477 0.2991 11	-0.51691 0.1035 11	-0.25508 0.4492 11	0.78304 0.0119 11	0.20013 0.4030 11
BID	0.03749 0.9129 11	0.41243 0.2475 11	0.43778 0.1785 11	0.00000 1.0000 11	0.27489 0.4133 11	0.39032 0.2363 11	0.36071 0.2759 11	0.08097 0.8512 11	0.37709 0.2579 11	0.02234 0.9480 11	0.43769 0.1782 11	0.36982 0.2829 11	0.02142 0.9502 11
ANK	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11
GRDEN	0.18234 0.5915 11	0.01441 0.0011 11	0.49231 0.1240 11	0.00000 1.0000 11	0.60202 0.0500 11	-0.20236 0.4002 11	0.30954 0.3543 11	0.33042 0.3210 11	0.00608 0.9840 11	0.13768 0.6866 11	0.17795 0.6006 11	0.06496 0.8495 11	0.55974 0.0791 11
G	0.04004 0.0046 9	0.63500 0.0661 9	0.10177 0.6397 9	0.00000 1.0000 9	0.23206 0.5480 9	0.23904 0.5356 9	0.10641 0.0834 9	0.33405 0.3796 9	0.11591 0.7273 9	-0.04400 0.0042 9	-0.50413 0.1664 9	0.41392 0.2681 9	-0.33122 0.3839 9

	LLD	COQ	GYP	KAO	HEM	ANH	BZM	QTZ	PYR	CAL	DOL	ORT	PLA
SAMPLE	0.11670 0.9326 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.30181 0.3671 11	0.17657 0.6035 11	-0.66423 0.0258 11	-0.07365 0.8296 11	-0.20256 0.5503 11	0.16096 0.6364 11	0.00000 1.0000 11	0.01528 0.9644 11	-0.37192 0.2600 11
LOSIG100	-0.75089 0.0077 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.65815 0.0277 11	-0.55573 0.0759 11	0.07018 0.8375 11	0.70708 0.0150 11	0.74967 0.0079 11	0.27368 0.4155 11	0.00000 1.0000 11	-0.16897 0.6194 11	0.42219 0.1958 11
LOSIG500	0.64338 0.0327 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.38754 0.2399 11	-0.05790 0.8657 11	0.26615 0.4289 11	-0.68059 0.0212 11	-0.34877 0.2932 11	-0.09860 0.7730 11	0.00000 1.0000 11	-0.45994 0.1546 11	-0.63333 0.0364 11
STRAT	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11
BULKDEN	0.58988 0.0661 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.87214 0.0005 11	0.44667 0.1684 11	0.32256 0.3333 11	-0.63501 0.0350 11	-0.56398 0.0707 11	-0.34225 0.3029 11	0.00000 1.0000 11	-0.04835 0.8877 11	-0.07437 0.8280 11
MATRXDEN	0.31035 0.3530 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.12202 0.7208 11	-0.15672 0.6454 11	0.32960 0.3223 11	-0.25551 0.4483 11	-0.12469 0.7149 11	-0.05584 0.8705 11	0.00000 1.0000 11	0.56178 0.0721 11	-0.45342 0.1613 11

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	ILL	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
LOGDEN	0.38242 0.2458 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.50706 0.1114 11	0.16268 0.6327 11	0.23391 0.4888 11	-0.32834 0.3242 11	-0.18358 0.5890 11	-0.16989 0.6175 11	0.00000 1.0000 11	-0.48061 0.1346 11	0.03671 0.9147 11
POROSITY	-0.30099 0.3684 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.66311 0.0261 11	-0.48777 0.1280 11	-0.05451 0.8735 11	0.37538 0.2553 11	-0.40130 0.2212 11	-0.25114 0.4563 11	0.00000 1.0000 11	-0.41379 0.2058 11	-0.23192 0.4926 11
LITYPE	-0.11183 0.7434 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.14613 0.6681 11	0.34728 0.2954 11	-0.39755 0.2260 11	0.09402 0.7815 11	-0.17802 0.5988 11	0.10264 0.7639 11	0.00000 1.0000 11	-0.14776 0.6646 11	0.34477 0.2991 11
RESIST	0.08471 0.8044 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.36255 0.2732 11	0.12182 0.7212 11	-0.51698 0.1035 11	-0.02731 0.9365 11	-0.12486 0.7145 11	0.09934 0.7714 11	0.00000 1.0000 11	-0.23741 0.4821 11	-0.51691 0.1035 11
GAMMA	0.19831 0.5589 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.11568 0.7348 11	0.21323 0.5290 11	-0.26044 0.4393 11	-0.10629 0.7558 11	0.02610 0.9391 11	0.52636 0.0962 11	0.00000 1.0000 11	0.05444 0.8737 11	-0.25602 0.4492 11
QUARTZ	-0.21597 0.5236 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.19665 0.5622 11	0.09082 0.7906 11	-0.05430 0.8740 11	0.03141 0.4936 11	-0.10929 0.7491 11	-0.17136 0.6144 11	0.00000 1.0000 11	0.21431 0.5269 11	0.72304 0.0119 11
EXP	0.41130 0.2088 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.51012 0.1009 11	0.24121 0.4749 11	0.15630 0.6463 11	-0.45105 0.1628 11	-0.64132 0.0443 11	-0.12719 0.7094 11	0.00000 1.0000 11	0.51056 0.1022 11	-0.28073 0.4030 11
ILL	1.00000 0.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.82612 0.0017 11	0.10401 0.7609 11	-0.36641 0.2677 11	-0.98437 0.0001 11	-0.75604 0.0071 11	-0.05483 0.8728 11	0.00000 1.0000 11	-0.10539 0.5852 11	-0.66361 0.0260 11
COQ	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11
GYP	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11
KAO	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11
HEM	-0.82612 0.0017 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	1.00000 0.0000 11	-0.24727 0.4635 11	-0.47915 0.1359 11	0.86235 0.0006 11	0.78970 0.0038 11	0.26596 0.4292 11	0.00000 1.0000 11	-0.15800 0.6491 11	0.33920 0.3075 11
ANH	0.10401 0.7609 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.24727 0.4635 11	1.00000 0.0000 11	-0.41485 0.2046 11	-0.08557 0.8025 11	-0.31724 0.3418 11	-0.46065 0.1459 11	0.00000 1.0000 11	-0.17594 0.6046 11	0.07318 0.8307 11
SZM	0.36641 0.2677 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.47915 0.1359 11	-0.41485 0.2046 11	1.00000 0.0000 11	-0.42671 0.1906 11	-0.09870 0.7728 11	-0.06344 0.8530 11	0.00000 1.0000 11	-0.11623 0.7336 11	-0.38214 0.2461 11
QTZ	-0.98437 0.0001 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.86235 0.0006 11	-0.08557 0.8025 11	-0.42671 0.1906 11	1.00000 0.0000 11	0.77123 0.0054 11	0.06838 0.8417 11	0.00000 1.0000 11	-0.19011 0.5756 11	0.68223 0.0207 11
PYR	-0.75604 0.0071 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.78970 0.0038 11	-0.31724 0.3418 11	-0.09870 0.7728 11	0.77123 0.0054 11	1.00000 0.0000 11	0.26387 0.4330 11	0.00000 1.0000 11	-0.06881 0.8407 11	0.43638 0.1796 11
CAL	-0.05483 0.8728 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.26596 0.4292 11	-0.46065 0.1459 11	-0.06344 0.8530 11	0.06838 0.8417 11	0.26387 0.4330 11	1.00000 0.0000 11	0.00000 1.0000 11	0.23034 0.4803 11	0.02693 0.9374 11
DOL	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11

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	ILL	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
ORT	-0.18539 0.5852 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.15500 0.6491 11	0.17594 0.6048 11	-0.11623 0.7336 11	0.19011 0.5755 11	0.06081 0.8407 11	0.23034 0.4803 11	0.00000 1.0000 11	1.00000 0.0000 11	0.05887 0.8635 11
PLA	-0.66361 0.0260 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	-0.33920 0.3075 11	0.07310 0.8307 11	-0.30214 0.2461 11	-0.48223 [illegible]07 11	0.43638 0.1796 11	0.02693 0.9374 11	0.00000 1.0000 11	0.05887 0.8635 11	1.00000 0.0000 11
GID	-0.65245 0.0296 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.34112 0.3046 11	0.04921 0.8856 11	0.33531 0.3134 11	0.57512 0.0642 11	0.03936 0.9085 11	-0.21499 0.5255 11	0.00000 1.0000 11	0.27115 0.4200 11	0.41503 0.2043 11
ANK	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11
GRDEN	-0.94930 0.0001 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.83101 0.0015 11	0.25179 0.4551 11	-0.21088 0.5337 11	0.92527 0.0001 11	0.09830 0.0007 11	0.10404 0.7163 11	0.00000 1.0000 11	0.04495 0.8956 11	0.55241 0.0736 11
G	-0.34506 0.3631 9	0.00000 1.0000 9	0.00000 1.0000 9	0.00000 1.0000 9	0.10405 0.7899 9	-0.38312 0.3088 9	0.56633 0.1119 9	0.22865 0.5540 9	0.45891 0.2232 9	-0.00334 0.9932 9	0.00000 1.0000 9	-0.27940 0.4665 9	0.38919 0.3005 9

	GID	ANK	GRDEN	G
SAMPLE	0.03748 0.9109 11	0.00000 1.0000 11	-0.18234 0.5915 11	-0.84004 0.0046 9
LOSIG100	0.41243 0.2075 11	0.00000 1.0000 11	0.84441 0.0011 11	0.63500 0.0661 9
LOSIG500	-0.43768 0.1782 11	0.00000 1.0000 11	-0.49231 0.1240 11	-0.18177 0.6397 9
STRAT	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 9
BULKDEN	-0.27489 0.4133 11	0.00000 1.0000 11	-0.60202 0.0500 11	0.23206 0.5400 9
MATRXDEN	-0.39032 0.2353 11	0.00000 1.0000 11	-0.28236 0.4002 11	-0.73904 0.5356 9
LOGDEN	-0.36071 0.2758 11	0.00000 1.0000 11	-0.30954 0.3543 11	0.60641 0.0834 9
POROSITY	-0.02097 0.9512 11	0.00000 1.0000 11	0.33042 0.3210 11	-0.33405 0.3796 9
LITYPE	0.37709 0.2589 11	0.00000 1.0000 11	0.00688 0.9840 11	0.13591 0.7273 9
RESIST	-0.02234 0.9480 11	0.00000 1.0000 11	-0.13758 0.6866 11	-0.84400 0.0042 9
GAMMA	-0.43769 0.1782 11	0.00000 1.0000 11	-0.17795 0.6006 11	-0.50413 0.1664 9
QUARTZ	0.36989 0.2629 11	0.00000 1.0000 11	0.06496 0.8495 11	0.41397 0.2601 9

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	STD	ANK	GRDEN	S
EXP	-0.02142 0.9502 11	0.00000 1.0000 11	-0.55074 0.0791 11	-0.33122 0.3839 9
ILL	-0.65245 0.0296 11	0.00000 1.0000 11	-0.94930 0.0001 11	-0.34596 0.3631 9
COQ	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 9
GYP	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 9
KAO	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 9
HEM	0.34112 0.3046 11	0.00000 1.0000 11	0.83181 0.0015 11	-0.10405 0.7899 9
ANH	0.04927 0.8856 11	0.00000 1.0000 11	-0.25179 0.4551 11	-0.30312 0.3088 9
SZM	-0.33531 0.3134 11	0.00000 1.0000 11	-0.21088 0.5337 11	0.56633 0.1119 9
QTZ	0.67512 0.0642 11	0.00000 1.0000 11	0.92527 0.0001 11	0.22865 0.5540 9
PYR	0.02926 0.9085 11	0.00000 1.0000 11	0.89830 0.0002 11	0.48091 0.2232 9
CAL	-0.21499 0.5255 11	0.00000 1.0000 11	0.12404 0.7163 11	-0.00334 0.9932 9
DOL	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 9
ORT	0.27115 0.4200 11	0.00000 1.0000 11	0.04495 0.8956 11	-0.27940 0.4665 9
PLA	0.41503 0.2043 11	0.00000 1.0000 11	0.55941 0.0736 11	0.38919 0.3005 9
STD	1.00000 0.0000 11	0.00000 1.0000 11	0.47305 0.1417 11	0.19668 0.6120 9
ANK	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 11	0.00000 1.0000 9
GRDEN	0.47305 0.1417 11	0.00000 1.0000 11	1.00000 0.0000 11	0.48295 0.1879 9
S	0.19668 0.6120 9	0.00000 1.0000 9	0.48295 0.1879 9	1.00000 0.0000 9

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Appendix D. Correlations within the lower portion of the Huron Member

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
SAMPLE	36	5306.93333333	47.49593065	193929.60000000	5305.00000000	5474.00000000
LOSIG100	36	4.41111111	2.10098994	159.00000000	0.00000000	8.30000000
L9610500	36	4.83611111	1.33462735	174.10000000	2.40000000	8.00000000
STRAT	36	3.00000000	0	108.00000000	3.00000000	3.00000000
BULKDEN	36	2.62583333	0.07346039	94.53000000	2.49000000	2.82000000
MATRXDEN	36	2.69722222	0.05375134	97.10000000	2.60000000	2.83000000
LOGDEN	36	2.57555556	0.03930415	92.72000000	2.50000000	2.67000000
POROSITY	36	2.77444444	1.44556157	99.88000000	0	5.64000000
LITYPE	36	3.97222222	1.50211491	143.00000000	2.00000000	6.00000000
RESIST	36	36.41666667	14.81304488	1311.00000000	0	80.00000000
GAMMA	36	271.11111111	47.31522121	9760.00000000	200.00000000	380.00000000
QUARTZ	36	0.15416667	0.04716991	5.55000000	0.07000000	0.30000000
EXP	36	0.00878212	0.00293323	0.31615626	0.00470916	0.01666155
ILL	36	0.44620566	0.08314149	16.06340355	0.13848323	0.58094872
CBO	36	0	0	0	0	0
GYP	36	0	0	0	0	0
KAO	36	0.00005053	0.00030318	0.00181907	0	0.00181907
HEM	36	0.03545313	0.01636533	1.27631263	0	0.10331603
ANH	36	0.00653750	0.00543668	0.23535010	0	0.01860214
SZM	36	0.00576861	0.00997732	0.20767012	0	0.03303983
QTZ	36	0.34171339	0.02993197	12.30168210	0.26673377	0.45814725
PYR	36	0.08645998	0.04079401	3.11258937	0	0.19618114
CAL	36	0.00106329	0.00149006	0.06707832	0	0.00676581
DOL	36	0.00599177	0.01772026	0.21570361	0	0.07913536
ORT	36	0.00095109	0.00083971	0.03423926	0	0.00398827
PLA	36	0.02009687	0.00833617	0.72348747	0.00635928	0.05198990
BIO	36	0.03286600	0.01729657	1.18317598	0	0.07053349
ANK	36	0.00726006	0.02187173	0.26136205	0	0.10790801
GRDEN	36	2.91083103	0.09215119	105.07794572	2.70981953	3.13404517
S	36	3.04672222	1.26201912	109.68200000	1.38600000	8.04700000

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	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
SAMPLE	1.00000 0.0000	0.36941 0.0266	-0.39962 0.0157	0.00000 1.0000	-0.19195 0.2621	-0.18095 0.2909	-0.58966 0.0002	0.19678 0.2500	0.08547 0.6201	0.25688 0.1304	0.56950 0.0003	0.23624 0.1654	-0.38758 0.0195
LOSIG100	0.36941 0.0266	1.00000 0.0000	-0.20312 0.2348	0.00000 1.0000	-0.60115 0.0001	-0.69319 0.0001	-0.57188 0.0003	0.33402 0.0465	-0.37470 0.0243	-0.40661 0.0139	-0.38184 0.0216	-0.06006 0.7279	-0.59467 0.0001
LOSIG500	-0.39962 0.0157	-0.20312 0.2348	1.00000 0.0000	0.00000 1.0000	0.35449 0.0339	0.35590 0.0331	0.24068 0.1574	-0.18658 0.2759	0.00907 0.9581	0.01656 0.9236	0.02016 0.9071	0.05836 0.7353	0.04018 0.8160
STRAT	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
BULKDEN	-0.19195 0.2621	-0.60115 0.0001	0.35449 0.0339	0.00000 1.0000	1.00000 0.0000	0.77339 0.0001	0.37955 0.0224	-0.66697 0.0001	0.56338 0.0003	-0.16061 0.3494	-0.06110 0.7233	-0.10451 0.5441	0.33681 0.0446
MATRXDEN	-0.18095 0.2909	-0.69319 0.0001	0.35590 0.0331	0.00000 1.0000	0.77339 0.0001	1.00000 0.0000	0.45018 0.0059	-0.09724 0.5726	0.52628 0.0010	-0.20913 0.2209	-0.12457 0.4691	-0.12828 0.4559	0.41446 0.0120
LOGDEN	-0.58966 0.0002	-0.57188 0.0003	0.24068 0.1574	0.00000 1.0000	0.37955 0.0224	0.45018 0.0059	1.00000 0.0000	-0.18342 0.2843	0.08479 0.6230	-0.49869 0.0020	-0.73323 0.0001	-0.27427 0.1056	0.68584 0.0001
POROSITY	0.19678 0.2500	0.33402 0.0465	-0.18658 0.2759	0.00000 1.0000	-0.66697 0.0001	-0.09724 0.5726	-0.18342 0.2843	1.00000 0.0000	-0.25981 0.1259	0.11009 0.5227	0.05661 0.7430	-0.02626 0.8792	-0.17951 0.2948
LITYPE	0.08547 0.6201	-0.37470 0.0243	0.00907 0.9581	0.00000 1.0000	0.56338 0.0003	0.52628 0.0010	0.08479 0.6230	-0.25981 0.1259	1.00000 0.0000	0.06088 0.7243	0.16125 0.3475	-0.11526 0.5032	0.16121 0.3476
RESIST	0.25688 0.1304	0.40661 0.0139	0.01656 0.9236	0.00000 1.0000	-0.16061 0.3494	-0.20913 0.2209	-0.49869 0.0020	0.11009 0.5227	0.06088 0.7243	1.00000 0.0000	0.49459 0.0022	0.24850 0.1439	-0.36750 0.0275
GAMMA	0.56950 0.0003	0.38184 0.0216	0.02016 0.9071	0.00000 1.0000	-0.06110 0.7233	-0.12457 0.4691	-0.73323 0.0001	0.05661 0.7430	0.16125 0.3475	0.49459 0.0022	1.00000 0.0000	0.30511 0.0704	-0.47137 0.0037
QUARTZ	0.23624 0.1654	0.06006 0.7279	0.05836 0.7353	0.00000 1.0000	-0.10451 0.5441	-0.12828 0.4559	-0.27427 0.1056	-0.02626 0.8792	-0.11526 0.5032	0.24850 0.1439	0.30511 0.0704	1.00000 0.0000	-0.17718 0.3012
EXP	-0.38758 0.0195	-0.59467 0.0001	-0.04018 0.8160	0.00000 1.0000	0.33681 0.0446	0.41446 0.0120	0.68584 0.0001	-0.17951 0.2948	0.16121 0.3476	-0.36750 0.0275	-0.47137 0.0037	-0.17718 0.3012	1.00000 0.0000
ILL	-0.17786 0.2994	-0.39504 0.0171	-0.06815 0.6929	0.00000 1.0000	0.14608 0.3985	0.28008 0.0873	0.28701 0.0897	0.06102 0.7237	0.11927 0.4884	-0.38997 0.0187	-0.35676 0.1306	-0.45077 0.0058	0.30862 0.0670
COQ	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
GYP	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
KAO	-0.14882 0.3863	-0.04986 0.7727	-0.40639 0.0139	0.00000 1.0000	-0.01361 0.9372	0.16832 0.3264	0.10640 0.5368	0.23191 0.1735	-0.22508 0.1869	-0.07425 0.6669	-0.07649 0.6575	-0.05149 0.7655	-0.03898 0.8214
HEM	0.09423 0.5846	-0.06657 0.6997	-0.28783 0.0887	0.00000 1.0000	-0.07425 0.6669	-0.29854 0.0770	-0.09721 0.5728	-0.27677 0.1022	-0.08709 0.6135	-0.08379 0.6271	-0.17656 0.3030	0.24196 0.1551	0.09101 0.5976
ANH	0.21049 0.2179	0.26194 0.1220	-0.26710 0.1153	0.00000 1.0000	-0.31724 0.0637	-0.33563 0.0454	-0.37338 0.0249	0.17884 0.2967	-0.00767 0.9646	0.24403 0.1515	0.21705 0.2036	0.04084 0.8131	-0.56897 0.0003
SZM	0.15449 0.3683	0.48571 0.0027	-0.12931 0.4523	0.00000 1.0000	-0.18196 0.2882	-0.21317 0.2119	-0.26208 0.1226	0.18447 0.2815	-0.26192 0.1228	0.33319 0.0471	0.32547 0.0527	0.08267 0.6317	-0.21126 0.2161
QTZ	0.11764 0.4944	0.20596 0.2282	-0.09058 0.5993	0.00000 1.0000	-0.08271 0.6313	-0.22981 0.1776	-0.19376 0.2575	-0.12090 0.4824	-0.02463 0.8866	0.23180 0.1737	0.14091 0.4124	0.40089 0.0154	-0.21756 0.2024
PYR	0.24146 0.1744	0.63667 0.0007	0.00092 0.9960	0.00000 1.0000	-0.20648 0.2270	-0.12352 0.4729	-0.35533 0.0334	0.32092 0.0563	-0.08014 0.6422	0.38889 0.0191	0.31186 0.0641	0.22384 0.1894	-0.39535 0.0170
CAL	0.03013 0.8615	0.09615 0.5769	-0.17609 0.3036	0.00000 1.0000	-0.21317 0.1711	-0.27074 0.1102	0.03321 0.8476	-0.01352 0.9376	-0.20422 0.2322	0.12675 0.4613	-0.22036 0.1966	0.25904 0.1271	-0.03932 0.8199
DOL	-0.02872 0.8680	0.28909 0.0873	0.04693 0.7858	0.00000 1.0000	-0.25998 0.1257	-0.40948 0.0131	-0.44706 0.0063	-0.04538 0.7927	-0.03566 0.8364	0.32089 0.0564	0.31544 0.0609	0.18564 0.2784	-0.24799 0.1447

MOORE BUSINESS FORMS

UGR File #210 Bureau of Geological & Economic Survey

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 36

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
ORT	0.16444 0.3379	-0.00508 0.9765	0.09069 0.5989	0.00000 1.0000	0.09594 0.5778	0.11529 0.5031	0.04653 0.7876	0.00274 0.9873	0.19460 0.2554	0.06072 0.7250	0.01920 0.9111	0.29734 0.0782	0.06834 0.6921
PLA	0.35952 0.0313	0.02036 0.9062	-0.38074 0.0220	0.00000 1.0000	-0.02743 0.8738	-0.20915 0.2209	-0.03163 0.8547	-0.23758 0.1629	0.15456 0.3681	0.08396 0.6264	0.12260 0.4763	0.40197 0.0151	0.04071 0.8136
SID	-0.07465 0.6657	-0.13056 0.4479	0.28274 0.0948	0.00000 1.0000	0.12287 0.4753	0.09693 0.5739	0.15649 0.3621	-0.16565 0.3343	-0.05081 0.7686	-0.02436 0.8879	-0.02071 0.9046	0.08641 0.6163	0.23034 0.1765
ANK	-0.11896 0.4896	-0.08271 0.6315	0.61012 0.0001	0.00000 1.0000	0.26167 0.1212	0.14991 0.3828	0.12952 0.4515	-0.30659 0.0690	-0.07053 0.6827	0.05649 0.7435	-0.07461 0.6654	0.14187 0.4092	-0.09860 0.5673
GRDEN	0.21692 0.2038	0.54089 0.0007	0.08632 0.6167	0.00000 1.0000	-0.18972 0.2678	-0.11335 0.5104	-0.34945 0.0367	-0.29521 0.0805	-0.10346 0.5482	-0.41312 0.0123	-0.33311 0.0471	0.24692 0.1465	-0.37885 0.0227
S	0.12092 0.4824	0.57965 0.0002	0.14901 0.3857	0.00000 1.0000	-0.25150 0.1390	-0.06236 0.7179	-0.25009 0.1413	0.48987 0.0024	-0.17806 0.2998	0.33890 0.0432	0.30779 0.0670	-0.01745 0.9195	-0.29350 0.0823

	ILL	COQ	GYP	KAO	HEM	ANH	BZM	QTZ	PYR	CAL	DOL	ORT	PLA
SAMPLE	-0.17786 0.2994	0.00000 1.0000	0.00000 1.0000	-0.14882 0.3863	0.09423 0.5846	0.21049 0.2179	0.15449 0.3683	0.11764 0.4944	0.23145 0.1744	0.03013 0.8615	-0.02872 0.8680	0.16444 0.3379	0.35952 0.0313
LOSIG100	-0.39504 0.0171	0.00000 1.0000	0.00000 1.0000	-0.04996 0.7727	-0.06657 0.6997	0.26194 0.1228	0.48571 0.0027	0.20596 0.2282	0.53667 0.0007	0.09615 0.5769	0.28904 0.0873	-0.00508 0.9765	0.02036 0.9062
LOSIG500	-0.06815 0.6929	0.00000 1.0000	0.00000 1.0000	0.40639 0.0139	-0.28783 0.0887	-0.26710 0.1153	-0.12931 0.4523	-0.09056 0.6093	0.00092 0.9958	-0.17669 0.3026	0.04693 0.7858	-0.09069 0.5989	-0.38074 0.0220
STRAT	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
BULKDEN	0.14508 0.3985	0.00000 1.0000	0.00000 1.0000	-0.01361 0.9372	-0.07425 0.6669	-0.31224 0.0637	-0.18196 0.2882	-0.08277 0.6313	-0.20648 0.2270	-0.23317 0.1711	-0.25998 0.1257	-0.09594 0.5778	-0.02743 0.8738
MATRXDEN	0.28908 0.0873	0.00000 1.0000	0.00000 1.0000	0.16002 0.3284	-0.29854 0.0770	-0.33563 0.0454	-0.21317 0.2119	-0.22981 0.1776	-0.12352 0.4729	-0.27074 0.1102	-0.40940 0.0131	-0.11529 0.5031	-0.20915 0.2209
LOGDEN	0.28701 0.0897	0.00000 1.0000	0.00000 1.0000	0.10648 0.5360	0.09721 0.5728	-0.37338 0.0249	-0.26208 0.1226	-0.19376 0.2575	-0.35533 0.0334	0.03321 0.8475	-0.44706 0.0063	0.04653 0.7876	-0.03163 0.8547
POROSITY	0.06102 0.7237	0.00000 1.0000	0.00000 1.0000	0.23191 0.1135	-0.27677 0.1022	0.17884 0.2967	0.18447 0.2815	-0.12090 0.4824	0.32092 0.0563	-0.01352 0.9376	-0.04538 0.7927	0.00274 0.9873	-0.23758 0.1629
LITYPE	0.11927 0.4884	0.00000 1.0000	0.00000 1.0000	-0.22508 0.1869	-0.08709 0.6135	-0.00767 0.9646	-0.26192 0.1228	-0.02463 0.8866	-0.08014 0.6422	-0.20422 0.2322	-0.03566 0.8364	-0.19460 0.2554	0.15456 0.3681
RESIST	-0.38997 0.0187	0.00000 1.0000	0.00000 1.0000	-0.07425 0.6669	-0.08339 0.6271	-0.24493 0.1515	-0.33319 0.0471	-0.23180 0.1737	-0.38089 0.0191	-0.12675 0.4613	-0.32009 0.0564	-0.06072 0.7250	-0.08396 0.6264
GAMMA	-0.25676 0.1306	0.00000 1.0000	0.00000 1.0000	-0.07649 0.6575	-0.17656 0.3039	0.21706 0.2035	0.32547 0.0527	0.14091 0.4124	0.31186 0.0641	-0.22036 0.1966	0.31544 0.0609	-0.01920 0.9111	0.12260 0.4763
QUARTZ	-0.45077 0.0058	0.00000 1.0000	0.00000 1.0000	-0.05149 0.7655	0.24196 0.1551	0.04084 0.8131	0.08267 0.6317	0.40089 0.0154	0.22384 0.1894	0.25904 0.1271	0.18564 0.2784	0.29734 0.0782	0.40197 0.0151
EXP	0.30862 0.0670	0.00000 1.0000	0.00000 1.0000	-0.03898 0.8214	0.09101 0.5976	-0.56897 0.0003	-0.21126 0.2161	-0.21756 0.2024	-0.39535 0.0170	-0.03932 0.8199	-0.24799 0.1447	0.06834 0.6921	0.04071 0.8136
ILL	1.00000 0.0000	0.00000 1.0000	0.00000 1.0000	-0.08570 0.6192	-0.48377 0.0067	-0.15410 0.3695	-0.41316 0.0123	-0.91319 0.0001	-0.58335 0.0002	-0.28416 0.0930	-0.31052 0.0653	-0.48663 0.0026	-0.54420 0.0006
COQ	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
GYP	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
KAO	-0.08570 0.6192	0.00000 1.0000	0.00000 1.0000	1.00000 0.0000	-0.10778 0.5315	0.04655 0.7875	0.09620 0.5768	-0.03484 0.8401	0.02732 0.8743	-0.21322 0.2118	-0.05797 0.7370	0.04591 0.7903	-0.19295 0.2595

