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## PREVIOUS INVESTIGATIONS

The earliest systematic geologic investigations in the western Arctic were those of the U.S. Geological Survey (USGS) in 1901 and 1904. More detailed exploration was undertaken by the USGS after the establishment of Naval Petroleum Reserve No. 4 in 1923. Post-World War II work by the USGS for the Navy (1947-1953) resulted in the publication of USGS Professional Paper 303-C, by R.M. Chapman and E.G. Sable, which remains the primary reference for Cretaceous stratigraphy and structural character of the northern foothills of the western Arctic. Chapman and Sable sampled a number of coal beds along the Kukpowruk, Kokolik and Utukok Rivers, which provided an indication of the quality of coals in the inland parts of the region.

Toenges and Jolley (1947) of the U.S. Bureau of Mines (USBM) made a reconnaissance survey of coals along the Kukpowruk River in 1946, including a 20 foot bed on the south limb of the Howard Syncline. This coal was sampled extensively in 1954 by J.S. Robbins for the Morgan Coal Co., and later in 1962 and 1963 by the Union Carbide Co. In 1962 and 1963 the USBM sampled the 20 foot bed by trenching and from the adit originally driven by Robbins, and conducted coking tests on these samples. In 1966, they cored the bed on the Kukpowruk at various depths, and also cored one bed at Cape Beaufort, and again conducted extensive carbonization tests on these samples. In 1966, the USGS began investigations specifically oriented towards assessment of coal resources and quality in the area, beginning with the Howard Syncline. Between 1969 and 1972, field investigations in the Cape Beaufort, Pitmegea River and Corwin Bluff area were conducted. In 1972, the USGS and USBM drilled and cored a number of beds in the north half of the basin at Cape Beaufort. In 1973, surface work and shallow auger drilling were done in the western extension of the Deadfall Syncline. In 1982, a program funded by the State of Alaska for the assessment of coals for local use in northwest Alaska was initiated, and the Deadfall Syncline (Figure 1) selected as the most promising site for the western Arctic Slope. Field reconnaissance work was conducted during the 1982 season, followed by drilling and coring in 1983.

In 1984, additional exploratory drilling and some geophysical investigations were undertaken by Howard Grey and Associates for the Western Arctic Coal Development Project. A total of 47 drill holes and auger borings were completed in the northeastern part of the Deadfall Syncline.

## PRESENT INVESTIGATION

The purpose of the 1991 drilling program was twofold:

1. To evaluate the coal reserves in a previously identified thick coal in an area of low structural dips and dip-slope topography near the axial plunge of the west extension of the Deadfall Syncline, primarily for surface mining, and to determine the feasibility of mining additional beds in conjunction with the thick coal. (For the purposes of this investigation, this coal is designated K3 as explained below).
2. To examine a continuous and unbroken stratigraphic interval of the Corwin formation in the northeastern part of the Deadfall Syncline as an initial step toward evaluation of the whole basin. This was accomplished by drilling overlapping holes aligned generally parallel to the dip direction, and spaced in accordance with the magnitude of dip and depth capacity of the drill. About 720 feet of stratigraphic section were covered in this way.

A total of fourteen exploratory holes were drilled, ranging from 116 to 426 feet in depth (Figure 2). The drill was a Mobil B-60 mounted on a Nodwell tracked vehicle. Circulation was provided by a large compressor mounted on another Nodwell. Most of the footage was drilled with an air hammer, which provided a significant improvement in drilling rates over conventional rotary drilling. Lithology of cuttings from all holes was logged continuously, and composite grab samples from each 5 or 10 foot interval were taken. Coal cuttings were collected on a (relatively) clean plastic sheet, and promptly double bagged in plastic to minimize loss of bed moisture. Cores were taken from the K3 coal at 3 drill hole locations, and the underlying K4 coal was also cored at one of these 3 holes. A comparison of core length to geophysical logs indicates essentially 100% recovery for all cores. All samples, including rock cuttings, were shipped to the Mineral Industry Research Laboratory (MIRL), University of Alaska Fairbanks, for analyses and/or storage.

All holes were logged with a Gearhart-Owen GeoLogger using natural gamma and gamma-gamma density tools. The log response with these tools for coals is distinct and unambiguous, particularly that of the density log, and the resolution is sufficient to estimate bed thickness to within 3 to 4 inches (Figures 8 and 9).

## GEOLOGIC SETTING

Identified coal resources on the North Slope of Alaska occur primarily in the Corwin formation of the Nanushuk Group of Middle to Late Cretaceous age. The Corwin is a non-marine, predominantly fine grained clastic sequence which probably represents deposition of materials from the rising Brooks Range by relatively low-gradient streams flowing across a broad, slowly subsiding coastal lowland marginal to the Colville geosyncline. Coals are present throughout the Corwin formation, but are thin and discontinuous in its lower two to three thousand feet in the western Arctic. The Corwin formation is about 11,000 feet thick at Corwin Bluff and thins to a

zero edge southwest of Barrow. In the northern foothills of the Brooks Range, the Nanushuk group rocks have been subject to extensive structural deformation, uplift and erosion subsequent to deposition. As a result, the occurrence of the Corwin formation is generally limited to the core areas of numerous broad, relatively simple, east-west trending synclines or structural basins separated by complexly faulted anticlines. In the western Arctic, west of the NPRA, the significant coal bearing sections of the Corwin formation are present in the western extension of the Deadfall Syncline, the Howard Syncline, and the "Liz-A" Syncline at Cape Beaufort. Of these, the Deadfall Syncline coals appear to offer the best near term potential for development because of the occurrence of thick coals in areas of low structural dips and with reasonable proximity to tidewater.

### COAL BEDS

In an effort to avoid confusion, it is proposed that the temporary field designations (K1-K5, "K" for Kuchiak) given to the coal beds east of Kuchiak Creek, be retained pending further exploration and a better understanding of the relationships between these coals and the DFS-1-4 coals to the west. While it does appear that the thick coal K3 splits and thins to the west to become DFS-1, the relationship of coals K4 and K5 to the lower "DFS" beds is still unclear.

A total of eight coal beds were identified within the 720 feet of stratigraphic section covered by the 1991 drilling program (Figures 2-7). Of these, five beds are more than four feet thick wherever they were intercepted by a drill hole, (including 1983 and 1984 drill holes). However, two of the beds, the uppermost (unnamed) and lowermost (K5) were intercepted by only one hole each, so that there is no information available about their continuity or thickness trends. For the remaining three coals, K1, K3 and K4, there is sufficient drillhole information to calculate a measured reserve base, and surface mineable tonnages at various stripping ratios. A bony appearing coal about 4.5 feet thick, which was intercepted by DH91-2 was initially designated "K2", but it appears to be shaling out to the east in DH91-11 and cannot be identified in DH91-3. A thin but well defined coal appears at a different position in this interval further east.

Coal K1 ranges in thickness from about 4.4 feet in DH91-4 to about 6.8 feet in DH91-11 (Figure 12). The geophysical logs indicate a possible parting or high ash interval in the lower half of the bed in all of the logged holes (Figures 8 and 9). Analyses of cutting samples from this bed indicate ash contents ranging from about 15% to over 26%. The weighted average ash content for K1 from the core of DH84-106 was 17.54%.

Coal K3 is about 210 to 230 feet stratigraphically below coal K1 (Figures 4-7). It thickens from about 10.5 feet in DH91-2 to 18.3 feet in DH83-10 (Figure 15). West of Kuchiak Creek, the coal splits into an upper 6 foot seam and lower 3.5 foot seam. The geophysical logs indicate a



parting or high ash zone 3 to 5 feet below the top of the bed in all of the logged holes (Figures 8 and 9). Analyses of core samples from DH91-5 and DH91-7 show ash contents of 14.7% and 14.3% respectively for the interval from 2 to 6 feet below the top of the bed in both cores. The weighted average ash content for the remaining intervals of the K3 bed in both cores is less than 4%.

Coal K4 occurs from 40 to 65 feet stratigraphically below coal K3 (Figures 4-7). It ranges in thickness from 4 feet in DH91-2 to about 6 feet in DH91-4, DH91-6 and DH91-7 (Figure 12). The geophysical logs do not indicate significant partings (Figures 8 and 9), but do suggest a shaly or bony bottom, which appears to be the case in the core from DH91-7.

## COAL RESERVES

### Procedure

The USGS-Bureau of Mines definition of measured reserves was used as a guideline to establish the limits of the measured reserve base for the 3 coals discussed above. This standard requires points of measurement no more than 1/2 mile apart.

The volume of coal is based on acreage between thickness isopachs multiplied by the average thickness, as shown in Table 1. For the determination of mining ratios, a generalized structure contour map on the top of each of the 3 coals (Fig. 13, 16 and 19) was constructed based on cross sections aligned generally parallel to the dip direction (Sections A-A' through D-D').

It was assumed that the three coals could be mined together under certain conditions. Coal K1 becomes part of the overburden for K3 and would begin to be taken as a matter of course when the mining ratio for coal K3 exceeds 5:1. Its thickness would be added to that of K3 to decrease the ratio and increase the mineable area to various mining ratio limits. It was assumed that coal K4 could be mined wherever the ratio of the interburden or parting between K3 and K4 to the thickness of K4 is less than or equal to the ratio of overburden thickness to combined coal thicknesses of K3 and K1. A protocol based on these assumptions was developed by Steve Denton of Denton Civil and Mineral for determining mining ratios along the cross section lines. The procedure was used in somewhat modified form to determine appropriate ratio limits for the areal calculation of surface mineable reserves. Areas (square feet) along the cross sections (Figs. 4-7) representing coal and overburden material were converted to tons/linear foot along strike and cubic yards/linear foot along strike respectively. Figure 3 is an example of a working diagram along Sec. C-C' for this procedure. For the coal, a factor of 25 cubic feet per ton (1742 tons/acre foot) was used. A recovery factor of 0.9 was used for coals K3 and K4, and 0.75 for K1. Incremental and cumulative mining ratios at various points along the section were first determined for coal K3 and K1 (where present). Separate interburden to coal ratios for coal K4 were

determined at the same horizontal locations. At a point where the incremental ratio of overburden to coal for K1 and K3 approximates the incremental ratio of K3-K4 interburden (parting) to coal K4, it is assumed feasible to take coal K4, and cumulative ratios of all 3 beds are used to establish ratio limits beyond this point. Table 2 is a sample worksheet used for this analysis corresponding to the diagram along Sec. C-C'. Based on analyses of the four cross sections (A-A' to D-D') included here, and spot calculations elsewhere, it appears that the conditions for taking coal K4 prevail in the southern half of the area. In the northern part of the area, along cross sections A-A' and B-B', the incremental K3-K4 interburden ratio is greater than the incremental K3 overburden ratio beyond the point where the cumulative K3 overburden ratio reaches 10:1, due to thinning of coal K4 and thickening of the interburden. For the southern part of the area, the incremental K3-K4 interburden to coal ratio approximates the incremental K3 overburden to coal ratio where the cumulative ratio for all 3 coals is between 5:1 and 6:1. For the calculation of reserves for the area, combined ratio limits of 5:1, 7:1 and 10:1 were interpolated from points along the sections and posted to a map for each coal, along with intermediate points based on overburden and coal thickness maps (Fig. 12, 15 and 18, ratios and limits). For coals K1 and K3, cumulative reserves were calculated from their respective outcrops to the 5:1, 7:1 and 10:1 combined ratio limits. For coal K4, reserves were calculated from the outcrop of coal K3 to the same ratio limits, but that portion from the outcrop to the 5:1 limit was added to cumulative figure for the 7:1 ratio limit, since it is assumed under the scenario described above that K4 would not be taken unless K3 is taken beyond its 5:1 limit. Additional reserves for coal K4 were calculated between the K4 outcrop and K3 outcrop or downdip edge of burn, down to a stand-alone limit of 10:1 for coal K4.

### Summary of Coal Reserves

The results of the above procedure are shown in Table 1. About 32 million tons of coal meeting the requirements for the measured coal category have been identified, occurring in 3 coals in a 300 foot interval. Of this total, 23 million would be surface mineable down to a mining ratio limit of 10:1 if the coals are mined together. About 10 million tons, almost all from the K3 coal, would be recovered down to a 5:1 mining ratio.

### PETROLOGY AND PALYNOLOGY

Petrological and palynological investigations were undertaken by Youtcheff, Rao and Smith on K3 seam (Drill hole 83-8C). The samples were divided to one foot intervals. The vitrinite reflectance values for the 8C samples ranged from 0.61% to 0.75% (Table 3). The average for the seam was 0.69%.

The petrographic composition of these coals was examined. Table 4 and Figure 21 show the maceral distribution of the samples is divided into three major maceral groups: vitrinites, exinites, and inertinites. The concentration of inertinite is quite variable, though it tends to increase towards the top of the seam. As in most coals, vitrinite is the predominant maceral at all depths. Exinite is not present in appreciable quantities.

The unusually wide range of petrographic compositions within these seams is indicative of drastic changes taking place in the environment during peat formation. These changes were most likely due to fluctuations in the water table which resulted in the generation of high concentrations of semifusinite and macrinite. The conditions which gave rise to globular macrinite formation are still obscure. The seam is roughly divisible into three zones. These are partitioned by a major break around the 9-foot level and a minor break at the 12-foot level.

The distribution of major palynomorph types are plotted as a function of depth in Figure 22. The palynological profile indicates that the seam is dominated by bisaccate (coniferous) pollen and gleichenious (fern) spore types. The relative abundance of ferns versus conifers was used to differentiate periods of dry environment from those periods of a wet environment. The implication of relative dryness at or in the vicinity of the site does not preclude the presence of standing water, but does suggest potential variations in water depth, extent, pH and Eh.

The seam K3 appears to consist basically of three palynomorphic zones: a dry zone in the bottom 6 feet of the coal bed, a wet zone for coal found in the 7-9 foot interval, and a dry zone for the top 5 feet of the bed. The presence of these dry zones correlates with enhanced inertinite concentrations. It should be noted that a rapidly fluctuating water table may not be reflected palynologically.

## COAL QUALITY

Coal quality data included in this report is a compilation of analytical information obtained for samples from 1973 auger hole drilling by the U.S. Geological Survey and U.S. Bureau of Mines, 1983 drilling by the State of Alaska, Division of Geological and Geophysical Surveys, 1984 Drilling by Arctic Slope Consulting Engineering, 1986 and 1987 sampling from pits excavated for bulk sampling and the 1991 drilling program. Mr. James Callahan has designed and supervised much of the drilling and exploration activities that have spanned nearly two decades. With the exception of the 1973 Auger hole samples, all other samples were analyzed by the Mineral Industry Research Laboratory, University of Alaska Fairbanks. Table 4 lists complete details of drill hole numbers and the analyses presented in the report. Prefix numbers for the drill holes indicate the year of sampling.

Moisture basis for presentation of analytical data is determined by the available data. Samples from the 1973 and 83 drilling programs have lost moisture either during sampling or processing. The samples were brought to theoretical bed moisture level by subjecting coal samples to 97% relative humidity. Analyses reported on an equilibrium moisture basis are what would be expected for freshly mined coal. The 1984 drill samples were received in well sealed boxes. Since no prior processing was done, these analyses were reported on an as received basis and could be considered nearly equal to bed moisture, since moisture loss or gain was minimal. The 1992 drill samples lost moisture and are therefore expressed on an as analyzed basis. The moisture values are therefore lower than bed moisture. Equilibrium moisture values are not available for these samples.

Average proximate analyses and ash analyses, where available, are presented for DFS and K group coals in Tables 5-19. Densimetric partition data for the 1983 samples are summarized in Table 20. Analytical data for all individual samples, defined by Table 4, are presented in Table 21-31. Some mention of individual data and averages need to be made.

1983 drill cuttings were split in the laboratory. One raw coal split received proximate analysis. Another split was subjected to a 1.6 specific gravity (S.G.) float-sink separation. Sinks weights were recorded and floats received proximate and ultimate analyses. 1983 drill cores were crushed to minus 2.4mm in the laboratory, then subjected to a 1.5 S.G. separation. Sinks received proximate analyses and floats received both proximate and ultimate analyses. Analyses for reconstituted raw coal were calculated from recoveries of floats and sinks and are presented throughout Tables 21-31. An average analysis for a seam was calculated using samples thickness as a weighting factor. Moisture values for 1983 samples are equilibrium moistures.

1984 drill samples were all core samples, and were analyzed without any densimetric separations. Their moisture values are given on an as received basis. The cores were well preserved on site and their as received moisture levels should represent the bed moisture for these coal samples. Average analyses for the seams were weighted by the mass of core, rather than thickness. Averages calculated this way will more accurately represent the average analysis of a seam.

For 1991 drill cores equilibrium moisture was determined. Moisture values of the remaining samples are on as analyzed basis.

Of the four Mormon block seams, DFS-4 has the most drill data and is also of high quality. The seam is 9-10 ft. thick. 1987 and 1991 pit channel samples probably best represent the quality of the seam, and the ash contents were 3.08 and 3.58 respectively. Other samples were drill cuttings and could not be relied on represent the true quality of the seam.

Seam K1 is about 5-6 ft. thick. Drill hole 84-106 gave 17.62% average ash for the seam. The coal however, could be cleaned to give a lower ash product. Samples from Drill hole 83-9 gave a 1.6 SG float product containing 7.23% ash.

Seam K3 has the largest amount of analytical data available. Six drill holes located about 0.5-0.6 miles apart are discussed. These project a true image of the change in quality of K3 seam in the north-south direction and are listed below starting from the southern most drill hole to the northern most drill hole.

<u>Drill Hole No.</u>	<u>Thickness, ft.</u>	<u>Ash, %</u>
91-2	6	15.2
91-10C	12.5	9.49
83-8C	14	8.07
91-7	17.5	6.62
91-5	17.3	6.13
83-10	15	8.71

K3 Seam coal is of highest quality and the seam is thickest at Drill holes 91-7 and 91-5. Both seams have high ash partings located in the same position of the seam; a 2' parting located 3' below the top of the seam and a 6" parting located 1' from the bottom of the seam. It is reasonable to assume the quality between these two drill holes, located 0.6 miles apart, will not differ significantly. Coal quality as well as seam thickness deteriorate to the north and south of these two drill holes. Drill hole 83-10 located 0.5 miles to the south, shows slight deterioration of quality to 8.71% ash. Again quality and thickness are affected as we go north to Drill holes 83-81 and 91-10C. The 91-10C coal is not only thinner, but also the high ash partings are thicker and responsible for an increase in ash content to 9.49%. Drill hole 91-2, to the northwest of 91-10C, shows further thinning to 6 ft. as well as an increase in ash content to 15.2%.

#### Effect of Weathering on Coal Quality

Exposure of outcrops of coal to oxygen deteriorates the quality of coal. Equilibrium moisture and oxygen levels increase whereas heating value and carbon content decrease. Influence of sample depth on these parameters is presented in Figures 17-24. Figure 17 shows that calorific value reaches maximum for Mormon block DFS samples at a depth of 40 ft. Figure 18, 19, and 20 confirm that the lowest oxygen, and equilibrium moisture levels and highest carbon levels are reached at this depth. Figures 21, 22, 23, and 24 show that K group coal samples at depths as low as 20 ft. show no weathering. The only exceptions are the samples from drill hole 84-117. This

seam, at this drill site, was probably closer to the surface at some time past and weathered before burial to its present depth.

ASTM rank calculations of K3 seam core samples show that the Deadfall Syncline coals are of high volatile A bituminous rank, bordering on high volatile B bituminous. An average vitrinite reflectance value of 0.74% also confirms this conclusion.

The coal is of coking quality. Free swelling indices (FSI) range from 1 to 5 for core samples. FSI is a function of ash content and percent inert macerals in the coal. Some portions of Deadfall Syncline coals have a high inertinite macerals content, which can cause low FSI values. Hardgrove grindability values ranged from 47-61 and fall within the expected range for coal of this rank, i.e., bordering high volatile A and B bituminous. As noted previously, tables 5-19 show average proximate and ash analyses for each seam. Although weathered surface samples tend to be higher in moisture content, unweathered drill samples show fairly low moistures, 3 to 5 percent. DFS-1 averaged 11.92% ash. Float-sink analysis for drill hole 83-6, show that its ash content could be reduced to 5.57 by separating at 1.6 S.G. DFS-2 has an average ash content of 12.13. Float-sink analyses of drill holes 5 and 5c show that its ash content could be reduced to about 5% by washing. DFS-3 has an average ash content of 7.90%. DFS 83-4C analyses show that the top 2 feet and the bottom 2 feet of DFS-3 have higher ash contents. The middle section (8 feet) averages 5.44% ash. Washing the entire seam at 1.5 S.G. can reduce the ash content to 3.69%. The average ash content of DFS-4 seam was 8.78% over all of the analyses listed. However, pit channel samples obtained in 1987 and 1991 show uniformly low ash over the entire 10 ft section of the coal seam. The average for the above referenced two pit channel samples gave 3.33% ash.

The seams K1 and K2 averaged fairly high ash, 20.66% and 16.59% respectively. Separation of sample from drill hole 83-9, at 1.6 S.G., reduced its ash content to 7.23%. K3 is the most important seam in the Kuchiak block. The seam has higher ash partings, but the average ash content of the seam was 9.06%. The 1991 core samples showed lower ash levels. Drill holes 91-5, 91-7 and 91-10c gave average ash values of 6.13%, 6.02% and 9.49% respectively. Float-sink separation of samples from drill holes 83-8c, 83-10, 83-11, and 83-11c showed that the ash content can be reduced to 4.01%, 4.32%, 3.76% and 3.28% respectively.

Seam K4 is somewhat higher in ash, averaging 15.18%. Float-sink separation of sample from drill hole 83-10 showed that its ash content can be reduced to 2.90%. Core samples from drill hole 91-7 showed an average ash content of 4.21. Other samples obtained from drill cuttings showed a fairly high ash content. Only one sample is available for seam K5 and it analyzed 36.23% ash. Only auger hole samples were available for seam no. 20 and their ash content was quite variable. Seam No. 21 had analyses available from drill core. Raw coal from drill hole 13c averaged 21.38% ash, but washing at 1.5 S.G. reduced its ash to 8.53%.