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 36

	ILL	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
HEM	-0.44377 0.0067	0.00000 1.0000	0.00000 1.0000	-0.10778 0.5315	1.00000 0.0000	0.07100 0.6807	-0.02520 0.8840	0.61852 0.0001	-0.07158 0.6782	0.57152 0.0003	-0.04538 0.7927	0.50849 0.0015	0.74981 0.0001
ANH	-0.15410 0.3695	0.00000 1.0000	0.00000 1.0000	0.04655 0.7875	0.07100 0.6807	1.00000 0.0000	0.27308 0.1071	0.18733 0.2739	0.07627 0.6584	-0.11732 0.4956	0.07475 0.6648	0.05964 0.7297	0.10035 0.5603
SZM	-0.41315 0.0123	0.00000 1.0000	0.00000 1.0000	0.09620 0.5768	-0.02520 0.8840	0.27308 0.1071	1.00000 0.0000	0.35096 0.0358	0.24729 0.1459	-0.32991 0.0494	0.18368 0.2836	0.05850 0.7347	0.12797 0.4570
QTZ	-0.91319 0.0001	0.00000 1.0000	0.00000 1.0000	-0.03484 0.8401	0.61852 0.0001	0.18733 0.2739	0.35096 0.0358	1.00000 0.0000	0.39163 0.0182	0.33874 0.0433	0.25534 0.1328	0.43564 0.0079	0.69909 0.0001
PYR	-0.58335 0.0002	0.00000 1.0000	0.00000 1.0000	0.02732 0.8743	-0.07158 0.6782	0.07627 0.6584	0.24729 0.1459	0.39163 0.0182	1.00000 0.0000	0.07579 0.6604	0.05968 0.7295	0.23353 0.1704	-0.00292 0.9865
CAL	-0.28416 0.0930	0.00000 1.0000	0.00000 1.0000	-0.21322 0.2118	0.57152 0.0003	-0.11732 0.4956	-0.32991 0.0494	0.33874 0.0433	0.07579 0.6604	1.00000 0.0000	0.10580 0.5391	0.49710 0.0020	0.47015 0.0038
DOL	-0.31052 0.0653	0.00000 1.0000	0.00000 1.0000	-0.05797 0.7370	-0.04538 0.7927	0.07475 0.6648	0.18368 0.2836	0.25534 0.1328	0.05968 0.7295	0.10580 0.5391	1.00000 0.0000	0.00056 0.9974	0.09648 0.5756
ORT	-0.48663 0.0026	0.00000 1.0000	0.00000 1.0000	0.04591 0.7903	0.50849 0.0015	0.05964 0.7297	0.05850 0.7347	0.43564 0.0079	0.23353 0.1704	0.49710 0.0020	0.00056 0.9974	1.00000 0.0000	0.42269 0.0102
PLA	-0.54420 0.0006	0.00000 1.0000	0.00000 1.0000	-0.19295 0.2595	0.74981 0.0001	0.10035 0.5603	0.12797 0.4570	0.69909 0.0001	-0.00292 0.9865	0.47015 0.0038	0.09648 0.5756	0.42269 0.0102	1.00000 0.0000
SID	-0.37953 0.0224	0.00000 1.0000	0.00000 1.0000	0.41030 0.0179	0.15042 0.3812	-0.13132 0.4462	0.09949 0.5637	0.35116 0.0357	-0.20984 0.2200	-0.06690 0.6983	-0.06765 0.6951	0.13271 0.4404	0.25257 0.1372
ANK	-0.14767 0.3901	0.00000 1.0000	0.00000 1.0000	0.14792 0.3893	-0.21778 0.2020	-0.15266 0.3741	-0.10514 0.5417	-0.05839 0.7352	-0.10486 0.5428	-0.06407 0.7105	-0.11545 0.5026	0.04734 0.7839	-0.23723 0.1636
GRDEN	-0.67883 0.0001	0.00000 1.0000	0.00000 1.0000	0.12691 0.4608	-0.08148 0.6366	0.06439 0.7091	0.30205 0.0734	0.46169 0.0046	0.97499 0.0001	0.03397 0.8441	0.07399 0.6681	0.25105 0.1397	0.01990 0.9083
S	-0.13890 0.4191	0.00000 1.0000	0.00000 1.0000	0.03386 0.8446	-0.51326 0.0014	-0.09663 0.5751	-0.24580 0.1484	-0.12864 0.4546	-0.74155 0.0001	-0.09734 0.5722	-0.11818 0.4924	-0.05731 0.7399	-0.42472 0.0098

	SID	ANK	GRDEN	S
SAMPLE	-0.07465 0.6652	-0.11896 0.4896	0.21692 0.2038	0.12092 0.4824
LOSIG100	-0.13056 0.4479	-0.08271 0.6315	0.54089 0.0007	0.57965 0.0002
LOSIG600	0.28274 0.0948	-0.61019 0.0001	0.08633 0.6167	0.14901 0.3857
STRAT	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
BULKDEN	0.12287 0.4753	0.26167 0.1232	-0.18972 0.2678	-0.25150 0.1390
MATRXDEN	0.09693 0.5739	0.14991 0.3828	-0.11335 0.5104	-0.06236 0.7179
LOGDEN	0.16649 0.3621	0.12952 0.4515	-0.34046 0.0367	-0.25009 0.1413
POROSITY	-0.16565 0.3343	-0.30659 0.0690	0.29521 0.0805	0.48987 0.0024
LITYPE	-0.05081 0.7686	-0.07053 0.6827	-0.10346 0.5482	-0.17806 0.2988
RESIST	-0.02436 0.8879	0.05649 0.7435	0.41312 0.0123	0.33890 0.0432

W.Va. Geological & Economic Survey

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 36

	SID	ANK	GRDEN	S
GAMMA	-0.02071 0.9046	-0.07461 0.6654	0.33311 0.0471	0.30779 0.0678
QUARTZ	0.08641 0.6163	0.14187 0.4042	0.24692 0.1465	-0.01745 0.4495
EXP	0.23034 0.1765	-0.09860 0.5673	-0.37885 0.0227	-0.29350 0.0823
ILL	-0.37953 0.0224	-0.14767 0.3901	-0.67883 0.0001	-0.11890 0.4191
CBO	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
GYP	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
KAO	0.41030 0.0129	0.14792 0.3893	0.12691 0.4608	0.03386 0.8446
HEM	0.15042 0.3812	-0.21778 0.2020	-0.08148 0.6366	-0.51325 0.0014
ANH	-0.13132 0.4452	-0.15266 0.3741	0.06439 0.7091	-0.09663 0.5751
SZM	0.09949 0.5637	-0.10514 0.5417	0.30205 0.0734	0.24580 0.1484
QTZ	0.35116 0.0357	-0.05839 0.7352	0.46169 0.0046	-0.12864 0.4546
PYR	-0.20954 0.2200	-0.10486 0.5428	0.97499 0.0001	0.74155 0.0001
CAL	-0.06690 0.6983	-0.06407 0.7105	0.03397 0.8441	-0.09734 0.5722
DOL	-0.06765 0.6951	-0.11545 0.5026	0.07398 0.6601	0.11818 0.4924
ORT	0.13271 0.4404	0.04734 0.7839	0.25105 0.1397	-0.05731 0.7399
PLA	0.25251 0.1372	-0.23723 0.1636	0.01990 0.9083	-0.42472 0.0098
SID	1.00000 0.0000	0.35832 0.0319	0.00351 0.9838	-0.34710 0.0381
ANK	0.35832 0.0319	1.00000 0.0000	0.00407 0.9812	0.00525 0.9758
GRDEN	0.00351 0.9838	0.00407 0.9812	1.00000 0.0000	0.70392 0.0001
S	-0.34710 0.0381	0.00525 0.9758	0.70392 0.0001	1.00000 0.0000

SUPERSEDED BY CORRECTED VERSION

UGR File #210
W. Va. Geological & Economic Survey

Appendix E. Correlations by Lithologic Type

PRELIMINARY
OPEN FILE REPORT
SUBJECT TO REVISION

Sharply - Banded Lithologic Type

PRELIMINARY
OPEN FILE REPORT
SUBJECT TO REVISION

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
SAMPLE	15	5146.40000000	238.71614644	77196.00000000	4870.30000000	5435.00000000
LOSIG100	15	4.86666667	2.12826780	73.00000000	2.20000000	8.90000000
LOGIG500	15	4.08666667	1.92014384	61.30000000	1.70000000	8.00000000
STRAT	15	5.53333333	3.11371773	83.00000000	2.00000000	9.00000000
BULKDEN	15	2.59933333	0.09043202	38.99000000	2.45000000	2.76000000
MATRXDEN	15	2.67933333	0.07333550	40.19000000	2.54000000	2.81000000
LOGDEN	15	2.55600000	0.05889458	38.34000000	2.47000000	2.65000000
POROSITY	15	2.99466667	1.52630210	44.92000000	0	5.64000000
LITYPE	15	2.00000000	0	30.00000000	2.00000000	2.00000000
RESIST	15	34.46666667	11.35068699	517.00000000	18.00000000	54.00000000
GAMMA	15	233.00000000	42.92019172	3495.00000000	180.00000000	330.00000000
QUARTZ	15	0.21133333	0.07219682	3.17000000	0.06000000	0.30000000
EXP	15	0.00728503	0.00282752	0.10927547	0.00333794	0.01163751
ILL	15	0.42277364	0.08285152	6.34160462	0.26732867	0.56488754
CHQ	15	0	0	0	0	0
GYP	15	0	0	0	0	0
KAO	15	0.00034493	0.00082826	0.00517396	0	0.00278475
HEM	15	0.03425497	0.01553103	0.51382457	0	0.05806984
ANH	15	0.00741420	0.00605900	0.11121297	0	0.01577876
SZM	15	0.00325326	0.00725089	0.04879897	0	0.02441810
QTZ	15	0.35135700	0.03356710	5.27036824	0.30306701	0.41710293
PYR	15	0.09447956	0.05469822	1.41719337	0.04250025	0.24649873
CAL	15	0.00223692	0.00155477	0.03355383	0	0.00515036
DOL	15	0.00157802	0.00611164	0.02367029	0	0.02367029
ORT	15	0.00090214	0.00052207	0.01353217	0	0.00156236
PLA	15	0.02672512	0.01929792	0.40087682	0.00635928	0.07368530
BID	15	0.03204033	0.02212583	0.48060490	0	0.07426391
ANK	15	0.01535399	0.02942702	0.23030982	0	0.10790801
GRDEN	15	2.93563640	0.11252741	44.03454597	2.80877343	3.23932059
S	15	2.89806667	1.84098454	43.47100000	1.34900000	8.04700000

W.Va. Geological & Economic Survey

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 15

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
SAMPLE	1.00000 0.0000	-0.27080 0.3290	0.68438 0.0049	-0.94215 0.0001	0.27394 0.3231	0.40947 0.1296	0.58796 0.0212	0.09776 0.7289	0.00000 1.0000	0.26367 0.3423	0.56873 0.0269	-0.60614 0.0166	0.59541 0.0192
LOSIG100	-0.27080 0.3290	1.00000 0.0000	-0.38885 0.1520	0.33162 0.2272	-0.70934 0.0031	-0.74246 0.0015	-0.64565 0.0093	0.27933 0.3133	0.00000 1.0000	-0.33156 0.2273	0.27760 0.3165	0.22902 0.4116	-0.70355 0.0034
LOSIG500	0.68438 0.0049	-0.38885 0.1520	1.00000 0.0000	-0.68209 0.0051	0.35206 0.1981	0.46407 0.0814	0.63491 0.0110	0.01991 0.9439	0.00000 1.0000	-0.11407 0.6856	-0.25447 0.3601	-0.53676 0.0391	0.41063 0.1284
STRAT	-0.94215 0.0001	0.33162 0.2272	-0.68209 0.0051	1.00000 0.0000	-0.25232 0.3643	-0.36745 0.1779	-0.65360 0.0082	-0.07165 0.7997	0.00000 1.0000	-0.03786 0.8934	-0.36826 0.1768	0.65751 0.0077	-0.68782 0.0046
BULKDEN	0.27394 0.3231	-0.70934 0.0031	0.35206 0.1981	-0.25232 0.3643	1.00000 0.0000	0.89818 0.0001	0.77866 0.0006	-0.64679 0.0092	0.00000 1.0000	-0.11519 0.6827	-0.28653 0.3005	-0.13333 0.6357	0.53284 0.0408
MATRXDEN	0.40947 0.1296	-0.74246 0.0015	0.46407 0.0814	-0.36745 0.1779	0.89818 0.0001	1.00000 0.0000	0.81797 0.0002	-0.24572 0.3774	0.00000 1.0000	-0.17894 0.5234	-0.12413 0.6594	-0.21972 0.4314	0.54332 0.0363
LOGDEN	0.58796 0.0212	-0.64565 0.0093	0.63491 0.0110	-0.65360 0.0082	0.77866 0.0006	0.81797 0.0002	1.00000 0.0000	-0.30117 0.2753	0.00000 1.0000	-0.32397 0.2388	-0.22239 0.4257	-0.51774 0.0481	0.63755 0.0106
POROSITY	0.09776 0.7289	0.27933 0.3133	0.01991 0.9439	-0.07165 0.7997	-0.64679 0.0092	-0.24572 0.3774	-0.30117 0.2753	1.00000 0.0000	0.00000 1.0000	-0.05699 0.8401	0.41378 0.1252	-0.07953 0.7781	-0.23663 0.3958
LITYPE	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
RESIST	0.26367 0.3423	-0.33156 0.2273	-0.11407 0.6856	-0.03786 0.8934	-0.11519 0.6827	-0.17894 0.5234	-0.32397 0.2388	-0.05699 0.8401	0.00000 1.0000	1.00000 0.0000	0.70509 0.0033	-0.10715 0.7039	-0.02210 0.9377
GAMMA	0.56873 0.0269	0.27760 0.3165	0.25447 0.3601	-0.36826 0.1768	-0.28653 0.3005	-0.12413 0.6594	-0.22239 0.4257	0.41378 0.1252	0.00000 1.0000	0.70509 0.0033	1.00000 0.0000	-0.12125 0.6669	0.04734 0.8669
QUARTZ	-0.60614 0.0166	0.22902 0.4116	-0.53676 0.0391	0.65751 0.0077	-0.13333 0.6357	-0.21972 0.4314	-0.51774 0.0481	-0.07953 0.7781	0.00000 1.0000	-0.10715 0.7039	-0.12125 0.6669	1.00000 0.0000	-0.51004 0.0521
EXP	0.59541 0.0192	-0.70355 0.0034	0.41063 0.1284	-0.68782 0.0046	0.53284 0.0408	0.54332 0.0363	0.63755 0.0106	-0.23663 0.3958	0.00000 1.0000	-0.02210 0.9377	0.04734 0.8669	-0.51004 0.0521	1.00000 0.0000
ILL	0.37951 0.1630	-0.33269 0.2257	0.12763 0.6503	-0.46819 0.0820	-0.13397 0.6341	0.10390 0.7125	0.27098 0.3122	-0.11614 0.6802	0.00000 1.0000	0.19944 0.4761	0.14223 0.6131	-0.42726 0.1122	0.79765 0.0004
COQ	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
GYP	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
KAO	-0.12072 0.6682	-0.07640 0.7867	0.18779 0.5027	0.19449 0.4873	0.44657 0.0952	0.55940 0.0301	0.33142 0.2275	-0.01195 0.9663	0.00000 1.0000	-0.30153 0.2748	-0.24931 0.3702	0.16025 0.5683	-0.25116 0.3666
HEM	-0.30759 0.2647	-0.00[illegible] 0.9903	-0.31841 0.2474	-0.21921 0.4325	-0.05904 0.8335	-0.00029 0.9992	-0.11333 0.6876	-0.12773 0.6501	0.00000 1.0000	-0.23831 0.3924	-0.23090 0.4077	0.19653 0.4827	-0.07877 0.7802
ANH	-0.39597 0.1440	-0.08326 0.7680	-0.32923 0.2308	0.38224 0.1597	0.2[illegible]864 0.4330	-0.32235 0.2413	-0.35935 0.1803	0.02888 0.9186	0.00000 1.0000	-0.04019 0.8869	-0.30803 0.2640	-0.07253 0.7973	-0.27104 0.3286
SZM	0.43403 0.1060	0.08237 0.7704	0.13387 0.6343	-0.43229 0.1076	0.[illegible] 0.0265	0.15054 0.5923	0.26376 0.3422	0.12046 0.6689	0.00000 1.0000	0.18391 0.5117	0.16440 0.5582	-0.24853 0.3718	0.13570 0.6297
QTZ	-0.63842 0.0104	0.28321 0.3064	-0.51223 0.0509	0.65915 0.0075	-0.29457 0.2865	-0.29220 0.2906	-0.50570 0.0545	0.14571 0.6044	0.00000 1.0000	-0.26347 0.3427	-0.32641 0.2351	0.58641 0.0216	-0.76317 0.0009
PYR	0.06566 0.8164	0.17112 0.5420	-0.07613 0.7874	-0.07833 0.7814	-0.19445 0.4874	0.38536 0.1560	0.20113 0.4723	0.24691 0.3750	0.00000 1.0000	-0.03374 0.9050	0.17310 0.5373	-0.10677 0.7049	-0.31737 0.2491
CAL	-0.35816 0.1899	0.52218 0.0450	-0.45866 0.0855	0.40896 0.1301	-0.62219 0.0133	-0.64963 0.0088	-0.60770 0.0163	0.24956 0.3697	0.00000 1.0000	-0.05103 0.8567	0.03275 0.9077	0.57529 0.0248	-0.54611 0.0352
DOL	-0.29215 0.2907	0.19931 0.4764	-0.30063 0.2763	0.30800 0.2641	-0.27128 0.3244	-0.29927 0.2785	-0.26305 0.3435	0.08434 0.7651	0.00000 1.0000	-0.10886 0.6994	-0.27716 0.3173	0.22480 0.4205	-0.23317 0.4030

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 15

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
ORT	0.08543 0.7621	-0.29653 0.2832	0.41183 0.1272	-0.02813 0.9207	-0.14729 0.6004	0.25901 0.3512	0.15185 0.5890	0.12494 0.6573	0.00000 1.0000	-0.30496 0.2691	0.08274 0.7694	0.03171 0.9107	0.08584 0.7610
PLA	-0.67442 0.0058	0.36947 0.1753	-0.71145 0.0029	0.66343 0.0070	-0.43390 0.1061	-0.47753 0.0718	-0.66644 0.0067	0.13127 0.6410	0.00000 1.0000	-0.11032 0.6955	-0.22912 0.4114	0.66781 0.0065	-0.72084 0.0024
SID	0.09824 0.7276	-0.02494 0.9297	0.36274 0.1839	-0.11752 0.6766	-0.08366 0.7669	-0.17499 0.5328	-0.06872 0.8077	-0.13117 0.6412	0.00000 1.0000	-0.01627 0.9541	-0.06343 0.8223	-0.10583 0.7074	-0.01333 0.9624
ANK	0.06749 0.8111	0.07671 0.7858	0.51476 0.0496	-0.05525 0.8449	-0.02302 0.9351	-0.17743 0.5270	-0.01430 0.9597	-0.26368 0.3423	0.00000 1.0000	0.01636 0.9538	0.04969 0.8604	-0.08347 0.7674	-0.25161 0.3657
GRDEN	0.11948 0.6715	-0.18352 0.5127	-0.20304 0.4680	-0.03860 0.8914	-0.20047 0.4726	-0.38951 0.1513	-0.22291 0.4246	-0.23735 0.3943	0.00000 1.0000	-0.03015 0.9151	0.18877 0.5005	0.06960 0.8051	-0.35006 0.1998
S	0.45918 0.0851	0.16318 0.5612	0.36818 0.1769	-0.30772 0.2645	0.18964 0.4985	0.38095 0.1612	0.36933 0.1755	0.24676 0.3753	0.00000 1.0000	0.20277 0.4686	0.46635 0.0797	-0.18949 0.4988	-0.03330 0.9062

	ILL	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
SAMPLE	0.37951 0.1630	0.00000 1.0000	0.00000 1.0000	-0.12072 0.6682	-0.30759 0.2647	-0.39591 0.1440	0.43403 0.1060	-0.63842 0.0104	0.06556 0.8164	-0.35816 0.1899	-0.29215 0.2907	0.08543 0.7621	-0.67442 0.0058
LOSIG100	0.33269 0.2257	0.00000 1.0000	0.00000 1.0000	-0.07640 0.7867	-0.00345 0.9903	-0.08326 0.7680	0.00237 0.7704	0.20321 0.3064	0.17112 0.5420	0.52218 0.0459	0.19931 0.4764	-0.29653 0.2832	0.36947 0.1753
LOSIG500	0.12763 0.6503	0.00000 1.0000	0.00000 1.0000	0.18779 0.5097	-0.31841 0.2474	-0.32923 0.2308	0.13387 0.6343	-0.51223 0.0509	0.07613 0.7874	-0.45866 0.0855	-0.30063 0.2763	0.41183 0.1272	-0.71145 0.0029
STRAT	-0.46219 0.0828	0.00000 1.0000	0.00000 1.0000	0.19449 0.4873	0.21921 0.4325	0.38224 0.1597	-0.43229 0.1076	0.65915 0.0075	0.07833 0.7814	0.40896 0.1301	0.30800 0.2641	-0.02813 0.9207	0.66343 0.0070
BULKDEN	0.13397 0.6341	0.00000 1.0000	0.00000 1.0000	0.44657 0.0952	0.05903 0.8345	-0.26864 0.3330	0.06192 0.8265	-0.29457 0.2865	0.19445 0.4874	-0.62219 0.0133	-0.27328 0.3244	0.14729 0.6004	-0.43390 0.1061
MATRXDEN	-0.10390 0.7125	0.00000 1.0000	0.00000 1.0000	-0.55940 0.0301	-0.00029 0.9992	-0.32235 0.2413	0.15054 0.5923	-0.29220 0.2906	-0.30536 0.1560	-0.64963 0.0088	-0.29927 0.2785	0.25901 0.3512	-0.47753 0.0718
LOGDEN	0.27998 0.3122	0.00000 1.0000	0.00000 1.0000	0.33147 0.2275	-0.11333 0.6876	-0.35935 0.1803	0.26376 0.3422	-0.50570 0.0545	0.20113 0.4723	-0.60770 0.0163	-0.26305 0.3435	0.15185 0.5890	-0.66644 0.0067
POROSITY	-0.11614 0.6802	0.00000 1.0000	0.00000 1.0000	-0.01195 0.9663	-0.12773 0.6501	0.02888 0.9186	0.12046 0.6689	0.14571 0.6044	0.24691 0.3750	0.24956 0.3697	0.08434 0.7651	0.12494 0.6573	0.13127 0.6410
LITYPE	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
RESIST	-0.19944 0.4761	0.00000 1.0000	0.00000 1.0000	-0.30153 0.2748	-0.23831 0.3924	-0.04019 0.8869	0.18391 0.5117	-0.26347 0.3427	-0.03374 0.9050	-0.05103 0.8567	-0.10886 0.6994	-0.30496 0.2691	-0.11032 0.6955
GAMMA	0.14223 0.6131	0.00000 1.0000	0.00000 1.0000	-0.24931 0.3702	-0.23090 0.4077	-0.30803 0.2640	0.16440 0.5582	-0.32641 0.2351	0.17310 0.5373	0.03275 0.9077	-0.27716 0.3173	0.08274 0.7694	-0.22912 0.4114
QUARTZ	-0.42726 0.1122	0.00000 1.0000	0.00000 1.0000	0.16025 0.5683	0.19653 0.4827	-0.07253 0.7973	-0.24853 0.3718	0.50641 0.0216	0.10677 0.7049	0.57529 0.0248	0.22480 0.4205	0.03171 0.9107	0.66781 0.0065
EXP	0.79755 0.0004	0.00000 1.0000	0.00000 1.0000	-0.25116 0.3666	-0.07877 0.7802	-0.27104 0.3285	0.13570 0.6297	-0.76317 0.0009	-0.31737 0.2491	-0.54611 0.0352	-0.23317 0.4030	0.08584 0.7610	-0.72084 0.0024
ILL	1.00000 0.0000	0.00000 1.0000	0.00000 1.0000	-0.56114 0.0295	-0.12941 0.2305	-0.14248 0.6125	0.17309 0.5373	-0.85390 0.0001	-0.49360 0.0615	-0.30006 0.2772	0.02030 0.9427	-0.01371 0.9613	-0.64050 0.0101
COQ	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
GYP	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
KAO	-0.56114 0.0295	0.00000 1.0000	0.00000 1.0000	1.00000 0.0000	0.20509 0.4634	-0.21046 0.4515	0.04574 0.8714	0.30790 0.2641	0.66921 0.0064	-0.26723 0.3356	-0.11521 0.6826	0.14542 0.6051	0.06822 0.8091

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 15

	ILL	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
HEM	-0.32941 0.2305	0.00000 1.0000	0.00000 1.0000	0.20509 0.4634	1.00000 0.0000	-0.04391 0.8765	-0.13264 0.6375	0.46709 0.0792	0.09816 0.7278	-0.05628 0.8421	-0.61016 0.0157	-0.35019 0.2007	0.43281 0.1071
ANH	-0.14248 0.6125	0.00000 1.0000	0.00000 1.0000	-0.21046 0.4515	-0.04391 0.8765	1.00000 0.0000	-0.13801 0.6238	0.37264 0.1713	-0.42169 0.1174	0.04521 0.8729	0.31125 0.2588	-0.00083 0.9977	0.44353 0.0977
SZM	0.17309 0.5373	0.00000 1.0000	0.00000 1.0000	0.04574 0.8714	-0.13264 0.6375	-0.13801 0.6238	1.00000 0.0000	-0.17383 0.5355	-0.12981 0.6447	-0.15249 0.5874	-0.12412 0.6594	-0.41384 0.1252	-0.15635 0.5779
QTZ	-0.85390 0.0001	0.00000 1.0000	0.00000 1.0000	0.30798 0.2641	0.46709 0.0792	0.37264 0.1713	-0.17383 0.5355	1.00000 0.0000	0.18355 0.5126	0.49312 0.0618	0.11545 0.6820	-0.18651 0.5057	0.88312 0.0001
PYR	-0.49360 0.0615	0.00000 1.0000	0.00000 1.0000	0.66921 0.0064	0.09816 0.7278	-0.42169 0.1174	-0.12981 0.6447	0.18355 0.5126	1.00000 0.0000	-0.08561 0.7616	-0.19527 0.4855	0.23434 0.4005	0.01443 0.9593
CAL	-0.30006 0.2772	0.00000 1.0000	0.00000 1.0000	-0.26723 0.3356	-0.05628 0.8421	0.04521 0.8729	-0.15249 0.5874	0.49312 0.0618	-0.08561 0.7616	1.00000 0.0000	0.51839 0.0477	-0.05850 0.8359	0.47694 0.0722
DOL	0.02030 0.9427	0.00000 1.0000	0.00000 1.0000	-0.11521 0.6826	-0.61016 0.0157	0.31125 0.2588	-0.12412 0.6594	0.11545 0.6820	-0.19527 0.4855	0.51839 0.0477	1.00000 0.0000	0.18885 0.5003	0.11789 0.6756
ORT	-0.01371 0.9613	0.00000 1.0000	0.00000 1.0000	0.14542 0.6051	-0.35019 0.2007	-0.00083 0.9977	-0.41384 0.1252	-0.18651 0.5057	0.23434 0.4005	-0.05850 0.8359	0.18885 0.5003	1.00000 0.0000	-0.32649 0.2350
PLA	-0.64058 0.0101	0.00000 1.0000	0.00000 1.0000	-0.06822 0.8091	0.43281 0.1071	0.44353 0.0977	-0.15635 0.5779	0.88312 0.0001	0.01443 0.9593	0.47694 0.0722	0.11789 0.6756	-0.32649 0.2350	1.00000 0.0000
SID	-0.04008 0.8872	0.00000 1.0000	0.00000 1.0000	-0.05762 0.8384	-0.41340 0.1256	0.33673 0.2197	0.11309 0.6882	-0.03158 0.9110	-0.54977 0.0337	0.04205 0.8817	0.42147 0.1177	0.13748 0.6251	-0.08416 0.7686
ANK	-0.36216 0.1847	0.00000 1.0000	0.00000 1.0000	-0.06150 0.8278	-0.10917 0.6985	0.03210 0.9096	-0.15138 0.5902	0.10441 0.7111	-0.15494 0.5814	0.05558 0.8440	-0.14434 0.6078	0.14725 0.6005	-0.08093 0.7743
GRDEN	-0.54983 0.0337	0.00000 1.0000	0.00000 1.0000	0.72191 0.0024	-0.02087 0.9412	-0.39183 0.1486	-0.10457 0.7107	0.17380 0.5356	0.97468 0.0001	-0.09341 0.7406	-0.11399 0.6858	0.30190 0.2708	-0.03257 0.9083
S	-0.09414 0.7386	0.00000 1.0000	0.00000 1.0000	0.49046 0.1391	-0.24851 0.3778	-0.59056 0.0184	0.06710 0.8122	-0.30476 0.2694	0.84240 0.0001	-0.20693 0.4593	-0.22136 0.4279	0.24978 0.3693	-0.39424 0.1459