Coal ash composition was determined after ashing coal sample at 750°C. All ash analyses were conducted using a spectraspan V ICP spectrophotometer.

Deadfall Syncline coals have less than 0.02% chlorine, which will not contribute to boiler fouling. However, the high sodium content of the ash would cause the deposit forming propensity of these coal to be significant. Table 32 gives a compilation of all available ash composition and ash fusibility data.

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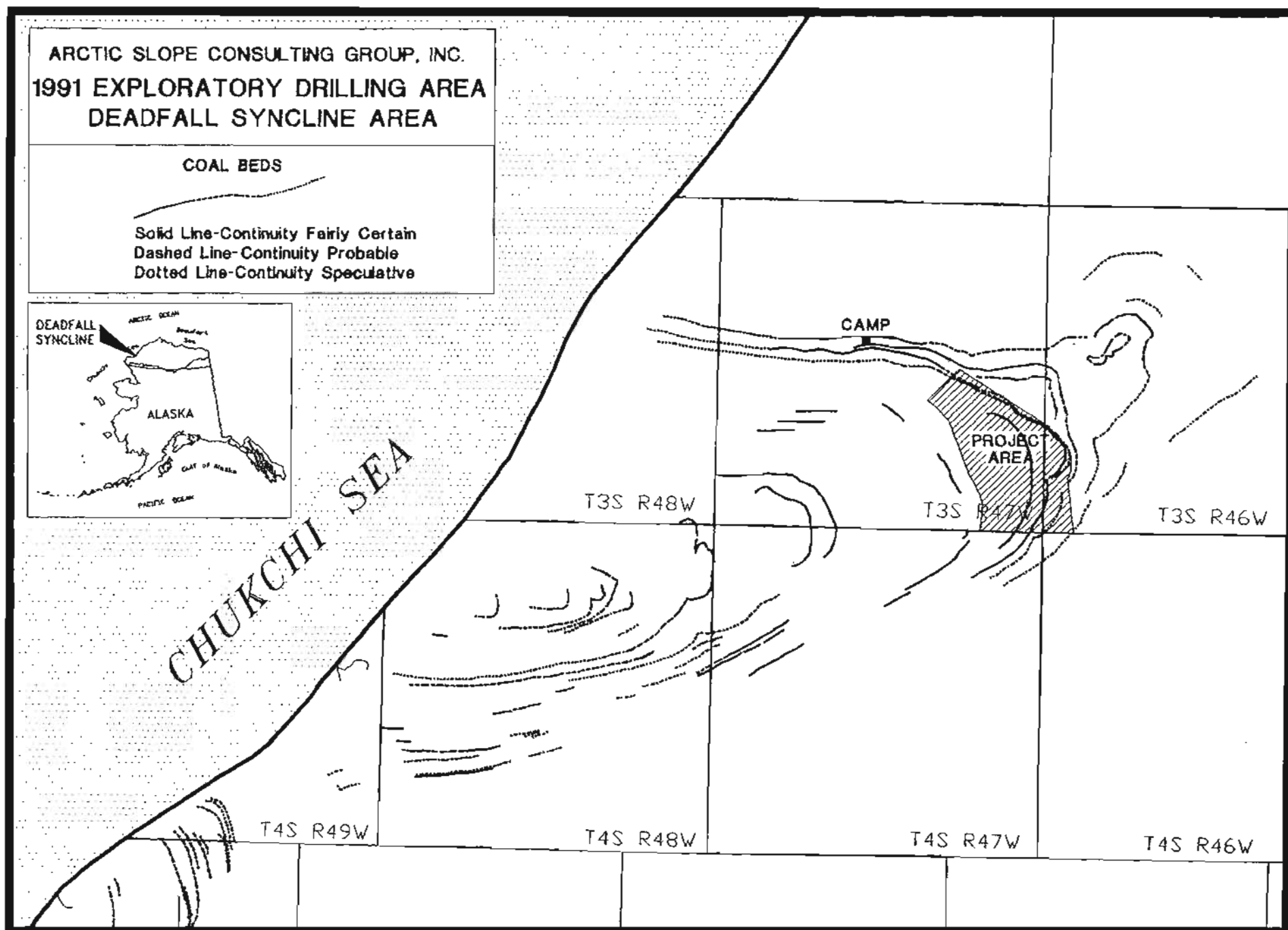


Figure 1. 1991 Exploratory Drilling Area: Deadfall Syncline Area

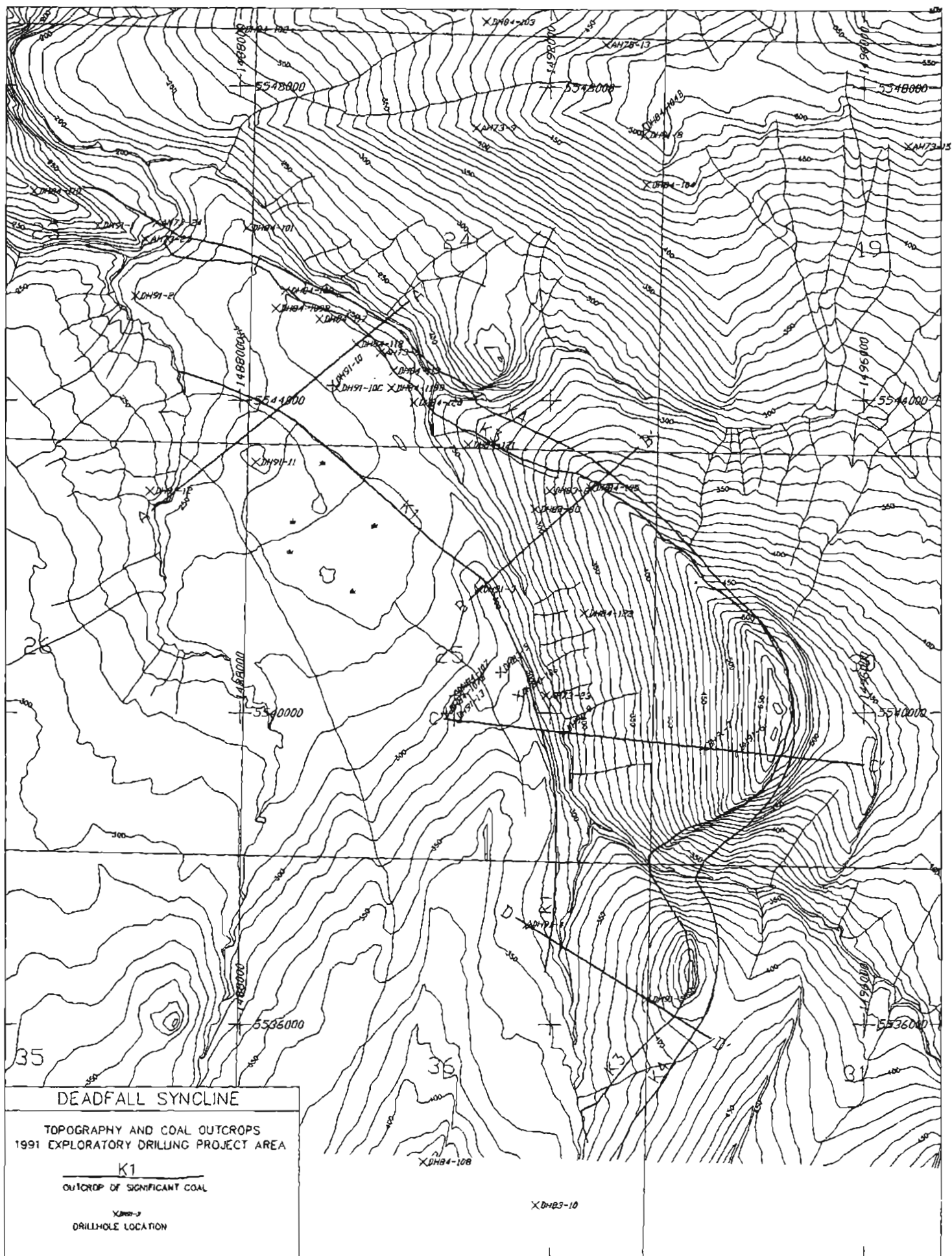


Figure 2. Topography and Coal Outcrops 1991 Exploratory Drilling Project Area

TABLE 1

## MEASURED RESERVES IN COAL BEDS K1, K3 AND K4 UNDER COMBINED MINING SCENARIO

## COAL K1

AV. THICKNESS	INCREMENTAL AREA (ACRES)				INCREMENTAL VOLUMES (ACRE FEET)				CUMULATIVE VOLUMES (ACRE FEET)				CUMULATIVE TONS*			
	<5:1	5:1-7:1	7:1-10:1	>10:1	<5:1	5:1-7:1	7:1-10:1	>10:1	5:1	7:1	10:1	>10:1	5:1	7:1	10:1	>10:1
6.50		1.3	13.55	69.62	0	8	88	453	0	8	97	549	0	11040	126110	717340
6.25		11.46	14.44	54.16	0	72	90	339	0	72	162	500	0	93578	211490	653740
5.75		3.72	19.33	66.14	0	21	111	380	0	21	133	513	0	27948	173160	670029
5.25		6.65	29.63	72.02	0	35	156	378	0	35	190	569	0	45613	248849	742843
4.75		3.62	19.5	41.2	0	17	93	196	0	17	110	306	0	22485	143480	399162
4.50		9.86	26.38	29.13	0	44	119	131	0	44	163	294	0	57969	213064	384327
TOTALS FOR K1														258612	1116153	3567441

## COAL K3

AV. THICKNESS	INCREMENTAL AREA (ACRES)				INCREMENTAL VOLUMES (ACRE FEET)				CUMULATIVE VOLUMES (ACRE FEET)				CUMULATIVE TONS**			
	<5:1	5:1-7:1	7:1-10:1	>10:1	<5:1	5:1-7:1	7:1-10:1	>10:1	5:1	7:1	10:1	>10:1	5:1	7:1	10:1	>10:1
18.00	3.76				68	0	0	0	68	68	68	68	106109	106109	106109	106109
17.88	44.11				788	0	0	0	788	788	788	788	1236157	1236157	1236157	1236157
17.63	55.23	0.48			973	8	0	0	973	982	982	982	1526142	1539405	1539405	1539405
17.25	58.27	26.7	5.38		1005	461	93	0	1005	1466	1559	1559	1575886	2297975	2443475	2443475
16.75	28.92	13.31	27.72		484	223	464	0	484	707	1172	1172	759458	1106987	1836932	1836932
16.25	23.07	6.24	20.44	7.81	375	101	332	127	375	476	808	935	587749	746724	1267458	1466442
15.75	23.19	6.94	18.24	16.67	365	109	287	263	365	475	762	1024	572627	743996	1194393	1606023
15.25	34.83	8.54	20.69	28.62	531	130	316	436	531	661	977	1413	832749	1036931	1531607	2215881
14.50	36.5	14.68	22.99	37.6	529	213	333	545	529	742	1075	1621	829758	1163480	1686114	2540879
13.50	31.12	10.9	15.16	42.28	420	147	205	571	420	567	772	1343	658664	889366	1210232	2105101
12.50	26.93	9.9	12.21	49.28	337	124	153	616	337	460	613	1229	527761	721776	961061	1926826
11.75	14.41	5.85	8.27	42.31	169	69	97	497	169	238	335	832	265456	373223	525570	1304990
11.25	14.69	5.05	7.7	40.14	165	57	87	452	165	222	309	760	259099	348169	483980	1191959
10.50	29.08	9.96	15.35	49.34	305	105	181	518	305	410	571	1069	478712	642673	895363	1707593
TOTALS FOR K3													10216326	12954970	16917867	23227772

## COAL K4

AV. THICKNESS	INCREMENTAL AREA (ACRES)				INCREMENTAL VOLUMES (ACRE FEET)				CUMULATIVE VOLUMES (ACRE FEET)				CUMULATIVE TONS**			
	<5:1	5:1-7:1	7:1-10:1	>10:1	<5:1	5:1-7:1	7:1-10:1	>10:1	5:1	7:1	10:1	>10:1	5:1	7:1	10:1	>10:1
6.00	23.16	100.98	14.73	0	139	606	88	0	139	745	833	833	217861	1167760	1306322	1306322
5.75	24.82	172.35	54.37	8.43	143	991	313	48	143	1134	1446	1495	223749	1777458	2267595	2343591
5.25	15.25	80.1	34.54	23.1	80	421	181	121	80	501	682	803	125522	784821	1069118	1259253
4.75	5.48	50.6	29.69	2.02	26	240	141	10	26	266	407	417	40810	417631	638733	653777
4.25	35.12	7.45	0	0	149	32	0	0	149	181	181	181	234010	283650	283650	283650
TOTALS FOR K4													607942	4147670	5281769	5562942
TOTALS FOR THE AREA													10824268	17361252	23315789	32358155

\* @1742 TONS/ACRE FOOT, 0.75 RECOVERY FACTOR (K1)

\*\* @1742 TONS/ACRE FOOT, 0.9 RECOVERY FACTOR (K3 &amp; K4)

**FIGURE 3**



**TABLE 2**  
**WORKSHEET FOR THE DETERMINATION OF COMBINED MINING RATIOS ALONG CROSS SECTION C-C'**

**CROSS SECTION C-C'**

coal k3	318	308	295	282	83	190	274	275	277	277
coal k1						12	90	82	74	70
coals k1 + k3	318	308	295	282	83	202	364	357	351	347
incr.overburden	606	923	1464	2175	795	2515	5151	6547	7631	8682
cum. coal k1 + k3	318	626	921	1203	1286	1488	1852	2209	2560	2907
cum. overburden	606	1529	2993	5168	5963	8478	13630	20176	27807	36489
incr.ratio	1.90	3.00	4.97	7.72	9.58	12.45	14.15	18.34	21.71	25.01
cum. ratio k1 + k3	1.90	2.44	3.25	4.30	4.84	5.70	7.36	9.14	10.86	12.55
coal k4	111	107	104	101	30	67	92	87	81	76
k3-k4 interburden	951	992	1023	1056	306	763	1092	1091	1077	1137
cum. coal k4	111	218	322	423	453	520	612	699	780	856
cum.interburden	951	1943	2966	4022	4328	5091	6183	7274	8351	9488
incr. ratio	8.57	9.27	9.84	10.46	10.20	11.39	11.87	12.54	13.30	14.96
cum. ratio	8.57	8.91	9.21	9.51	9.55	9.79	10.10	10.41	10.71	11.08
cum. coal k1 + k3 + k4	429	844	1243	1626	1739	2008	2464	2908	3340	3763
cum. ob. all 3	1557	3472	5959	9190	10291	13569	19813	27450	36158	45977
cum. ratio all 3	3.62	4.11	4.79	5.65	5.92	6.76	8.04	9.44	10.83	12.22

Coal: Tons per lin. foot along strike @25 cu.ft./ton, 0.9 rec. factor for k3 and k4, 0.75 rec. factor for k1

Overburden: Cubic yards per linear foot along strike

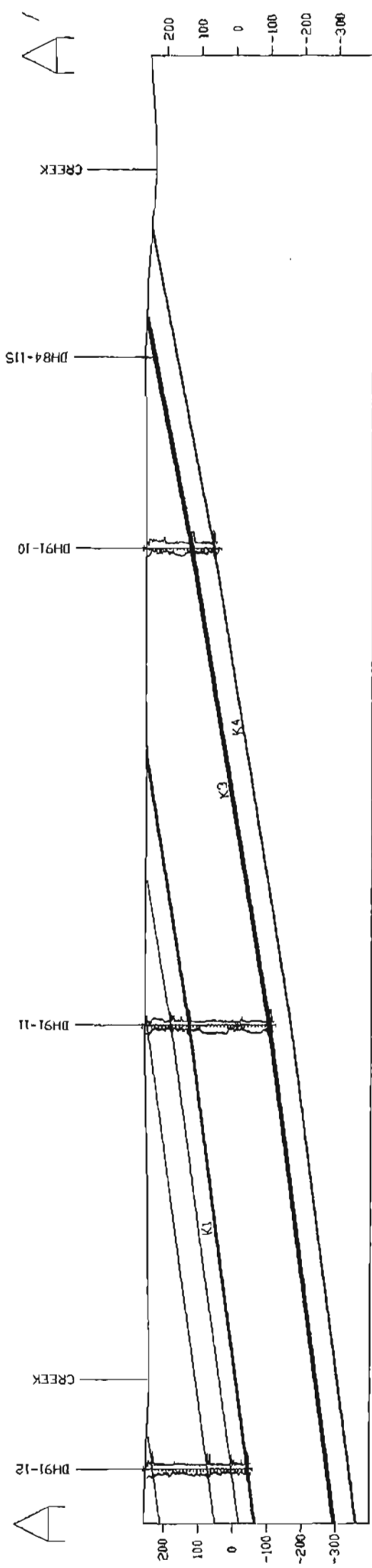


Figure 4. Geological Section A-A'

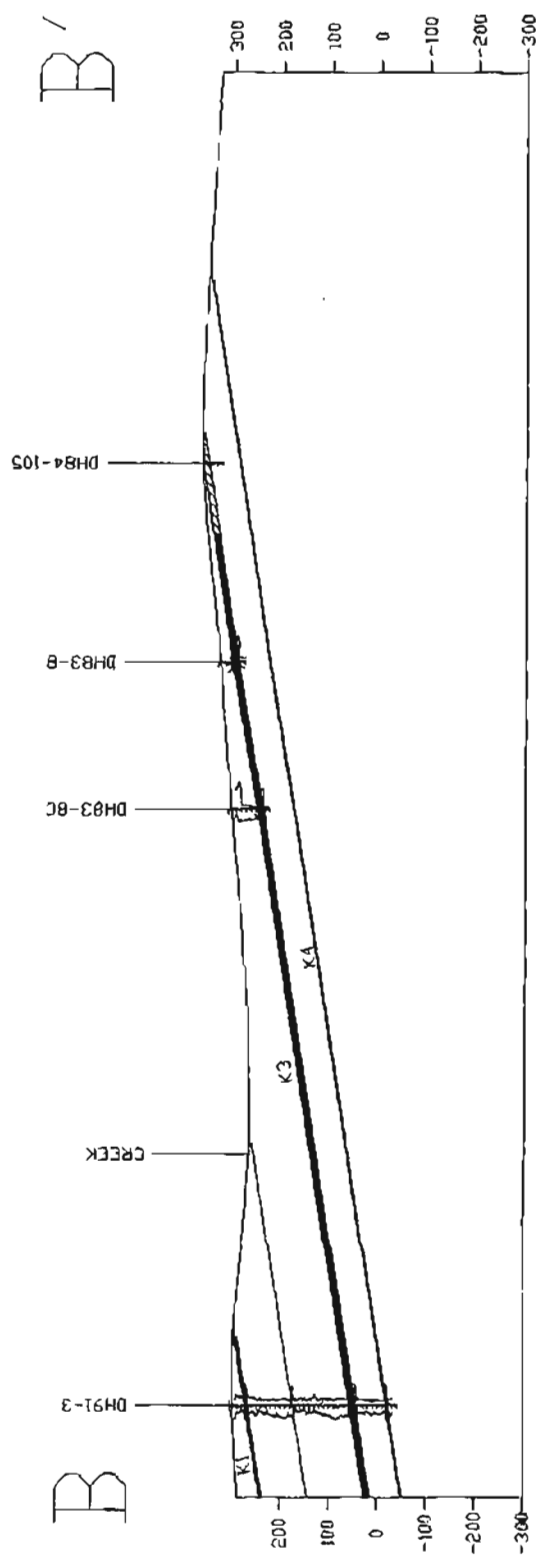


Figure 5. Geological Section B-B'

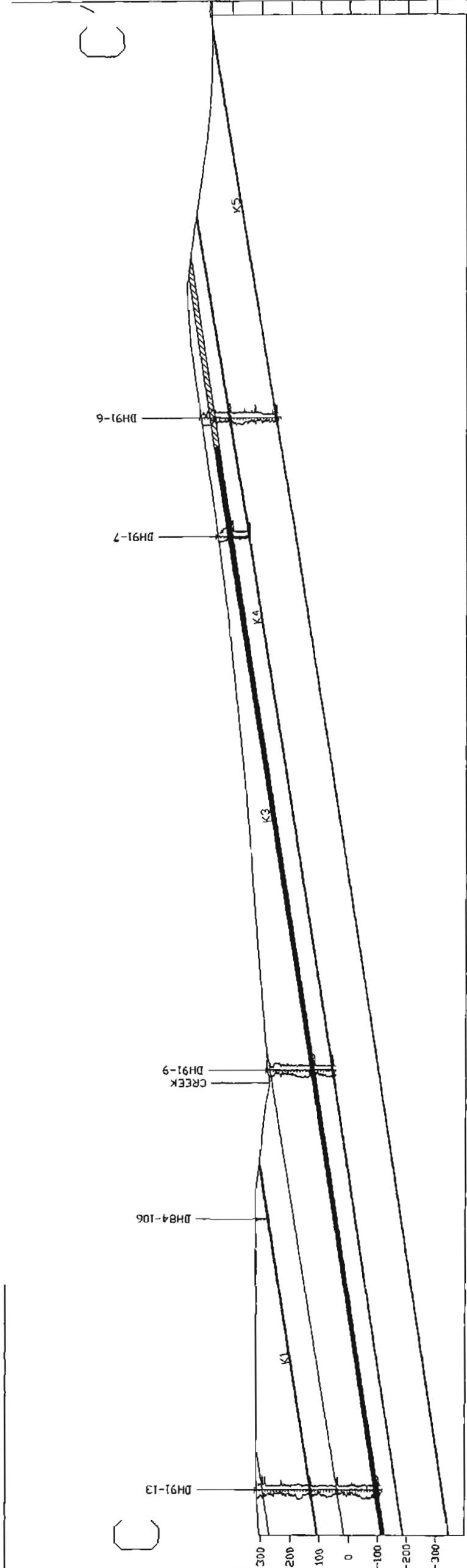


Figure 6. Geological Section, C-C'