	SID	ANK	GRDEN	S
SAMPLE	0.09824 0.7276	0.06749 0.8111	0.11948 0.6715	0.45910 0.0851
LOSIG100	-0.02494 0.9297	0.07671 0.7858	0.18352 0.5127	0.16318 0.5612
LOSIG500	0.36274 0.1839	0.51476 0.0496	0.20304 0.4680	0.36818 0.1769
STRAT	-0.11752 0.6766	-0.05525 0.8449	0.03860 0.8914	-0.30772 0.2646
BULKDEN	-0.08366 0.7669	-0.02302 0.9351	0.20097 0.4726	0.18964 0.4985
MATRXDEN	-0.17499 0.5328	-0.17743 0.5270	0.38951 0.1513	0.38095 0.1612
LOGDEN	-0.06872 0.8077	-0.01430 0.9597	0.22291 0.4246	0.36933 0.1755
POROSITY	-0.13117 0.6412	-0.26368 0.3423	0.23735 0.3943	0.24676 0.3753
LITYPE	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
RESIST	-0.01627 0.9541	0.01636 0.9538	-0.03015 0.9151	0.20277 0.4686

W.Va.Geological & Economic Survey
GR File #210

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 15

	SID	ANK	GRDEN	S
GAMMA	-0.06343 0.8223	0.04969 0.8604	-0.18077 0.5005	0.46635 0.0797
QUARTZ	-0.10583 0.7074	-0.08347 0.7674	0.06968 0.8051	-0.18989 0.4988
EXP	-0.01333 0.9624	-0.25161 0.3657	-0.35086 0.1998	-0.03330 0.9062
ILL	-0.04008 0.8872	-0.36216 0.1847	-0.54983 0.0337	-0.09414 0.7386
CAO	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
GYP	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
KAO	-0.05762 0.8384	-0.06150 0.8276	0.72191 0.0024	0.40046 0.1391
HEM	-0.41340 0.1256	-0.10917 0.6985	-0.02087 0.9412	-0.24551 0.3778
ANH	0.33673 0.2197	0.03210 0.9096	-0.39183 0.1486	-0.59856 0.0184
SZM	0.11309 0.6882	-0.15138 0.5902	-0.10457 0.7187	0.06710 0.8122
QTZ	-0.03158 0.9110	0.10441 0.7111	0.17380 0.5356	-0.30476 0.2694
PYR	-0.54977 0.0337	-0.15494 0.5814	0.97468 0.0001	0.84240 0.0001
CAL	0.04205 0.8817	0.05558 0.8440	-0.09341 0.7406	-0.20693 0.4593
DOL	0.42147 0.1177	-0.14434 0.6070	-0.11399 0.6858	-0.22136 0.4279
ORT	0.13748 0.6251	0.14725 0.6005	0.30390 0.2708	0.24978 0.3693
PLA	-0.08416 0.7656	-0.08093 0.7743	-0.03257 0.9083	-0.39424 0.1459
SID	1.00000 0.0000	0.50578 0.0544	-0.35237 0.1977	-0.44125 0.0997
ANK	0.50578 0.0544	1.00000 0.0000	-0.02155 0.9392	-0.08215 0.7710
GRDEN	-0.35237 0.1977	-0.02155 0.9392	1.00000 0.0000	0.84346 0.0001
S	-0.44125 0.0997	-0.08215 0.7710	0.84346 0.0001	1.00000 0.0000

UGR File #310
W.Va. Geological & Economic Survey

UGR File #210
W.Va.Geological & Economic Survey

Thinly- Laminated Lithologic Type

PRELIMINARY
OPEN FILE REPORT
SUBJECT TO REVISION

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
SAMPLE	23	5239.07826087	180.56383398	120498.00000000	4903.40000000	5474.00000000
LOSIG100	23	4.52173913	1.67493732	104.00000000	2.30000000	8.30000000
LOSIG500	23	4.01739130	1.13283722	92.40000000	1.60000000	6.60000000
STRAT	23	4.00000000	2.73030135	92.00000000	2.00000000	9.00000000
BULKDEN	23	2.60434783	0.04906630	59.90000000	2.49000000	2.70000000
MATRXDEN	23	2.67521739	0.03929719	61.53000000	2.60000000	2.74000000
LOGDEN	23	2.58521739	0.05687862	59.46000000	2.50000000	2.67000000
POROSITY	23	2.67478261	1.12972993	61.52000000	0.37000000	4.96000000
LITYPE	23	3.00000000	0	69.00000000	3.00000000	3.00000000
RESIST	23	32.08695652	14.06773563	738.00000000	17.00000000	70.00000000
GAMMA	23	223.47826087	55.23575058	5140.00000000	170.00000000	350.00000000
QUARTZ	23	0.20304348	0.10271031	4.67000000	0.10000000	0.48000000
EXP	23	0.00753477	0.00327120	0.17329965	0.00183160	0.01242113
ILL	23	0.41638573	0.08111324	9.57687175	0.25978285	0.54188081
COO	23	0	0	0	0	0
GYP	23	0	0	0	0	0
KAO	23	0.00049752	0.00057246	0.00454294	0	0.00240239
HEM	23	0.04010240	0.00851260	0.92442521	0.02586955	0.05724730
ANH	23	0.00594585	0.00674920	0.13678448	0	0.01560214
SZH	23	0.00537801	0.00996675	0.12362521	0	0.03303983
QTZ	23	0.35939293	0.03233693	8.26606036	0.31732987	0.43092341
PYR	23	0.08727284	0.03493781	2.00727541	0	0.16491607
CAL	23	0.00244380	0.00169940	0.05620057	0	0.00777609
DOL	23	0.00607274	0.02031459	0.13967300	0	0.07913536
ORT	23	0.00104144	0.00078666	0.02395304	0	0.00272845
PLA	23	0.02971794	0.02333641	0.68351265	0.01247967	0.09608049
STD	23	0.03394939	0.01814033	0.78083599	0.01521096	0.08615497
ANK	23	0.00447695	0.01529220	0.10296975	0	0.07146214
GRDEN	23	2.91932789	0.08064530	67.14464142	2.70981952	3.08506528
S	22	2.68959091	0.83830655	59.17100000	0.87100000	4.30400000

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
SAMPLE	1.00000 0.0000 23	0.25713 0.2362 23	0.62045 0.0016 23	-0.88527 0.0001 23	0.00325 0.9883 23	-0.03032 0.8908 23	0.06791 0.7582 23	-0.02934 0.8943 23	0.00000 1.0000 23	-0.06268 0.7763 23	0.60861 0.0021 23	-0.81817 0.0001 23	0.39518 0.0620 23
LOSIG100	0.25713 0.2362 23	1.00000 0.0000 23	0.23384 0.2829 23	0.05169 0.8148 23	-0.74732 0.0001 23	-0.72208 0.0001 23	-0.58954 0.0031 23	0.33899 0.1136 23	0.00000 1.0000 23	0.45345 0.0298 23	0.72875 0.0001 23	-0.22314 0.3061 23	-0.43023 0.0404 23
LOSIG500	0.62045 0.0016 23	0.23384 0.2829 23	1.00000 0.0000 23	-0.61576 0.0018 23	0.20547 0.3469 23	0.02340 0.9156 23	0.19535 0.3717 23	-0.28783 0.1829 23	0.00000 1.0000 23	-0.14585 0.5067 23	0.52783 0.0096 23	-0.52513 0.0101 23	0.28513 0.1873 23
STRAT	-0.88527 0.0001 23	0.05169 0.8148 23	-0.61576 0.0018 23	1.00000 0.0000 23	-0.39359 0.0631 23	-0.30926 0.1510 23	-0.39807 0.0599 23	0.23991 0.2702 23	0.00000 1.0000 23	0.37988 0.0738 23	-0.28030 0.1952 23	0.76668 0.0001 23	-0.61109 0.0020 23
BULKDEN	0.00325 0.9883 23	-0.74732 0.0001 23	0.20547 0.3469 23	-0.39359 0.0631 23	1.00000 0.0000 23	0.78686 0.0001 23	0.70976 0.0001 23	-0.64394 0.0009 23	0.00000 1.0000 23	-0.54385 0.0073 23	-0.46705 0.0246 23	0.04055 0.8543 23	0.60333 0.0023 23
MATRXDEN	-0.03032 0.8908 23	-0.72208 0.0001 23	0.02340 0.9156 23	-0.30926 0.1510 23	0.78686 0.0001 23	1.00000 0.0000 23	0.69903 0.0002 23	-0.03827 0.8624 23	0.00000 1.0000 23	-0.54435 0.0073 23	-0.47572 0.0218 23	0.02855 0.8971 23	0.50268 0.0145 23
LOGDEN	0.06791 0.7582 23	-0.58954 0.0031 23	0.19535 0.3717 23	-0.39807 0.0599 23	0.70976 0.0001 23	0.69903 0.0002 23	1.00000 0.0000 23	-0.30182 0.1616 23	0.00000 1.0000 23	-0.80214 0.0001 23	-0.48204 0.0198 23	-0.13900 0.5270 23	0.54310 0.0074 23
POROSITY	-0.02934 0.8943 23	0.33899 0.1136 23	-0.28783 0.1829 23	0.23991 0.2702 23	-0.64394 0.0009 23	-0.03827 0.8624 23	-0.30182 0.1616 23	1.00000 0.0000 23	0.00000 1.0000 23	0.25049 0.2490 23	0.20390 0.3507 23	-0.03288 0.8816 23	-0.36356 0.0881 23
LITYPE	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23
RESIST	-0.06268 0.7763 23	0.45345 0.0298 23	-0.14585 0.5067 23	0.37988 0.0738 23	-0.54385 0.0073 23	-0.54435 0.0073 23	-0.80214 0.0001 23	0.25049 0.2490 23	0.00000 1.0000 23	1.00000 0.0000 23	0.56584 0.0049 23	0.27255 0.2083 23	-0.62644 0.0014 23
GAMMA	0.60861 0.0021 23	0.72875 0.0001 23	0.52783 0.0096 23	-0.28030 0.1952 23	-0.46705 0.0246 23	-0.47572 0.0218 23	-0.48204 0.0198 23	0.20390 0.3507 23	0.00000 1.0000 23	0.56584 0.0049 23	1.00000 0.0000 23	-0.35849 0.0930 23	-0.23115 0.2886 23
QUARTZ	-0.81817 0.0001 23	-0.22314 0.3061 23	-0.52513 0.0101 23	0.76668 0.0001 23	0.04055 0.8543 23	0.02855 0.8971 23	-0.13900 0.5270 23	-0.03288 0.8816 23	0.00000 1.0000 23	0.27255 0.2083 23	-0.35849 0.0930 23	1.00000 0.0000 23	-0.50270 0.0145 23
EXP	0.39518 0.0620 23	-0.43023 0.0404 23	0.28513 0.1873 23	-0.61109 0.0020 23	0.60333 0.0023 23	0.50268 0.0145 23	0.54310 0.0074 23	-0.36356 0.0881 23	0.00000 1.0000 23	-0.62644 0.0014 23	-0.23115 0.2886 23	-0.50270 0.0145 23	1.00000 0.0000 23
ILL	0.51252 0.0124 23	-0.20755 0.3420 23	0.47364 0.0225 23	-0.63185 0.0012 23	0.36046 0.0911 23	0.29218 0.1761 23	0.46979 0.0237 23	-0.23174 0.2873 23	0.00000 1.0000 23	-0.62218 0.0015 23	-0.01636 0.7291 23	-0.74937 0.0001 23	0.73557 0.0001 23
COQ	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23
GYP	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23
KAO	-0.61192 0.0019 23	-0.04185 0.8496 23	-0.35814 0.0933 23	0.66059 0.0006 23	-0.15924 0.4708 23	-0.11376 0.6053 23	0.09046 0.6814 23	0.10549 0.6319 23	0.00000 1.0000 23	0.09530 0.6653 23	-0.19734 0.3668 23	0.69186 0.0002 23	-0.45359 0.0297 23
HEM	0.06213 0.7782 23	-0.16592 0.4493 23	-0.13009 0.5541 23	-0.09165 0.6775 23	-0.09432 0.6686 23	0.06270 0.7762 23	0.43283 0.0391 23	0.19057 0.3830 23	0.00000 1.0000 23	-0.34614 0.1057 23	-0.25323 0.2437 23	-0.04849 0.8261 23	-0.00359 0.9870 23

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CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
ANH	-0.18046 0.4100 23	-0.36733 0.0847 23	-0.01659 0.9401 23	0.09088 0.6801 23	-0.45111 0.0307 23	-0.36606 0.0850 23	-0.57020 0.0045 23	0.27500 0.2027 23	0.00000 1.0000 23	-0.37722 0.0760 23	0.51051 0.0113 23	-0.11464 0.6025 23	-0.28439 0.1884 23
GZM	0.39970 0.0588 23	0.44074 0.0353 23	0.33642 0.1165 23	-0.22750 0.2965 23	-0.14095 0.5212 23	-0.05974 0.7866 23	-0.23586 0.2786 23	0.19135 0.3818 23	0.00000 1.0000 23	-0.45686 0.0204 23	0.71888 0.0001 23	-0.20819 0.3405 23	-0.10917 0.6200 23
QTZ	-0.63355 0.0012 23	-0.07274 0.7415 23	-0.59069 0.0030 23	0.74608 0.0001 23	-0.36492 0.0869 23	-0.24657 0.2567 23	-0.37113 0.0812 23	0.20150 0.1930 23	0.00000 1.0000 23	-0.51701 0.0115 23	-0.08993 0.6833 23	-0.82130 0.0001 23	-0.72429 0.0001 23
PYR	-0.22078 0.3114 23	-0.31247 0.1466 23	-0.15922 0.4680 23	0.22018 0.3127 23	-0.14603 0.5061 23	-0.05765 0.7939 23	-0.37225 0.0803 23	0.18029 0.4104 23	0.00000 1.0000 23	-0.32348 0.1322 23	0.11798 0.5920 23	-0.30974 0.1244 23	-0.47193 0.0230 23
CAL	-0.27375 0.2062 23	-0.12167 0.5802 23	-0.23363 0.3050 23	0.29622 0.1699 23	-0.13044 0.5530 23	-0.00079 0.9972 23	-0.25632 0.2376 23	0.20718 0.3429 23	0.00000 1.0000 23	-0.03736 0.8656 23	-0.23331 0.2040 23	0.24517 0.2595 23	-0.12230 0.5783 23
DOL	0.25003 0.2499 23	0.40020 0.0585 23	0.33547 0.1176 23	-0.11446 0.6030 23	-0.24638 0.2571 23	-0.46301 0.0261 23	-0.44442 0.0336 23	-0.11330 0.6067 23	0.00000 1.0000 23	-0.55340 0.0062 23	-0.56119 0.0054 23	-0.12207 0.5765 23	-0.23504 0.2803 23
ORT	-0.06473 0.7692 23	0.02728 0.9017 23	-0.31926 0.1376 23	0.16612 0.4487 23	-0.24306 0.2638 23	0.05407 0.8064 23	0.02730 0.9016 23	0.47649 0.0216 23	0.00000 1.0000 23	-0.24021 0.2696 23	0.03114 0.8878 23	0.13509 0.5380 23	0.06537 0.7670 23
PLA	-0.72517 0.0001 23	-0.17987 0.4115 23	-0.58697 0.0033 23	0.77728 0.0001 23	-0.14607 0.5060 23	-0.12603 0.5666 23	-0.11407 0.6043 23	0.06626 0.7639 23	0.00000 1.0000 23	-0.30624 0.1553 23	-0.29677 0.1691 23	-0.83906 0.0001 23	-0.50355 0.0143 23
SID	-0.08814 0.6892 23	-0.04332 0.8444 23	-0.10441 0.6354 23	0.00141 0.9949 23	0.02935 0.8943 23	0.03641 0.8690 23	0.21053 0.3165 23	0.02506 0.9068 23	0.00000 1.0000 23	-0.26498 0.2217 23	-0.23868 0.2727 23	0.21464 0.3254 23	0.02559 0.9077 23
ANK	-0.40346 0.0563 23	-0.20837 0.3400 23	-0.49132 0.0173 23	0.46493 0.0254 23	-0.06769 0.7589 23	-0.08460 0.6843 23	-0.32800 0.1265 23	-0.01134 0.9590 23	0.00000 1.0000 23	0.40304 0.0565 23	-0.18489 0.3984 23	0.40825 0.0531 23	-0.23641 0.2775 23
GRDEN	-0.19713 0.3673 23	-0.33792 0.1148 23	-0.14649 0.5077 23	0.19242 0.3791 23	-0.15300 0.4858 23	-0.07241 0.7421 23	-0.36320 0.0884 23	0.17324 0.4319 23	0.00000 1.0000 23	0.30693 0.1543 23	0.12710 0.5633 23	0.33919 0.1133 23	-0.46619 0.0249 23
S	0.29390 0.1843 22	-0.46679 0.0285 22	-0.48376 0.0224 22	-0.31428 0.1543 22	0.05203 0.8181 22	0.05074 0.8226 22	-0.14349 0.5241 22	0.02522 0.9113 22	0.00000 1.0000 22	-0.12016 0.5943 22	-0.42854 0.0466 22	-0.27633 0.2132 22	0.05880 0.7949 22

	ILL	CDQ	GYP	KAO	HBM	ANH	GZM	QTZ	PYR	CAL	DOL	ORT	PLA
SAMPLE	0.51252 0.0124 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.61192 0.0019 23	0.06213 0.7782 23	0.18046 0.4100 23	0.39970 0.0588 23	-0.63355 0.0012 23	-0.22078 0.3114 23	-0.27375 0.2062 23	0.25003 0.2499 23	-0.06473 0.7692 23	-0.72517 0.0001 23
LOSIG100	-0.20755 0.3420 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.04185 0.8496 23	-0.16592 0.4493 23	0.36733 0.0847 23	0.44074 0.0353 23	0.07274 0.7415 23	0.31247 0.1466 23	-0.12167 0.5802 23	0.40020 0.0585 23	0.02728 0.9017 23	-0.17987 0.4115 23
LOSIG500	0.47334 0.0226 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.35814 0.0913 23	-0.13009 0.5541 23	-0.01659 0.9401 23	0.33642 0.1165 23	-0.59069 0.0030 23	-0.15922 0.4680 23	-0.23363 0.3050 23	0.33547 0.1176 23	-0.31926 0.1376 23	-0.58697 0.0033 23
STRAT	-0.63185 0.0012 23	0.00000 1.0000 23	0.00000 1.0000 23	0.66059 0.0006 23	-0.09165 0.6776 23	0.09088 0.6801 23	-0.22750 0.2965 23	0.74608 0.0001 23	0.22018 0.3127 23	0.29622 0.1699 23	-0.11446 0.6030 23	0.16612 0.4487 23	0.77728 0.0001 23
BULKDEN	0.36046 0.0911 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.15824 0.4708 23	-0.09432 0.6686 23	-0.45111 0.0307 23	-0.14095 0.5212 23	-0.36492 0.0869 23	-0.14603 0.5061 23	-0.13044 0.5530 23	-0.24638 0.2571 23	-0.24306 0.2638 23	-0.14607 0.5060 23
MATRXDEN	0.29218 0.1761 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.11376 0.6053 23	0.06270 0.7762 23	-0.36606 0.0850 23	-0.05974 0.7866 23	-0.24657 0.2567 23	-0.05765 0.7939 23	-0.00079 0.9972 23	-0.46301 0.0261 23	0.05407 0.8064 23	-0.12603 0.5666 23

Geological Survey of Alabama

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	ILL	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
LOGDEN	-0.46979 0.0237 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.09046 0.6814 23	-0.43283 0.0391 23	-0.57020 0.0045 23	-0.23506 0.2706 23	-0.37113 0.0813 23	-0.37225 0.0803 23	-0.25632 0.2378 23	-0.44442 0.0336 23	-0.02730 0.9016 23	-0.11407 0.6043 23
POROSITY	-0.93174 0.2873 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.10549 0.6319 23	-0.19057 0.3838 23	-0.27500 0.2027 23	-0.19135 0.3818 23	-0.20150 0.1930 23	-0.10029 0.4104 23	-0.20718 0.3429 23	-0.14330 0.6061 23	-0.47642 0.0215 23	-0.06626 0.7639 23
LITYPE	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23
RESIST	-0.62210 0.0015 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.09530 0.6653 23	-0.34614 0.1057 23	-0.37722 0.0760 23	-0.45606 0.0284 23	-0.51701 0.0115 23	-0.32348 0.1322 23	-0.03736 0.8656 23	-0.55340 0.0062 23	-0.24021 0.2696 23	-0.30624 0.1553 23
GAMMA	-0.07636 0.7291 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.19734 0.3669 23	-0.25323 0.2437 23	-0.51051 0.0113 23	-0.73888 0.0001 23	-0.00093 0.6932 23	-0.11792 0.5920 23	-0.23331 0.2840 23	-0.56119 0.0054 23	-0.03114 0.8878 23	-0.29677 0.1691 23
QUARTZ	-0.74937 0.0001 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.69186 0.0002 23	-0.04849 0.8261 23	-0.11464 0.6025 23	-0.26019 0.3405 23	-0.82130 0.0001 23	-0.32974 0.1244 23	-0.24517 0.2595 23	-0.10287 0.5765 23	-0.13509 0.5388 23	-0.83906 0.0001 23
EXP	-0.73557 0.0001 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.45359 0.0297 23	-0.00359 0.9870 23	-0.20439 0.1884 23	-0.10917 0.6200 23	-0.72489 0.0001 23	-0.47193 0.0230 23	-0.18030 0.5783 23	-0.23504 0.2803 23	-0.06537 0.7670 23	-0.50355 0.0143 23
ILL	1.00000 0.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.49559 0.0162 23	-0.00791 0.9714 23	-0.10873 0.6214 23	-0.19907 0.3625 23	-0.95081 0.0001 23	-0.52626 0.0099 23	-0.14313 0.5147 23	-0.15787 0.4719 23	-0.22426 0.1729 23	-0.72892 0.0001 23
COQ	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23
GYP	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23
KAO	-0.49559 0.0162 23	0.00000 1.0000 23	0.00000 1.0000 23	1.00000 0.0000 23	-0.20552 0.3468 23	-0.13966 0.5251 23	-0.19454 0.3738 23	-0.61620 0.0010 23	-0.05484 0.8037 23	-0.58642 0.0033 23	-0.10783 0.6243 23	-0.27630 0.2011 23	-0.70081 0.0001 23
HEM	-0.00791 0.9714 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.20552 0.3468 23	1.00000 0.0000 23	-0.30609 0.1555 23	-0.31783 0.1398 23	-0.14443 0.5109 23	-0.36645 0.0855 23	-0.44976 0.0313 23	-0.30188 0.1615 23	-0.10875 0.6213 23	-0.16741 0.4452 23
ANH	-0.10873 0.6214 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.13966 0.5251 23	-0.30609 0.1555 23	1.00000 0.0000 23	0.42191 0.0449 23	-0.46638 0.0335 23	-0.11594 0.5983 23	-0.42962 0.0408 23	-0.10221 0.6426 23	-0.07444 0.7357 23	-0.10850 0.6222 23
SZM	-0.19907 0.3625 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.19454 0.3738 23	-0.31753 0.1398 23	-0.42191 0.0449 23	1.00000 0.0000 23	-0.02850 0.8973 23	-0.32751 0.1271 23	-0.43415 0.0385 23	-0.22419 0.3038 23	-0.13424 0.5414 23	-0.21849 0.3166 23
QTZ	-0.95081 0.0001 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.61620 0.0010 23	-0.14443 0.5109 23	-0.46638 0.8335 23	-0.02850 0.8973 23	1.00000 0.0000 23	-0.39765 0.0602 23	-0.28330 0.1902 23	-0.00241 0.9913 23	-0.31998 0.1366 23	-0.84899 0.0001 23
PYR	-0.52626 0.0099 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.05484 0.8037 23	-0.36645 0.0855 23	-0.11594 0.5983 23	-0.32751 0.1271 23	-0.39765 0.0602 23	1.00000 0.0000 23	-0.32475 0.1306 23	-0.02331 0.9159 23	-0.01237 0.9553 23	-0.02689 0.9031 23
CAL	-0.14313 0.5147 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.58642 0.0033 23	-0.44976 0.0313 23	-0.42962 0.0408 23	-0.43415 0.0385 23	-0.28330 0.1902 23	-0.32475 0.1306 23	1.00000 0.0000 23	-0.04704 0.8312 23	-0.53909 0.0080 23	-0.48197 0.0199 23
DOL	-0.15787 0.4719 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.10783 0.6243 23	-0.30188 0.1615 23	-0.10221 0.6426 23	-0.22419 0.3038 23	-0.00241 0.9913 23	-0.02331 0.9159 23	-0.04704 0.8312 23	1.00000 0.0000 23	-0.04530 0.7672 23	-0.12144 0.5810 23

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CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	ILL	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
ORT	-0.29426 0.1729 23	0.00000 1.0000 23	0.00000 1.0000 23	0.27638 0.2017 23	0.10875 0.6213 23	0.07444 0.7357 23	0.13424 0.5414 23	-0.31998 0.1366 23	0.01237 0.9553 23	0.53909 0.0080 23	-0.06530 0.7672 23	1.00000 0.0000 23	0.29241 0.1758 23
PLA	-0.72892 0.0001 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.70881 0.0001 23	0.16741 0.4452 23	-0.10850 0.6222 23	-0.21849 0.3166 23	0.84899 0.0001 23	-0.02609 0.9031 23	-0.48197 0.0199 23	-0.12144 0.5810 23	0.29241 0.1758 23	1.00000 0.0000 23
SID	-0.26382 0.2425 23	0.00000 1.0000 23	0.00000 1.0000 23	0.33527 0.1178 23	0.53004 0.0093 23	-0.20112 0.3575 23	-0.20576 0.3463 23	-0.25853 0.2336 23	-0.10299 0.6401 23	-0.15636 0.4762 23	-0.23902 0.2720 23	-0.14299 0.5151 23	0.23026 0.2905 23
ANK	-0.43374 0.0387 23	0.00000 1.0000 23	0.00000 1.0000 23	-0.02407 0.9103 23	-0.10258 0.6414 23	0.07209 0.7438 23	-0.07492 0.7340 23	-0.47542 0.0219 23	-0.14005 0.5215 23	-0.00075 0.9684 23	-0.09149 0.6780 23	-0.07114 0.7470 23	0.64237 0.0010 23
GRDEN	-0.57212 0.0044 23	0.00000 1.0000 23	0.00000 1.0000 23	0.08307 0.7036 23	-0.29705 0.1687 23	0.11402 0.6044 23	0.33633 0.1166 23	0.42050 0.0413 23	0.98183 0.0001 23	-0.33072 0.1232 23	0.02269 0.9181 23	0.03321 0.8801 23	-0.01281 0.9536 23
S	0.08937 0.6925 22	0.00000 1.0000 22	0.00000 1.0000 22	-0.37798 0.0828 22	-0.54797 0.0083 22	0.05110 0.8213 22	0.51966 0.0132 22	-0.29470 0.1829 22	0.54977 0.0080 22	-0.36440 0.0954 22	0.39912 0.1348 22	-0.06567 0.7715 22	-0.55131 0.0078 22

	SID	ANK	GRDEN	S
SAMPLE	-0.08814 0.6882 23	-0.40346 0.0863 23	-0.19713 0.3633 23	0.29390 0.1843 22
LOSIG100	-0.04332 0.8444 23	-0.20837 0.3400 23	0.33792 0.1148 23	0.46679 0.0285 22
LOSIG500	-0.10441 0.6354 23	-0.40132 0.0132 23	-0.14549 0.5077 23	0.48370 0.0226 22
STRAT	0.00141 0.9949 23	0.46493 0.0254 23	0.19242 0.3791 23	-0.31428 0.1543 22
BULKDEN	0.02935 0.8943 23	-0.06769 0.7689 23	-0.15300 0.4868 23	0.05203 0.8181 22
MATRXDEN	0.03641 0.8690 23	-0.08960 0.6843 23	-0.07241 0.7427 23	0.05074 0.8226 22
LOGDEN	0.21852 0.3166 23	-0.32800 0.1266 23	-0.36328 0.0884 23	-0.14349 0.5241 22
POROSITY	-0.02586 0.9068 23	-0.01134 0.9590 23	0.17224 0.4319 23	0.02522 0.9113 22
LITYPE	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 22
RESIST	-0.26498 0.2217 23	0.40304 0.0566 23	0.30693 0.1543 23	0.12016 0.5943 22
GAMMA	-0.23868 0.2727 23	-0.18489 0.3984 23	0.12710 0.5633 23	0.42854 0.0466 22
QUARTZ	0.21464 0.3254 23	0.40825 0.0531 23	0.33919 0.1133 23	-0.27633 0.2132 22

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	SID	ANK	GRDEN	S
EXP	0.02559 0.9077 23	-0.23641 0.2775 23	-0.46619 0.0249 23	0.05880 0.7949 22
ILL	-0.25382 0.2425 23	-0.43374 0.0387 23	-0.57212 0.0044 23	0.08937 0.6925 22
QUQ	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 22
GYP	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 23	0.00000 1.0000 22
KAO	0.33527 0.1170 23	-0.02407 0.9103 23	0.00387 0.7036 23	-0.37798 0.0828 22
HEM	0.53004 0.0093 23	-0.10258 0.6414 23	-0.29705 0.1687 23	-0.54797 0.0083 22
ANH	-0.20112 0.3575 23	0.07209 0.7438 23	0.11402 0.6044 23	0.05110 0.8213 22
BAR	-0.20576 0.3463 23	0.07492 0.7340 23	0.33633 0.1166 23	0.51966 0.0132 22
QTZ	0.25453 0.2336 23	0.47542 0.0219 23	0.42058 0.0413 23	0.29470 0.1829 22
PYR	-0.10299 0.6401 23	-0.14005 0.5215 23	-0.98103 0.0001 23	-0.54977 0.0080 22
CAL	0.15636 0.4762 23	0.00076 0.9604 23	0.33072 0.1232 23	-0.36440 0.0954 22
DOL	-0.23902 0.2720 23	-0.09149 0.6780 23	-0.02269 0.9181 23	0.32918 0.1348 22
GHT	-0.14299 0.5151 23	0.03114 0.7470 23	0.03321 0.8804 23	-0.06567 0.7715 22
PLA	-0.23026 0.2905 23	0.64237 0.0010 23	-0.01201 0.9538 23	-0.55131 0.0078 22
SID	1.00000 0.0000 23	-0.11707 0.5947 23	0.07479 0.7345 23	-0.44590 0.0375 22
ANK	-0.11707 0.5947 23	1.00000 0.0000 23	-0.16449 0.4532 23	-0.42317 0.0497 22
GRDEN	0.07479 0.7345 23	-0.16449 0.4532 23	1.00000 0.0000 23	-0.53009 0.0110 22
S	-0.44590 0.0375 22	-0.42317 0.0497 22	-0.53009 0.0110 22	1.00000 0.0000 22

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Lenticularly - Laminated Lithologic Type

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
SAMPLE	15	5233.52666667	220.90433581	78502.90000000	4874.30000000	5456.20000000
LOSIG100	15	4.54666667	2.10301371	68.20000000	0.80000000	8.80000000
LOSIG500	15	4.02000000	1.22951791	60.30000000	1.90000000	6.30000000
STRAT	15	4.80000000	2.95683228	72.00000000	2.00000000	9.00000000
BULKDEN	15	2.63000000	0.07596993	39.45000000	2.51000000	2.78000000
MATRXDEN	15	2.70200000	0.07133422	40.53000000	2.58000000	2.90000000
LOGDEN	15	2.59333333	0.05765249	38.90000000	2.50000000	2.70000000
POROSITY	15	2.67533333	1.47140781	40.13000000	0	5.47000000
LITYPE	15	4.00000000	0	60.00000000	4.00000000	4.00000000
RESIST	15	27.93333333	11.50445048	419.00000000	0	45.00000000
GAMMA	15	227.00000000	45.42654902	3405.40000000	140.00000000	290.00000000
QUARTZ	15	0.20866667	0.07698485	3.13000000	0.12000000	0.38000000
EXP	15	0.00892495	0.00344019	0.13387426	0.00484736	0.01666155
ILL	15	0.42777485	0.10858089	6.41662277	0.13848321	0.58094872
GOO	15	0	0	0	0	0
GYP	15	0	0	0	0	0
KAO	15	0.00023711	0.00060502	0.00349666	0	0.00192209
HEM	15	0.01019121	0.01942204	0.60286901	0.02707220	0.10331603
ANH	15	0.00550753	0.00866009	0.08261289	0	0.01384047
SZN	15	0.00273981	0.00738147	0.04109719	0	0.02448021
QTZ	15	0.35009183	0.04227970	5.25137744	0.26673377	0.46514725
PYR	15	0.09582524	0.04460973	1.43737863	0.04500839	0.17124349
CAL	15	0.00200422	0.00164262	0.03006335	0	0.00676581
DOL	15	0.00172001	0.00666159	0.02580022	0	0.02580022
ORT	15	0.00112536	0.00104904	0.01688037	0	0.00398827
PLA	15	0.02662945	0.01396245	0.39944179	0.00915284	0.05737278
SID	15	0.03426088	0.01840621	0.51390417	0.01029281	0.07953349
ANK	15	0.00297808	0.00014890	0.04467125	0	0.03932497
GRDEN	15	2.93822176	0.09810116	44.07332644	2.81605063	3.12085218
S	14	3.16821429	1.65925035	44.35500000	1.96700000	7.68600000

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CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
SAMPLE	1.00000 0.0000 15	-0.24961 0.3696 15	0.32329 0.2399 15	-0.92204 0.0001 15	-0.25820 0.3528 15	-0.18344 0.5128 15	0.01334 0.9624 15	0.19191 0.4932 15	0.00000 1.0000 15	-0.11346 0.6872 15	0.75094 0.0013 15	-0.60068 0.0179 15	0.45093 0.0916 15
LOSIG100	-0.24961 0.3696 15	1.00000 0.0000 15	-0.64128 0.0100 15	0.34622 0.2062 15	-0.60446 0.0170 15	-0.40824 0.1309 15	-0.61525 0.0146 15	0.46456 0.0811 15	0.00000 1.0000 15	0.39841 0.1413 15	0.17728 0.5273 15	0.10321 0.7143 15	-0.40562 0.1336 15
LOSIG500	0.32329 0.2399 16	-0.64128 0.0100 15	1.00000 0.0000 15	-0.26210 0.3453 15	0.57200 0.0259 16	0.62334 0.0130 15	0.61871 0.0139 15	-0.02600 0.9267 15	0.00000 1.0000 15	-0.31349 0.2552 15	-0.12929 0.6461 15	-0.48643 0.0660 15	0.59581 0.0191 15
STRAT	-0.92204 0.0001 15	0.34622 0.2062 15	-0.26210 0.3453 15	1.00000 0.0000 15	0.21941 0.4320 15	0.26956 0.3313 15	-0.08380 0.7665 15	0.03687 0.8962 15	0.00000 1.0000 15	0.17806 0.5255 15	-0.58975 0.0207 15	0.52591 0.0440 15	-0.49149 0.0628 15
BULKDEN	-0.25820 0.3528 15	-0.60446 0.0170 15	0.57200 0.0259 15	0.21941 0.4320 15	1.00000 0.0000 15	0.86201 0.0001 15	0.56427 0.0284 15	-0.43202 0.1078 15	0.00000 1.0000 15	-0.33590 0.2209 15	-0.82675 0.0436 15	-0.01588 0.9552 15	0.21182 0.4485 15
MATRXDEN	-0.18344 0.5128 15	-0.40824 0.1309 15	0.62334 0.0130 15	0.26956 0.3313 15	0.86201 0.0001 15	1.00000 0.0000 15	0.51584 0.0490 15	0.08407 0.7658 15	0.00000 1.0000 15	-0.30881 0.2628 15	-0.44658 0.0952 15	-0.18027 0.5203 15	0.16794 0.5497 15
LOGDEN	0.01334 0.9624 15	-0.61525 0.0146 15	0.61871 0.0139 15	-0.08380 0.7665 15	0.56427 0.0284 15	0.51584 0.0490 15	1.00000 0.0000 15	-0.19599 0.4839 15	0.00000 1.0000 15	-0.31626 0.2508 15	-0.53866 0.0383 15	0.11051 0.6950 15	0.47371 0.0745 15
POROSITY	0.19191 0.4932 15	0.46456 0.0811 15	-0.02600 0.9267 15	0.03687 0.8962 15	-0.43202 0.1078 15	0.08407 0.7658 15	-0.19599 0.4839 15	1.00000 0.0000 15	0.00000 1.0000 15	0.11129 0.6929 15	0.24417 0.3805 15	-0.29624 0.2837 15	-0.11976 0.6708 15
LITYPE	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15
RESIST	-0.11346 0.6872 15	0.39841 0.1413 15	-0.31349 0.2552 16	0.17806 0.5255 15	-0.33590 0.2209 15	-0.30881 0.2628 15	-0.31626 0.2508 15	0.11129 0.6929 15	0.00000 1.0000 15	1.00000 0.0000 15	0.11508 0.6830 15	0.10554 0.7081 15	0.13541 0.6304 15
GAMMA	0.75094 0.0013 15	0.17728 0.5273 15	-0.12929 0.6461 16	-0.58975 0.0207 15	-0.52675 0.0436 15	-0.44658 0.0952 15	-0.53866 0.0383 15	0.24417 0.3805 15	0.00000 1.0000 15	0.11508 0.6830 15	1.00000 0.0000 15	-0.37806 0.1647 15	0.14253 0.6123 15
QUARTZ	-0.60068 0.0179 15	0.10321 0.7143 15	-0.48643 0.0660 15	0.52591 0.0440 16	-0.01588 0.9552 15	-0.18027 0.5203 15	0.11051 0.6950 15	-0.29624 0.2837 15	0.00000 1.0000 15	0.10554 0.7081 15	-0.37806 0.1647 15	1.00000 0.0000 15	-0.35885 0.1890 15
EXP	0.45093 0.0916 15	-0.40562 0.1336 15	0.59581 0.0191 15	-0.49149 0.0628 15	0.21182 0.4485 15	0.16794 0.5497 15	0.47371 0.0745 15	-0.11976 0.6708 15	0.00000 1.0000 15	0.13541 0.6304 15	0.14253 0.6123 15	-0.35885 0.1890 15	1.00000 0.0000 15
ILL	0.24968 0.3695 15	-0.33796 0.2179 15	0.24323 0.3824 15	-0.29744 0.2842 15	-0.00542 0.9847 15	0.09809 0.7264 15	0.17584 0.5308 15	0.18181 0.5167 15	0.00000 1.0000 15	-0.34473 0.2083 15	0.01685 0.9525 15	-0.36123 0.1859 15	0.07024 0.8036 15
COQ	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15
GYP	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15
KAO	-0.52539 0.0443 15	0.40339 0.1360 15	-0.36127 0.1858 15	0.51201 0.0510 15	-0.21414 0.4470 15	-0.27430 0.3225 15	-0.06070 0.8299 15	-0.06763 0.8107 15	0.00000 1.0000 15	-0.13125 0.6410 15	-0.25042 0.3680 15	0.66743 0.0066 15	-0.34106 0.2135 15
HEM	0.03851 0.8916 15	0.12252 0.6636 15	-0.03751 0.8944 15	-0.01807 0.9490 15	-0.10799 0.7017 15	-0.31543 0.2521 15	-0.05631 0.8420 15	-0.35229 0.1978 15	0.00000 1.0000 15	0.15749 0.5751 15	0.15560 0.5798 15	0.31370 0.2549 15	0.07163 0.7997 15

W. Va. Geological & Economic Survey

S T A T I S T I C A L A N A L Y S I S S Y S T E M 10:36 FRIDAY, JUNE 15, 1979

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
ANH	0.10075	-0.12305	-0.35218	-0.21118	-0.20185	-0.21698	-0.05041	0.01637	0.00000	0.17039	-0.04120	0.06351	-0.33763
	0.7209	0.6622	0.1980	0.4499	0.4707	0.4373	0.8584	0.9538	1.0000	0.5438	0.8841	0.8221	0.2184
	15	15	15	15	15	15	15	15	15	15	15	15	15
SZM	0.32237	0.18636	-0.08634	-0.24210	-0.30407	-0.11077	-0.13456	-0.41724	0.00000	0.27735	0.39319	-0.23163	0.46714
	0.2413	0.5061	0.7596	0.3847	0.2705	0.6943	0.6326	0.1218	1.0000	0.3169	0.1471	0.4062	0.0792
	15	15	15	15	15	15	15	15	15	15	15	15	15
QTZ	-0.28162	0.19988	-0.22940	0.28518	-0.00673	-0.16702	-0.12788	-0.28315	0.00000	0.17080	-0.06443	0.47624	-0.14017
	0.3092	0.4751	0.4108	0.3029	0.9810	0.5519	0.6497	0.3065	1.0000	0.5428	0.8196	0.0727	0.6183
	15	15	15	15	15	15	15	15	15	15	15	15	15
PYR	-0.34875	0.47077	-0.14709	0.49449	0.23001	-0.33127	-0.18554	0.14912	0.00000	0.24160	-0.20003	0.04339	-0.34500
	0.2027	0.0765	0.6009	0.0610	0.4095	0.2278	0.5079	0.5958	1.0000	0.3857	0.4747	0.8780	0.2068
	15	15	15	15	15	15	15	15	15	15	15	15	15
CAL	-0.06001	0.16611	-0.01898	0.12739	0.06438	-0.13590	-0.16450	-0.36313	0.00000	0.39957	0.02462	0.11488	-0.10116
	0.8318	0.5541	0.9465	0.6510	0.8197	0.6292	0.5500	0.1034	1.0000	0.1401	0.9306	0.6835	0.7198
	15	15	15	15	15	15	15	15	15	15	15	15	15
DOL	0.19708	-0.01929	0.08550	-0.16841	-0.18207	-0.12410	-0.01599	0.13061	0.00000	0.29016	-0.32276	-0.10301	-0.52214
	0.4814	0.9456	0.7619	0.5485	0.5160	0.6595	0.9549	0.6427	1.0000	0.2941	0.2407	0.7149	0.0133
	15	15	15	15	15	15	15	15	15	15	15	15	15
ORT	0.00875	0.37641	-0.16255	0.03295	-0.12020	-0.23402	-0.21307	-0.17746	0.00000	0.36777	-0.23376	0.27608	0.12619
	0.9753	0.1667	0.5627	0.9072	0.6696	0.4012	0.4458	0.5269	1.0000	0.1775	0.4227	0.3192	0.6540
	15	15	15	15	15	15	15	15	15	15	15	15	15
PLA	-0.32340	0.39029	-0.54532	0.28131	-0.41151	-0.61692	-0.37353	-0.29657	0.00000	0.28056	0.06927	0.57166	-0.27692
	0.2397	0.1504	0.0355	0.3098	0.1275	0.0143	0.1702	0.2831	1.0000	0.3111	0.8062	0.0254	0.3177
	15	15	15	15	15	15	15	15	15	15	15	15	15
SID	0.16722	-0.21527	[illegible]	[illegible]	-0.00675	-0.18033	0.27309	-0.30968	0.00000	0.11477	0.11833	0.30322	0.56220
	0.5514	0.4410	[illegible]	0.3046	0.9810	0.5201	0.3247	0.2613	1.0000	0.6838	0.6745	0.2719	0.0292
	15	15	15	15	15	15	15	15	15	15	15	15	15
ANK	-0.42994	0.32626	-0.20785	0.14650	[illegible]	0.25188	-0.37845	-0.05394	0.00000	0.39118	-0.17564	-0.01411	-0.29838
	0.1097	0.2353	[illegible]	0.0952	0.3562	0.3651	0.1642	0.8489	1.0000	0.1494	0.5312	0.9602	0.2800
	15	15	15	15	15	15	15	15	15	15	15	15	15
GRDEN	-0.31777	0.44275	-0.14421	0.44580	0.23865	0.32115	-0.13792	-0.11473	0.00000	0.28382	-0.17855	0.08390	-0.23230
	0.2484	0.0984	0.6081	0.0958	0.3910	0.2432	0.6240	0.6839	1.0000	0.3053	0.5243	0.7663	0.4048
	15	15	15	15	15	15	15	15	15	15	15	15	15
R	-0.23160	0.24968	0.17639	-0.14043	0.39596	0.70614	0.10637	0.50839	0.00000	0.02603	-0.34722	-0.10021	0.00824
	0.4256	0.3895	0.5464	0.2307	0.1611	0.0040	0.5235	0.0653	1.0000	0.9296	0.2238	0.2970	0.9771
	14	14	14	14	14	14	14	14	14	14	14	14	14

	ILL	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
SAMPLE	0.24968	0.00000	0.00000	-0.12639	0.03851	0.10075	0.32237	-0.28162	-0.34875	-0.06001	0.19708	0.00875	-0.32340
	0.3895	1.0000	1.0000	0.0443	0.8916	0.7209	0.2413	0.3092	0.2027	0.8318	0.4814	0.9753	0.2397
	15	15	15	15	15	15	15	15	15	15	15	15	15
LOSIG100	-0.33796	0.00000	0.00000	0.40339	0.12252	-0.12305	0.18636	0.19988	0.47077	0.16611	-0.01929	0.37641	0.39029
	0.2179	1.0000	1.0000	0.1360	0.6636	0.6622	0.5061	0.4751	0.0765	0.5541	0.9456	0.1667	0.1504
	15	15	15	15	15	15	15	15	15	15	15	15	15
LOSIG500	0.24323	0.00000	0.00000	-0.36527	-0.03751	-0.35218	-0.08634	-0.22940	-0.14709	-0.01898	0.08550	-0.16255	-0.54532
	0.3824	1.0000	1.0000	0.1850	0.8944	0.1980	0.7596	0.4108	0.6009	0.9465	0.7619	0.5627	0.0355
	15	15	15	15	15	15	15	15	15	15	15	15	15
STRAT	-0.29244	0.00000	0.00000	0.5120	-0.01807	-0.21118	-0.24210	0.28518	0.49449	0.12739	-0.16841	0.03295	0.28131
	0.2902	1.0000	1.0000	0.0510	0.9490	0.4499	0.3847	0.3029	0.0610	0.6510	0.5485	0.9072	0.3098
	15	15	15	15	15	15	15	15	15	15	15	15	15
BULKDEN	-0.00542	0.00000	0.00000	-0.21711	-0.10799	-0.20185	-0.30407	-0.00673	0.23001	0.06438	-0.18207	-0.12020	-0.41151
	0.9847	1.0000	1.0000	0.4370	0.7017	0.4707	0.2705	0.9810	0.4095	0.8197	0.5160	0.6696	0.1275
	15	15	15	15	15	15	15	15	15	15	15	15	15
MATRXDEN	0.09869	0.00000	0.00000	-0.27430	-0.31543	-0.21698	-0.11077	-0.16702	0.33127	-0.13590	-0.12410	-0.23402	-0.61692
	0.7264	1.0000	1.0000	0.3225	0.2521	0.4373	0.6943	0.5519	0.2278	0.6292	0.6595	0.4012	0.0143
	15	15	15	15	15	15	15	15	15	15	15	15	15

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	ILL	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
LOGDEN	0.17584 0.5308 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.06070 0.8299 15	-0.05631 0.8420 15	-0.05041 0.8584 15	-0.13456 0.6326 15	-0.12780 0.6497 15	-0.18554 0.5079 15	-0.16450 0.5580 15	-0.01599 0.9549 15	-0.21307 0.4458 15	-0.37353 0.1702 15
POROSITY	-0.18101 0.5167 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.06763 0.8107 15	-0.35229 0.1978 15	-0.01637 0.9538 15	-0.41724 0.1218 15	-0.28315 0.3065 15	-0.14912 0.5958 15	-0.36313 0.1834 15	-0.13061 0.6427 15	-0.17746 0.5269 15	-0.29657 0.2831 15
LITYPE	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15
RESIST	-0.34473 0.2083 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.13125 0.6410 15	-0.15749 0.5751 15	-0.17839 0.5438 15	-0.27735 0.3169 15	-0.17000 0.5428 15	-0.24160 0.3857 15	-0.39957 0.1401 15	-0.29016 0.2941 15	-0.36777 0.1775 15	-0.28056 0.3111 15
GAMMA	-0.01605 0.9525 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.25042 0.3680 15	-0.15560 0.5798 15	-0.04120 0.8841 15	-0.39319 0.1471 15	-0.06443 0.8196 15	-0.20003 0.4747 15	-0.08462 0.9306 15	-0.32276 0.2407 15	-0.22376 0.4227 15	-0.06927 0.8062 15
QUARTZ	-0.36123 0.1859 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.66743 0.0066 15	-0.31370 0.2549 15	-0.06351 0.8221 15	-0.23163 0.4062 15	-0.47624 0.0727 15	-0.04339 0.8780 15	-0.11400 0.6835 15	-0.10301 0.7149 15	-0.27608 0.3192 15	-0.57366 0.0254 15
EXP	-0.07024 0.8036 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.34106 0.2135 15	-0.07163 0.7997 15	-0.33763 0.2184 15	-0.46714 0.0792 15	-0.14017 0.6183 15	-0.34580 0.2068 15	-0.10116 0.7198 15	-0.62714 0.0133 15	-0.12610 0.6540 15	-0.37693 0.1377 15
ILL	1.00000 0.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.16703 0.5514 15	-0.79193 0.0004 15	-0.23100 0.4075 15	-0.16370 0.5599 15	-0.95040 0.0001 15	-0.66532 0.0068 15	-0.62757 0.0123 15	-0.16117 0.5661 15	-0.85319 0.0042 15	-0.85900 0.0037 15
COQ	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15
GYP	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15
KAO	-0.16703 0.5514 15	0.00000 1.0000 15	0.00000 1.0000 15	1.00000 0.0000 15	-0.25548 0.3581 15	-0.39135 0.1492 15	-0.14928 0.5954 15	-0.28997 0.2945 15	-0.01205 0.9660 15	-0.06812 0.8094 15	-0.10384 0.7127 15	-0.28596 0.3015 15	-0.47829 0.0713 15
HEM	-0.79193 0.0004 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.25548 0.3581 15	1.00000 0.0000 15	-0.33415 0.2235 15	-0.08549 0.7619 15	-0.82543 0.0002 15	-0.32209 0.2417 15	-0.73581 0.0018 15	-0.01075 0.9697 15	-0.81503 0.0002 15	-0.77233 0.0007 15
ANH	-0.23100 0.4075 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.39135 0.1492 15	-0.33415 0.2235 15	1.00000 0.0000 15	-0.13570 0.6297 15	-0.21162 0.4490 15	-0.14087 0.6165 15	-0.10536 0.7086 15	-0.26919 0.3320 15	-0.40606 0.1331 15	-0.12993 0.6189 15
SZM	-0.16370 0.5599 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.14928 0.5954 15	-0.08549 0.7619 15	-0.13570 0.6297 15	1.00000 0.0000 15	-0.08378 0.7666 15	-0.07781 0.7828 15	-0.31076 0.2596 15	-0.81478 0.0002 15	-0.00679 0.9808 15	-0.06879 0.8075 15
QTZ	-0.95040 0.0001 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.28997 0.2945 15	-0.82543 0.0002 15	-0.21162 0.4490 15	-0.08378 0.7666 15	1.00000 0.0000 15	-0.49173 0.0626 15	-0.55704 0.0310 15	-0.14814 0.5983 15	-0.59020 0.0185 15	-0.77465 0.0007 15
PYR	-0.66532 0.0068 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.01205 0.9660 15	-0.32209 0.2417 15	-0.14087 0.6165 15	-0.07781 0.7828 15	-0.49173 0.0626 15	1.00000 0.0000 15	-0.56744 0.0274 15	-0.31513 0.2526 15	-0.43259 0.1073 15	-0.20020 0.4744 15
CAL	-0.62757 0.0123 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.06812 0.8094 15	-0.73581 0.0018 15	-0.10536 0.7086 15	-0.31076 0.2596 15	-0.55704 0.0310 15	-0.56744 0.0274 15	1.00000 0.0000 15	-0.33754 0.2186 15	-0.71555 0.0027 15	-0.47381 0.0744 15
DOL	-0.16117 0.5661 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.10384 0.7127 15	-0.01075 0.9697 15	-0.26919 0.3320 15	-0.81478 0.0002 15	-0.14814 0.5983 15	-0.31513 0.2526 15	-0.33754 0.2186 15	1.00000 0.0000 15	-0.02261 0.9365 15	-0.06252 0.8525 15

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	ILL	COO	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
ORT	-0.69319 0.0042 15	0.00000 1.0000 15	0.00000 1.0000 15	0.20596 0.3015 15	0.81503 0.0002 15	-0.40606 0.1331 15	0.00679 0.9808 15	0.69020 0.0185 15	0.43259 0.1073 15	-0.71555 0.0027 15	-0.02251 0.9365 15	1.00000 0.0000 15	0.60506 0.0169 15
PLA	-0.69900 0.0037 15	0.00000 1.0000 15	0.00000 1.0000 15	0.47829 0.0713 15	0.77233 0.0007 15	-0.13992 0.6189 15	-0.06879 0.8075 15	0.77465 0.0007 15	0.20020 0.4744 15	-0.47381 0.0744 15	0.05252 0.8525 15	0.60506 0.0169 15	1.00000 0.0000 15
SID	-0.47079 0.0765 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00062 0.9757 15	0.46805 0.0779 15	-0.16898 0.5472 15	0.45930 0.0850 15	0.52424 0.0448 15	-0.22744 0.4149 15	-0.04512 0.8731 15	0.68045 0.0057 15	0.31445 0.2537 15	0.35767 0.1906 15
ANK	-0.22865 0.4124 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.11802 0.6753 15	-0.20966 0.4533 15	0.08230 0.7706 15	-0.11670 0.6787 15	0.08272 0.7695 15	-0.51018 0.0478 15	0.22203 0.4264 15	-0.08118 0.7737 15	-0.01764 0.9503 15	-0.11143 0.6926 15
GRDEN	-0.75965 0.0010 15	0.00000 1.0000 15	0.00000 1.0000 15	-0.03773 0.8938 15	0.30295 0.1589 15	-0.16074 0.5677 15	0.04159 0.8830 15	0.58364 0.0224 15	0.98029 0.0001 15	0.54503 0.0356 15	-0.16701 0.5519 15	-0.47094 0.0709 15	0.24027 0.3884 15
S	-0.01633 0.9585 14	0.00000 1.0000 14	0.00000 1.0000 14	-0.26620 0.3575 14	-0.40149 0.1548 14	-0.06610 0.8221 14	0.13020 0.6375 14	-0.19031 0.5146 14	0.60452 0.0220 14	-0.18689 0.5223 14	-0.08417 0.7748 14	-0.13833 0.6372 14	-0.49256 0.0736 14

	SID	ANK	GRDEN	S
SAMPLE	0.16722 0.5614 15	-0.42994 0.1091 15	-0.31777 0.2484 15	-0.23160 0.4256 14
LOSIG100	-0.21527 0.4410 15	0.32626 0.2353 15	0.44275 0.0984 15	0.24958 0.3895 14
LOSIG500	0.03823 0.8954 15	-0.20485 0.4630 15	-0.14421 0.6081 15	0.17639 0.5464 14
STRAT	-0.28421 0.3046 15	0.44658 0.0952 15	0.44580 0.0958 15	0.34243 0.2307 14
BULKDEN	-0.00675 0.9810 15	0.25645 0.3562 15	0.23866 0.3916 15	0.39596 0.1611 14
MATRXDEN	-0.18033 0.5201 15	0.25188 0.3661 15	0.32115 0.2432 15	0.70614 0.0048 14
LOGDEN	0.27309 0.3247 15	-0.37845 0.1442 15	-0.13792 0.6240 15	0.18637 0.5236 14
POROSITY	-0.30968 0.2612 15	-0.05384 0.8489 15	0.11473 0.6839 15	0.50539 0.0663 14
LITYPE	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 14
RESIST	0.11477 0.6838 15	0.39118 0.1494 15	0.28382 0.3053 15	0.02603 0.9296 14
GAMMA	0.11833 0.6748 15	-0.17564 0.5312 15	-0.17855 0.5243 15	-0.34722 0.2239 14
QUARTZ	0.30322 0.2719 15	-0.01411 0.9602 15	0.08390 0.7663 15	-0.30021 0.2970 14

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CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	SID	ANK	GRDEN	S
EXP	-0.56220 0.0292 15	-0.29838 0.2800 15	-0.23230 0.4048 15	0.00824 0.9777 14
ILL	-0.47879 0.0765 15	-0.22065 0.4124 15	-0.75965 0.0010 15	-0.01533 0.9585 14
COQ	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 14
GYP	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 15	0.00000 1.0000 14
KAO	0.00062 0.9757 15	-0.11002 0.6753 15	-0.03773 0.8930 15	-0.26628 0.3575 14
HEM	0.46885 0.0779 15	-0.20966 0.4533 15	0.38295 0.1589 15	-0.40149 0.1548 14
ANH	-0.16898 0.5472 15	0.08230 0.7706 15	-0.16074 0.5671 15	-0.06610 0.8221 14
BBM	0.45930 0.0850 15	-0.11670 0.6787 15	0.04159 0.8830 15	-0.13890 0.6375 14
QTZ	0.52424 0.0448 15	0.08272 0.7695 15	0.50364 0.0224 15	-0.19031 0.5146 14
PYR	-0.22744 0.4149 15	0.51818 0.0478 15	0.98029 0.0001 15	0.60452 0.0220 14
CAL	-0.04512 0.8731 15	0.22203 0.4264 15	0.54503 0.0356 15	-0.18609 0.5223 14
DOL	0.68045 0.0052 15	-0.08118 0.7737 15	-0.16701 0.5519 15	-0.08417 0.7748 14
ORT	0.31445 0.2537 15	-0.01764 0.9503 15	0.47894 0.0709 15	-0.13833 0.6372 14
PLA	0.35767 0.1906 15	-0.11143 0.6926 15	0.24027 0.3884 15	-0.49256 0.0736 14
SID	1.00000 0.0000 15	-0.25299 0.3630 15	-0.03816 0.8926 15	-0.34406 0.2284 14
ANK	-0.25299 0.3630 15	1.00000 0.0000 15	0.50511 0.0548 15	0.41317 0.1420 14
GRDEN	-0.03816 0.8926 15	0.50511 0.0548 15	1.00000 0.0000 15	0.57949 0.0299 14
S	-0.34406 0.2284 14	0.41317 0.1420 14	0.57949 0.0299 14	1.00000 0.0000 14