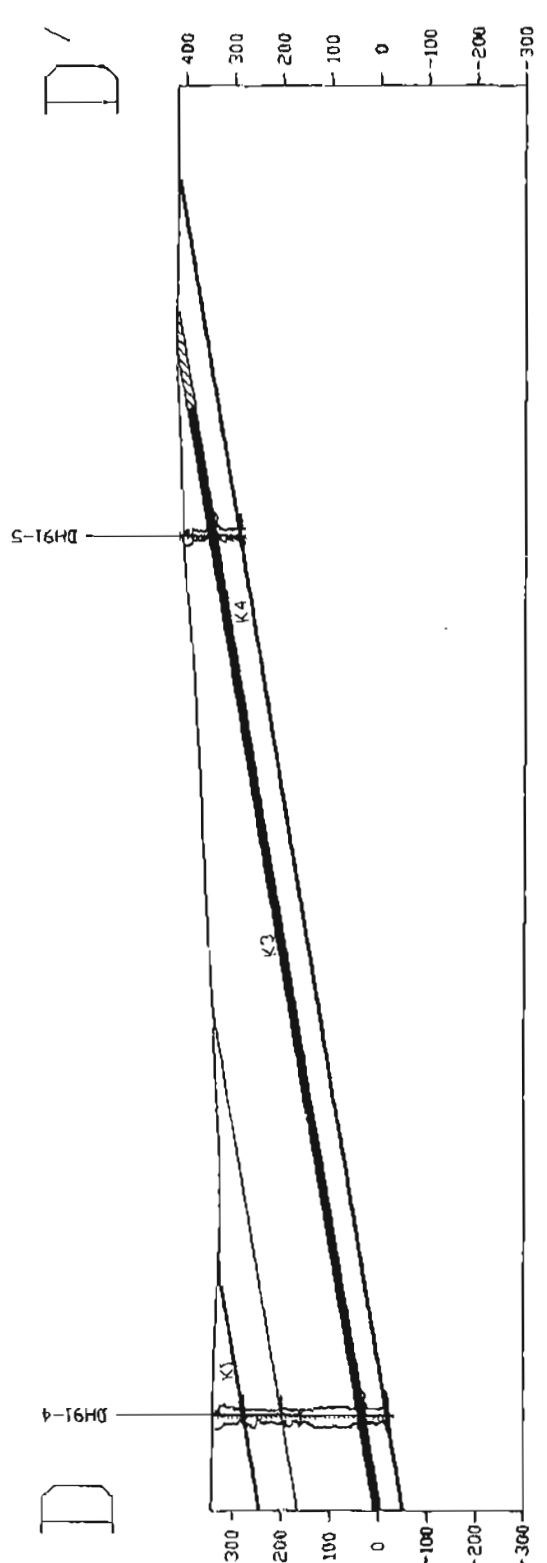


Figure 7. Geological Section, D-D'



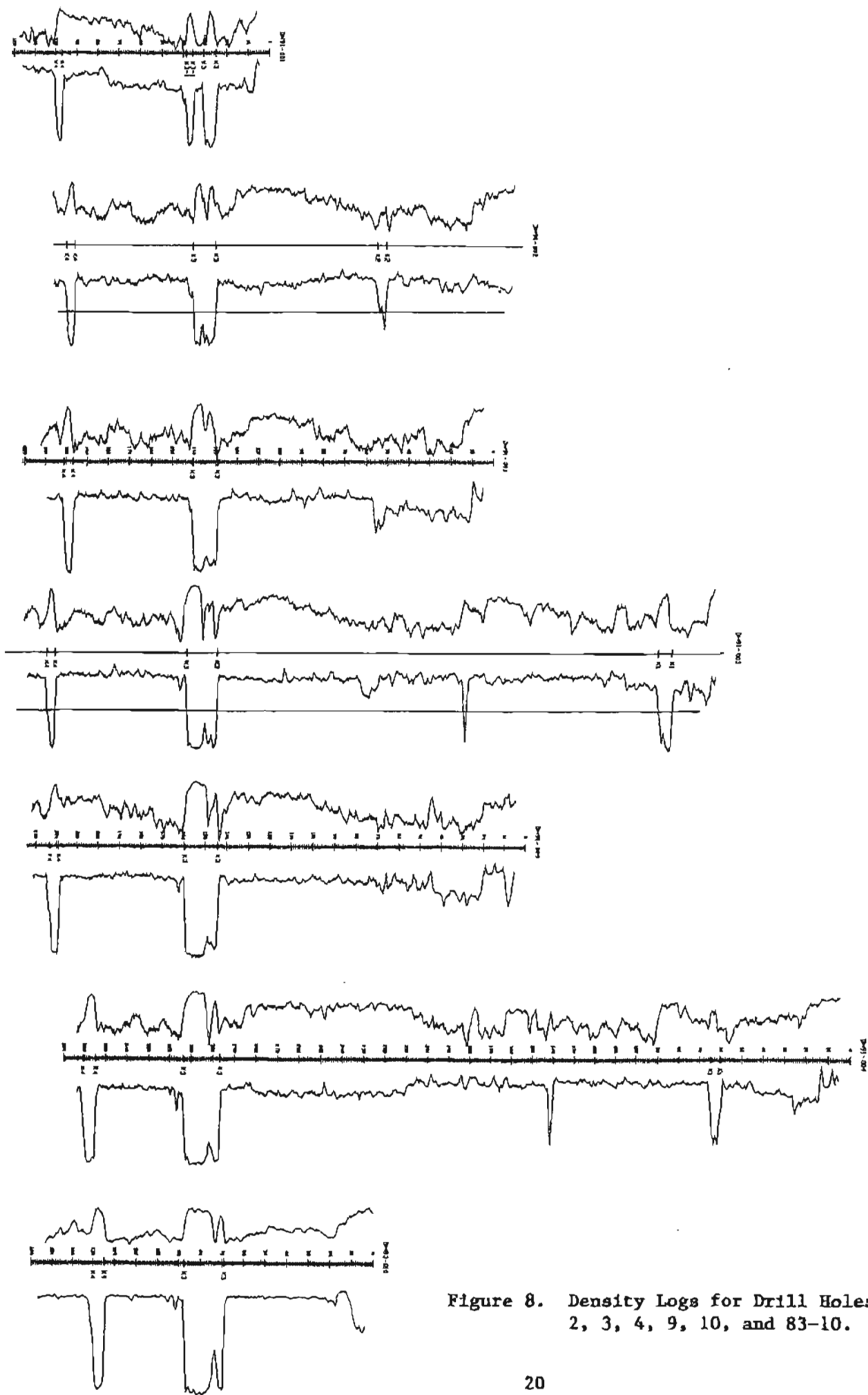


Figure 8. Density Logs for Drill Holes 91-1, 2, 3, 4, 9, 10, and 83-10.

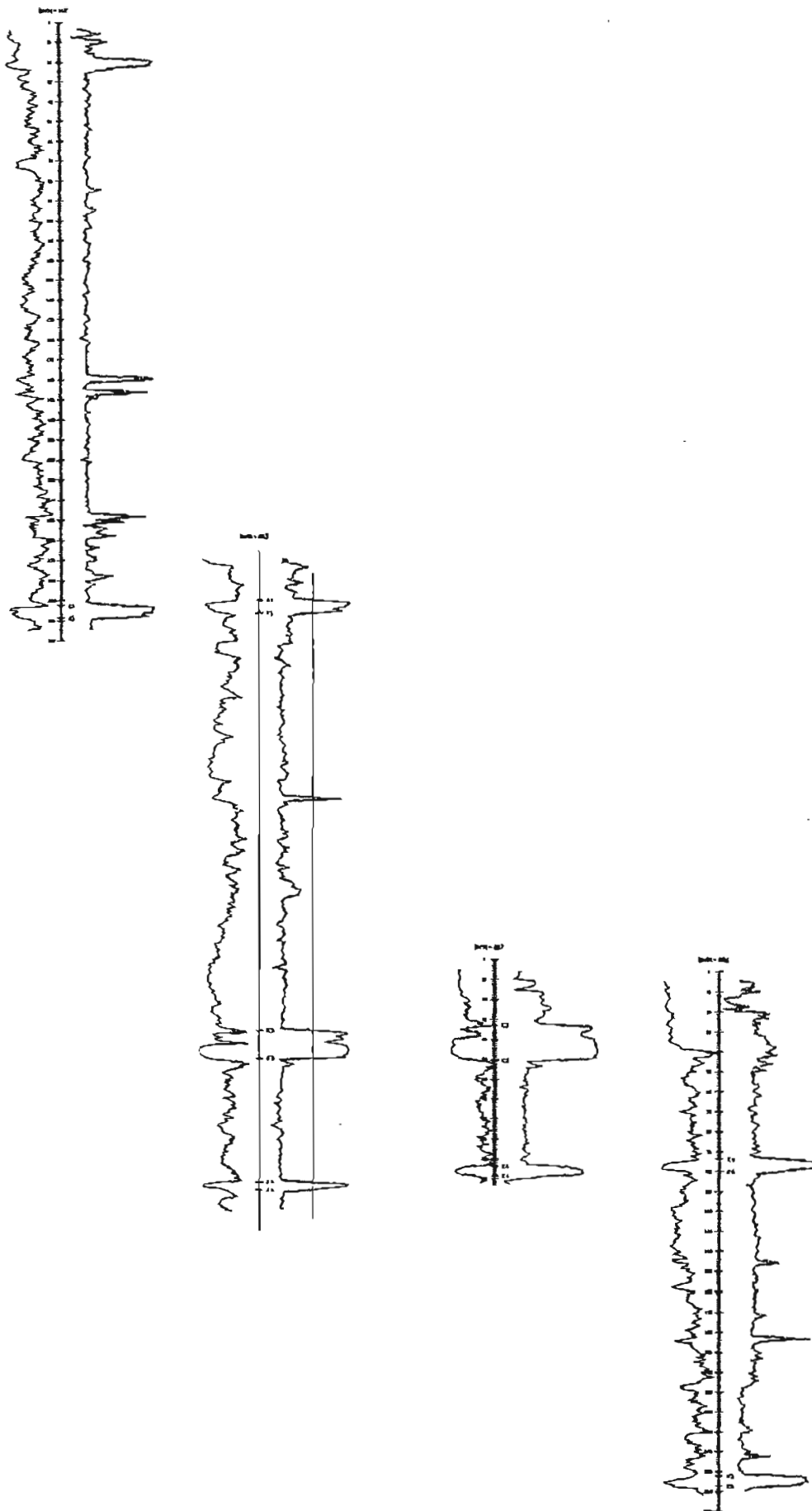


Figure 9. Density Logs for Drill Holes 91-3, 6, 7, and 12.