OFFICIAL USE ONLY
SUBJECT TO REVISION

M. Vail Geological & Economic Survey

Non Banded Lithologic Type

SUBJECT TO REVISION

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
SAMPLE	16	5246.90000000	217.49566739	83950.40000000	4894.10000000	5433.10000000
LOSIG100	16	3.43125000	2.26795613	54.90000000	0.90000000	7.50000000
LOSIG500	16	4.63125000	1.58691262	74.10000000	2.10000000	8.00000000
STRAT	16	4.87500000	2.87228132	78.00000000	3.00000000	9.00000000
BULKDEN	16	2.68937500	0.06147032	43.03000000	2.56000000	2.82000000
MATRXDEN	16	2.74625000	0.05264662	43.94000000	2.65000000	2.83000000
LOGDEN	16	2.58437500	0.05784678	41.35000000	2.50000000	2.70000000
POROSITY	16	2.29125000	1.26817914	36.66000000	0	4.36000000
LITYPE	16	6.00000000	0	96.00000000	6.00000000	6.00000000
RESIST	16	35.75000000	15.74589894	572.00000000	17.00000000	80.00000000
GAMMA	16	252.50000000	69.13754407	4040.00000000	160.00000000	380.00000000
QUARTZ	16	0.16875000	0.08007288	2.70000000	0.07000000	0.33000000
EXP	16	0.00840529	0.00340241	0.13448471	0.00309643	0.01575750
ILL	16	0.44758727	0.08801360	7.16139525	0.24413721	0.65556506
GBO	16	0	0	0	0	0
GYP	16	0	0	0	0	0
KAO	16	0.00032430	0.00090493	0.00518875	0	0.00309670
HEM	16	0.03275163	0.01645225	0.52402613	0	0.05545728
ANH	16	0.00216990	0.00576044	0.03471973	0	0.01684619
SZM	16	0.00142357	0.00747483	0.05477711	0	0.02085332
QTZ	16	0.34384853	0.03278476	5.49357646	0.30926809	0.39266489
PYR	16	0.09235866	0.07580665	1.47773860	0	0.27843040
CAL	16	0.00142800	0.00107963	0.02284800	0	0.00280862
DOL	16	0.00403126	0.01043747	0.06453218	0	0.03974004
ORT	16	0.00065556	0.00056044	0.01048888	0	0.00128247
PLA	16	0.02022026	0.00626995	0.32352411	0.01213719	0.03258331
SID	16	0.03056113	0.01586482	0.48897807	0	0.06928872
ANK	16	0.00773256	0.01907827	0.12372102	0	0.07583523
GRDEN	16	2.92924169	0.16452922	46.86786703	2.73481140	3.32363865
S	16	3.07181250	2.39952426	49.14900000	0.07000000	8.73300000

W. Va. Geological & Economic Survey 101

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 16

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
SAMPLE	1.00000 0.0000	-0.15483 0.5670	0.36919 0.1593	-0.98715 0.0001	0.10762 0.6916	-0.16307 0.5462	-0.09878 0.7159	-0.25937 0.3320	0.00000 1.0000	0.45026 0.0801	0.76367 0.0006	-0.44697 0.0826	0.30497 0.2507
LOSIG100	-0.15483 0.5670	1.00000 0.0000	-0.18791 0.4859	-0.13778 0.6109	-0.02071 0.9393	0.05576 0.8375	-0.72117 0.0016	0.38615 0.1396	0.00000 1.0000	-0.42438 0.1014	-0.20993 0.4352	0.47416 0.0635	-0.72438 0.0015
LOSIG500	0.36919 0.1593	0.18791 0.4859	1.00000 0.0000	-0.45250 0.0784	0.39176 0.1334	0.59359 0.0153	-0.37778 0.1491	0.24276 0.3650	0.00000 1.0000	0.44616 0.0832	0.40392 0.1208	0.18920 0.4828	-0.08207 0.7625
STRAT	-0.98715 0.0001	0.13778 0.6109	-0.45250 0.0784	1.00000 0.0000	-0.10618 0.6955	0.07605 0.7795	0.11586 0.6692	0.16623 0.5384	0.00000 1.0000	-0.45769 0.0746	-0.73018 0.0013	0.42828 0.0979	-0.32825 0.2145
BULKDEN	0.10762 0.6916	-0.02071 0.9393	0.39176 0.1334	-0.10618 0.6955	1.00000 0.0000	0.59450 0.0152	-0.03105 0.9091	-0.48807 0.0551	0.00000 1.0000	-0.04425 0.8707	0.05058 0.8524	-0.09632 0.7227	0.11746 0.6649
MATRXDEN	-0.16307 0.5462	0.05576 0.8375	0.59359 0.0153	0.07605 0.7795	0.59450 0.0152	1.00000 0.0000	-0.26132 0.3283	0.32609 0.2177	0.00000 1.0000	0.05670 0.8348	-0.14744 0.5858	0.14272 0.5980	0.09613 0.7232
LOGDEN	-0.09878 0.7159	-0.72117 0.0016	-0.37778 0.1491	0.11586 0.6692	-0.03105 0.9091	-0.26132 0.3283	1.00000 0.0000	-0.44455 0.0845	0.00000 1.0000	-0.50960 0.0438	-0.52800 0.0355	-0.40893 0.1158	0.56783 0.0218
POROSITY	-0.25937 0.3320	0.38615 0.1396	0.24276 0.3650	0.16623 0.5384	-0.48807 0.0551	0.32609 0.2177	-0.44455 0.0845	1.00000 0.0000	0.00000 1.0000	0.33471 0.2051	-0.08778 0.7465	0.25730 0.3360	-0.22315 0.4061
LITYPE	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
RESIST	0.45026 0.0801	-0.42438 0.1014	-0.44616 0.0832	-0.45769 0.0746	-0.04425 0.8707	0.05670 0.8348	-0.50960 0.0438	0.33471 0.2051	0.00000 1.0000	1.00000 0.0000	0.54993 0.0273	0.02864 0.9249	-0.32178 0.2242
GAMMA	0.76367 0.0006	0.20993 0.4352	0.40392 0.1208	-0.73018 0.0013	0.05058 0.8524	-0.14744 0.5858	-0.52800 0.0355	-0.08778 0.7465	0.00000 1.0000	0.54993 0.0273	1.00000 0.0000	-0.13427 0.6201	-0.14178 0.6004
QUARTZ	-0.44697 0.0826	0.47416 0.0635	0.18920 0.4828	0.42828 0.0979	-0.09632 0.7227	0.14272 0.5980	-0.40893 0.1158	0.25730 0.3360	0.00000 1.0000	0.02864 0.9249	-0.13427 0.6201	1.00000 0.0000	-0.80338 0.0002
EXP	0.30497 0.2507	-0.72438 0.0015	-0.08207 0.7625	-0.32825 0.2145	0.11746 0.6649	0.09613 0.7232	0.56783 0.0218	-0.22315 0.4061	0.00000 1.0000	-0.32178 0.2242	-0.14178 0.6004	-0.80338 0.0002	1.00000 0.0000
ILL	-0.29993 0.2591	-0.83641 0.0001	-0.37033 0.1485	-0.25287 0.3447	-0.03036 0.9131	-0.28514 0.2834	-0.69346 0.0029	-0.47010 0.0661	0.00000 1.0000	-0.35291 0.1800	-0.96365 0.0148	-0.79540 0.0002	-0.78733 0.0003
COO	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
GYP	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
KAO	-0.50557 0.0457	-0.25429 0.3419	-0.49434 0.0516	0.54898 0.0276	-0.24582 0.3588	-0.42248 0.1031	0.63085 0.0080	-0.26434 0.3225	0.00000 1.0000	-0.42582 0.1001	-0.48913 0.0545	0.17615 0.5140	-0.16667 0.5373
HEM	-0.14482 0.5926	-0.34388 0.1922	-0.68070 0.0037	-0.24183 0.3669	-0.39797 0.2459	-0.69844 0.0026	0.37916 0.1475	-0.47219 0.0648	0.00000 1.0000	-0.20366 0.4493	-0.35228 0.3459	-0.08024 0.7424	-0.01859 0.9514
ANH	-0.06221 0.8190	0.06493 0.8112	-0.47983 0.0600	0.14014 0.6047	-0.24042 0.3608	-0.53904 0.0312	-0.00836 0.9755	-0.30001 0.2589	0.00000 1.0000	0.11195 0.6798	0.01038 0.9696	0.05095 0.8514	-0.15774 0.5896
SZM	-0.34893 0.1853	0.73375 0.0012	0.20714 0.4414	0.33398 0.2061	0.52964 0.0349	0.37411 0.1534	-0.56047 0.0239	0.02619 0.9233	0.00000 1.0000	0.12552 0.6432	-0.03035 0.9112	0.45259 0.0784	-0.60476 0.0131
QTZ	-0.36379 0.1660	0.79448 0.0002	0.20366 0.4493	0.33402 0.2061	-0.09531 0.7255	0.11148 0.6811	-0.59606 0.0148	0.40644 0.1187	0.00000 1.0000	0.27431 0.3039	-0.00593 0.9826	0.83461 0.0001	-0.83151 0.0001
PYR	-0.25944 0.3319	0.82084 0.0001	0.46134 0.0721	0.17980 0.5057	0.12841 0.6355	0.48157 0.0589	-0.70734 0.0022	0.57059 0.0186	0.00000 1.0000	0.38524 0.1406	0.05910 0.8276	0.63680 0.0094	-0.63203 0.0085
CAL	-0.12396 0.6474	0.42869 0.0976	0.04616 0.8652	0.11315 0.6765	-0.50998 0.0436	0.03578 0.8954	-0.47462 0.0633	0.70313 0.0023	0.00000 1.0000	0.38784 0.1377	-0.03075 0.9100	0.46604 0.0688	-0.42420 0.1018
DOL	0.04607 0.8655	0.45683 0.0753	0.05820 0.8305	-0.07825 0.7733	-0.52076 0.0386	-0.36494 0.1646	-0.33066 0.2110	0.31331 0.2374	0.00000 1.0000	0.03063 0.9103	0.21219 0.4301	0.41052 0.1139	-0.33865 0.1995

CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 16

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	EXP
ORT	-0.05126 0.8505	-0.11425 0.6735	-0.05707 0.8337	0.08028 0.7676	-0.00390 0.9886	-0.05650 0.8354	0.06524 0.8103	-0.10289 0.7045	0.00000 1.0000	-0.27608 0.3006	-0.03556 0.8960	0.04696 0.8629	0.05053 0.8526
PLA	0.04879 0.8576	0.14306 0.5971	-0.28694 0.2813	0.01569 0.9540	-0.09681 0.7213	-0.25439 0.3417	-0.17305 0.5216	-0.22321 0.4060	0.00000 1.0000	-0.00653 0.9808	0.15342 0.5705	0.47256 0.0645	-0.39041 0.1349
SID	0.19873 0.4606	-0.47126 0.0654	-0.31287 0.2381	-0.14510 0.5918	-0.16020 0.5534	-0.26872 0.3142	0.45757 0.0747	-0.20936 0.4365	0.00000 1.0000	-0.15502 0.5645	0.10847 0.6892	-0.51606 0.0407	0.38619 0.1395
ANK	0.13247 0.6248	-0.14424 0.5941	0.67963 0.0038	-0.14507 0.5919	0.34337 0.1929	0.39857 0.1262	-0.03766 0.8899	-0.03981 0.8836	0.00000 1.0000	0.07221 0.8366	0.08103 0.7486	0.22528 0.4015	-0.01295 0.9620
GRDEN	-0.25171 0.3470	0.82786 0.0001	-0.47126 0.0654	0.17233 0.5233	-0.12744 0.6381	0.49054 0.0537	-0.70975 0.0021	0.59661 0.0163	0.00000 1.0000	-0.39539 0.1296	0.08033 0.7674	-0.61818 0.0110	-0.63547 0.0082
S	-0.20416 0.4482	0.77463 0.0004	-0.55551 0.0255	0.11746 0.6648	0.23513 0.3807	0.58737 0.0167	-0.71175 0.0020	0.55096 0.0270	0.00000 1.0000	0.37819 0.1486	0.09353 0.7304	0.58018 0.0185	-0.55450 0.0258

	ILL	COQ	GYP	KAO	HEM	ANH	SZM	DTZ	PYR	CAL	DOL	ORT	PLA
SAMPLE	0.29993 0.2591	0.00000 1.0000	0.00000 1.0000	-0.50557 0.0457	-0.14482 0.5926	-0.06221 0.8190	-0.34893 0.1853	-0.36379 0.1660	-0.25944 0.3319	-0.12396 0.6474	0.04607 0.8655	-0.05126 0.8505	0.04879 0.8576
LOSIG100	-0.83643 0.0001	0.00000 1.0000	0.00000 1.0000	-0.25429 0.3419	-0.34388 0.1922	0.06493 0.8112	0.73376 0.0012	0.79448 0.0002	0.82084 0.0001	0.42869 0.0976	0.45683 0.0753	-0.11425 0.6735	0.14306 0.5971
LOSIG500	-0.37833 0.1485	0.00000 1.0000	0.00000 1.0000	-0.49434 0.0516	-0.68010 0.0037	-0.47983 0.0600	0.20714 0.4414	0.20366 0.4493	0.16134 0.5721	0.04816 0.8652	0.08020 0.8305	-0.05707 0.8337	-0.28694 0.2813
STRAT	-0.25287 0.3447	0.00000 1.0000	0.00000 1.0000	0.54898 0.0276	0.24183 0.3689	0.14014 0.6047	0.33398 0.2061	0.33402 0.2061	0.17980 0.5052	0.11315 0.6765	-0.07425 0.7843	0.08028 0.7676	0.01569 0.9540
BULKDEN	-0.03036 0.9111	0.00000 1.0000	0.00000 1.0000	-0.24582 0.3588	-0.30797 0.2459	-0.24042 0.3698	0.52964 0.0349	-0.09531 0.7255	0.12061 0.6355	-0.50098 0.0436	-0.56028 0.0246	-0.00390 0.9886	-0.09681 0.7213
MATRXDEN	-0.28571 0.2834	0.00000 1.0000	0.00000 1.0000	-0.42248 0.1031	-0.69841 0.0026	-0.63404 0.0312	0.37413 0.1534	0.11148 0.6811	0.48151 0.0589	0.03530 0.8954	-0.11604 0.6646	-0.05650 0.8354	-0.25439 0.3417
LOGDEN	0.69346 0.0029	0.00000 1.0000	0.00000 1.0000	0.63085 0.0098	0.37916 0.1416	0.00836 0.9755	-0.56041 0.0239	-0.59606 0.0149	-0.70734 0.0022	-0.47462 0.0632	-0.33068 0.2110	0.06524 0.8103	-0.17305 0.5216
POROSITY	-0.47010 0.0661	0.00000 1.0000	0.00000 1.0000	-0.26434 0.3225	-0.47219 0.0648	-0.30001 0.2589	0.02619 0.9233	0.40644 0.1182	0.52959 0.0186	0.70373 0.0023	0.31331 0.2374	-0.10289 0.7045	-0.22321 0.4060
LITYPE	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
RESIST	-0.35291 0.1800	0.00000 1.0000	0.00000 1.0000	-0.42582 0.1001	-0.20366 0.4493	-0.11195 0.6798	0.12552 0.6432	-0.27431 0.3039	-0.38524 0.1406	-0.38784 0.1377	-0.03061 0.9103	-0.27608 0.3006	-0.00653 0.9808
GAMMA	-0.06365 0.8148	0.00000 1.0000	0.00000 1.0000	-0.48913 0.0545	-0.25225 0.3450	0.01036 0.9604	-0.03035 0.9113	-0.00593 0.9826	0.05919 0.8276	-0.03075 0.9100	0.21219 0.4301	-0.03556 0.8960	0.15342 0.5705
QUARTZ	-0.79540 0.0002	0.00000 1.0000	0.00000 1.0000	0.17615 0.5140	-0.08924 0.7424	0.05095 0.8514	0.45259 0.0784	0.83461 0.0001	0.62689 0.0094	0.46604 0.0688	0.41092 0.1139	0.04696 0.8629	0.47256 0.0645
EXP	0.78732 0.0003	0.00000 1.0000	0.00000 1.0000	-0.16667 0.5373	0.01659 0.9514	-0.15774 0.5598	-0.60476 0.0131	-0.83151 0.0001	-0.63302 0.0085	-0.42420 0.1015	-0.33868 0.1995	0.05053 0.8526	-0.39041 0.1349
ILL	1.00000 0.0000	0.00000 1.0000	0.00000 1.0000	0.23384 0.3834	0.37962 0.1470	-0.03384 0.9302	-0.70132 0.0025	-0.83182 0.0001	-0.82159 0.0001	-0.53462 0.0329	-0.50148 0.0447	-0.04942 0.8558	-0.28910 0.2771
COQ	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
GYP	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
KAO	0.23384 0.3834	0.00000 1.0000	0.00000 1.0000	1.00000 0.0000	0.46072 0.0725	0.08019 0.7678	-0.17508 0.5166	-0.09728 0.7200	-0.31805 0.2299	-0.26211 0.3268	-0.14771 0.5851	-0.09616 0.7231	0.05281 0.8460

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CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / N = 16

	ILL	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA
HEM	-0.37962 0.1470	0.00000 1.0000	0.00000 1.0000	0.46072 0.0725	1.00000 0.0000	0.57874 0.0188	-0.25856 0.3336	-0.21395 0.4262	0.58892 0.0164	-0.09716 0.7204	-0.07874 0.7719	0.14196 0.6000	0.23415 0.3827
ANH	-0.02384 0.9382	0.00000 1.0000	0.00000 1.0000	0.08019 0.7670	0.57874 0.0188	1.00000 0.0000	-0.01289 0.9622	0.17273 0.5224	0.47767 0.5103	0.03465 0.8986	0.19303 0.4738	0.06429 0.8130	0.33267 0.2080
SZM	-0.70122 0.0025	0.00000 1.0000	0.00000 1.0000	-0.17508 0.5166	-0.25856 0.3336	-0.01289 0.9622	1.00000 0.0000	0.63863 0.0078	0.77047 0.0020	-0.00156 0.9954	-0.01536 0.9550	-0.11318 0.6764	0.09266 0.7329
QTZ	-0.92152 0.0001	0.00000 1.0000	0.00000 1.0000	-0.09728 0.7200	-0.21395 0.4262	0.17273 0.5224	0.63863 0.0078	1.00000 0.0000	0.83403 0.0001	0.54957 0.0274	0.57661 0.0194	0.11527 0.6708	0.40687 0.1176
PYR	-0.99159 0.0001	0.00000 1.0000	0.00000 1.0000	-0.31805 0.2299	-0.58892 0.0164	-0.47767 0.5103	0.77047 0.0020	0.83403 0.0001	1.00000 0.0000	0.44252 0.0861	0.37636 0.1508	-0.04310 0.8741	0.07581 0.7751
CAL	-0.53462 0.0329	0.00000 1.0000	0.00000 1.0000	-0.26211 0.3268	-0.09716 0.7204	0.03465 0.8986	-0.00156 0.9954	-0.54957 0.0274	0.44252 0.0861	1.00000 0.0000	0.42128 0.1041	0.11937 0.6598	0.30209 0.2555
DOL	-0.50768 0.0447	0.00000 1.0000	0.00000 1.0000	-0.14771 0.5851	-0.07874 0.7719	0.19303 0.4738	-0.01536 0.9550	0.57661 0.0194	0.37636 0.1508	0.42128 0.1041	1.00000 0.0000	0.36870 0.1599	0.21508 0.3010
ORT	-0.04942 0.8558	0.00000 1.0000	0.00000 1.0000	-0.09616 0.7231	0.14196 0.6000	0.06429 0.8130	-0.11318 0.6764	0.11527 0.6708	-0.04310 0.8741	0.11937 0.6598	0.36870 0.1599	1.00000 0.0000	0.13535 0.6172
PLA	-0.28930 0.2771	0.00000 1.0000	0.00000 1.0000	0.05281 0.8460	0.23415 0.3827	0.33267 0.2080	0.09266 0.7329	0.40687 0.1176	0.07581 0.7751	0.30209 0.2555	0.21508 0.3010	0.13535 0.6172	1.00000 0.0000
SID	0.62573 0.0045	0.00000 1.0000	0.00000 1.0000	0.20121 0.4548	0.10356 0.7027	0.06675 0.8060	-0.54169 0.0302	-0.57507 0.0196	-0.67620 0.0040	-0.29084 0.2745	-0.31623 0.2320	-0.20226 0.4525	-0.13059 0.6250
ANK	-0.10689 0.6936	0.00000 1.0000	0.00000 1.0000	-0.15493 0.5667	-0.23493 0.3811	-0.43553 0.0918	0.03442 0.8993	0.00684 0.9799	0.00247 0.9926	0.06738 0.8042	-0.18706 0.4863	0.04574 0.8664	-0.12164 0.6536
GRDEN	-0.92034 0.0001	0.00000 1.0000	0.00000 1.0000	-0.32399 0.2209	-0.62447 0.0097	-0.18587 0.4907	-0.70450 0.0023	-0.83047 0.0001	-0.94849 0.0001	-0.43932 0.0888	-0.56694 0.0209	-0.06784 0.8034	0.06409 0.8113
S	-0.08212 0.0001	0.00000 1.0000	0.00000 1.0000	-0.38625 0.1395	-0.67564 0.0041	-0.23235 0.3457	-0.81810 0.0018	-0.91384 0.0006	-0.99169 0.0001	-0.37196 0.1521	-0.34114 0.2034	-0.14214 0.7233	-0.04677 0.9216

	SID	ANK	GRDEN	S
SAMPLE	0.19873 0.4606	0.13247 0.6248	-0.25171 0.3470	-0.20416 0.4482
LOSIG100	-0.47126 0.0654	-0.14424 0.5941	0.82786 0.0001	0.77463 0.0004
LOBIG500	-0.31207 0.2381	-0.67963 0.0038	0.47126 0.0654	0.55551 0.0255
STRAT	-0.14510 0.5918	-0.14507 0.5919	0.17233 0.5233	0.11746 0.6640
BULKDEN	-0.16020 0.5534	0.34337 0.1929	0.12744 0.6381	0.23513 0.3807
MATRXDEN	-0.26872 0.3142	0.39857 0.1262	0.49054 0.0537	0.58737 0.0167
LOGDEN	0.45753 0.0747	-0.03766 0.8899	-0.70975 0.0021	-0.71175 0.0020
POROSITY	-0.20936 0.4365	-0.03981 0.8836	0.59397 0.0153	0.55096 0.0270
LITYPE	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
RESIST	-0.15582 0.5645	0.04221 0.8766	0.39539 0.1296	0.37819 0.1486

CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / N = 16

	SID	ANK	GRDEN	S
GAMMA	0.10847 0.6892	0.08703 0.7486	0.08033 0.7674	0.09353 0.7304
QUARTZ	-0.51606 0.0407	0.22528 0.4015	0.61616 0.0110	0.58018 0.0185
EXP	0.38619 0.1395	-0.01295 0.9620	-0.63547 0.0082	-0.55450 0.0258
ILL	0.62573 0.0095	-0.10689 0.6936	-0.92034 0.0001	-0.88212 0.0001
COO	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
GYP	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000	0.00000 1.0000
KAO	0.20127 0.4548	-0.15493 0.5667	-0.32399 0.2209	-0.38625 0.1395
HEM	0.10356 0.7027	-0.23493 0.3811	-0.62447 0.0097	-0.67564 0.0041
ANH	0.06675 0.8060	-0.43553 0.0918	-0.18507 0.4907	-0.25235 0.3457
SZM	-0.54169 0.0302	0.03442 0.8903	0.70450 0.0023	0.71610 0.0018
OTZ	-0.57587 0.0196	0.00684 0.9799	0.83047 0.0001	0.76488 0.0006
PYR	-0.67620 0.0040	0.00247 0.9928	0.99649 0.0001	0.98650 0.0001
CAL	-0.29084 0.2745	0.06738 0.8042	0.43932 0.0886	0.37496 0.1524
DOL	-0.31623 0.2328	-0.16706 0.5363	0.36828 0.1605	0.29615 0.2664
ORT	-0.20226 0.4525	0.04574 0.8664	-0.06764 0.8034	-0.09610 0.7233
PLA	-0.13059 0.6298	-0.12164 0.6536	0.06489 0.8113	0.02677 0.9216
SID	1.00000 0.0000	-0.08218 0.7622	-0.61368 0.0115	-0.65480 0.0059
ANK	-0.08218 0.7622	1.00000 0.0000	0.00874 0.9744	0.08087 0.7435
GRDEN	-0.61368 0.0115	0.00874 0.9744	1.00000 0.0000	0.98606 0.0001
S	-0.65480 0.0059	0.08087 0.7435	0.98606 0.0001	1.00000 0.0000

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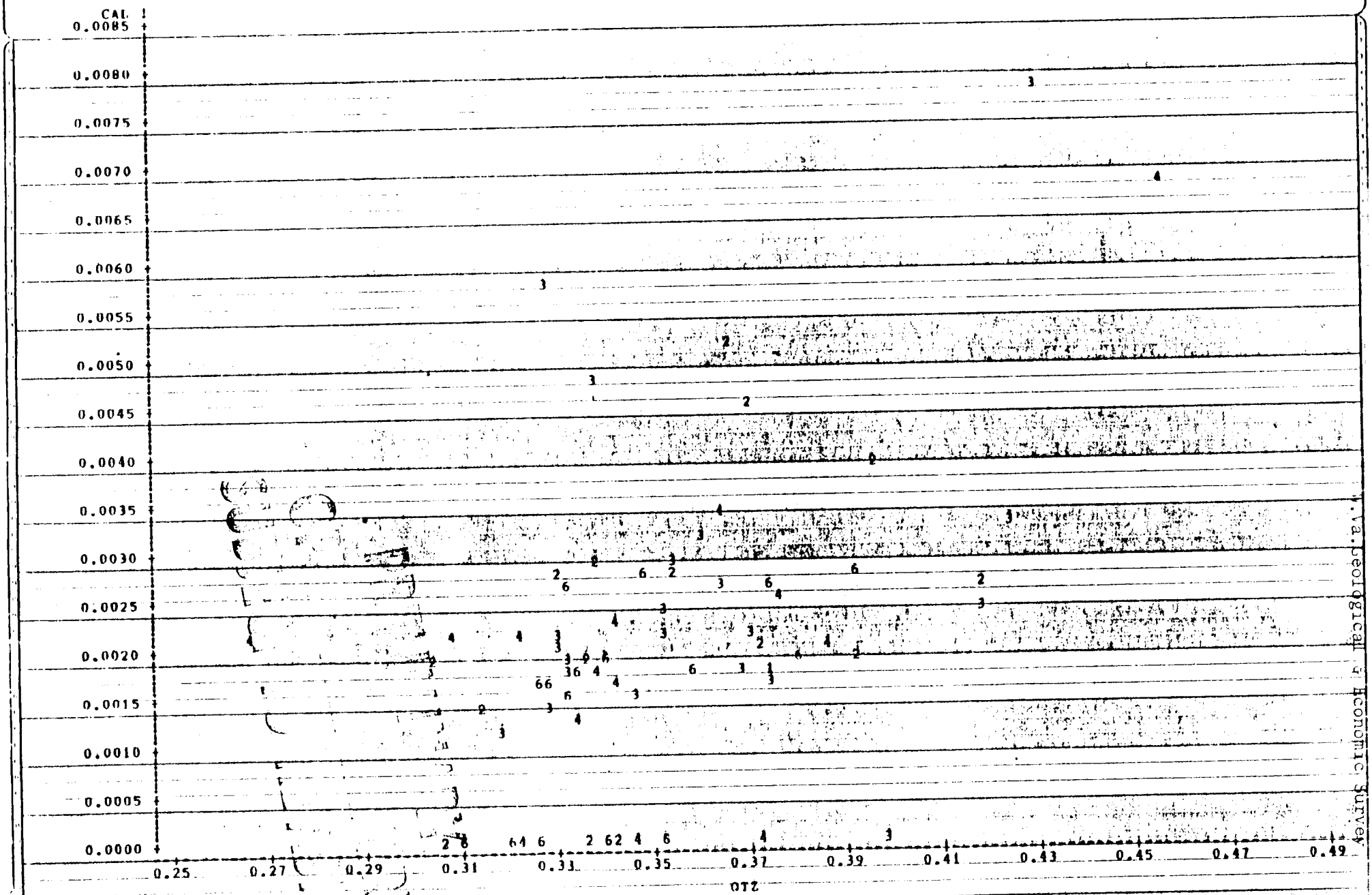
Appendix F. Crossplots of Selected Variables Coded by Lithotype

Plot Codes

1) Siltstone
2) Sharply-banded shale
3) Thinly-laminated shale
4) Lenticularly-laminated shale
6) Non banded shale

PLOT OF CAL*OTZ SYMBOL IS VALUE OF LITYPE



NOTE: 3 OBS HIDDEN

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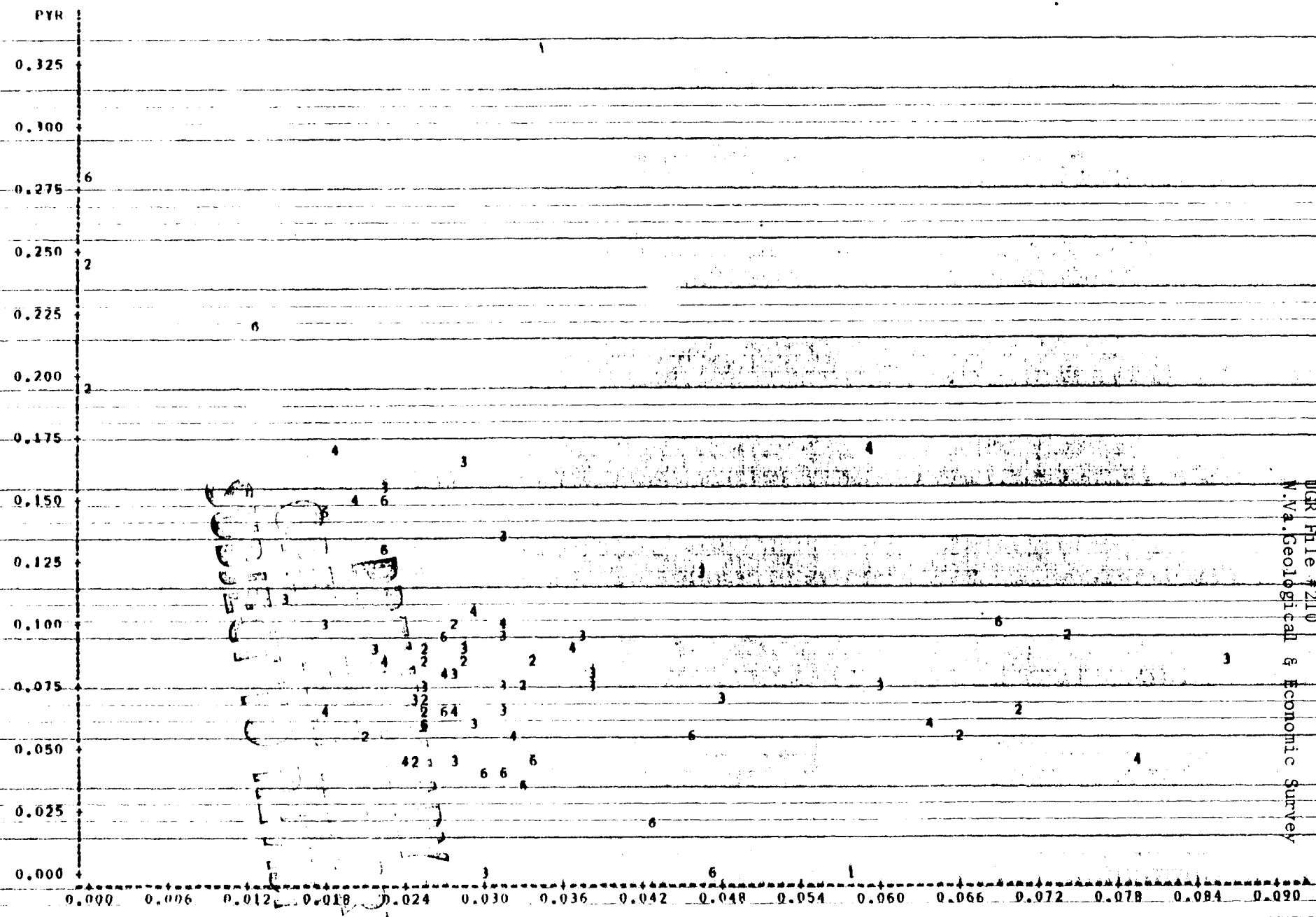
PLOT OF PYR*SID SYMBOL IS VALUE OF LITYPE



NOTE: 1 OBS HIDDEN

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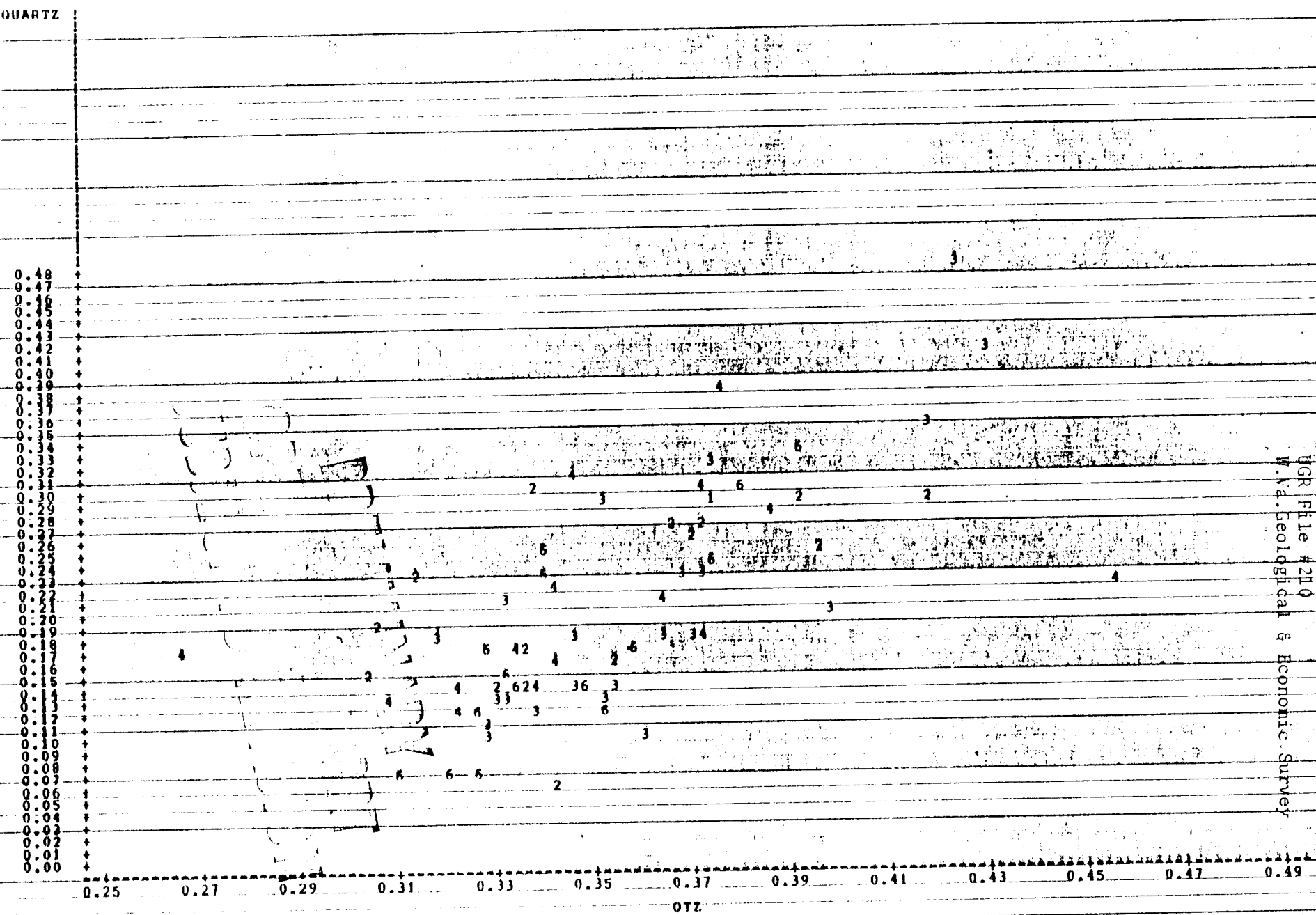
PLOT OF QUARTZ*QTZ SYMBOL IS VALUE OF LITYPE



NOTE: 2 OBS HIDDEN

UGR File #210
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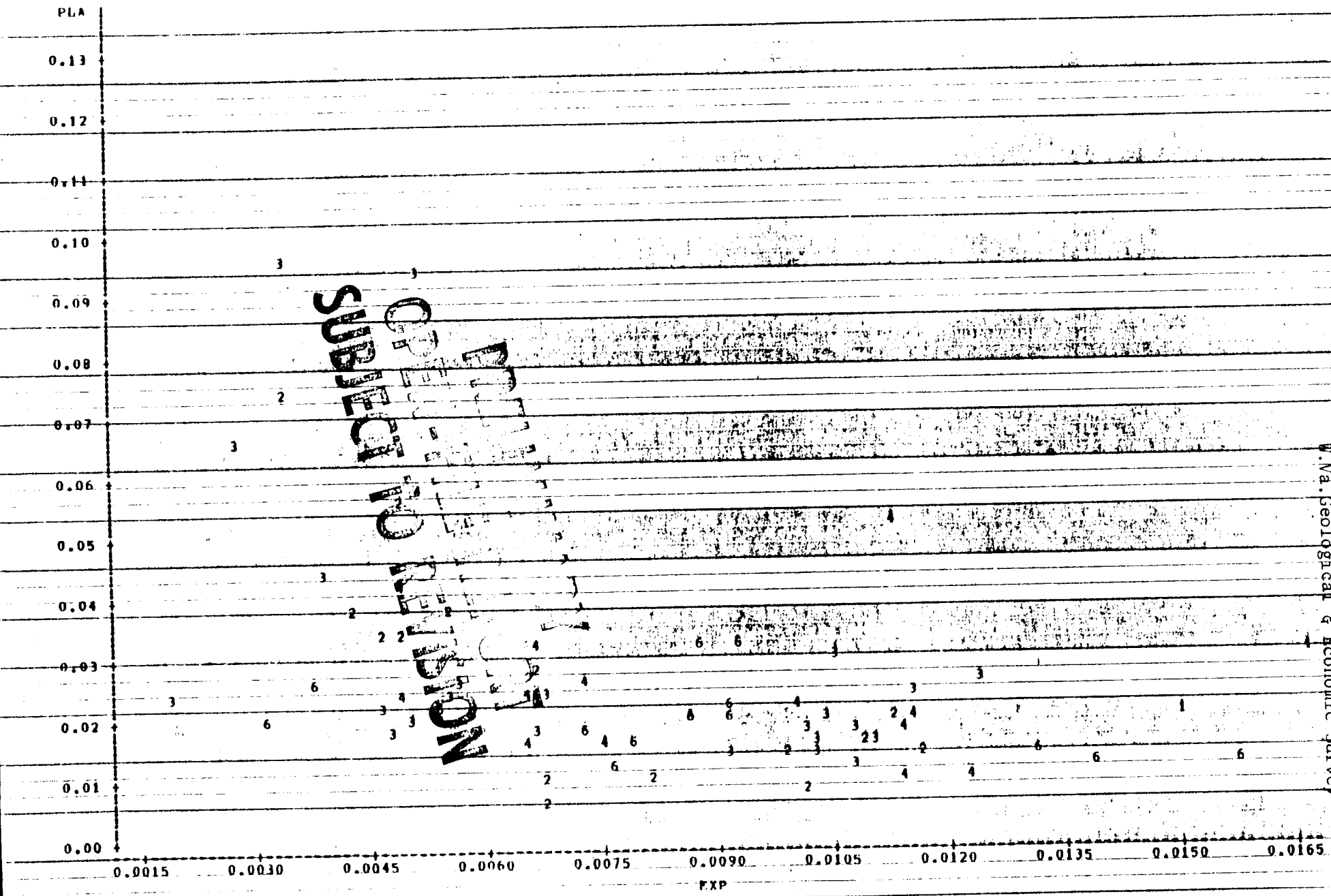
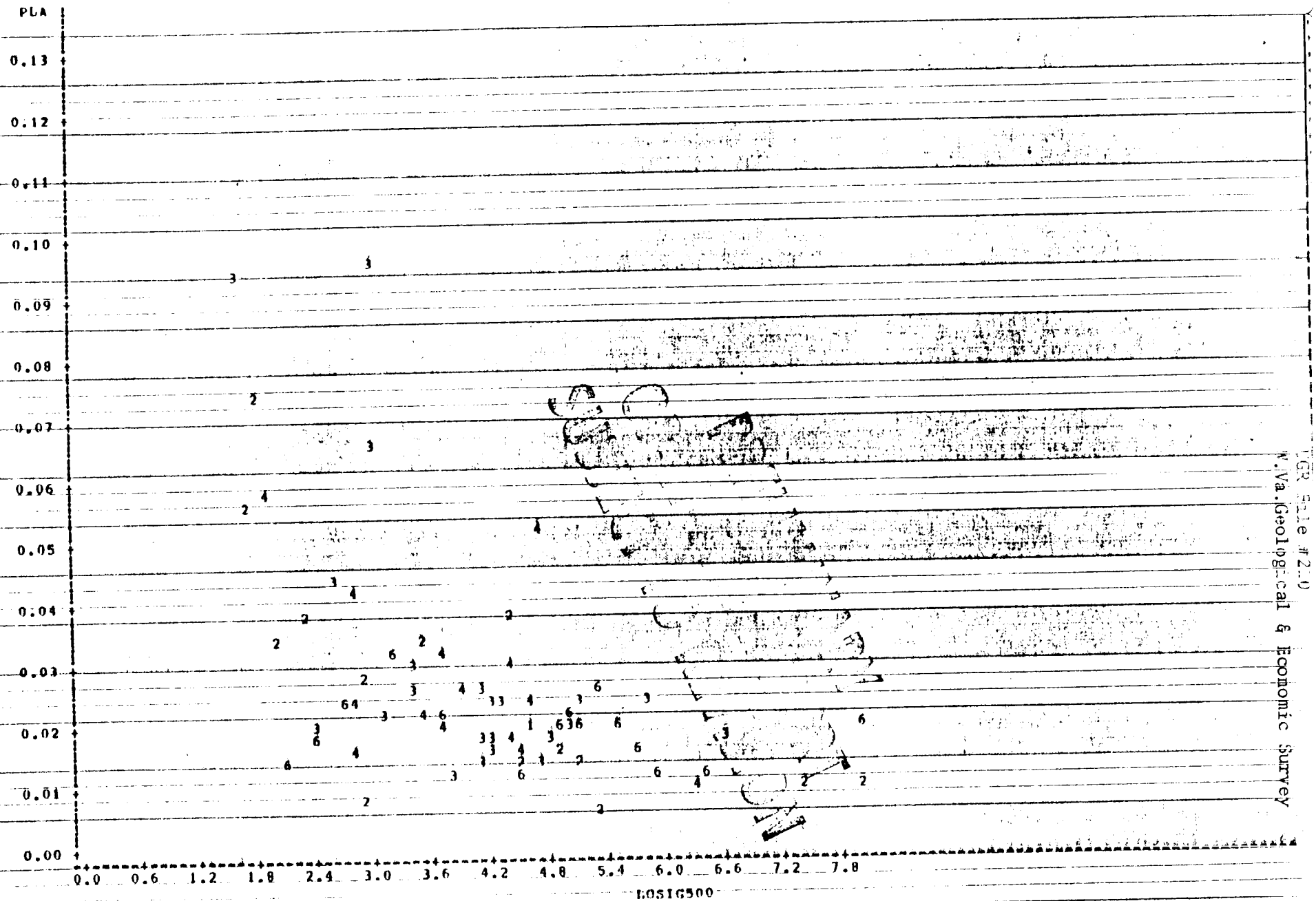
STATISTICAL ANALYSIS SYSTEM 10:36 FRIDAY, JUNE 15, 1979 9

PLOT OF PLA*EXP SYMBOL IS VALUE OF LITYPE



SUPERSEDED BY REVISION

PLOT OF PLA*LOSIG500 SYMBOL IS VALUE OF LITYPE



NOTE: 4 OBS HIDDEN

UGR File #2.0
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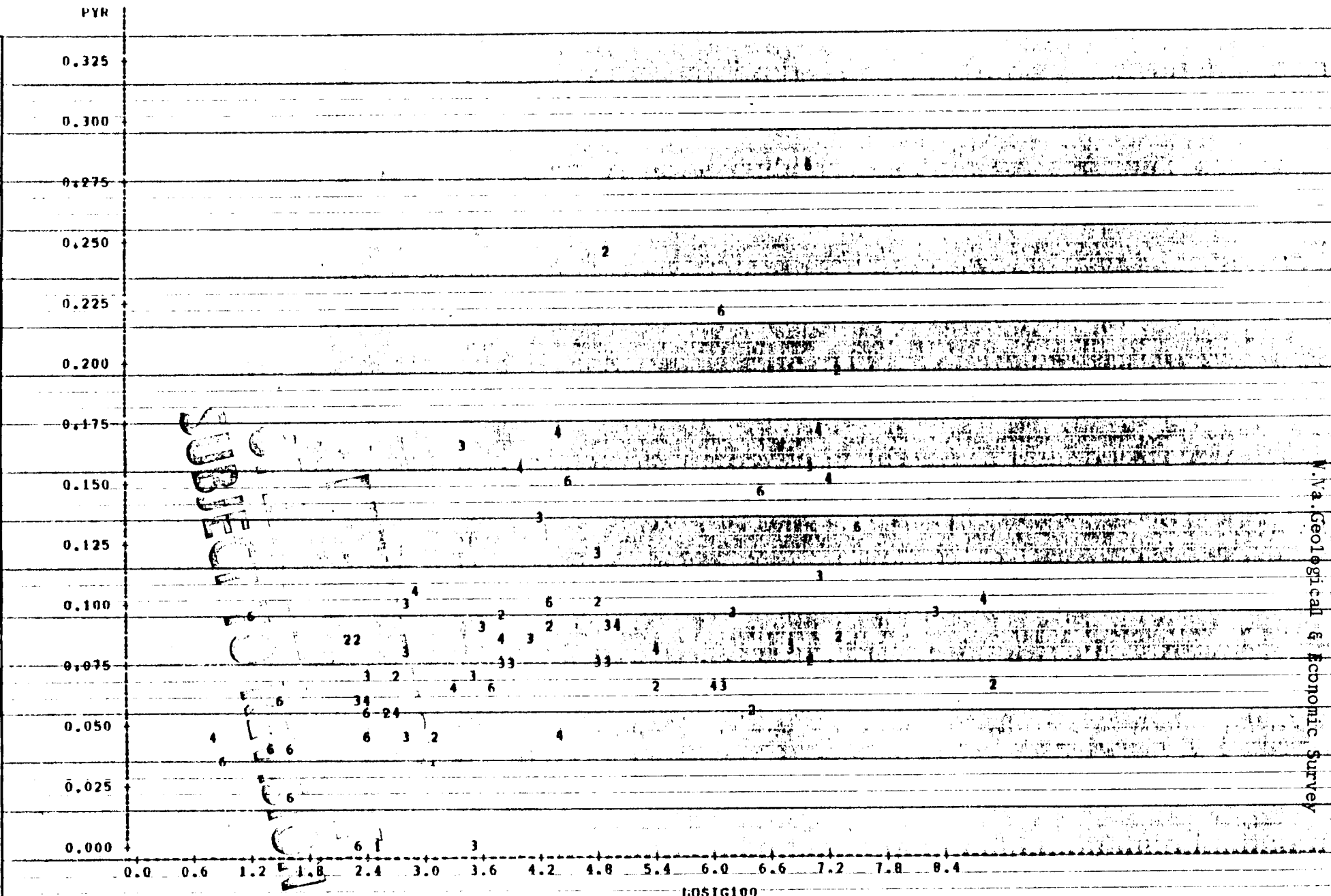
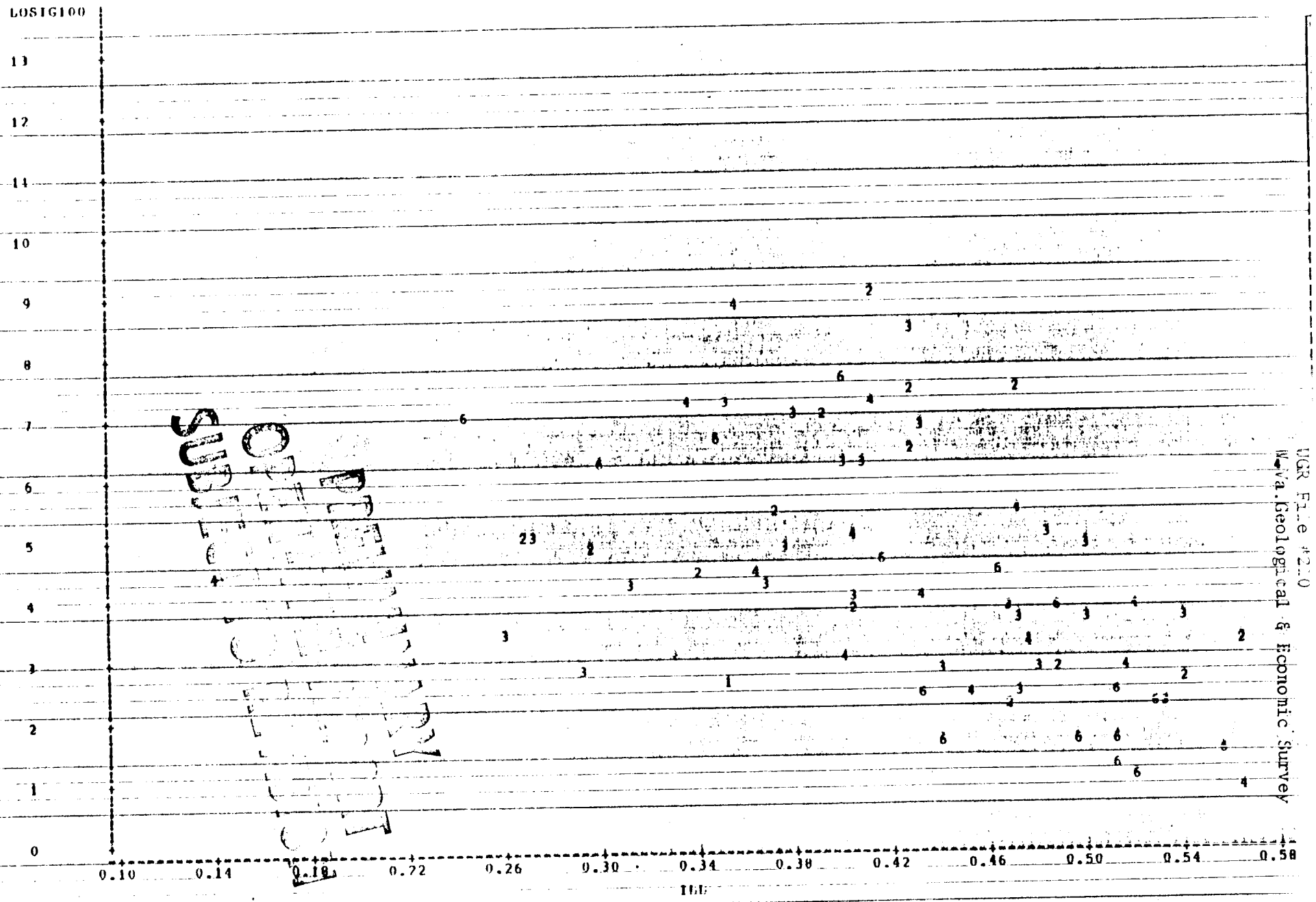


DGR File #210
W.Va. Geological & Economic Survey

PLOT OF LOSIG100*ILL SYMBOL IS VALUE OF LITYPE



NOTE: 1 OBS HIDDEN

UGR File #2.0
W.Va.Geological & Economic Survey

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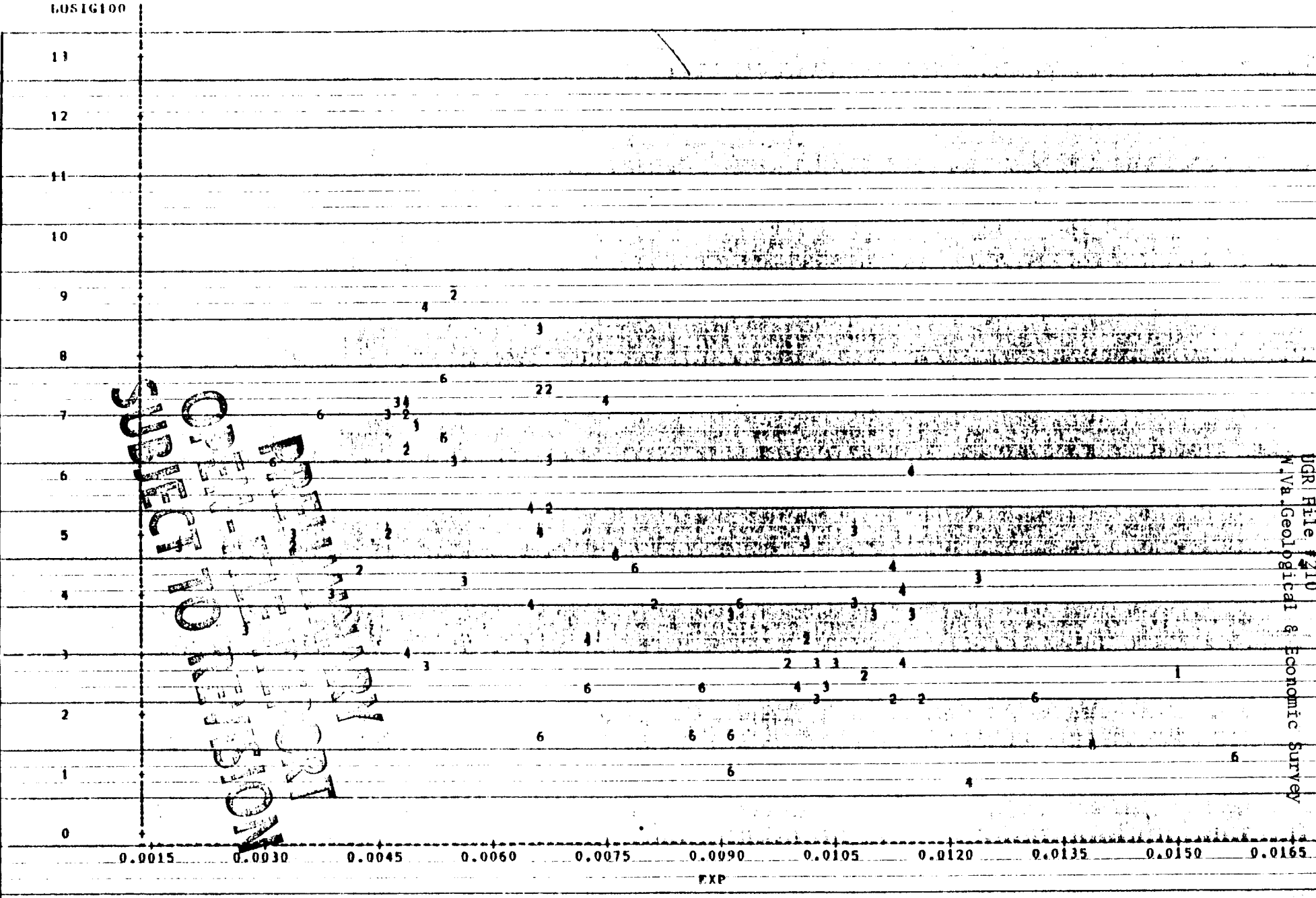