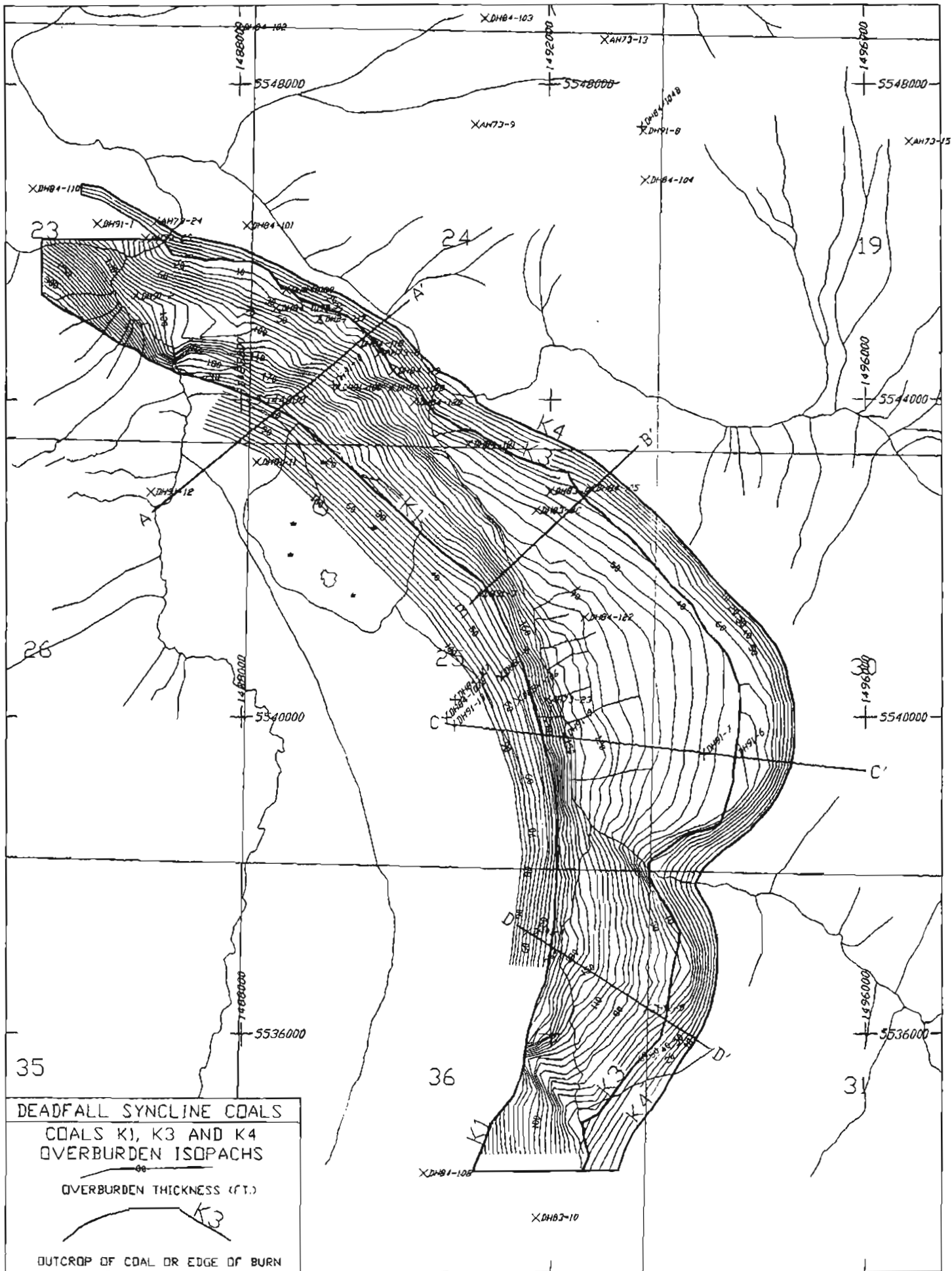


Figure 10. Coals K1, K3 and K4 Overburden Isopachs

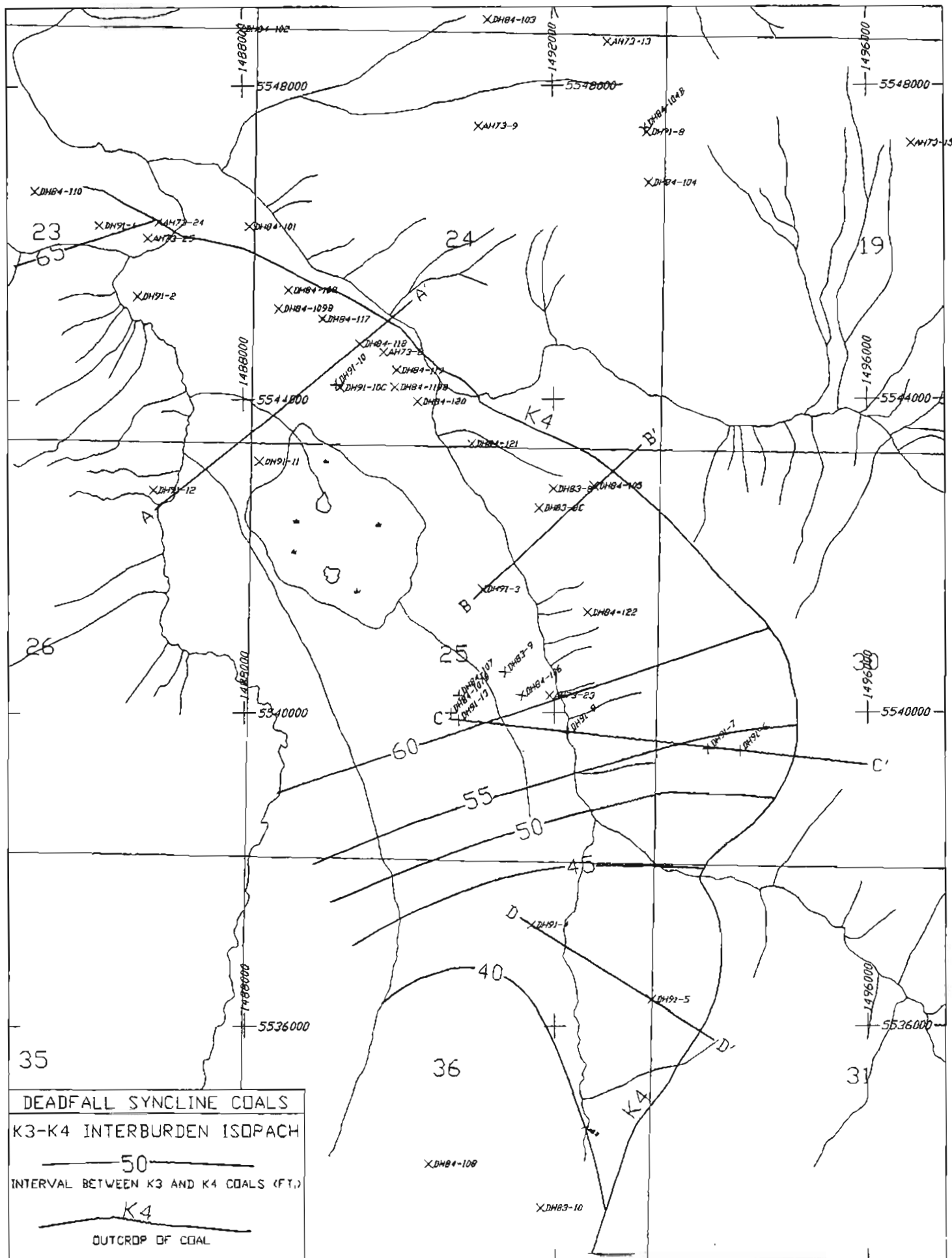


Figure 11. K3-K4 Interburden Isopach



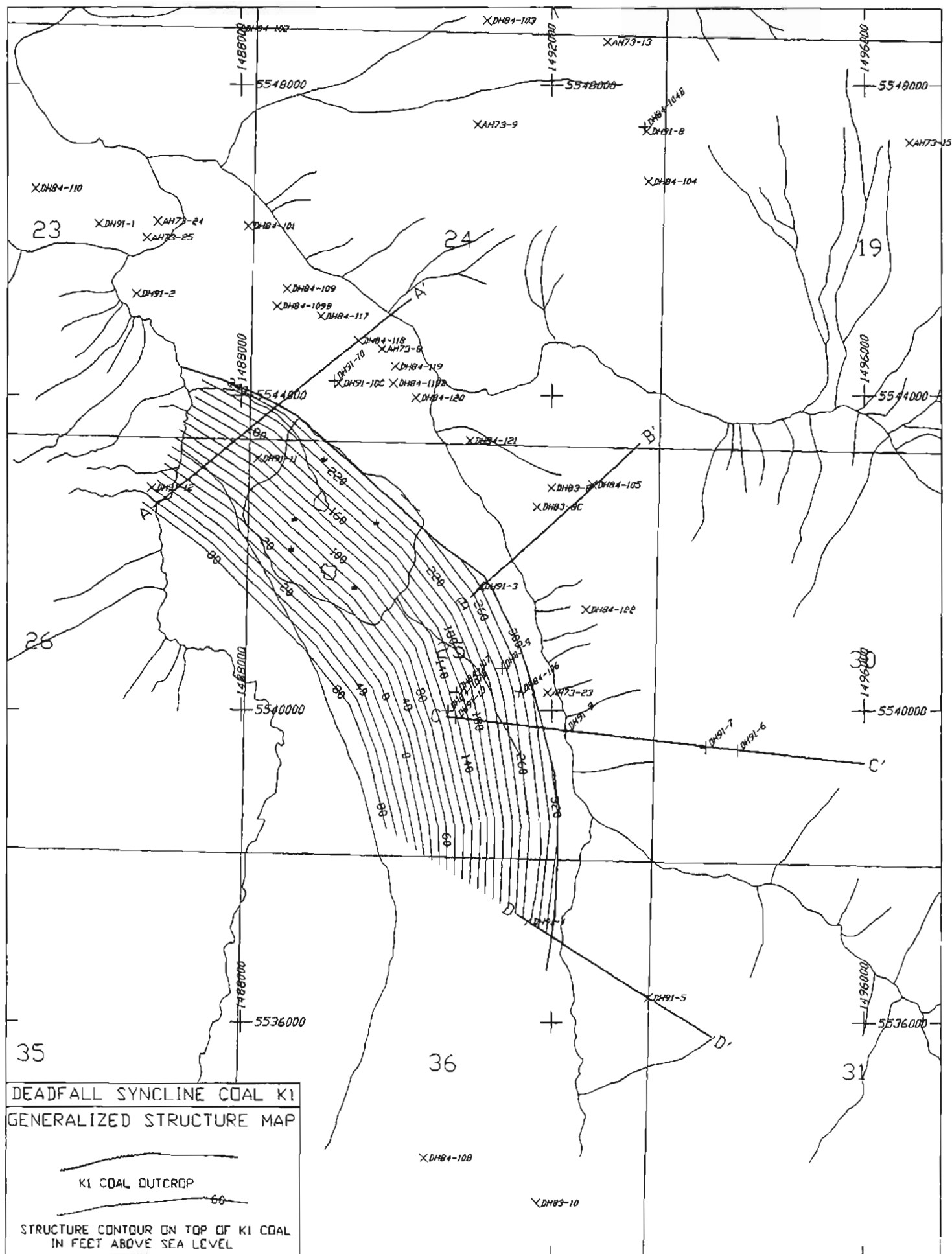


Figure 13. K1 Generalized Structure Map

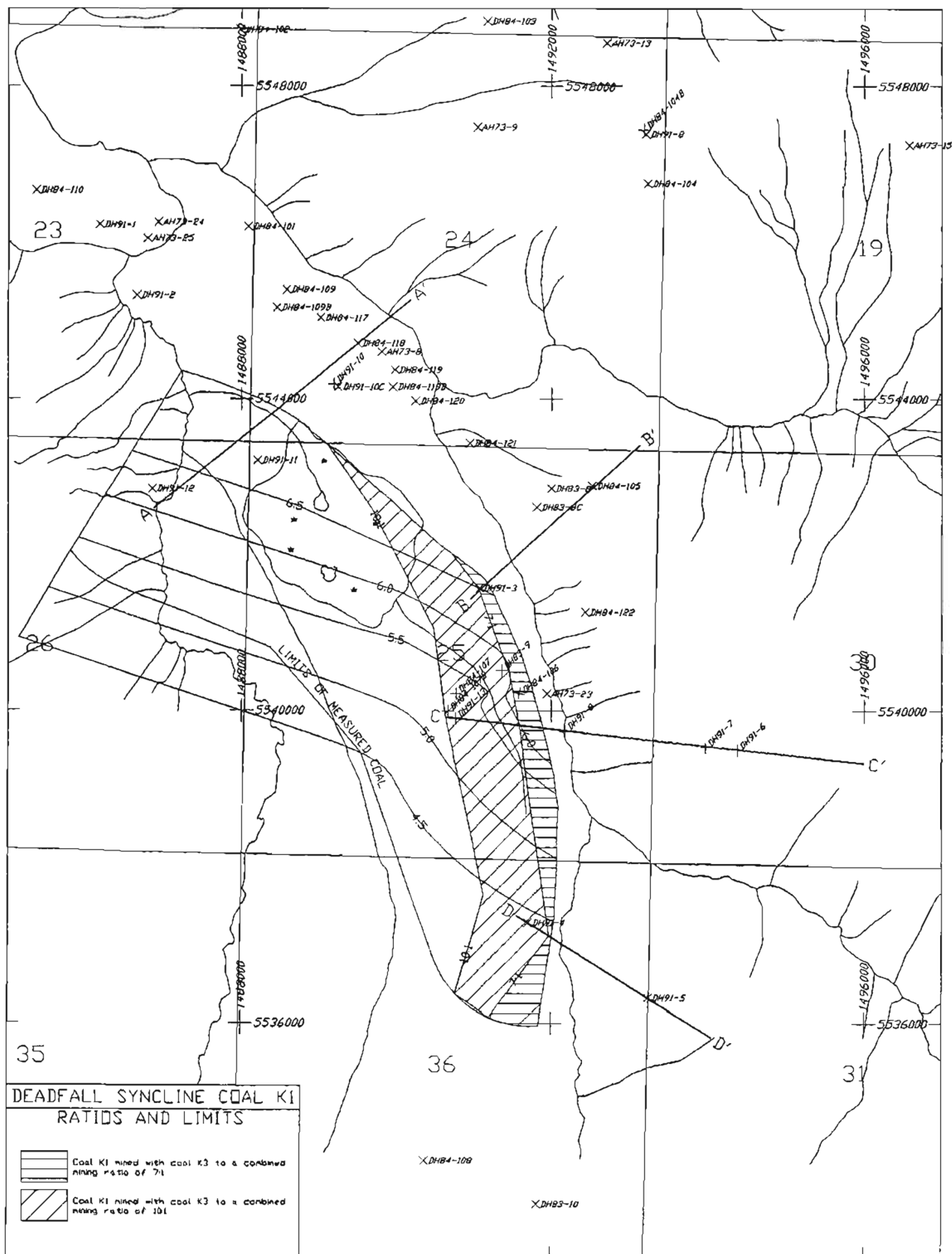
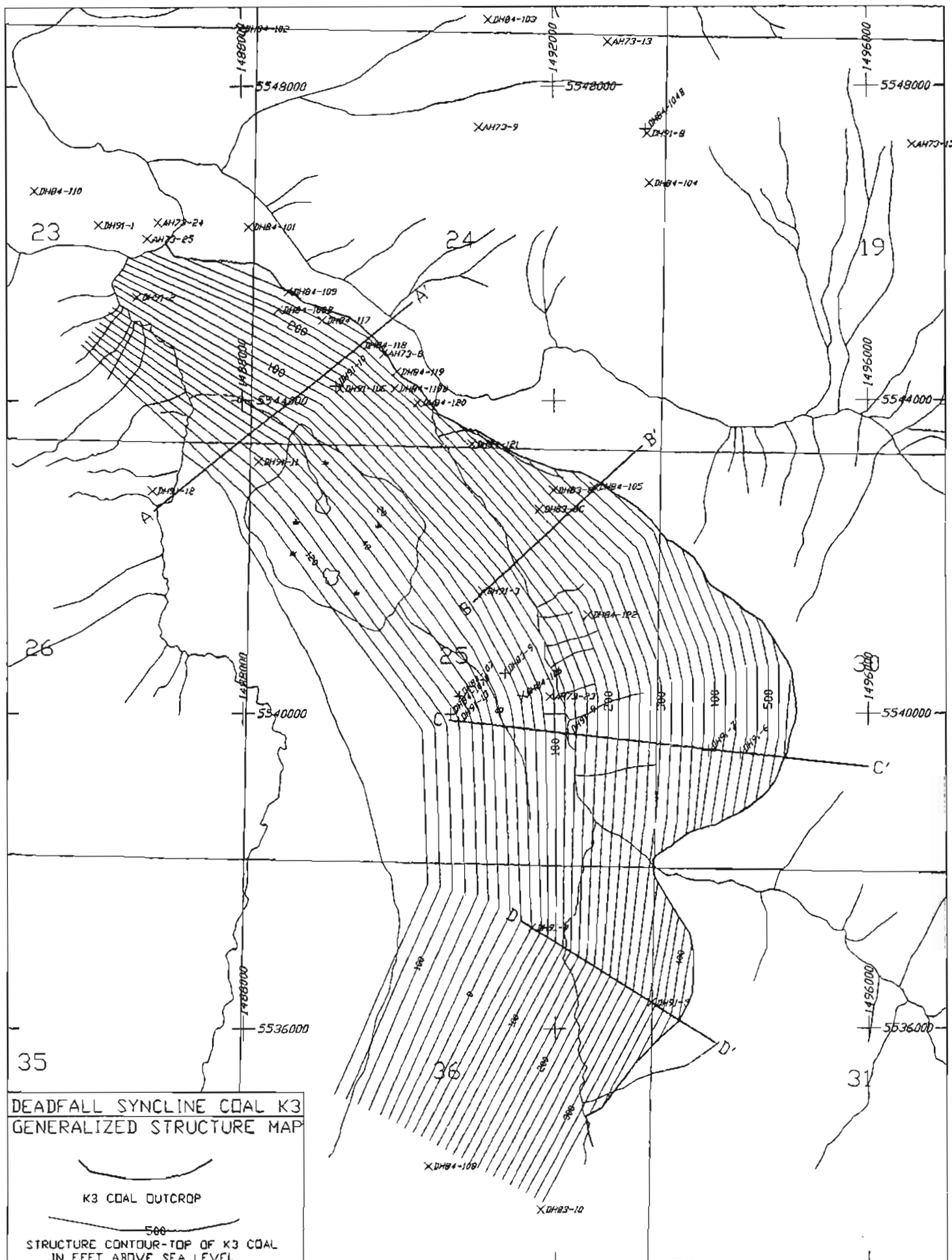


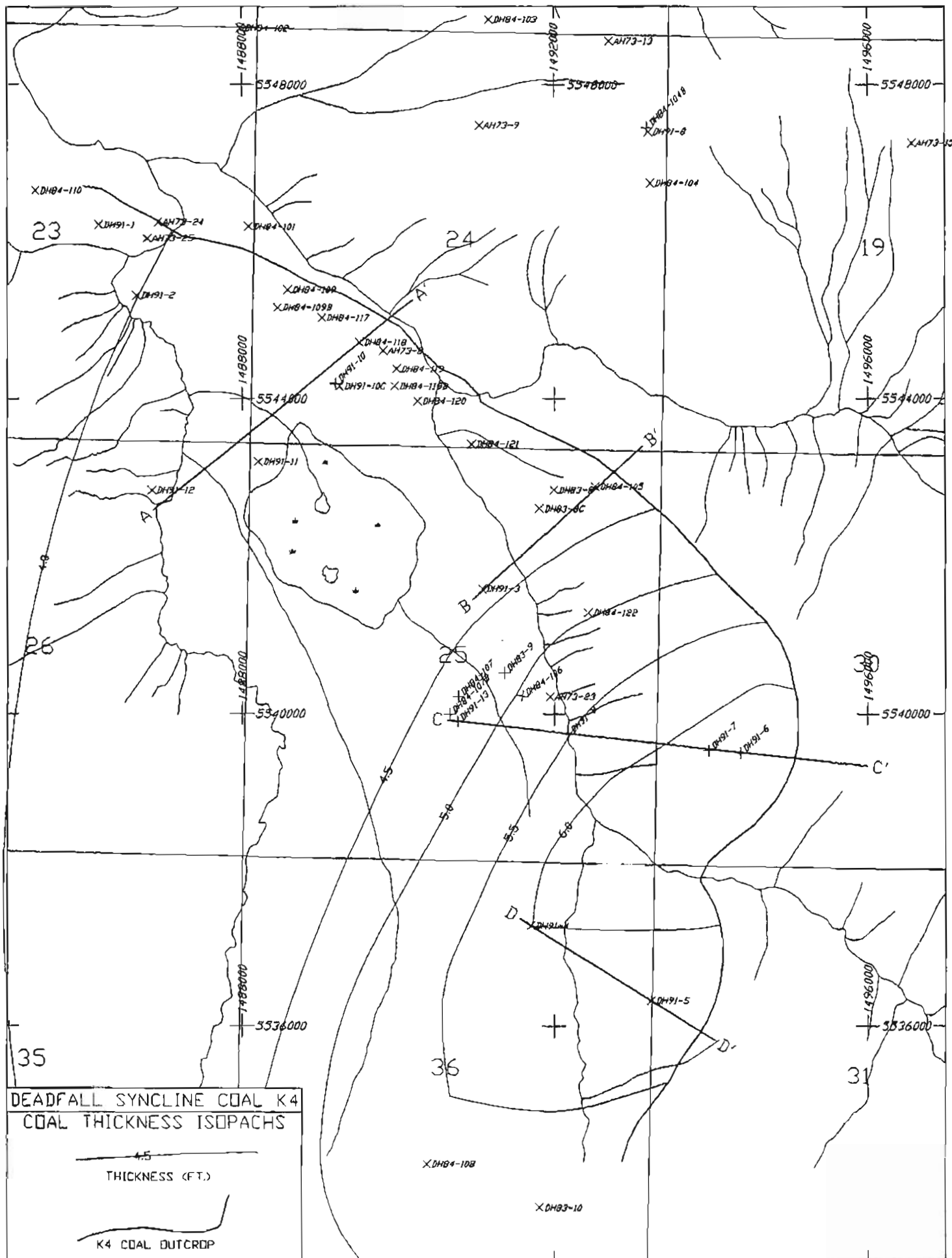
Figure 14. KI Ratios and Limits











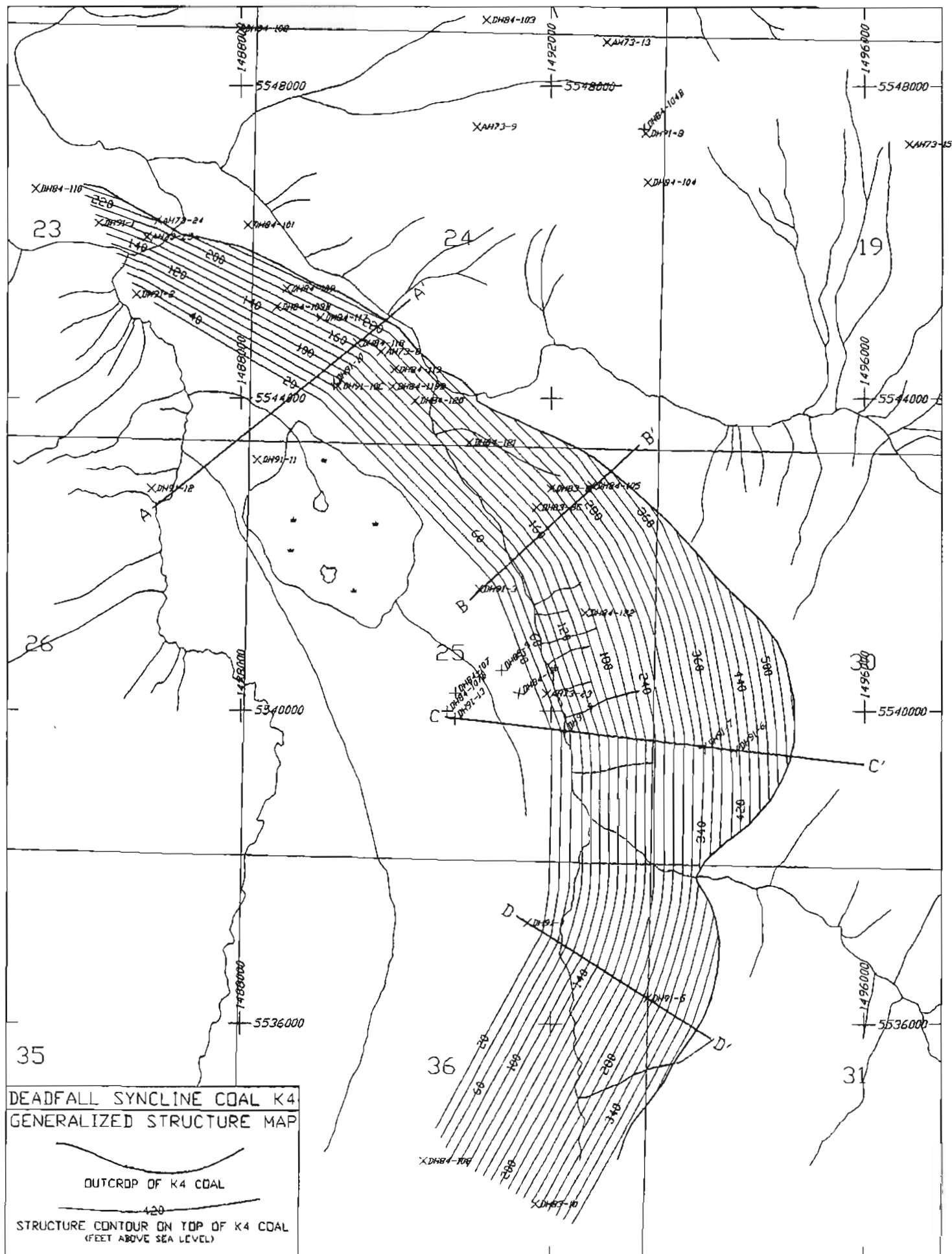
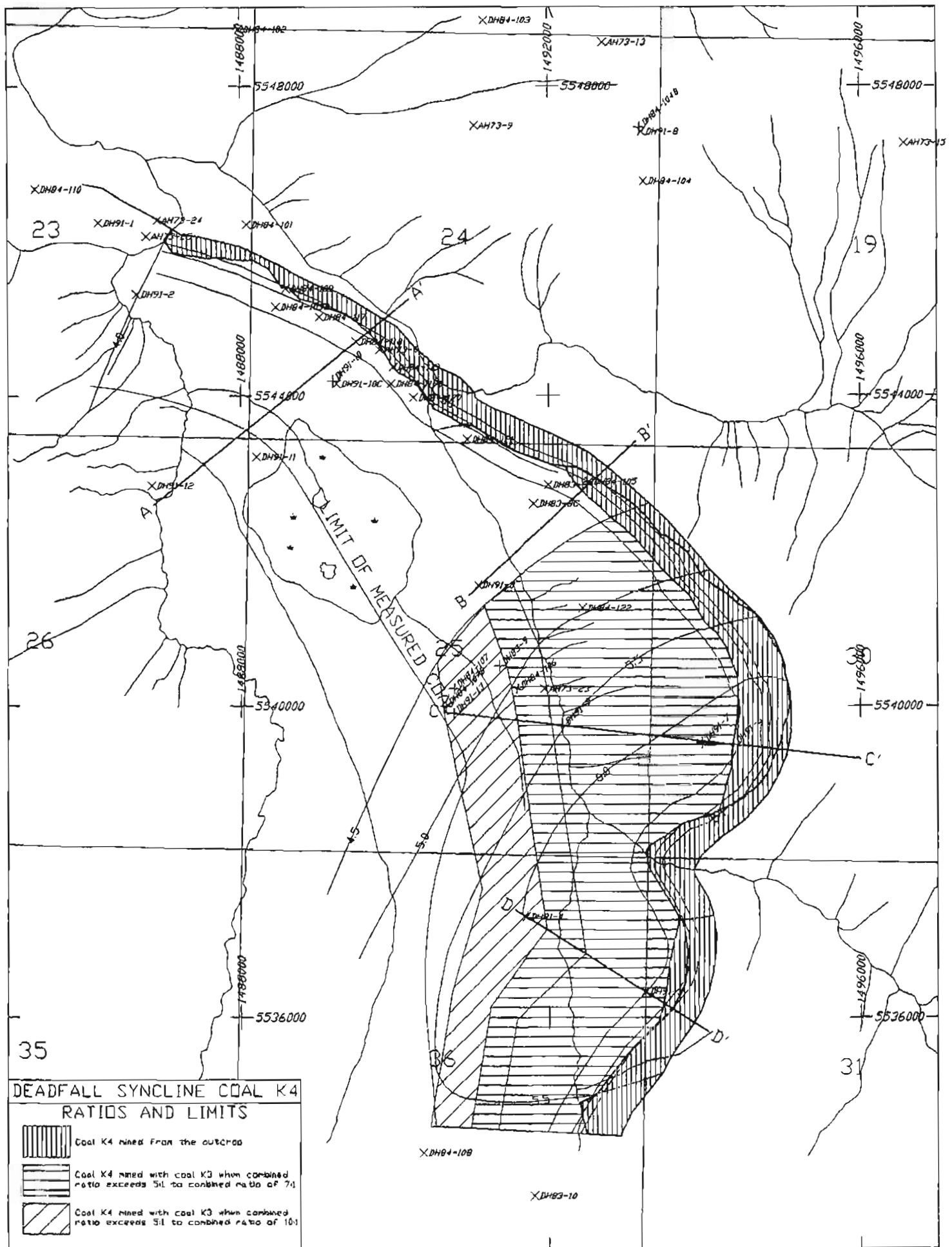


Figure 19. K4 Generalized Structure Map



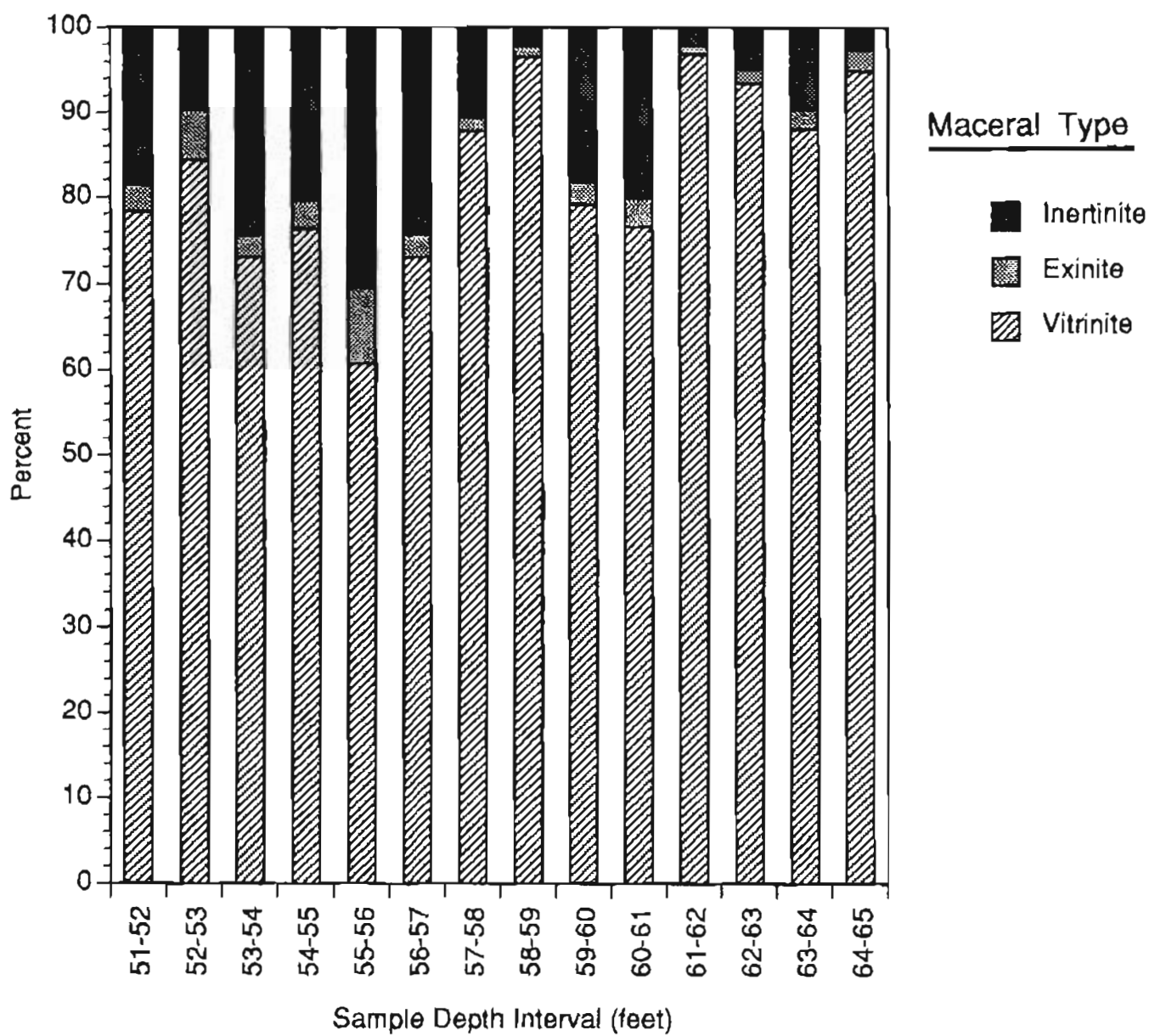


Figure 21 Distribution of maceral groups as a function of depth, Drill hole 83-8C, K3 seam.

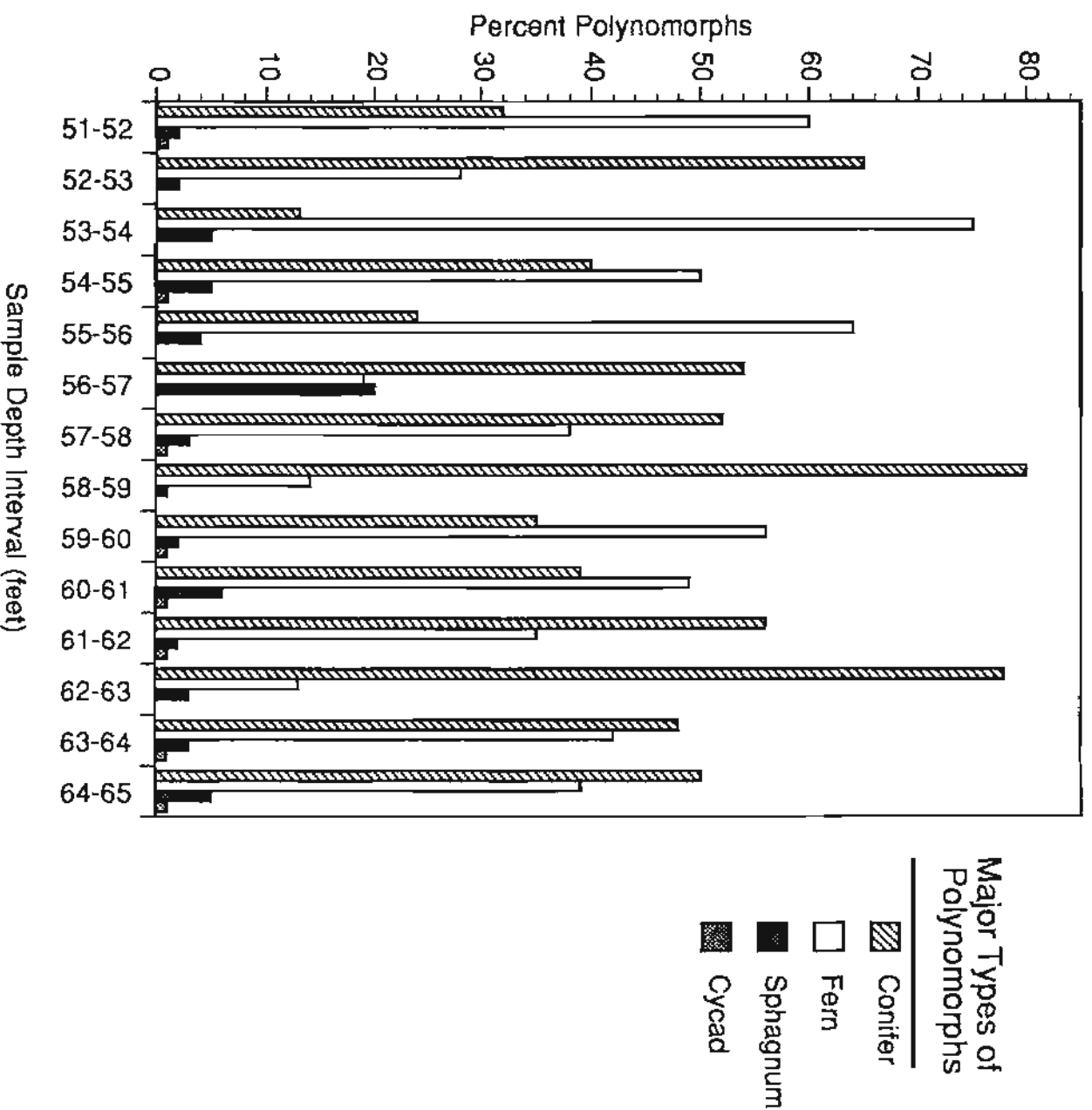


Figure 22 Major polynomorph types versus sample depth for drill hole 83-8c, K3 seam

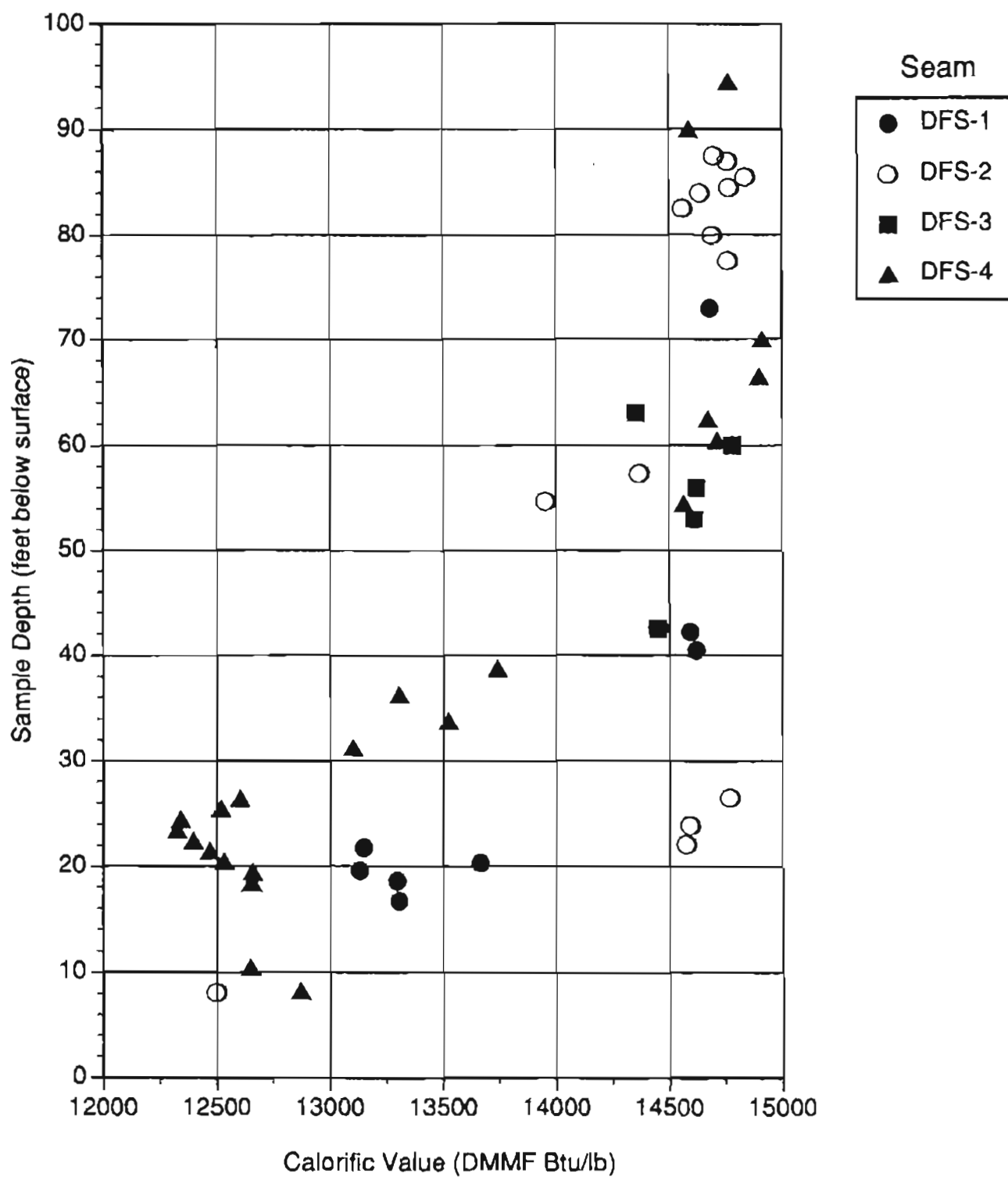


Figure 23 Calorific value versus sample depth for DFS group coal.



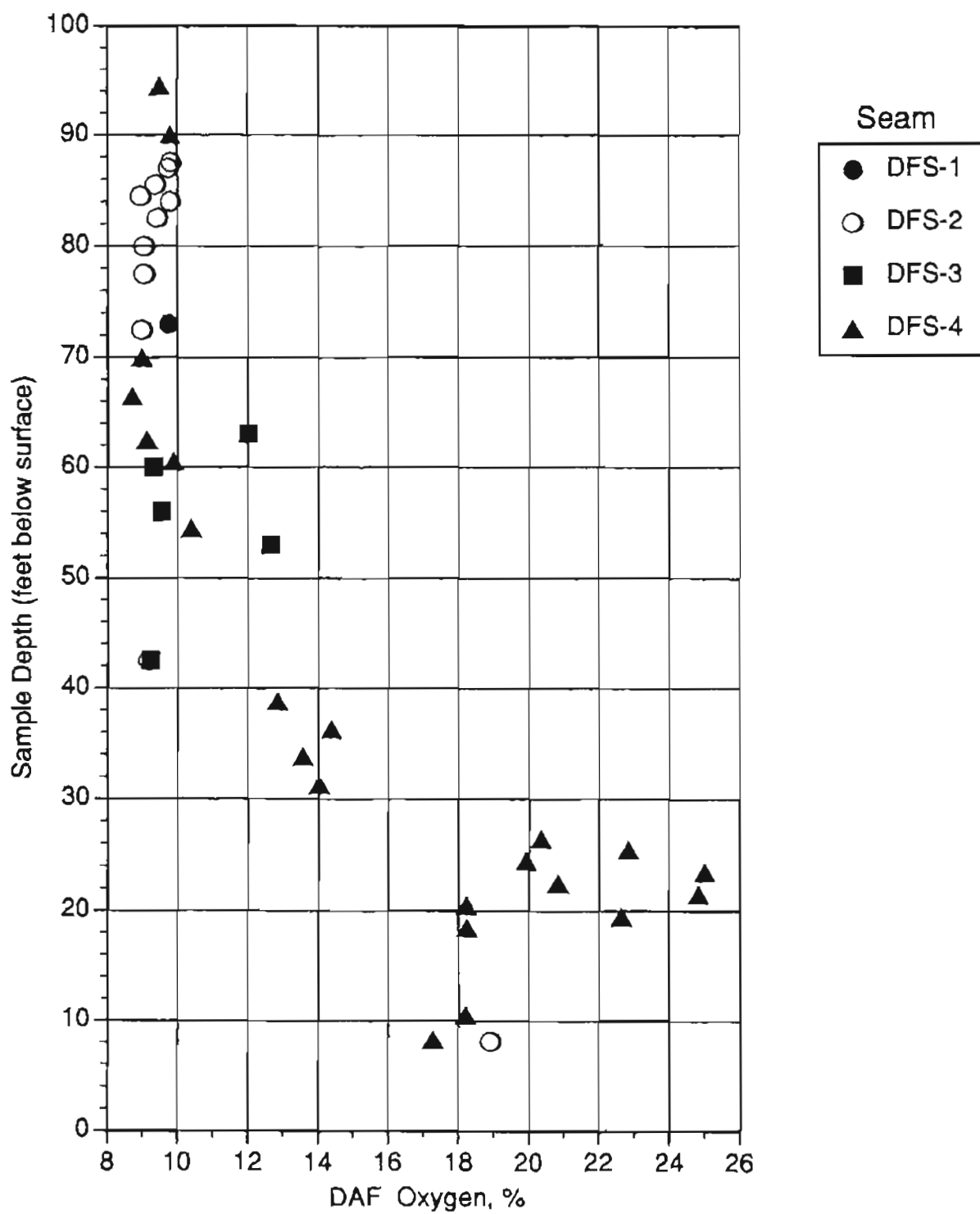


Figure 24 Oxygen content versus sample depth for DFS group coal.

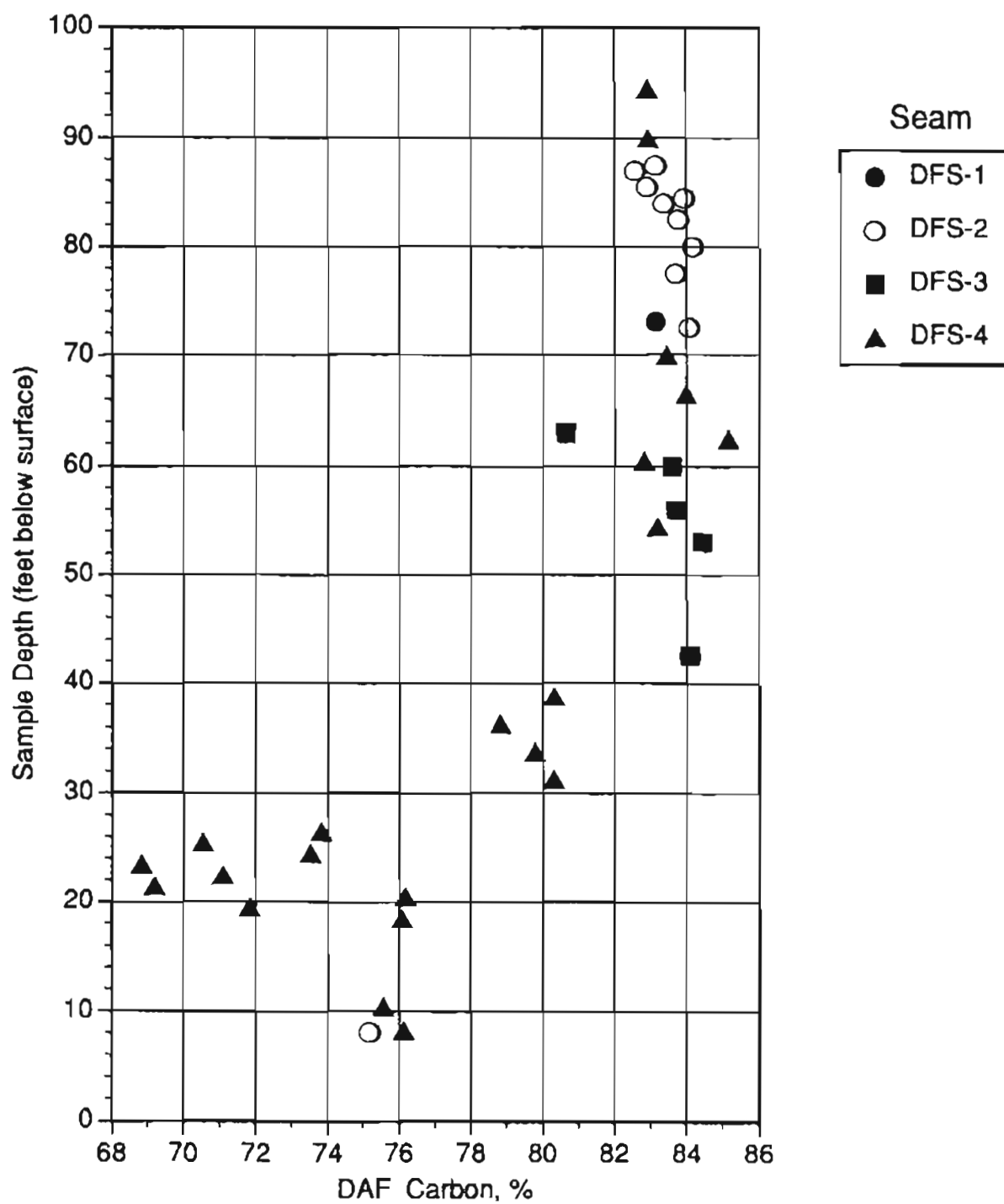


Figure 25 Carbon content versus sample depth for DFS group coal.

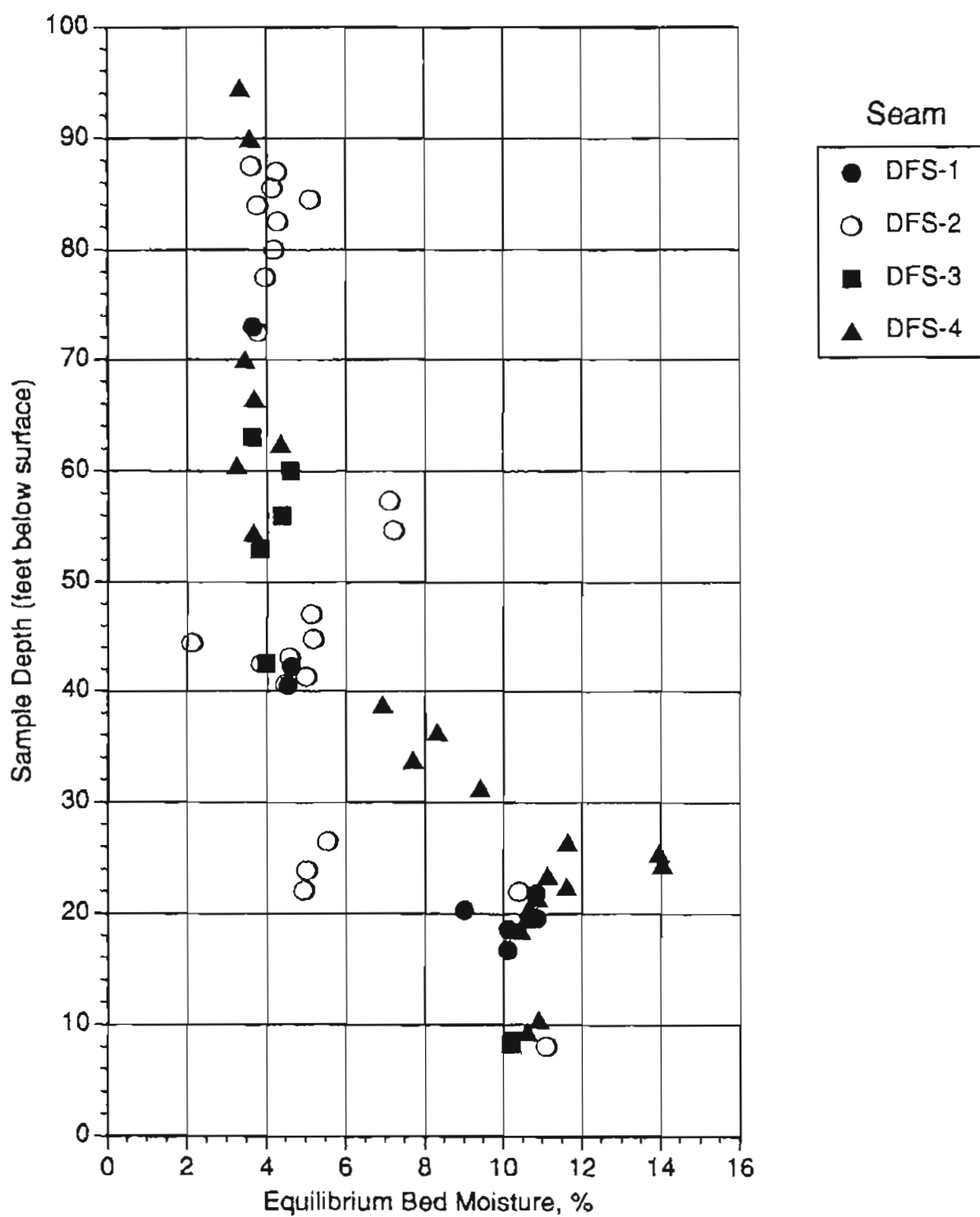
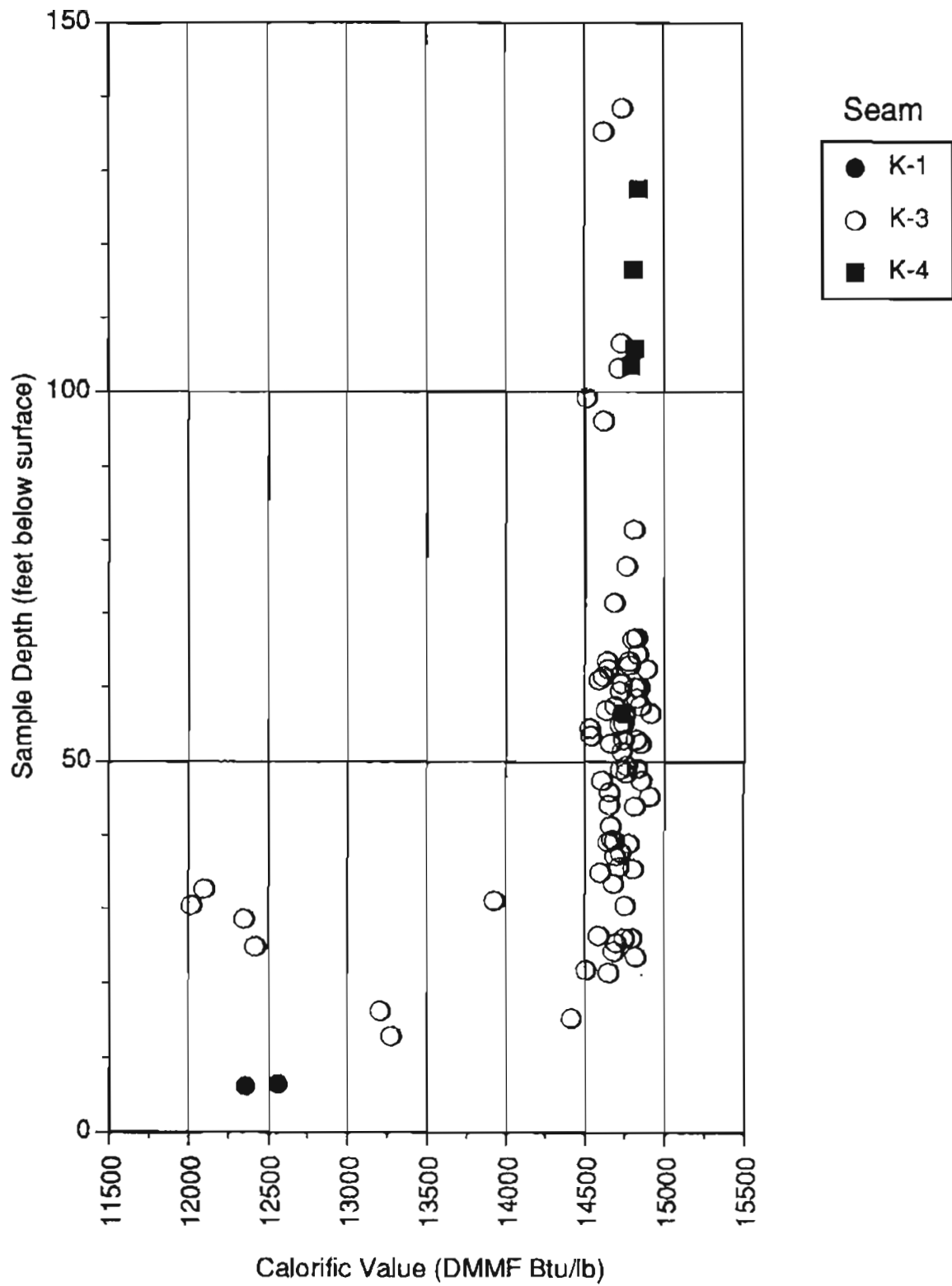


Figure 26 Equilibrium bed moisture versus sample depth for DFS group coal.