UGR File #210
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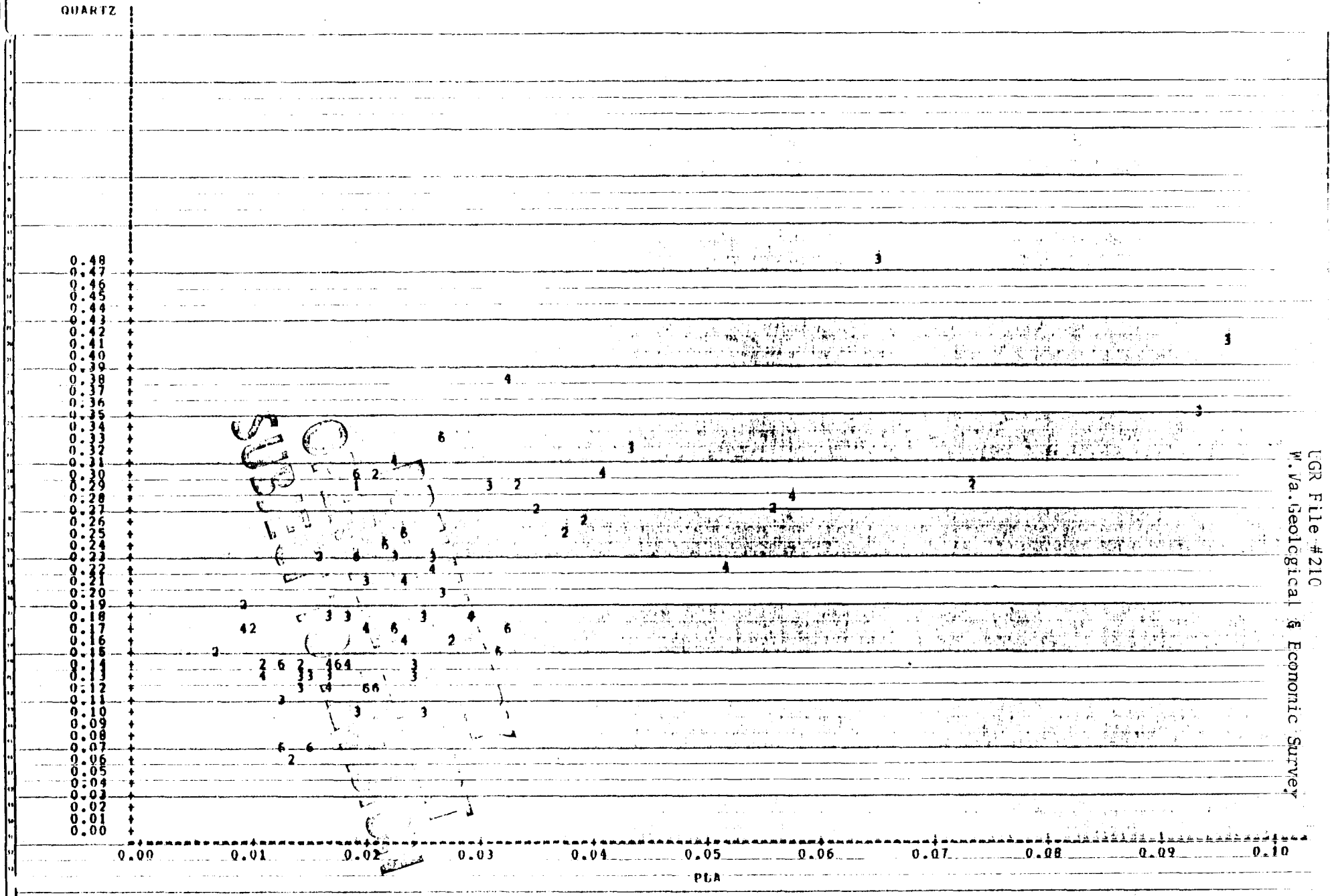
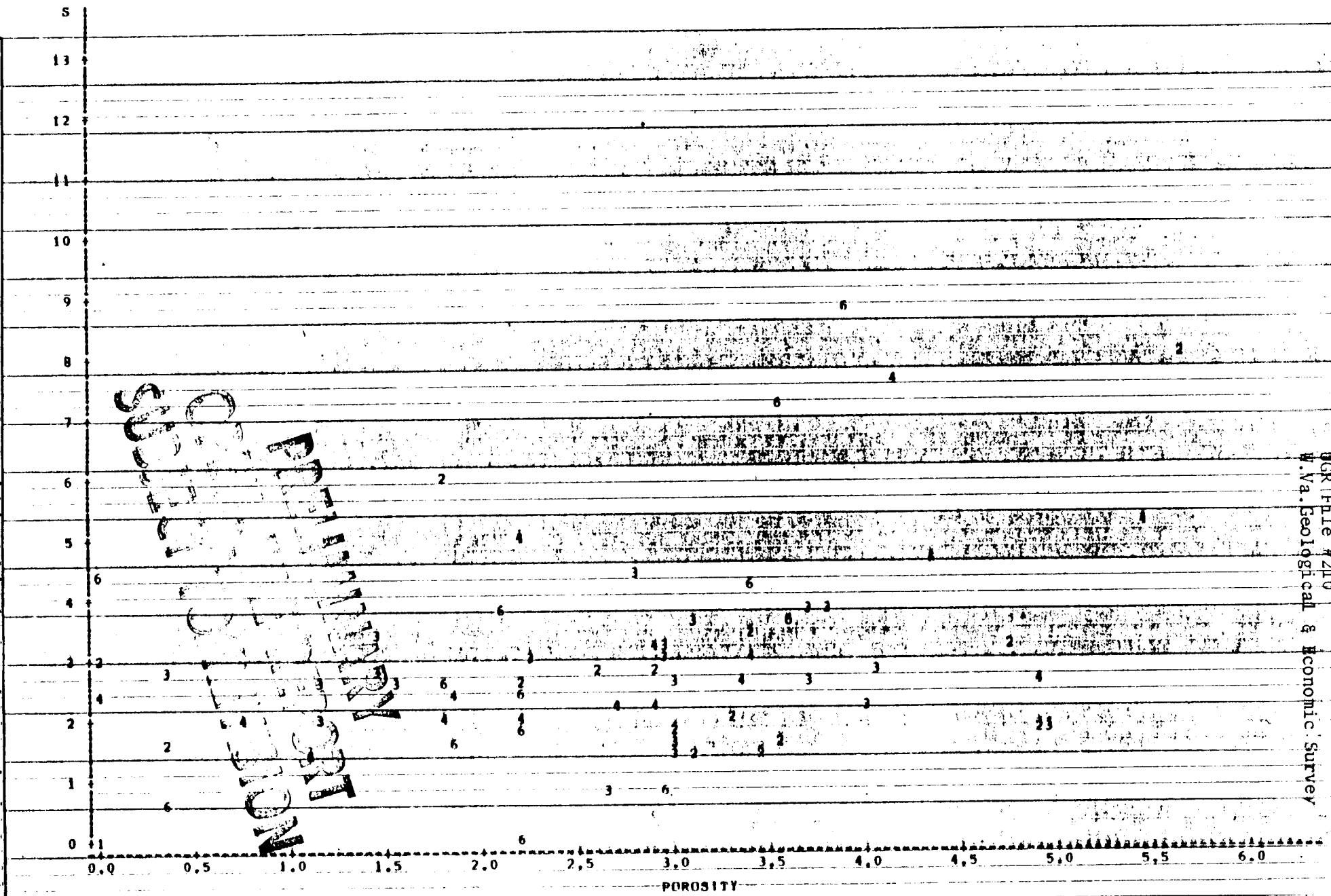
PLOT OF QUARTZ*PLA SYMBOL IS VALUE OF LITYPE



NOTE: 4 OBS HIDDEN

UGR File #21C
W.Va.Geological & Economic Survey

PLOT OF S*POROSITY SYMBOL IS VALUE OF LITYPE

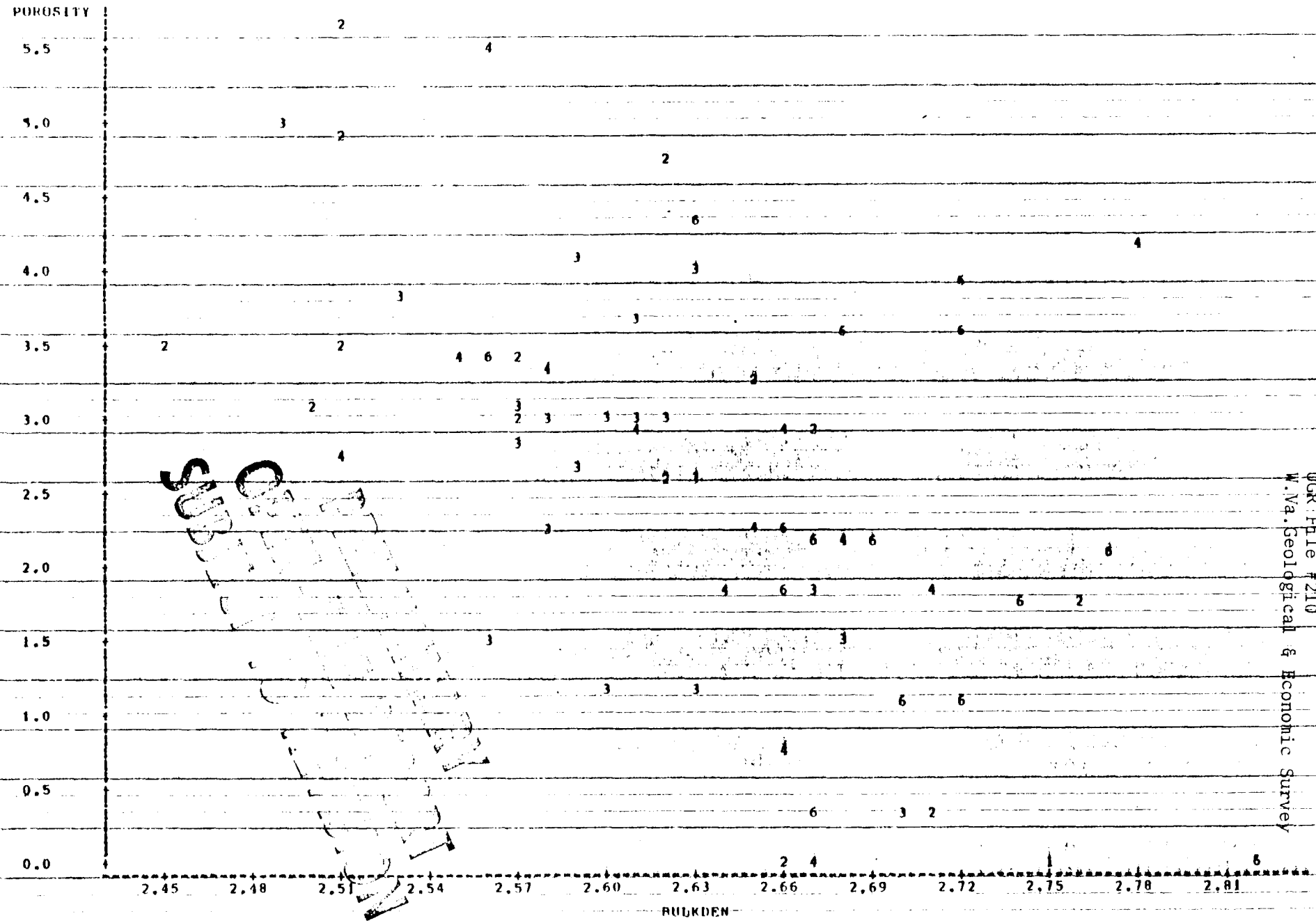


NOTE: 2 OBS HAD MISSING VALUES 2 OBS HIDDEN

UGR File #210
W.Va. Geological & Economic Survey

S T A T I S T I C A L A N A L Y S I S S Y S T E M 10:11 WEDNESDAY, JUNE 6, 1979 8

PLOT OF POROSITY*BULKDEN SYMBOL IS VALUE OF LITYPE



NOTE: 7 OBS HIDDEN

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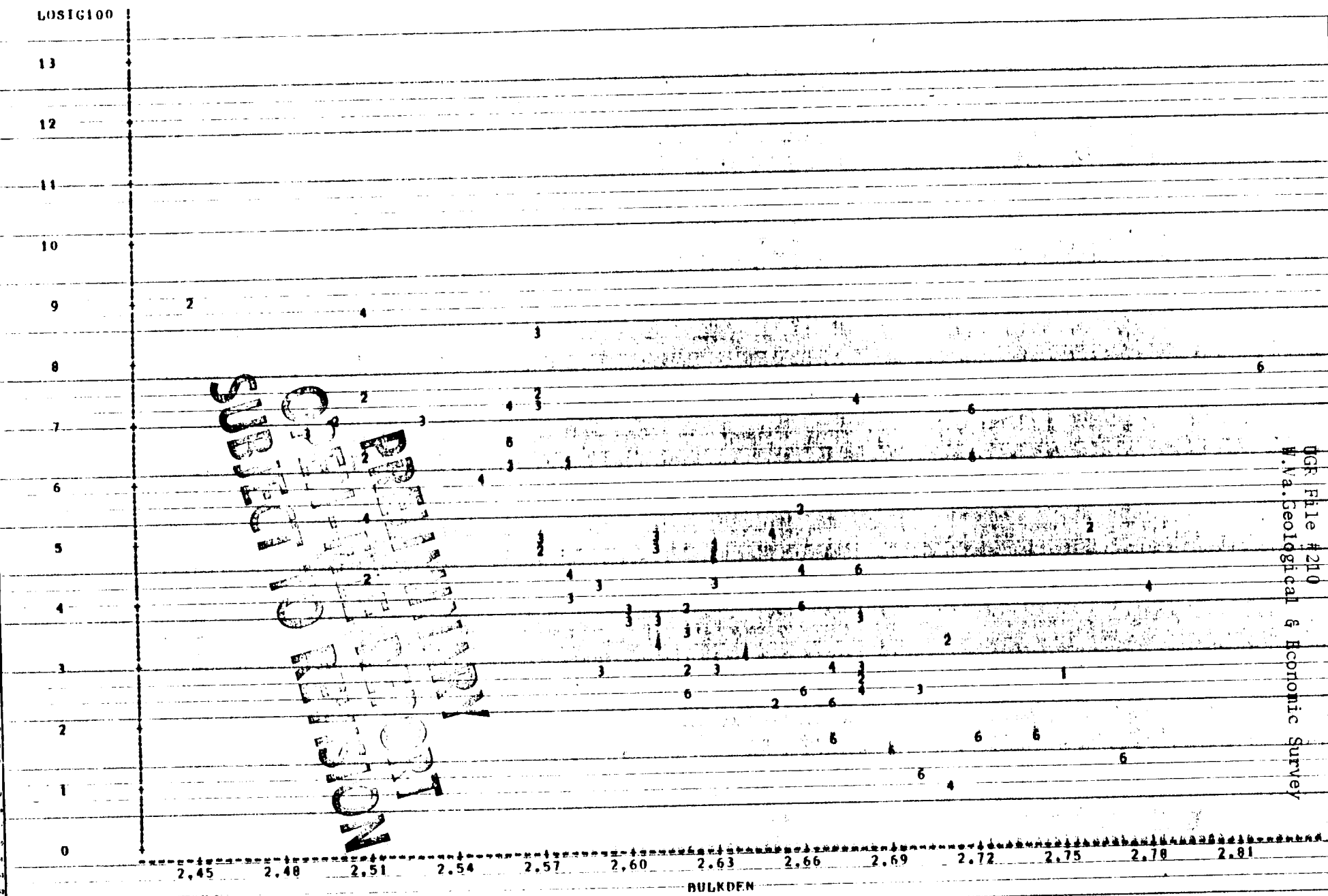
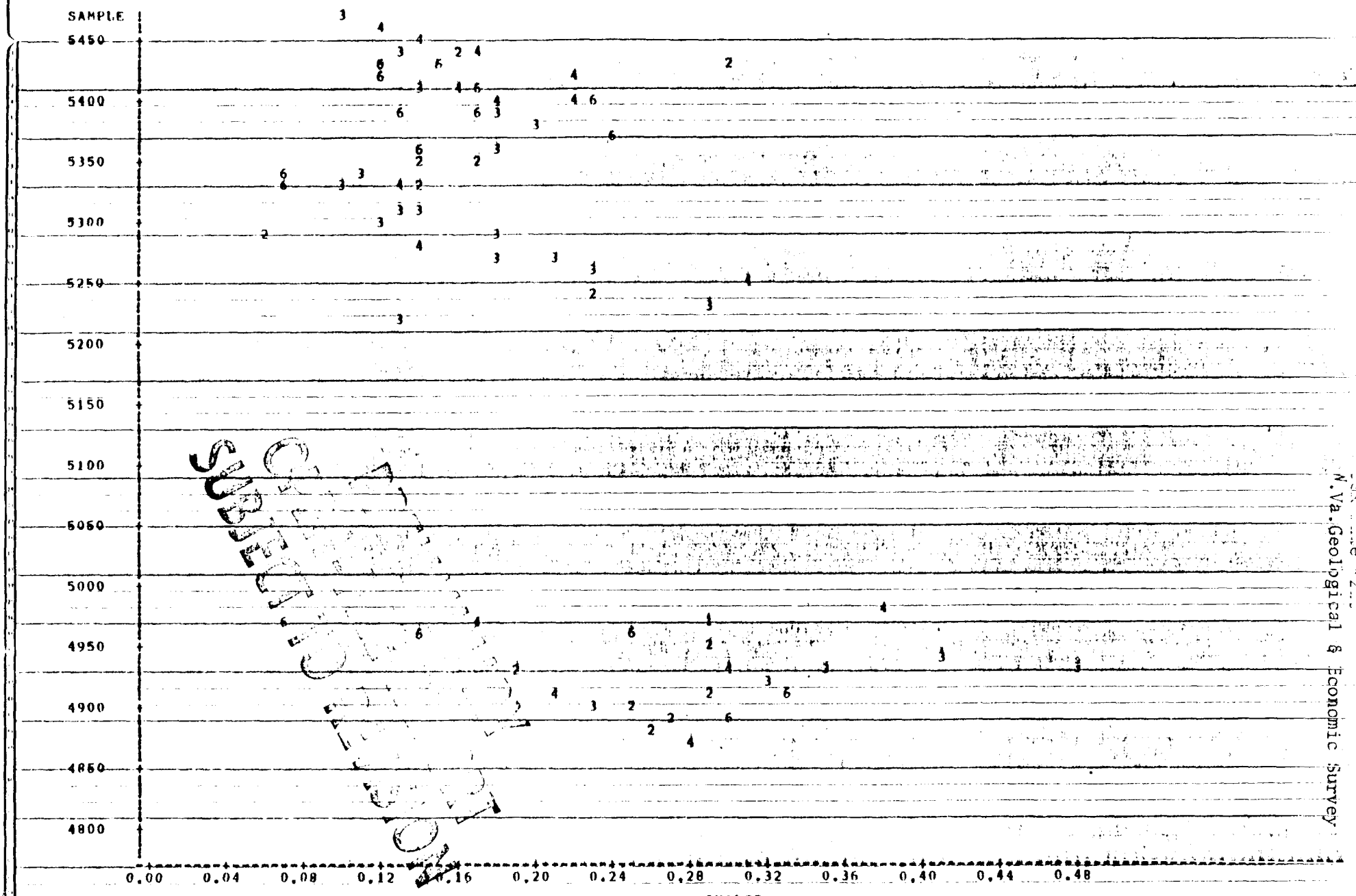


NOTE: 3 OBS HIDDEN

UGR File #210
W.Va. Geological & Economic Survey

PLOT OF SAMPLE*QUARTZ SYMBOL IS VALUE OF LITYPE



NOTE: 3 OBS HIDDEN

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Appendix G. Correlations in Overall Well.

PRELIMINARY
OPEN-FILE REPORT
SUBJECT TO REVISION

VARIABLE	N	MEAN	STD DEV	SUM	MINIMUM	MAXIMUM
SAMPLE	70	5215.90142857	212.84709867	365113.10000000	4874.30000000	5474.00000000
LOSIG100	70	4.32285714	2.03713150	302.60000000	0.80000000	8.90000000
LOSIG500	70	4.18142857	1.44134527	292.70000000	1.60000000	8.00000000
STRAT	70	4.77142857	2.91508534	334.00000000	2.00000000	9.00000000
BULKDEN	70	2.63028571	0.07661255	184.12000000	2.45000000	2.82000000
MATRXDEN	70	2.69914286	0.06362806	188.94000000	2.54000000	2.90000000
LOGDEN	70	2.58214286	0.05931720	180.75000000	2.47000000	2.70000000
POROSITY	70	2.61757143	1.35101297	183.23000000	0	5.64000000
LITYPE	70	3.65714286	1.46342574	256.00000000	1.00000000	6.00000000
GAMMA	70	232.00000000	54.83440156	16240.00000000	140.00000000	380.00000000
QUARTZ	70	0.19942857	0.06607186	13.96000000	0.06000000	0.46000000
EXP	70	0.00808513	0.00334467	0.56595890	0.00183168	0.01666155
ILL	70	0.42641254	0.08824322	29.84887755	0.13848323	0.50094872
COQ	70	0	0	0	0	0
GYP	70	0	0	0	0	0
KAO	70	0.00026160	0.00070782	0.01831231	0	0.00309670
HEM	70	0.03710834	0.01480370	2.59758406	0	0.10331603
ANH	70	0.00642554	0.00568828	0.44978811	0	0.01654619
SSM	70	0.00383284	0.00810038	0.26829848	0	0.03303903
QTZ	70	0.35221461	0.03287514	24.65502292	0.26673377	0.45514725
PYR	70	0.09056551	0.05274338	6.33958601	0	0.27843840
CAL	70	0.00206337	0.00153703	0.14443555	0	0.00777609
DOL	70	0.00362394	0.01325188	0.25367569	0	0.07913535
ORT	70	0.00092649	0.00076443	0.06485446	0	0.00398827
PLA	70	0.02609760	0.01761990	1.82683173	0.00635920	0.09600849
SID	70	0.03317255	0.01751799	2.32207816	0	0.08615497
ANK	70	0.00920994	0.02518768	0.64469607	0	0.14302423
GRDEN	70	2.92692201	0.11370328	204.88454059	2.70981953	3.32363865
G	68	2.88563235	1.70500599	196.22300000	0.07000000	6.73300000

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CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	GAMMA	QUARTZ	EXP	ILL
SAMPLE	1.00000 0.0000 70	-0.11463 0.3447 70	0.49394 0.0001 70	-0.92497 0.0001 70	0.05314 0.6622 70	0.04809 0.6926 70	0.13578 0.2624 70	0.01746 0.8860 70	0.15338 0.2049 70	0.64324 0.0001 70	-0.62575 0.0001 70	0.37414 0.0014 70	0.36352 0.0020 70
LOSIG100	-0.11463 0.3447 70	1.00000 0.0000 70	-0.17177 0.1551 70	0.17856 0.1391 70	-0.55758 0.0001 70	-0.49774 0.0001 70	-0.62852 0.0001 70	0.40315 0.0005 70	-0.21367 0.0757 70	0.30623 0.0099 70	0.13150 0.2779 70	-0.55617 0.0001 70	-0.42444 0.0003 70
LOSIG500	0.49394 0.0001 70	-0.17177 0.1551 70	1.00000 0.0000 70	-0.47944 0.0001 70	0.39982 0.0006 70	0.46127 0.0001 70	0.24406 0.0417 70	-0.03686 0.7619 70	0.13573 0.2626 70	0.31982 0.0070 70	-0.33945 0.0040 70	0.26854 0.0246 70	0.12127 0.3173 70
STRAT	-0.92497 0.0001 70	0.17856 0.1391 70	-0.47944 0.0001 70	1.00000 0.0000 70	-0.06719 0.5805 70	-0.03467 0.7757 70	-0.23432 0.0509 70	0.05355 0.6598 70	-0.04921 0.6858 70	-0.45451 0.0001 70	0.59846 0.0001 70	-0.43588 0.0002 70	-0.40352 0.0005 70
BULKDEN	0.05314 0.6622 70	-0.55758 0.0001 70	0.39982 0.0006 70	-0.06719 0.5805 70	1.00000 0.0000 70	0.84767 0.0001 70	0.51363 0.0001 70	-0.57595 0.0001 70	0.39514 0.0007 70	-0.17332 0.1513 70	-0.09228 0.4474 70	0.39703 0.0007 70	0.13151 0.2778 70
MATRXDEN	0.04809 0.6926 70	-0.49774 0.0001 70	0.46127 0.0001 70	-0.03467 0.7757 70	0.84767 0.0001 70	1.00000 0.0000 70	0.44417 0.0001 70	-0.08302 0.4944 70	0.38902 0.0009 70	-0.16835 0.1636 70	-0.11177 0.3570 70	0.34126 0.0038 70	0.10073 0.4067 70
LOGDEN	0.13578 0.2624 70	-0.62852 0.0001 70	0.24406 0.0417 70	-0.23432 0.0509 70	0.51363 0.0001 70	0.44417 0.0001 70	1.00000 0.0000 70	-0.35843 0.0023 70	0.07203 0.5535 70	-0.45537 0.0001 70	-0.18029 0.1353 70	0.58336 0.0001 70	0.35484 0.0026 70
POROSITY	0.01746 0.8860 70	0.40315 0.0005 70	-0.03686 0.7619 70	0.05355 0.6598 70	-0.57595 0.0001 70	-0.08302 0.4944 70	-0.35843 0.0023 70	1.00000 0.0000 70	-0.11155 0.3579 70	0.16511 0.1720 70	-0.03506 0.7732 70	-0.29341 0.0137 70	-0.12188 0.3149 70
LITYPE	0.15338 0.2049 70	-0.21367 0.0757 70	0.13573 0.2626 70	-0.04921 0.6858 70	0.39514 0.0007 70	0.38902 0.0009 70	0.07203 0.5535 70	-0.11155 0.3579 70	1.00000 0.0000 70	0.18747 0.1202 70	-0.19486 0.1060 70	0.07724 0.5251 70	0.13910 0.2508 70
GAMMA	0.64324 0.0001 70	0.30623 0.0099 70	0.31982 0.0070 70	-0.45451 0.0001 70	-0.17332 0.1513 70	-0.16835 0.1636 70	-0.45537 0.0001 70	0.16511 0.1720 70	0.18747 0.1202 70	1.00000 0.0000 70	-0.29930 0.0118 70	-0.11066 0.3618 70	0.02693 0.8249 70
QUARTZ	-0.62575 0.0001 70	0.13150 0.2779 70	-0.33945 0.0040 70	0.59846 0.0001 70	-0.09228 0.4474 70	-0.11177 0.3570 70	-0.18029 0.1353 70	-0.03506 0.7732 70	-0.19486 0.1060 70	-0.29930 0.0118 70	1.00000 0.0000 70	-0.47650 0.0001 70	-0.60655 0.0001 70
EXP	0.37414 0.0014 70	-0.55617 0.0001 70	0.26854 0.0246 70	-0.43588 0.0002 70	0.39703 0.0007 70	0.34126 0.0038 70	0.58336 0.0001 70	-0.29341 0.0137 70	0.07724 0.5251 70	-0.11066 0.3618 70	-0.47650 0.0001 70	1.00000 0.0000 70	0.52438 0.0001 70
ILL	0.36352 0.0020 70	-0.42444 0.0003 70	0.12127 0.3173 70	-0.40352 0.0005 70	0.13151 0.2778 70	0.10073 0.4067 70	0.35484 0.0026 70	-0.12188 0.3149 70	0.13910 0.2508 70	0.02693 0.8249 70	-0.60655 0.0001 70	0.52438 0.0001 70	1.00000 0.0000 70
COQ	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70
GYP	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70
KAO	-0.41079 0.0004 70	-0.03576 0.7689 70	-0.21011 0.0808 70	0.45680 0.0001 70	0.01425 0.9068 70	-0.00170 0.9889 70	0.23654 0.0487 70	-0.05137 0.6728 70	0.02470 0.8392 70	-0.28414 0.0171 70	0.38206 0.0011 70	-0.28684 0.0161 70	-0.20179 0.0939 70
HEM	-0.06805 0.5756 70	-0.05008 0.6806 70	-0.33147 0.0051 70	0.04885 0.6880 70	-0.15098 0.2122 70	-0.29193 0.0142 70	0.14586 0.2283 70	-0.19220 0.1109 70	-0.07408 0.5422 70	-0.16296 0.1777 70	0.10061 0.4073 70	0.00291 0.9809 70	-0.25109 0.0345 70
ANH	-0.04683 0.7003 70	0.06342 0.6020 70	-0.26327 0.0277 70	0.11371 0.3486 70	-0.23444 0.0508 70	-0.28470 0.0169 70	-0.29480 0.0132 70	0.03306 0.7858 70	0.01916 0.8749 70	0.13828 0.2536 70	-0.05106 0.6746 70	-0.26598 0.0260 70	0.00355 0.9767 70

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CORRELATION COEFFICIENTS / PROB > |R| UNDER H0:RHO=0 / NUMBER OF OBSERVATIONS

	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	GAMMA	QUARTZ	EXP	ILL
BZM	0.22769 0.0580 70	0.36372 0.0020 70	0.15813 0.1911 70	-0.17661 0.1436 70	-0.02720 0.8231 70	-0.02147 0.8600 70	-0.18264 0.1302 70	0.10779 0.1195 70	-0.02383 0.8448 70	-0.36149 0.0021 70	-0.09391 0.4393 70	-0.08710 0.4734 70	-0.22170 0.0651 70
GYP	-0.46356 0.0001 70	0.29013 0.0148 70	-0.32736 0.0057 70	0.48068 0.0001 70	-0.21438 0.0747 70	-0.21748 0.0705 70	-0.31561 0.0078 70	-0.08267 0.4963 70	-0.14683 0.2252 70	-0.14231 0.2399 70	-0.67040 0.0001 70	-0.52442 0.0001 70	-0.92483 0.0001 70
PYR	-0.14654 0.2261 70	-0.48429 0.0001 70	-0.12619 0.2979 70	-0.17671 0.1434 70	-0.06752 0.5786 70	-0.26389 0.0273 70	-0.33309 0.0048 70	-0.33926 0.0041 70	-0.05396 0.6573 70	-0.08565 0.4808 70	-0.26552 0.0263 70	-0.46678 0.0001 70	-0.60257 0.0001 70
CAL	-0.20807 0.0839 70	-0.24487 0.0410 70	-0.22389 0.0624 70	0.20960 0.0816 70	-0.34488 0.0035 70	-0.29456 0.0133 70	-0.15977 0.1865 70	-0.17255 0.1532 70	-0.21921 0.0736 70	-0.12289 0.3108 70	-0.32787 0.0056 70	-0.26338 0.0276 70	-0.38496 0.0010 70
DOL	0.12343 0.3087 70	0.25928 0.0302 70	0.10954 0.3667 70	-0.08307 0.4942 70	-0.20503 0.0886 70	-0.24980 0.0370 70	-0.28491 0.0168 70	0.02532 0.8352 70	-0.02168 0.8586 70	0.32948 0.0053 70	-0.01009 0.9339 70	-0.14333 0.2365 70	-0.17704 0.1426 70
ORT	0.01082 0.9292 70	0.11366 0.3488 70	-0.09708 0.4240 70	0.02566 0.8330 70	-0.16588 0.1699 70	-0.11708 0.3344 70	-0.05707 0.6389 70	0.13705 0.2551 70	-0.10110 0.4050 70	-0.04313 0.7230 70	-0.15020 0.2146 70	-0.00395 0.9787 70	-0.34527 0.0034 70
PLA	-0.47930 0.0001 70	-0.14063 0.2195 70	-0.53942 0.0001 70	-0.48529 0.0001 70	-0.31944 0.0070 70	-0.37215 0.0015 70	-0.27701 0.0203 70	-0.02279 0.8515 70	-0.15193 0.2093 70	-0.17477 0.1479 70	-0.69029 0.0001 70	-0.45081 0.0001 70	-0.59919 0.0001 70
GID	0.06423 0.5973 70	-0.17099 0.1570 70	-0.03325 0.7847 70	-0.10057 0.4074 70	-0.04111 0.7355 70	-0.14225 0.2401 70	-0.23325 0.0520 70	-0.10020 0.1186 70	-0.07903 0.5112 70	-0.07458 0.5395 70	0.04504 0.7112 70	-0.24960 0.0372 70	-0.10009 0.4060 70
ANK	-0.18515 0.1249 70	-0.07388 0.5433 70	-0.22451 0.0617 70	-0.22491 0.0612 70	-0.16113 0.1827 70	-0.07430 0.5410 70	-0.01534 0.8997 70	-0.21944 0.0680 70	-0.20610 0.0869 70	-0.11124 0.3593 70	-0.19599 0.1039 70	-0.02008 0.8690 70	-0.26210 0.0284 70
GRDEN	-0.13259 0.2739 70	-0.49240 0.0001 70	-0.16461 0.1733 70	-0.16216 0.1799 70	-0.07105 0.5589 70	-0.26102 0.0286 70	-0.32093 0.0067 70	-0.32734 0.0057 70	-0.04141 0.7336 70	-0.09538 0.4322 70	-0.27690 0.0203 70	-0.45009 0.0001 70	-0.05427 0.0001 70
S	0.07092 0.5655 68	-0.42901 0.0003 68	-0.38942 0.0010 68	-0.04058 0.7425 68	-0.10136 0.1389 68	-0.42080 0.0004 68	-0.17103 0.1612 68	-0.33443 0.0017 68	-0.10921 0.3790 68	-0.17501 0.1515 68	-0.00191 0.9877 68	-0.21040 0.0849 68	-0.25514 0.0357 68
	COQ	GYP	KAO	HEM	ANH	BZM	GYP	PYR	CAL	DOL	ORT	PLA	GID
SAMPLE	0.00000 1.0000 70	0.00000 1.0000 70	-0.41079 0.0004 70	-0.06805 0.5756 70	-0.04683 0.7003 70	0.22769 0.0580 70	-0.46356 0.0001 70	-0.14654 0.2261 70	-0.20807 0.0839 70	0.12343 0.3087 70	0.01082 0.9292 70	-0.47930 0.0001 70	0.06423 0.5973 70
LOSIG100	0.00000 1.0000 70	0.00000 1.0000 70	-0.03576 0.7689 70	-0.05008 0.6806 70	0.06342 0.6020 70	0.36372 0.0020 70	0.29013 0.0148 70	0.48429 0.0001 70	0.24487 0.0410 70	0.25928 0.0302 70	0.11366 0.3488 70	-0.14063 0.2195 70	-0.17099 0.1570 70
LOSIG500	0.00000 1.0000 70	0.00000 1.0000 70	-0.21011 0.0800 70	-0.33147 0.0051 70	-0.26327 0.0277 70	0.15813 0.1911 70	-0.32736 0.0057 70	0.12619 0.2979 70	-0.22389 0.0624 70	0.10954 0.3667 70	-0.09708 0.4240 70	-0.53942 0.0001 70	0.03325 0.7847 70
STRAT	0.00000 1.0000 70	0.00000 1.0000 70	0.45680 0.0001 70	0.04885 0.6880 70	0.11371 0.3486 70	-0.17661 0.1436 70	0.48068 0.0001 70	0.17671 0.1434 70	0.20960 0.0816 70	-0.08307 0.4942 70	0.02566 0.8330 70	0.48529 0.0001 70	-0.10057 0.4074 70
BULKDEN	0.00000 1.0000 70	0.00000 1.0000 70	0.01425 0.9060 70	-0.15098 0.2122 70	-0.23444 0.0508 70	-0.02720 0.8231 70	-0.21438 0.0747 70	0.06752 0.5786 70	-0.34488 0.0035 70	-0.20503 0.0886 70	-0.16588 0.1699 70	-0.31944 0.0070 70	-0.04111 0.7355 70
MATRXDEN	0.00000 1.0000 70	0.00000 1.0000 70	-0.00170 0.9889 70	-0.29193 0.0142 70	-0.28470 0.0169 70	0.02147 0.8600 70	-0.21748 0.0705 70	0.26389 0.0273 70	-0.29456 0.0133 70	-0.24980 0.0370 70	-0.11708 0.3344 70	-0.37215 0.0015 70	-0.14225 0.2401 70
LOGDEN	0.00000 1.0000 70	0.00000 1.0000 70	0.23654 0.0487 70	0.14586 0.2283 70	-0.29480 0.0132 70	-0.18264 0.1302 70	-0.31561 0.0078 70	-0.33309 0.0048 70	-0.15977 0.1865 70	-0.28491 0.0168 70	-0.05707 0.6389 70	-0.27701 0.0203 70	0.23325 0.0520 70

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CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA	SID
POROSITY	0.00000 1.0000 70	0.00000 1.0000 70	-0.05137 0.6728 70	-0.19220 0.1109 70	0.03306 0.7859 70	0.18779 0.1195 70	0.08267 0.4963 70	0.33926 0.0041 70	0.17255 0.1532 70	0.02532 0.8352 70	0.13785 0.2551 70	0.02279 0.8515 70	0.18828 0.1186 70
LITYPE	0.00000 1.0000 70	0.00000 1.0000 70	-0.02470 0.8392 70	-0.07408 0.5422 70	0.01916 0.8749 70	-0.02363 0.8448 70	-0.14603 0.2252 70	0.05398 0.6573 70	-0.21521 0.0736 70	-0.02160 0.8586 70	-0.10116 0.4050 70	-0.15193 0.2093 70	0.07963 0.5112 70
GAMMA	0.00000 1.0000 70	0.00000 1.0000 70	-0.28414 0.0171 70	-0.16296 0.1777 70	0.13828 0.2536 70	0.36149 0.0021 70	-0.14331 0.2369 70	0.09765 0.4808 70	-0.13789 0.3108 70	0.32248 0.0053 70	0.04313 0.7230 70	0.17477 0.1479 70	0.07450 0.5395 70
QUARTZ	0.00000 1.0000 70	0.00000 1.0000 70	-0.38206 0.0011 70	-0.10081 0.4073 70	-0.05100 0.6746 70	-0.09391 0.4393 70	-0.67040 0.0001 70	-0.26552 0.0263 70	-0.32181 0.0056 70	-0.01005 0.9339 70	-0.15020 0.2146 70	-0.69829 0.0001 70	-0.04504 0.7112 70
EXP	0.00000 1.0000 70	0.00000 1.0000 70	-0.28684 0.0161 70	0.00291 0.9809 70	-0.26598 0.0260 70	-0.08710 0.4734 70	-0.52442 0.0001 70	-0.46670 0.0001 70	-0.26338 0.0276 70	-0.14333 0.2365 70	-0.00325 0.9787 70	-0.45001 0.0001 70	-0.24960 0.0372 70
TOC	0.00000 1.0000 70	0.00000 1.0000 70	-0.20179 0.0939 70	-0.25309 0.0345 70	0.00355 0.9767 70	-0.22170 0.0651 70	-0.92463 0.0001 70	-0.80257 0.0001 70	-0.38476 0.0010 70	-0.17704 0.1476 70	-0.34541 0.0034 70	-0.59519 0.0001 70	-0.10089 0.4060 70
COQ	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70
GYP	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 70
KAO	0.00000 1.0000 70	0.00000 1.0000 70	1.00000 0.0000 70	0.26422 0.0271 70	-0.10138 0.3169 70	-0.10322 0.3067 70	0.02889 0.8133 70	0.05105 0.6837 70	0.05284 0.6640 70	-0.10249 0.3985 70	0.13684 0.2584 70	-0.12032 0.3200 70	0.02541 0.4320 70
HEM	0.00000 1.0000 70	0.00000 1.0000 70	0.26422 0.0271 70	1.00000 0.0000 70	-0.04141 0.7336 70	-0.15800 0.1914 70	0.40300 0.0005 70	0.15222 0.2084 70	0.31161 0.0086 70	-0.14629 0.2269 70	0.34534 0.0034 70	0.36323 0.0020 70	0.13898 0.2512 70
ANH	0.00000 1.0000 70	0.00000 1.0000 70	-0.10138 0.3169 70	-0.04141 0.7336 70	1.00000 0.0000 70	0.10941 0.3673 70	0.05888 0.6685 70	-0.13947 0.2495 70	-0.17350 0.1509 70	0.08393 0.4897 70	0.09798 0.4240 70	0.04860 0.6895 70	0.00396 0.9740 70
SZM	0.00000 1.0000 70	0.00000 1.0000 70	-0.10322 0.3067 70	-0.15800 0.1914 70	0.10941 0.3673 70	1.00000 0.0000 70	-0.10138 0.4039 70	-0.25416 0.0337 70	-0.25422 0.0337 70	-0.91536 0.0734 70	-0.00300 0.9798 70	-0.12073 0.2882 70	-0.05025 0.6320 70
QTZ	0.00000 1.0000 70	0.00000 1.0000 70	0.02889 0.8133 70	0.40300 0.0005 70	0.05888 0.6685 70	-0.10138 0.4039 70	1.00000 0.0000 70	0.38640 0.0010 70	0.45703 0.0001 70	-0.11183 0.3567 70	0.32179 0.0066 70	0.16666 0.0001 70	-0.15231 0.2081 70
PYR	0.00000 1.0000 70	0.00000 1.0000 70	0.05795 0.6331 70	-0.15222 0.2084 70	-0.13947 0.2495 70	-0.25416 0.0337 70	-0.38640 0.0010 70	1.00000 0.0000 70	0.10447 0.3894 70	-0.05161 0.6714 70	-0.15791 0.1917 70	-0.03533 0.7715 70	-0.43306 0.0002 70
CAL	0.00000 1.0000 70	0.00000 1.0000 70	-0.05284 0.6640 70	-0.31167 0.0086 70	-0.17350 0.1509 70	-0.25422 0.0337 70	-0.45703 0.0001 70	0.10447 0.3894 70	1.00000 0.0000 70	0.09876 0.4160 70	-0.46018 0.0001 70	-0.48064 0.0001 70	-0.02003 0.8693 70
DOL	0.00000 1.0000 70	0.00000 1.0000 70	-0.10249 0.3985 70	-0.14629 0.2269 70	-0.08393 0.4897 70	-0.91536 0.0734 70	-0.11183 0.3567 70	-0.05161 0.6714 70	-0.09876 0.4160 70	1.00000 0.0000 70	-0.02599 0.8309 70	-0.03504 0.7683 70	-0.03050 0.7996 70
ORT	0.00000 1.0000 70	0.00000 1.0000 70	-0.13684 0.2584 70	-0.34534 0.0034 70	-0.09798 0.4240 70	-0.00300 0.9798 70	-0.32179 0.0066 70	-0.15791 0.1917 70	-0.46018 0.0001 70	-0.02599 0.8309 70	1.00000 0.0000 70	-0.26433 0.0270 70	-0.12173 0.3154 70
PLA	0.00000 1.0000 70	0.00000 1.0000 70	-0.12032 0.3200 70	-0.36323 0.0020 70	-0.04860 0.6895 70	-0.12073 0.2882 70	-0.16666 0.0001 70	-0.03533 0.7715 70	-0.48064 0.0001 70	-0.03504 0.7683 70	-0.26433 0.0270 70	1.00000 0.0000 70	-0.11053 0.3284 70

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CORRELATION COEFFICIENTS / PROB > |R| UNDER HO:RHO=0 / NUMBER OF OBSERVATIONS

	COQ	GYP	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA	SID
SID	0.00000 1.0000 70	0.00000 1.0000 70	0.09541 0.4320 70	-0.13098 0.2512 70	-0.00396 0.9740 70	-0.05025 0.6320 70	0.15231 0.2081 70	-0.43386 0.0002 70	0.02002 0.8693 70	-0.03090 0.7996 70	0.12173 0.3154 70	0.11053 0.3284 70	1.00000 0.0000 70
ANK	0.00000 1.0000 70	0.00000 1.0000 70	-0.07694 0.5267 70	-0.15880 0.1892 70	-0.04855 0.6898 70	-0.09668 0.4259 70	0.16754 0.1657 70	-0.14992 0.2154 70	0.02587 0.8316 70	-0.10140 0.4036 70	-0.06019 0.5749 70	0.09233 0.4471 70	0.19839 0.0997 70
GRDEN	0.00000 1.0000 70	0.00000 1.0000 70	0.06003 0.6216 70	-0.17159 0.1555 70	-0.13599 0.2617 70	0.28434 0.0171 70	0.42194 0.0003 70	0.98626 0.0001 70	0.09492 0.4344 70	-0.06985 0.5656 70	0.17433 0.1489 70	0.03248 0.7895 70	-0.28701 0.0160 70
G	0.00000 1.0000 68	0.00000 1.0000 68	-0.12705 0.3019 68	-0.44032 0.0002 68	-0.22402 0.0663 68	-0.33725 0.0049 68	-0.02916 0.8134 68	-0.63937 0.0001 68	-0.07842 0.5250 68	0.11404 0.3511 68	-0.00560 0.9633 68	-0.28741 0.0175 68	-0.49354 0.0001 68

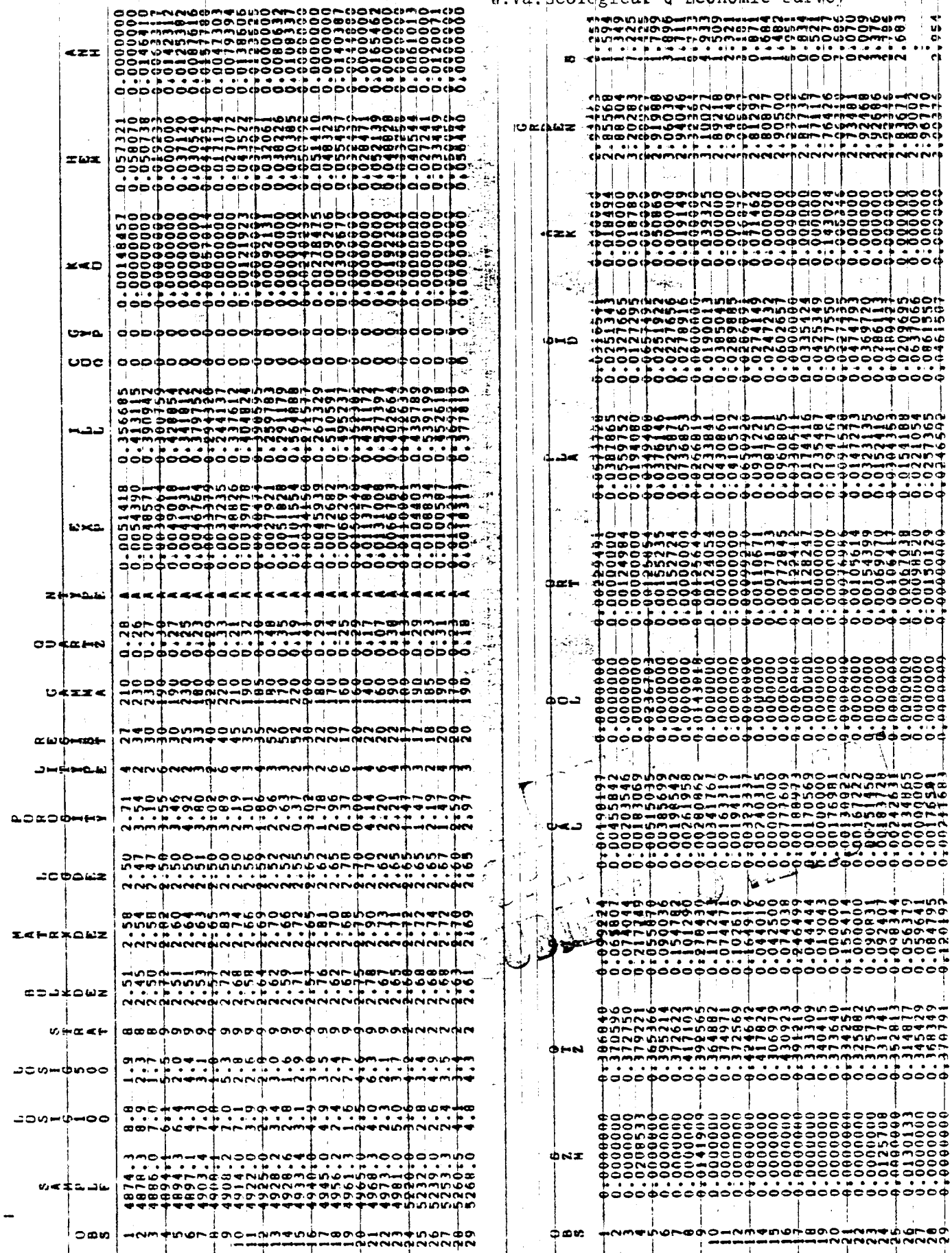
	ANK	GRDEN	G
SAMPLE	-0.18515 0.1249 70	-0.13259 0.2739 70	0.07092 0.5655 68
LOSIG100	-0.07388 0.5433 70	0.49240 0.0001 70	0.42901 0.0003 68
LOSIG500	0.22451 0.0617 70	0.16461 0.1733 70	0.38942 0.0010 68
STRAT	0.22491 0.0613 70	0.16216 0.1799 70	-0.04058 0.7425 68
BULKDEN	0.16113 0.1827 70	0.07105 0.5889 70	0.18136 0.1389 68
MATRXDEN	0.07430 0.5410 70	0.26182 0.0286 70	0.42080 0.0004 68
LOGDEN	0.01534 0.8997 70	-0.32097 0.0067 70	-0.17103 0.1612 68
POROSITY	-0.21944 0.0680 70	0.32734 0.0057 70	0.37447 0.0017 68
LITYPE	-0.20610 0.0869 70	0.04141 0.7336 70	0.10821 0.3790 68
GAMMA	-0.11124 0.3693 70	0.09538 0.4322 70	0.17581 0.1515 68
QUARTZ	0.19599 0.1039 70	0.27690 0.0203 70	-0.00191 0.9877 68
EXP	0.02008 0.8690 70	-0.45009 0.0001 70	-0.21048 0.0849 68
ILL	-0.26210 0.0284 70	-0.65427 0.0001 70	-0.25514 0.0357 68
COQ	0.00000 1.0000 70	0.00000 1.0000 70	0.00000 1.0000 68

Contact
Supervisor
Before Removal

File FZT
W.Va. Geological & Economic Survey

Appendix H. Raw Data

PRELIMINARY
CHECK PRINT
SUBJECT TO REVISION


OBS
SAMPLE
LOS-LOO
LOS-LOO
LOS-LOO
MAGNESIUM
MANGANESE
IRON
STRONTIUM
POTASSIUM
SODIUM
LITHIUM
RUBIDIUM
CESIUM
BARIUM
CADMIUM
ZINC
LEAD
COPPER
NICKEL
CHROMIUM
VANADIUM
MOLYBDENUM
GREEN
B
OBS

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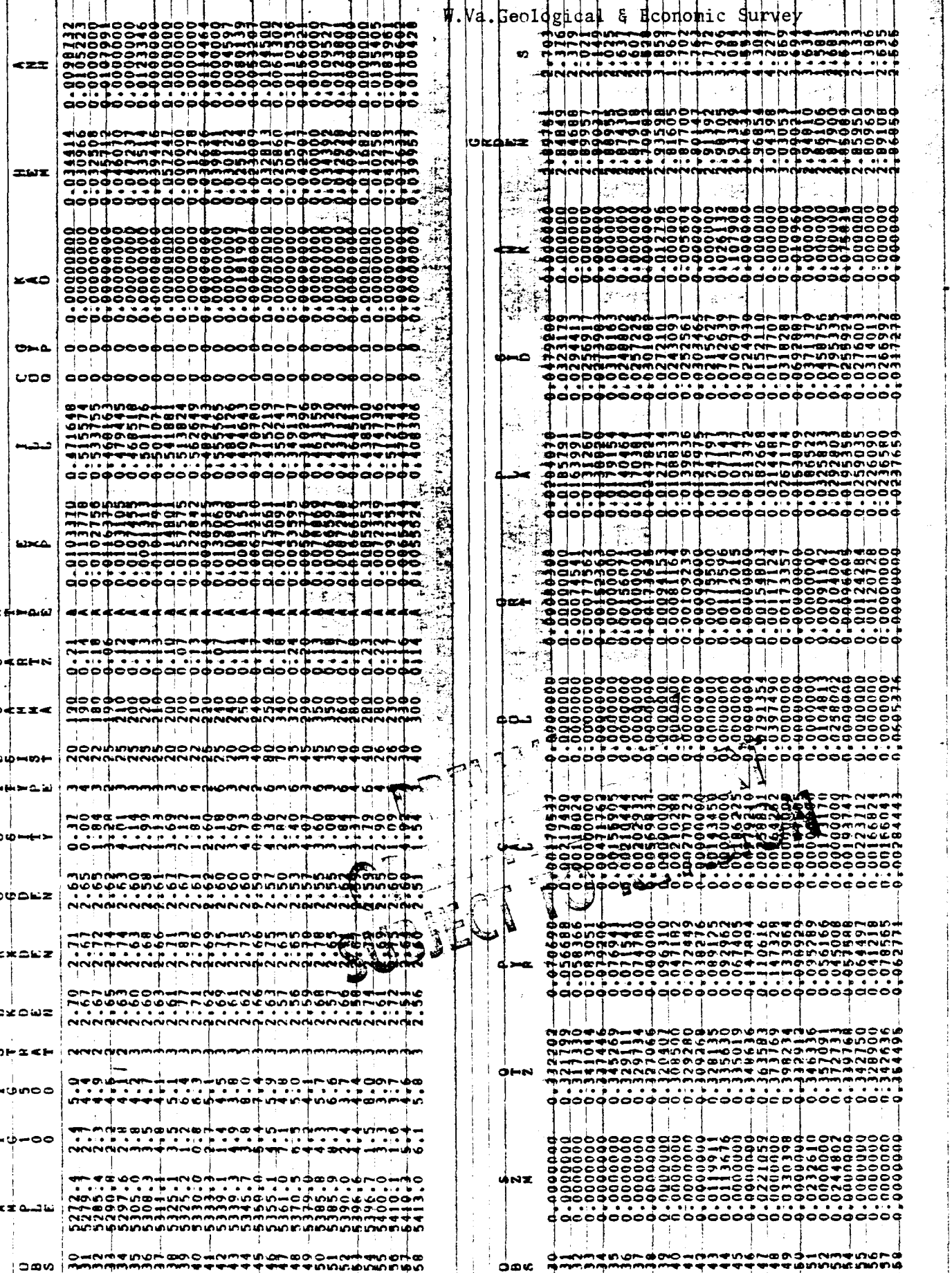
STATISTICAL ANALYSIS SYSTEM 10:36 FRIDAY, JUNE 15, 1979 2



OBS	SAMPLE	LOSIG100	LOSIG500	STRAT	BULKDEN	MATRXDEN	LOGDEN	POROSITY	LITYPE	RESIST	GAMMA	QUARTZ	NTYPE	EXP	ILL	COO	GYP
59	5418.0	4.4	4.7	3	2.66	2.68	2.60	0.75	4	35	260	0.22	A	0.0112605	0.138483	0	0
60	5424.0	0.9	4.9	3	2.70	2.73	2.55	1.10	6	42	380	0.12	A	0.0091220	0.518443	0	0
61	5428.0	2.3	4.6	3	2.67	2.75	2.55	2.91	2	42	300	0.30	A	0.0113014	0.467899	0	0
62	5429.0	3.7	3.2	3	2.66	2.72	2.55	2.21	6	42	300	0.15	A	0.0092029	0.487175	0	0
63	5432.0	7.3	5.3	3	2.51	2.66	2.55	5.64	2	50	330	0.15	A	0.0067312	0.471134	0	0
64	5432.1	7.5	5.1	3	2.82	2.72	2.55	0.00	6	50	330	0.12	A	0.0054162	0.398390	0	0
65	5435.0	7.3	2.9	3	2.57	2.66	2.55	3.38	2	54	280	0.16	A	0.0065760	0.420784	0	0
66	5439.0	6.2	4.2	3	2.58	2.64	2.55	2.27	3	52	300	0.13	A	0.0067102	0.399578	0	0
67	5444.0	6.0	3.7	3	2.55	2.64	2.58	3.41	4	45	280	0.17	A	0.0115450	0.580949	0	0
68	5452.2	7.2	2.8	3	2.56	2.70	2.55	5.47	4	30	260	0.14	A	0.0075215	0.410429	0	0
69	5456.2	3.8	4.5	3	2.66	2.74	2.56	2.92	4	0	290	0.12	A	0.0064592	0.519195	0	0
70	5474.0	6.8	2.4	3	2.49	2.62	2.50	4.96	3	40	260	0.10	A	0.0050476	0.432323	0	0

OBS	KAO	HEM	ANH	SZM	QTZ	PYR	CAL	DOL	ORT	PLA	SID	ANK	GRDEN	S
59	0	0.103316	0.0000000	0.0000000	0.455147	0.169772	0.00676581	0	0.00398827	0.0519899	0.0592770	0.0000000	3.12085	2.019
60	0	0.042246	0.0134027	0.0000000	0.325927	0.036027	0.00000000	0	0.00113407	0.0207741	0.0329237	0.0000000	2.80099	1.406
61	0	0.037193	0.0000000	0.0000000	0.338359	0.086746	0.00290390	0	0.00136461	0.0206330	0.0336006	0.0000000	2.91496	2.784
62	0	0.034815	0.0080018	0.0000000	0.332781	0.066279	0.00250360	0	0.00000000	0.0319551	0.0272063	0.0000000	2.86235	2.303
63	0	0.011242	0.0000000	0.0000000	0.303067	0.196181	0.00185521	0	0.00127686	0.0063593	0.0000000	0.0021531	3.13405	8.047
64	0	0.034070	0.0093886	0.0197329	0.352725	0.132058	0.00000000	0	0.00056219	0.0197329	0.0225837	0.0053408	3.01510	4.175
65	0	0.033661	0.0076100	0.0244181	0.353865	0.085973	0.00276606	0	0.00000000	0.0276606	0.0286863	0.0000000	2.91550	3.341
66	0	0.039097	0.0119922	0.0296565	0.352249	0.095046	0.00207139	0	0.00206565	0.0239271	0.0311752	0.0146317	2.94286	3.052
67	0	0.028920	0.0055464	0.0000000	0.266734	0.063972	0.00218444	0	0.00166170	0.0201893	0.0187928	0.0000000	2.85054	2.946
68	0	0.028754	0.0088445	0.0166170	0.338765	0.149102	0.00178230	0	0.00129541	0.0167510	0.0201387	0.0000000	3.05085	5.250
69	0	0.028621	0.0000000	0.0000000	0.372607	0.083621	0.00000000	0	0.00000000	0.0168276	0.0226695	0.0000000	2.89770	3.144
70	0	0.046216	0.0135802	0.0000000	0.360195	0.080180	0.00309010	0	0.00187032	0.0191911	0.0383067	0.0000000	2.90777	1.022

UGR File #210
W.Va.Geological & Economic Survey

Summary of Contractural Fulfillment

Parameter	Contractural Requirement	Fulfilled
Thin section mineralogy	yes	yes
Texture-fabric from thin sections	yes	yes
X-ray diffraction mineralogy	yes	yes
Texture-fabric from X-radiography	no	yes
Study by scanning electron microscopy	yes	yes
Organic matter from LOI	no	yes
Bulk Density	yes	yes
Matrix Density	no	yes
Porosity	no	yes
Material-balance density	no	yes
Correlation analysis whole well	yes	yes
Correlation analysis by lithotype	no	yes
Correlation analysis by stratigraphy	no	yes
Interpretation of correlation matrices	no	yes
Strip log presentations	yes (selected)	yes (all)
Relate log data to analytical data	yes	yes

Contributors

by Alphabetical Order

J.L. Clagett - Radiography, staining of thin-sections.

J.E. Florence - Initial sample preparation, thin-slabbing of shales for X-radiography, preparation of archive material.

M.E. Hohn - Computer generation of strip log profiles, linear correlation tables, data cross plots, multivariate analysis.

J.F. Kposowa - Sample preparation and diffractometer operator.

E.B. Nuhfer --Design of investigation, development of methodology, fabric classification by lithotypes, interpretation of correlation matrices, organization of report.

P.W. Queen - drafting.

J.J. Renton - X-ray diffraction study

J.Schwietering - Stratigraphic subdivision.

R.A. Smosna - Administration

R.J. Vinopal - Loss on ignition determinations, density-porosity measurements, fabric classification by lithotypes, sample selection, thin-section microscopy, interpretation of correlation matrices, organization of report, conclusions and recommendations.