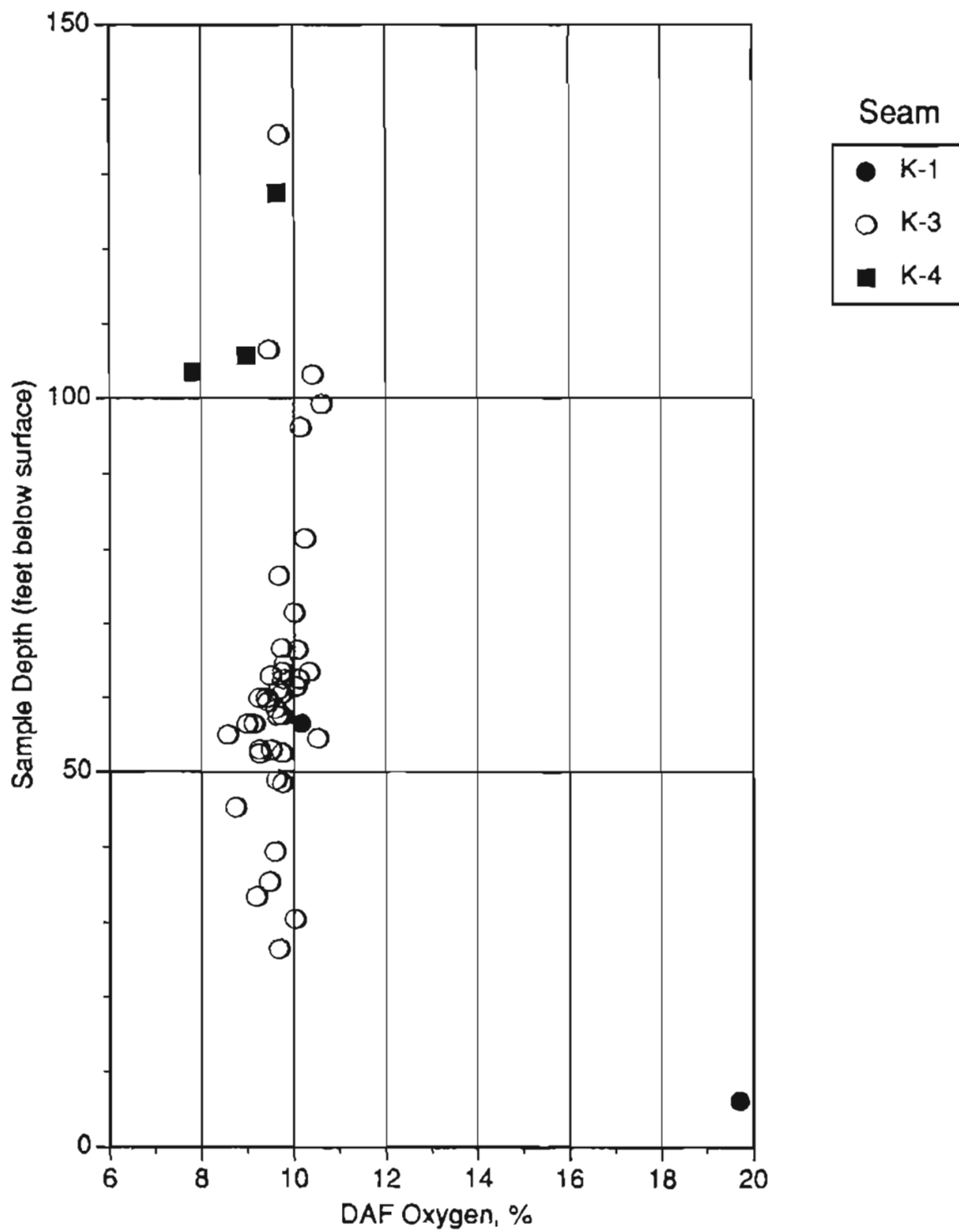


Figure 28 Oxygen content versus sample depth for K group coal.

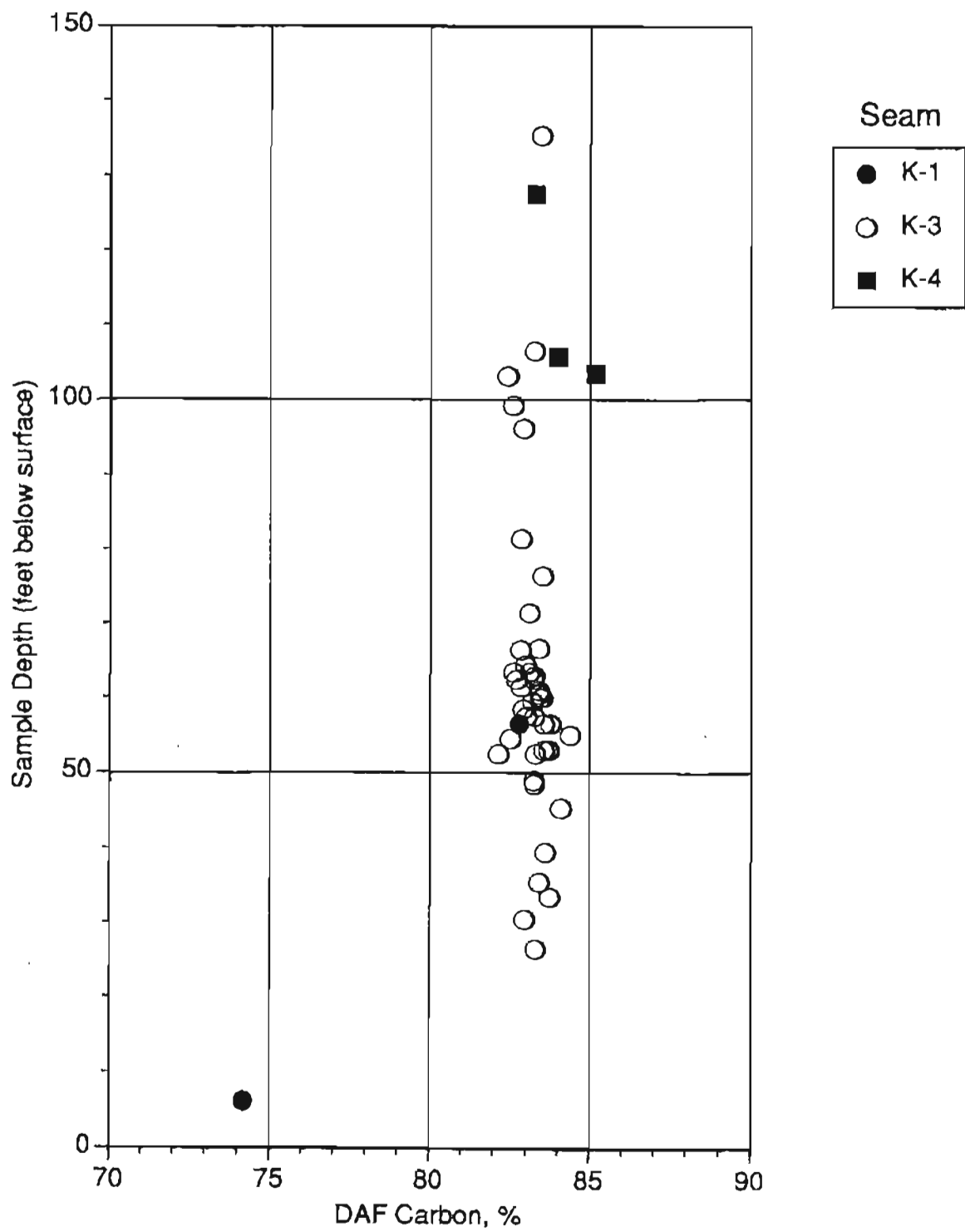


Figure 29 Carbon content versus sample depth for K group coal.

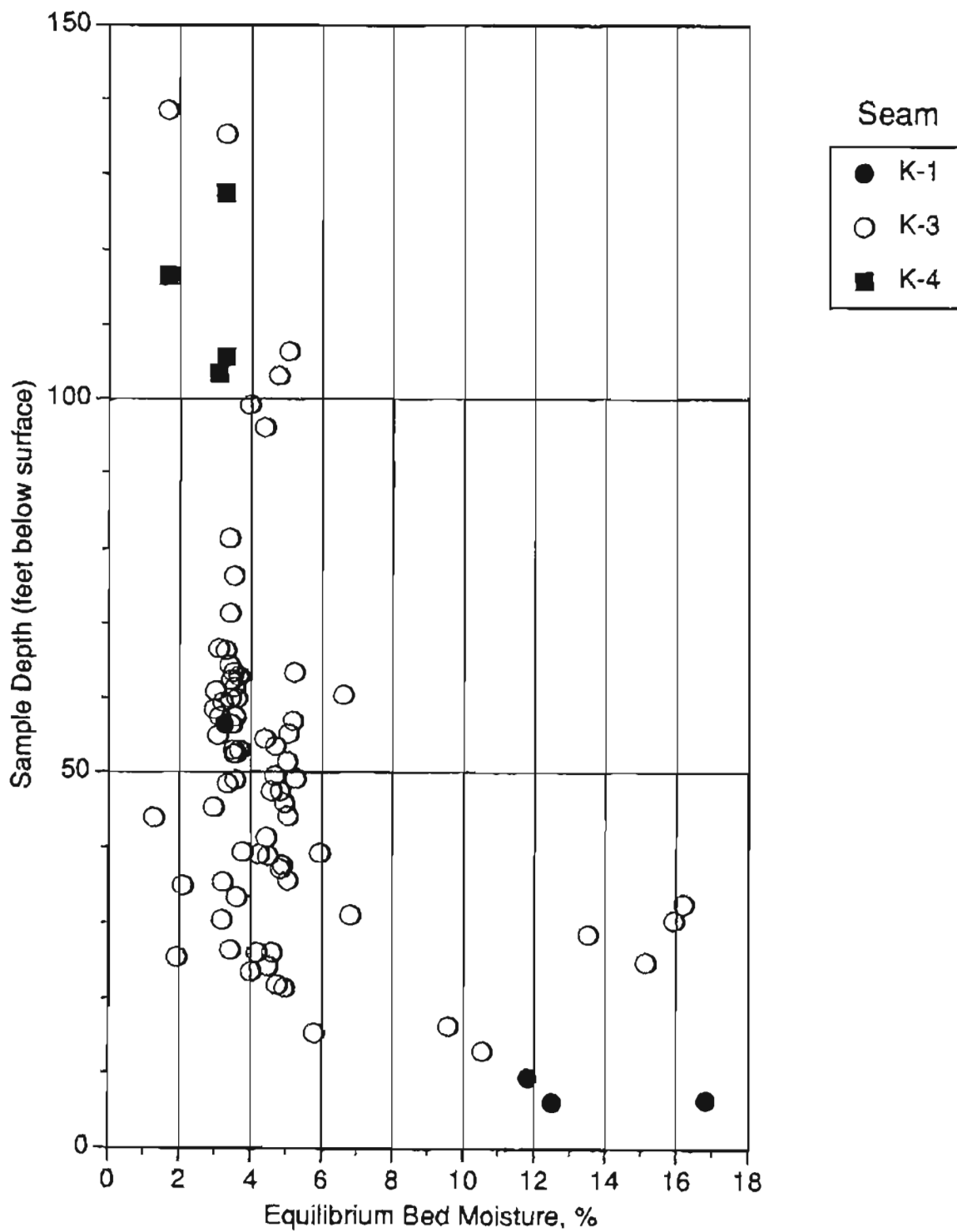


Figure 30 Equilibrium bed moisture versus sample depth for K group coal.

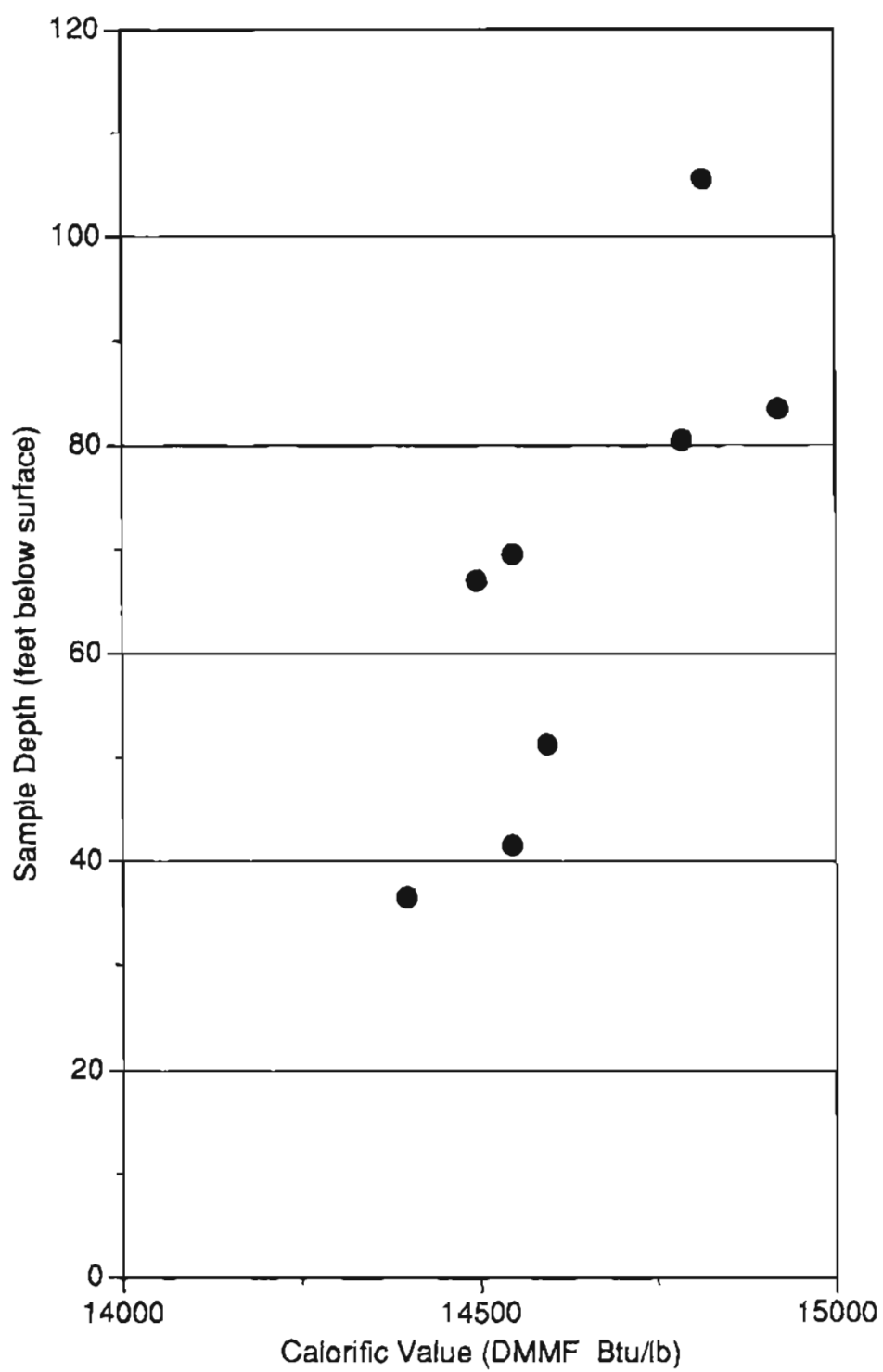


Figure 31 Calorific value versus sample depth for uncorrelated coal.



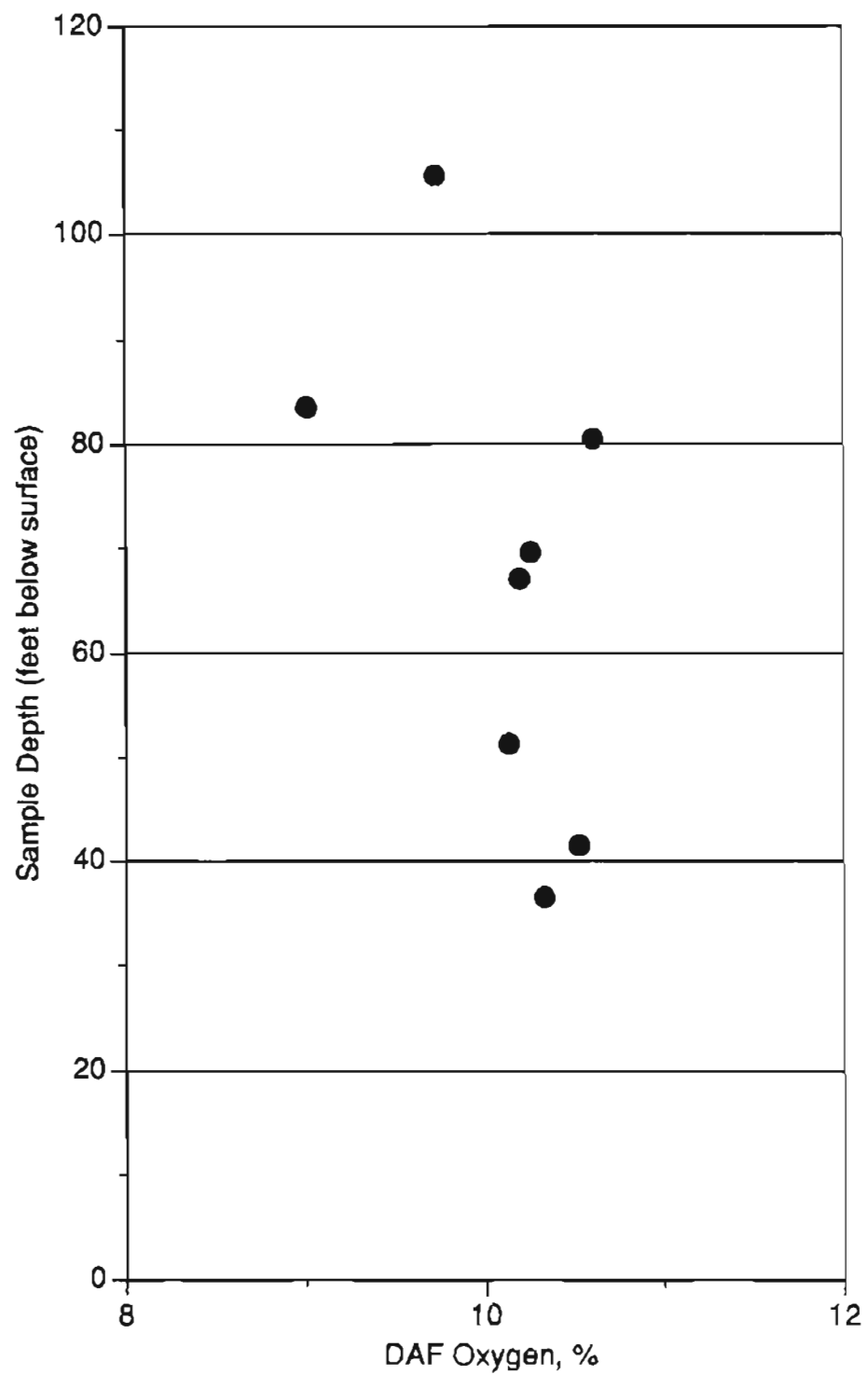


Figure 32 Oxygen content versus sample depth for uncorrelated coal.

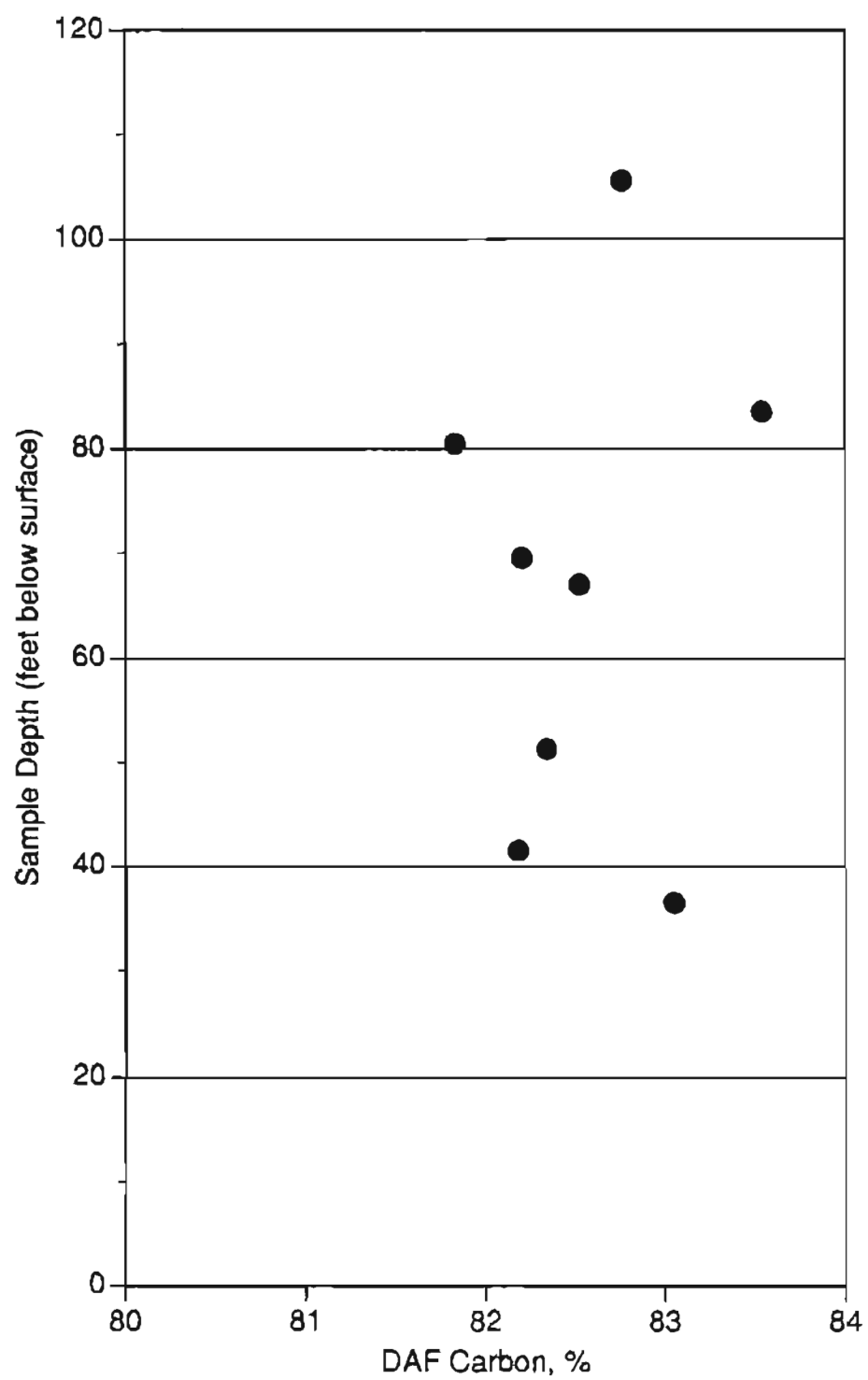


Figure 33 Carbon content versus sample depth for uncorrelated coal.

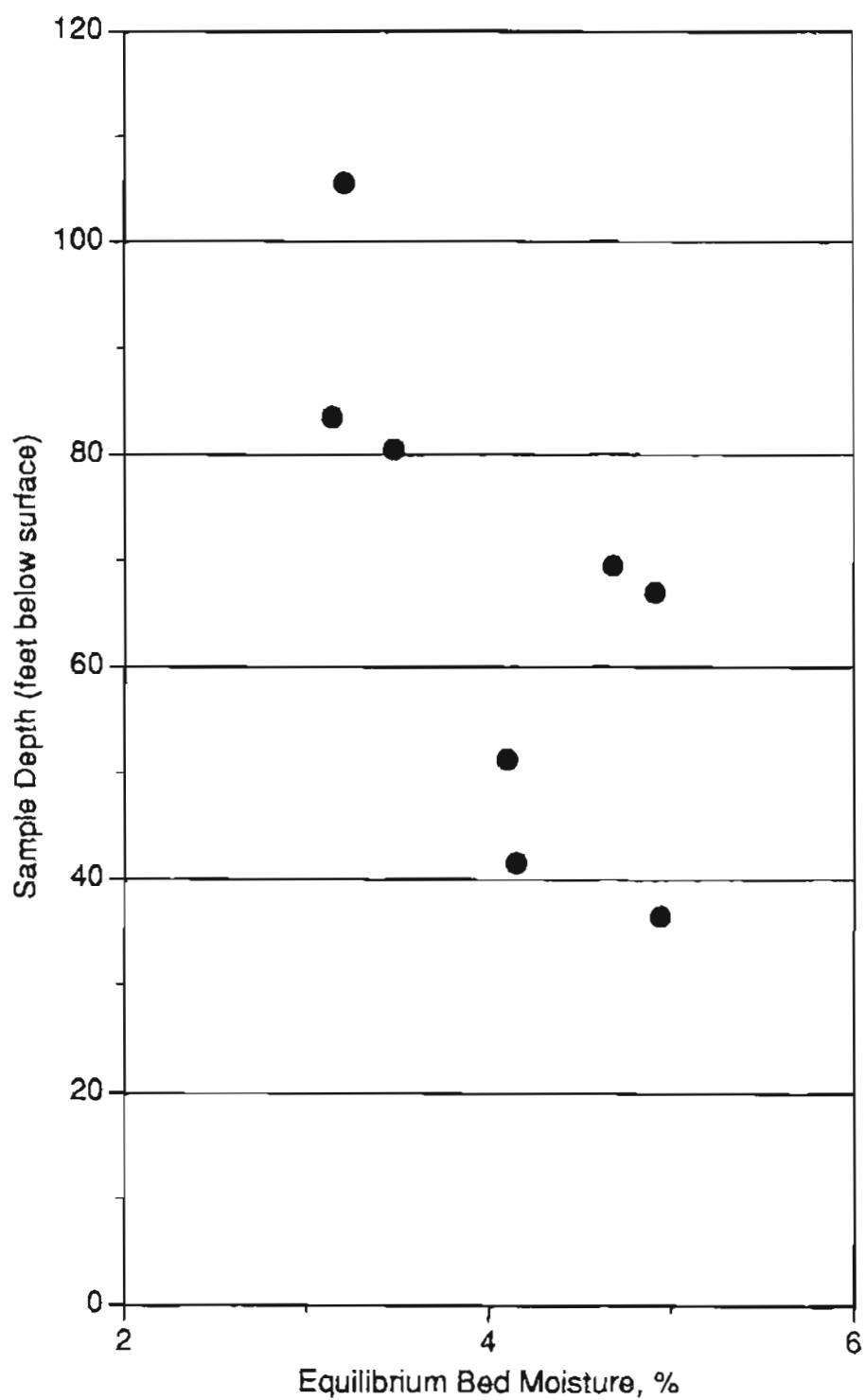


Figure 34 Equilibrium bed moisture versus sample depth for uncorrelated coal.

Table 3. Reflectance Rank Distribution of Vitrinites in Drill Hole 83-8C, K3 Seam

Depth Interval/Feet	V4	V5	V6	V7	V8	V9	Mean Maximum Reflectance in oil R <sub>max</sub> , %
51-52		9	75	16			.65
52-53		7	61	32			.68
53-54		5	58	35	2		.68
54-55		32	67	1			.61
55-56		9	56	35			.67
56-57			7	93			.73
57-58			62	38			.69
58-59			85	15			.67
59-60			54	46			.69
60-61			59	41			.69
61-62			56	44			.69
62-63			50	39	11		.70
63-64			7	75	18		.75
64-65			43	57			.71

Table 4. Distribution of Maceral Groups in K3 Seam, Drill Hole no. 83-8C.

Depth Interval (feet)	Vitrinite	Exinite	Inertinite
51-52	78.3	3.0	18.7
52-53	84.3	5.9	9.8
53-54	73.1	2.5	24.4
54-55	76.3	3.2	20.5
55-56	60.7	8.8	30.0
56-57	73.0	2.6	24.4
57-58	87.8	1.5	10.7
58-59	96.5	1.3	2.2
59-60	79.1	2.6	18.3
60-61	76.5	3.3	20.2
61-62	96.9	1.0	2.1
62-63	93.4	1.7	4.9
63-64	88.0	2.3	9.7
64-65	94.9	2.5	2.6
Seam Average			

Table 5. Summary of Samples and Coal Analyses from the Deadfall Syncline

Seam No.	Drill Hole	Sample Type	Raw Coal Analysis									HGI	FSI	Vitrinite Reflectance
			Proximate	Ultimate	Ash Composition	Ash Fusibility	1.5 S.G.		1.6 S.G.					
							Floats		Sinks	Floats				
							Proximate	Ultimate	Proximate	Proximate	Ultimate			
DFS-1	83-6	T	X							X	X			
DFS-1	84-110c	C	X											
DFS-1	84-112	C	X											
DFS-1	84-112c	C	X											
DFS-1	84-112f	C	X											
DFS-1	84-116	C	X											
DFS-1	84-116b	C	X											
DFS-1	86 PIT #3	SS	X	X	X	X								
DFS-2	73-6	A	X	X										
DFS-2	83-1	T	X							X	X			
DFS-2	83-5	T	X				X	X	X					
DFS-2	83-5c	C	X				X	X	X					
DFS-2	84-113b	C	X											
DFS-2	84-113c	C	X											
DFS-2	84-114	C	X											
DFS-2	84-115	C	X											
DFS-2	91-2	C	X	X	X	X						X		
DFS-2	86 PIT #2	SS	X	X	X	X								
DFS-3	AH73-5	A	X	X										
DFS-3	83-4	T	X							X	X			
DFS-3	83-4c	C	X				X	X	X					
DFS-3	91-1	C	X	X	X	X						X		
DFS-4	AH73-4	C	X	X										
DFS-4	AH73-10	T	X											
DFS-4	AH73-27	C	X	X										
DFS-4	83-2	T	X							X	X			
DFS-4	83-3	T	X							X	X			
DFS-4	87-PIT	SS	X	X										
DFS-4	91-PIT	SS	X	X	X	X								
K1	AH73-23	C	X	X										
K1	83-9	T	X							X	X			
K1	84-106	C	X											
K1	84-107	SS	X											
K1	DH91-3	T	X											
K1	DH91-4	T	X											
K1	DH91-11	T	X											
K1	DH91-12	T	X											
K1	DH91-13	T	X											
K2	DH91-3	T	X											
K2	DH91-4	T	X											
K2	DH91-9	T	X											
K3	AH73-8	C	X	X										
K3	AH73-25	T	X											
K3	83-8	T	X							X	X			

A: Auger Sample

T: Drill Cuttings

C: BW Core

SS: Surface Sample

Table 5. Summary of Samples and Coal Analyses from the Deadfall Syncline (continued)

Seam No.	Drill Hole	Sample Type	Raw Coal Analysis				1.5 S.G.			1.6 S.G.		HGI	FSI	Vitrinite Reflectance
			Proximate	Ultimate	Ash Composition	Ash Fusibility	Floats		Sinks	Floats				
							Proximate	Ultimate	Proximate	Proximate	Ultimate			
K3	8c	C	X				X	X	X					
K3	83-10	T	X							X	X			
K3	83-11	T	X							X	X			
K3	83-11c	C	X				X	X	X					
K3	83-8c	C	X	X										X
K3	84-108	C	X											
K3	84-109b	C	X											
K3	84-117	C	X											
K3	84-118	C	X											
K3	84-119b	C	X											
K3	84-120	C	X											
K3	84-121	C	X											
K3	84-122	C	X	X	X	X								
K3	DH91-1	T	X											
K3	DH91-2	T	X											
K3	DH91-3	T	X											
K3	DH91-4	T	X											
K3	DH91-5	C	X	X	X	X						X	X	
K3	DH91-7	C	X	X	X	X						X	X	
K3	DH91-7	T	X											
K3	DH91-9	T	X											
K3	DH91-10	T	X											
K3	DH91-10c	C	X	X	X	X						X	X	X
K3	DH91-11	T	X											
K3	DH91-13	T	X											
K4	AH73-24	C	X	X										
K4	83-10	T	X							X	X			
K4	DH91-1	T	X											
K4	DH91-2	T	X											
K4	DH91-3	T	X											
K4	DH91-4	T	X											
K4	DH91-5	T	X											
K4	DH91-6	T	X											
K4	DH91-7	C	X	X	X	X						X	X	
K4	DH91-9	T	X											
K4	DH91-10	T	X											
K5	DH91-6	T	X											
20	AH73-2	A	X											
20	AH73-3	A	X											
21	AH73-1	C	X	X										
21	83-12	T	X							X	X			
21	83-13c	C	X				X	X	X					
U.C.	83-16	T	X							X	X			

A: Auger Sample  
T: Drill Cuttings  
C: BW Core  
SS: Surface Sample

Table 5. Summary of Samples and Coal Analyses from the Deadfall Syncline (continued)

Seam No.	Drill Hole	Sample Type	Raw Coal Analysis				1.5 S.G.			1.6 S.G.		HGI	FSI	Vitrinite Reflectance
			Proximate	Ultimate	Ash Composition	Ash Fusibility	Floats		Sinks	Floats				
							Proximate	Ultimate	Proximate	Proximate	Ultimate			
U.C.	83-17	T	X							X	X			
U.C.	83-17C	C	X				X	X	X	X	X			
U.C.	83-19	T	X							X	X			
U.C.	83-20	T	X							X	X			
U.C.	83-21	T	X							X	X			
U.C.	83-22	T	X							X	X			
U.C.	DH91-8	T	X											
U.C.	DH91-12	T	X											
U.C.	DH91-13	T	X											

A: Auger Sample  
T: Drill Cuttings  
C: BW Core  
SS: Surface Sample



Table 6  
Average Proximate Analyses, DFS-1 Seam

	Weathered Coal			Unweathered Coal		
	n	range	mean	n	range	mean
Equilibrium moisture, %	5	9.85-20.21	12.32	2	3.65-4.75	4.20
Ash, %	5	6.88-16.29	10.19	2	9.50-15.13	11.92
Volatile Matter, %	5	23.39-29.12	27.42	2	30.94-31.24	31.09
Fixed Carbon, %	5	40.42-54.77	50.04	2	49.98-54.81	52.79
Heating Value, Btu/lb	5	7835-11074	10029	2	11736-12393	12122
Total Sulfur, %	5	0.14-0.29	0.25	2	0.28-0.31	0.30

Table 7  
Average Ash Composition, DFS-1 Seam

Constituent	Wt. Percent
Silicon dioxide	52.6
Aluminum oxide	33.4
Iron oxide	3.36
Magnesium oxide	1.62
Calcium oxide	3.92
Sodium oxide	1.64
Potassium oxide	1.46
Titanium oxide	1.37
Manganese oxide	0.03
Phosphorous oxide	N.A.
Barium Oxide	N.A.
Strontium Oxide	N.A.
Sulfur trioxide	0.85

N.A. - Not Analyzed.

Table 8  
Average Proximate Analyses, DFS-2 Seam

	Weathered Coal			Unweathered Coal		
	n	range	mean	n	range	mean
Equilibrium moisture, %	2	10.64-11.10	10.87	6	3.71-5.24	4.68
Ash, %	2	8.67-9.90	9.31	6	7.81-18.65	12.13
Volatile Matter, %	2	29.50-29.63	29.56	6	29.21-52.93	31.15
Fixed Carbon, %	2	49.50-51.05	50.25	6	48.33-57.10	52.44
Heating Value, Btu/lb	2	9776-10451	10098	6	10361-12679	11845
Total Sulfur, %	2	0.20-0.27	0.23	5	0.22-0.28	0.23
Hardgrove Grindability Index						53

Table 9  
Average Ash Composition, DFS-2 Seam

Constituent	Wt. Percent
Silicon dioxide	29.6
Aluminum oxide	23.7
Iron oxide	12.1
Magnesium oxide	6.88
Calcium oxide	14.1
Sodium oxide	4.16
Potassium oxide	1.14
Titanium oxide	1.18
Manganese oxide	0.08
Phosphorous oxide	1.76
Barium Oxide	1.41
Strontium Oxide	0.28
Sulfur trioxide	4.51

Table 10  
Average Proximate Analysis, DFS-3 Seam

	Weathered Coal			Unweathered Coal		
	n	range	mean	n	range	mean
Equilibrium moisture, %	1		10.20	2	3.99-4.25	4.12
Ash, %			13.4	2	7.67-8.12	7.90
Volatile Matter, %			26.70	2	31.39-32.44	31.59
Fixed Carbon, %			49.70	2	30.22-56.50	56.40
Heating Value, Btu/lb			9651	2	12665-12606	12635
Total Sulfur, %			0.20	1		0.17
Hardgrove Grindability Index						47

Table 11  
Average Ash Composition, DFS-3 Seam

Constituent	Wt. Percent
Silicon dioxide	31.0
Aluminum oxide	22.9
Iron oxide	16.2
Magnesium oxide	6.72
Calcium oxide	10.3
Sodium oxide	1.54
Potassium oxide	1.17
Titanium oxide	0.79
Manganese oxide	0.14
Phosphorous oxide	1.59
Barium Oxide	0.82
Strontium Oxide	0.22
Sulfur trioxide	4.23

Table 12  
Average Proximate Analyses, DFS-4 Seam

	Weathered Coal			Unweathered Coal		
	n	range	mean	n	range	mean
Equilibrium moisture, %	5	8.09-11.64	10.26	2	3.51-3.84	3.68
Ash, %	5	3.08-7.75	4.85	2	8.07-9.43	8.78
Volatile Matter, %	5	27.94-31.00	30.43	2	30.51-32.56	31.48
Fixed Carbon, %	5	53.20-57.67	58.03	2	55.88-56.22	56.06
Heating Value, Btu/lb	5	10669-11814	10948	2	12629-12884	12750
Total Sulfur, %	4	0.11-0.21	0.18	2	0.28-0.32	0.30

Table 13  
Average Ash Composition, DFS-4 Seam

Constituent	Wt. Percent
Silicon dioxide	25.0
Aluminum oxide	31.6
Iron oxide	4.83
Magnesium oxide	5.94
Calcium oxide	11.1
Sodium oxide	4.06
Potassium oxide	0.52
Titanium oxide	0.97
Manganese oxide	0.01
Phosphorous oxide	2.45
Barium Oxide	1.76
Strontium Oxide	0.55
Sulfur trioxide	8.90

Table 14  
Average Proximate Analyses, K1 Seam

	Weathered Coal			Unweathered Coal		
	n	range	mean	n	range <sup>1</sup>	mean
Equilibrium moisture, %	1		12.50	1		3.25
Ash, %	1		10.40	7	17.46-31.14	20.66
Volatile Matter, %	1		30.20	7	26.78-32.08	29.37
Fixed Carbon, %	1		46.90	7	44.26-51.60	46.71
Heating Value, Btu/lb	1		9424	7	7919-11824	10679
Total Sulfur, %	1		0.20	7	0.22-0.33	0.24

<sup>1</sup> Moisture free basis

Table 15  
Average Proximate Analyses, K2 Seam

	Weathered Coal			Unweathered Coal		
	n	range	mean	n	range <sup>1</sup>	mean
Equilibrium moisture, %						3.25 <sup>2</sup>
Ash, %				3	13.68-17.49	16.59
Volatile Matter, %				3	27.30-33.08	30.77
Fixed Carbon, %				3	46.65-53.23	49.39
Heating Value, Btu/lb				3	10629-12628	11684
Total Sulfur, %				3	0.29-0.45	0.33

<sup>1</sup> Moisture free basis

<sup>2</sup> Estimated

Table 16  
Average Proximate Analyses, K3 Seam

	Weathered Coal			Unweathered Coal		
	n	range	mean	n	range <sup>1</sup>	mean
Equilibrium moisture, %	2	11.20-14.84	13.02	16	3.01-5.12	4.19
Ash, %	2	7.21-10.50	8.86	24	6.23-15.43	9.06
Volatile Matter, %	2	29.12-29.30	29.21	24	31.00-35.93	32.81
Fixed Carbon, %	2	48.83-49.00	48.91	24	51.26-58.49	53.85
Heating Value, Btu/lb	2	9548-9643	9596	24	12227-13777	12602
Total Sulfur, %	1	0.20	0.20	22	0.19-0.32	0.19
Free Swelling Index				11	1-5	2.4
Hardgrove Grindability Index				11	52-61	58
ASTM Rank				High Volatile A Bituminous		
Vitrinite Reflectance						0.74

<sup>1</sup> Moisture free basis

Table 17  
Average Ash Composition, K3 Seam

Constituent	Wt. Percent
Silicon dioxide	29.8
Aluminum oxide	31.4
Iron oxide	4.15
Magnesium oxide	6.14
Calcium oxide	11.5
Sodium oxide	6.81
Potassium oxide	0.61
Titanium oxide	0.56
Manganese oxide	0.01
Phosphorous oxide	0.83
Barium Oxide	1.39
Strontium Oxide	0.26
Sulfur trioxide	4.93

Table 18  
Average Proximate Analyses, K4 Seam

	Weathered Coal			Unweathered Coal		
	n	range	mean	n	range <sup>1</sup>	mean
Equilibrium moisture, %	1		12.10	2		3.24
Ash, %	1		10.50	2	4.35-28.76	15.18
Volatile Matter, %	1		29.60	2	28.47-35.98	31.49
Fixed Carbon, %	1		47.80	2	42.77-59.91	49.99
Heating Value, Btu/lb	1		9480	2	10265-14114	11967
Total Sulfur, %	1		0.20	2	0.21-0.30	0.25
Free Swelling Index				2	2.5-3.0	2.75
Hard Grove Grindability Index				2	53-55	54

<sup>1</sup> Moisture free basis

Table 19  
Average Ash Composition, K4 Seam

Constituent	Wt. Percent
Silicon dioxide	24.3
Iron oxide	5.23
Magnesium oxide	7.79
Calcium oxide	12.9
Sodium oxide	7.55
Potassium oxide	0.53
Titanium oxide	0.92
Manganese oxide	0.01
Phosphorous oxide	0.94
Barium Oxide	1.58
Strontium Oxide	0.30
Sulfur trioxide	7.41

Table 20  
Average Proximate Analyses, K5 Seam

	Weathered Coal			Unweathered Coal		
	n	range	mean	n	range	mean <sup>1</sup>
Equilibrium moisture, %						
Ash, %						36.86
Volatile Matter, %						25.86
Fixed Carbon, %						37.28
Heating Value, Btu/lb						8993
Total Sulfur, %						0.24

<sup>1</sup> Moisture free basis



Table 21  
Weight Distribution of Float and Sink Products from 1983 Drill Samples

Drill Hole Number	Seam No.	Depth Interval (feet)	Weight, % Floats	Weight, % Sinks
83-6 1.6 S.G.	DFS-1	71-75	83.48	16.52
Seam Average		71-75	83.48	16.52
5C 1.5 S.G.	DFS-2	77-78	86.68	13.32
		79-81	90.37	9.63
		81-84	90.02	9.98
		84-85	91.94	8.06
Seam Average		77-85	89.92	10.08
83-1 1.6 S.G.	DFS-2	70-75	80.00	20.00
83-5 1.6 S.G.	DFS-2	82-86	85.03	14.97
		86-89	78.41	21.59
Seam Average		82-89	82.19	17.81
4C 1.5 S.G.	DFS-3	52-54	88.35	11.65
		56-58	94.10	5.90
		58-62	89.31	10.69
		62-64	73.75	26.25
Seam Average		52-64	86.96	13.04
83-4 1.6 S.G.	DFS-3	51-58	84.04	15.96
		58-63	76.61	23.39
Seam Average		51-63	80.94	19.06
83-2 1.6 S.G.	DFS-4	61-64	86.49	13.51
		64-69	93.83	6.17
		69-71	84.12	15.88
Seam Average		61-71	89.69	10.31

Table 21  
Weight Distribution of Float and Sink Products from 1983 Drill Samples (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Weight, % Floats	Weight, % Sinks
83-3	DFS-4	87-93	90.56	9.44
1.6 S.G.		93-96	89.46	10.54
Seam Average		87-96	90.19	9.81
83-9	K1	55-58	77.68	22.32
1.6 S.G.				
8c	K3	51-55	85.71	14.29
1.5 S.G.		55-58	79.69	20.31
		58-62	97.49	2.51
		62-65	92.64	7.36
Seam Average		51-62	89.27	10.73
11c	K3	47-51	85.52	4.48
1.5 S.G.		51-55	73.51	6.49
		55-58	95.98	4.02
		58-62	98.28	1.72
		62-64	95.55	4.45
Seam Average		51-64	88.72	11.28
83-8	K3	25-28	83.46	16.54
1.6 S.G.		28-33	89.76	10.24
		33-38	91.72	8.28
Seam Average		25-38	89.06	10.94
83-10	K3	69-74	80.90	19.10
1.6 S.G.		74-79	94.06	5.94
		79-84	94.31	5.69
Seam Average		69-84	89.76	10.24

Table 21  
Weight Distribution of Float and Sink Products from 1983 Drill Samples (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Weight, % Floats	Weight, % Sinks
83-11	K3	47-50	73.29	26.71
1.6 S.G.		50-55	79.50	20.50
		55-60	82.47	17.53
		60-65	89.72	10.28
		65-68	83.70	16.30
Seam Average		47-68	82.35	17.65
83-10	K4	125-130	85.41	14.59
1.6 S.G.				
13c	21	32-35	57.82	42.18
1.5 S.G.		35-38	67.28	32.72
		38-41	29.11	70.89
		41-42	88.35	11.65
Seam Average		32-42	55.10	44.90
83-12	21	33-40	48.10	51.90
1.6 S.G.				
17c	Un-	66-68	91.03	8.97
1.5 S.G.	correlated	68-71	92.26	7.74
Seam Average		66-71	91.77	8.23
83-16	Un-	96-99	72.37	37.63
1.6 S.G.	correlated	100-102	70.77	29.23
		102-104	82.94	17.06
Seam Average		96-104	74.93	25.07
83-17	Un-	62-67	77.83	22.17
1.6 S.G.	correlated	67-72	75.36	24.64
Seam Average		62-72	76.60	23.41

Table 21  
Weight Distribution of Float and Sink Products from 1983 Drill Samples (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Weight, % Floats	Weight, % Sinks
83-20 1.6 S.G.	Un- correlated	4-6.3	43.82	56.18
83-21 1.6 S.G.	Un- correlated	78-83 83-84	91.77 93.08	8.23 6.92
Seam Average		78-84	91.99	8.01
83-22 1.6 S.G.	Un- correlated	50-52.5	68.97	31.03

Table 22  
Proximate and Ultimate Analyses of DFS-1 Seam, Deadfall Syncline

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
83-6 Drill Cuttings	DFS-1	71-75	4	3.65	15.13	31.24	49.98	11736	0.28						
			2		15.71	32.42	51.88	12181	0.30						
			3			38.46	61.54	14450	0.35						
83-6 1.6 SG Float	DFS-1	71-75	4	3.65	5.57	34.53	56.25	13263	0.30	75.47	5.21	1.36	12.09	1.5	
			2		5.78	35.84	58.38	13765	0.32	78.32	4.98	1.42	9.18		
			3			38.04	61.96	14610	0.34	83.13	5.29	1.50	9.74		
84-110c Core	DFS-1	10.9-12.7	1	10.59	13.50	27.38	48.53	9768	0.32						
			2		15.10	30.63	54.28	10925	0.35						
			3			36.07	63.93	12868	0.42						
		12.7-15.2	1	10.55	4.38	30.22	54.85	11183	0.19						
			2		4.90	33.78	61.32	12502	0.21						
			3			35.52	64.48	13146	0.22						
		15.2-17.4	1	9.59	8.83	29.33	52.25	10679	0.19						
			2		9.76	32.44	57.80	11811	0.21						
			3			35.95	64.05	13089	0.23						
Seam Average		10.9-17.4	1	10.22	8.47	29.12	52.19	10617	0.23						
			2		9.43	32.43	58.13	11826	0.26						
			3			35.81	64.19	13057	0.28						
84-110c Core	Un-correlated	25.5-26.6	1	4.60	8.00	34.22	53.18	12796	0.25						
			2		8.38	35.87	55.75	13413	0.26						
			3			39.15	60.85	14640	0.29						
		26.6-27.6	1	7.20	41.20	19.49	32.11	7095	0.27						
			2		44.40	21.00	34.60	7646	0.30						
			3			37.77	62.23	13751	0.53						
84-112 Core	DFS-1	17.1-18.9	1	10.46	11.67	27.28	50.59	9991	0.36						
			2		13.03	30.47	56.50	11158	0.40						
			3			35.04	64.96	12830	0.46						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 22  
Proximate and Ultimate Analyses of DFS-1 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
		18.9-20.9	1	10.85	5.03	30.34	53.78	10993	0.26						
			2		5.64	34.03	60.32	12331	0.29						
			3			36.07	63.93	13068	0.31						
		20.9-22.6	1	10.84	7.82	28.42	52.92	10612	0.25						
			2		8.77	31.88	59.35	11902	0.28						
			3			34.94	65.06	13046	0.31						
Seam Average		17.1-22.6	1	10.70	8.33	28.53	52.34	10507	0.29						
			2		9.33	31.95	58.72	11766	0.32						
			3			35.24	64.76	12976	0.36						
84-112c	DFS-1 ?	1.0-3.0	1	15.22	22.17	21.53	41.07	7624	0.14						
			2		26.15	25.40	48.45	8993	0.16						
			3			34.39	65.61	12178	0.22						
		3.0-5.0	1	24.35	10.94	24.84	39.86	8010	0.14						
			2		14.47	32.84	52.69	10588	0.19						
			3			38.40	61.60	12379	0.22						
Seam Average		1-5	1	20.21	16.03	23.34	40.42	7835	0.14						
			2		20.09	29.25	50.66	9820	0.18						
			3		20.09	29.25	50.66	9820	0.18						
84-112F Core	DFS-1 ?	4.0-5.0	1	18.52	43.82	14.46	23.19	4026	0.10						
			2		53.79	17.75	28.46	4941	0.12						
			3			38.41	61.59	10691	0.26						
		5.0-5.5	1	18.16	17.26	22.17	42.41	7954	0.14						
			2		21.10	27.09	51.82	9719	0.17						
			3			34.33	65.67	12317	0.22						
Seam Average		4-5.5	1	18.33	29.58	18.59	33.50	6132	0.12						
			2		36.22	22.76	41.02	7508	0.15						
			3			35.69	64.31	11772	0.23						

\*1 - As Received Moisture  
 2 - Moisture Free  
 3 - Moisture and Ash Free  
 4 - Equilibrium Moisture  
 5 - As Analyzed

Table 22  
Proximate and Ultimate Analyses of DFS-1 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
96	DFS-1	9.0-9.5	1	17.26	41.71	18.54	22.49	4502	0.15						
			2		50.42	22.41	27.18	5441	0.18						
			3			45.19	54.81	10974	0.37						
		15.8-17.6	1	10.11	8.65	28.04	53.20	10716	0.32						
			2		9.62	31.19	59.19	11922	0.35						
			3			34.51	65.49	13191	0.39						
		17.6-19.6	1	10.11	6.63	28.65	54.62	10999	0.22						
			2		7.37	31.87	60.76	12236	0.24						
			3			34.40	65.60	13210	0.26						
		19.6-20.9	1	9.00	4.46	29.00	57.54	11776	0.29						
			2		4.90	31.87	63.23	12941	0.32						
			3			33.51	66.49	13608	0.34						
	Seam Average	15.8-20.9	1	9.85	6.88	28.5	54.77	11074	0.27						
			2		7.63	31.61	60.75	12284	0.30						
			3			34.23	65.77	13299	0.32						
	DFS-1	37.8-39.6	1	5.05	13.95	28.12	52.87	11603	0.37						
			2		14.70	29.62	55.69	12220	0.39						
			3			34.72	65.28	14325	0.45						
		39.6-41.3	1	4.54	4.48	33.58	57.40	13250	0.26						
			2		4.69	35.18	60.13	13880	0.27						
			3			36.91	63.09	14564	0.29						
		41.3-43.1	1	4.63	9.81	31.28	54.28	12371	0.31						
			2		10.29	32.80	56.92	12972	0.32						
			3			36.56	63.44	14459	0.36						
	Seam Average	37.8-43.1	1	4.75	9.50	30.94	54.81	12393	0.31						
			2		9.97	32.48	57.54	13011	0.33						
			3			36.08	63.92	14452	0.36						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 22  
Proximate and Ultimate Analyses of DFS-1 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
86 Test Pit #3	DFS-1	4-6	4	10.72	16.29	25.73	47.26	9255	0.24	55.53	4.37	0.99	22.58		

\*1 - As Received Moisture  
 2 - Moisture Free  
 3 - Moisture and Ash Free  
 4 - Equilibrium Moisture  
 5 - As Analyzed



Table 23  
Proximate and Ultimate Analyses of DFS-2 Seam, Deadfall Syncline

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
AH 73-6	DFS-2	4.2-12.0	4	11.10	9.90	29.50	49.50	9776	0.20	59.40	4.60	1.10	24.80		
			2		11.14	33.18	55.68	10997	0.22	66.82	3.78	1.24	16.81		
			3			37.34	62.66	12375	0.25	75.19	4.25	1.39	18.92		
83-1 Drill Cuttings	DFS-2	70-75	4	3.80	18.65	29.21	48.33	11082	0.23						
			2		19.39	30.37	50.24	11520	0.24						
			3			37.67	62.33	14291	0.30						
83-1 1.6 SG Float	DFS-2	70-75	4	3.80	4.69	31.40	60.11	11168	0.23	76.94	5.22	1.32	11.60		
			2		4.88	32.64	62.48	11609	0.24	79.98	4.98	1.37	8.55		
			3			34.31	65.69	12205	0.26	84.08	5.23	1.44	8.99		
83-5 Drill Cuttings	DFS-2	82-86	4	3.78	11.87	30.41	53.95	12021	0.28						
			2		12.33	31.60	56.07	12493	0.29						
			3			36.04	63.96	14250	0.33						
		86-89	4	3.62	17.37	30.67	48.34	11346	0.25						
			2		18.02	31.82	50.15	11772	0.25						
			3			38.82	61.18	14360	0.31						
Seam Average Raw Coal		82-89	4	3.71	14.22	30.51	51.54	11732	0.26						
			2		14.77	31.69	53.53	12184	0.27						
			3			37.18	62.82	14295	0.32						
83-5 1.6 SG Float	DFS-2	82-86	4	3.78	5.98	31.21	59.03	13144	0.29	75.25	5.01	1.27	12.20	1.5	
			2		6.21	32.44	61.35	13661	0.31	78.20	4.76	1.32	9.19		
			3			34.59	65.41	14566	0.33	83.38	5.08	1.41	9.80		
		86-89	4	3.62	3.73	33.66	58.99	13580	0.27	77.04	5.27	1.37	12.31	1.5	
			2		3.87	34.93	61.20	14090	0.29	79.93	5.05	1.43	9.44		
			3			36.33	63.67	14657	0.30	83.15	5.25	1.48	9.82		
Seam Average 1.6 SG Float		82-89	4	3.71	5.02	32.27	59.02	13331	0.29	76.01	5.11	1.32	12.25	1.5	
			2		5.21	33.51	61.29	13845	0.30	78.94	4.88	1.37	9.30		
			3			35.35	64.65	14606	0.32	83.28	5.15	1.45	9.81		

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 23  
Proximate and Ultimate Analyses of DFS-2 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
69		77-78	4	3.98	11.70	31.47	52.86	12257							
			2		12.18	32.77	55.05	12765							
			3			37.31	62.69	14535							
		79-81	4	4.20	8.25	28.74	58.81	12702							
			2		8.61	30.00	61.39	13259							
			3			32.83	67.17	14508							
		81-84	4	4.30	7.50	31.24	56.96	12625							
			2		7.84	32.64	59.52	13192							
			3			35.42	64.58	14314							
		84-85	4	5.12	3.97	32.64	58.28	13206							
			2		4.18	34.40	61.43	13919							
			3			35.90	64.10	14526							
	Raw Coal Seam Average	77-85	4	4.34	7.81	30.76	57.10	12679							
			2		8.16	32.16	59.69	13254							
			3			35.02	64.98	14432							
	DFS-2	77-78	4	3.98	4.14	33.54	58.35	13516	0.56	76.91	5.26	1.28	11.85	1.5	
			2		4.31	34.93	60.76	14076	0.58	80.10	5.01	1.34	8.66		
			3			36.50	63.50	14709	0.61	83.70	5.24	1.40	9.05		
		79-81	4	4.20	5.72	29.29	60.79	13171	0.33	75.83	4.94	1.29	11.88	1.5	
			2		5.97	30.57	63.46	13748	0.35	79.16	4.67	1.35	8.51		
			3			32.51	67.49	14621	0.37	84.18	4.96	1.43	9.05		
		81-84	4	4.30	4.72	31.27	59.71	13196	0.28	76.22	5.08	1.31	12.38	2.0	
			2		4.93	32.68	62.39	13789	0.30	79.65	4.81	1.37	8.95		
			3			34.37	65.63	14504	0.31	83.78	5.06	1.44	9.42		
		84-85	4	5.12	2.29	32.86	59.73	13650	0.30	77.72	5.49	1.36	12.83	2.0	
			2		2.42	34.63	62.96	14387	0.32	81.91	5.18	1.44	8.73		
			3			35.49	64.51	14743	0.32	83.94	5.31	1.47	8.95		

\*1 - As Received Moisture  
 2 - Moisture Free  
 3 - Moisture and Ash Free  
 4 - Equilibrium Moisture  
 5 - As Analyzed

Table 23  
Proximate and Ultimate Analyses of DFS-2 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average 1.5 SG Float		77-85	4	4.34	4.57	31.25	59.84	13301	0.33	76.43	5.13	1.31	12.22	2.0	
			2		4.78	32.67	62.56	13904	0.35	79.90	4.85	1.37	8.75		
			3			34.31	65.69	14602	0.37	83.91	5.09	1.44	9.19		
83-5c 1.5 SG Sink	DFS-2	77-78	2		63.45	18.72	17.83	4219	0.18						
			3			51.22	48.78	11543	0.50						
		79-81	2		33.52	24.59	41.89	8659	0.26						
			3			36.99	63.01	13025	0.40						
		81-84	2		34.04	32.30	33.66	7819	0.18						
			3			48.97	51.03	11854	0.28						
		84-85	2		24.17	31.75	44.08	8615	0.12						
			3			41.87	58.13	11360	0.16						
		Seam Average	2		38.31	27.58	34.11	7461							
			3			44.71	55.29	12094							
		21.5-22.7	1	4.96	6.61	30.59	57.84	12814	0.29					1.5	
			2		6.95	32.19	60.86	13483	0.31						
			3			34.59	65.41	14491	0.33						
		22.7-25.0	1	5.03	7.66	31.59	55.72	12654	0.22					1.5	
			2		8.06	33.27	58.67	13325	0.23						
			3			36.18	63.82	14493	0.25						
		25.6-27.5	1	5.54	3.09	32.57	58.80	13457	0.23					1.5	
			2		3.27	34.48	62.24	14246	0.24						
			3			35.65	64.35	14728	0.25						

\*1 - As Received Moisture  
 2 - Moisture Free  
 3 - Moisture and Ash Free  
 4 - Equilibrium Moisture  
 5 - As Analyzed

Table 23  
Proximate and Ultimate Analyses of DFS-2 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
		27.5-28.5	1	5.48	32.86	26.25	35.41	8768	0.27					0	
			2		34.76	27.77	37.46	9277	0.28						
			3			42.57	57.43	14220	0.44						
Seam Average		21.5-28.5	1	5.24	10.18	30.84	53.74	12294	0.24						
			2		10.74	32.55	56.71	12974	0.25						
			3			36.46	63.54	14535	0.28						
84-113c Core	DFS-2	52.2-53.7	1	7.10	10.20	29.97	52.73	11751	0.29					0	
			2		10.98	32.26	56.76	12649	0.32						
			3			36.24	63.76	14209	0.35						
		53.7-55.7	1	7.22	7.94	28.97	55.87	11769	0.22					0	
			2		8.56	31.22	60.22	12685	0.24						
			3			34.14	65.86	13873	0.26						
		55.7-56.3	1	1.92	51.18	37.92	8.98	2468	0.06					0	
			2		52.18	38.66	9.16	2517	0.06						
			3			80.85	19.15	5262	0.13						
		56.3-58.2	1	7.12	2.94	31.62	58.32	12892	0.26					0	
			2		3.16	34.05	62.79	13880	0.28						
			3			35.16	64.84	14334	0.28						
		58.2-59.0	1	5.37	42.51	22.87	29.24	7254	0.24					0	
			2		44.93	24.17	30.90	7665	0.25						
			3			43.89	56.11	13918	0.46						
		59.0-60.2	1	5.27	66.23	14.01	14.49	2981	0.14					0	
			2		69.91	14.79	15.30	3147	0.15						
			3			49.16	50.84	10461	0.51						
		60.2-60.4	1	4.97	21.83	28.31	44.89	10654	0.32					0	
			2		22.98	29.79	47.23	11211	0.34						
			3			38.68	61.32	14556	0.44						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 23  
Proximate and Ultimate Analyses of DFS-2 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average		52.2-58.2	1	6.21	15.01	31.51	47.27	10361	0.22					0	
			2		16.00	33.60	50.40	11047	0.23						
			3			40.00	60.00	13152	0.28						
84-114	DFS-2	19.0-25.0	1	10.40	11.44	25.30	52.86	10940	0.22						
			2		12.77	28.24	59.00	12210	0.24						
			3			32.37	67.63	13997	0.28						
84-115 Core	DFS-2	40.4-40.7	1	4.48	5.47	34.01	56.04	13256	0.35					1.0	
			2		5.73	35.60	58.67	13878	0.37						
			3			37.77	62.23	14721	0.39						
		40.7-41.8	1	5.01	79.53	9.22	6.24	1655	0.10					0	
			2		83.73	9.71	6.57	1742	0.10						
			3			59.65	40.35	10704	0.62						
		41.8-44.3	1	4.60	12.57	29.80	53.03	11900	0.25					0	
			2		13.18	31.23	55.58	12474	0.26						
			3			35.98	64.02	14367	0.30						
		44.3-44.5	1	2.13	37.79	46.82	13.27	5611	0.11					0	
			2		38.61	47.84	13.55	5734	0.11						
			3			77.92	22.08	9339	0.18						
		44.5-46.0	1	5.18	6.17	32.63	56.02	12811	0.22					1.5	
			2		6.51	34.41	59.08	13511	0.23						
			3			36.81	63.19	14452	0.25						
		46.0-48.1	1	5.15	3.47	33.58	57.80	13315	0.23					1.5	
			2		3.65	35.40	60.94	14038	0.24						
			3			36.75	63.25	14570	0.25						
Seam Average		41.8-48.1	1	4.77	9.52	32.58	52.93	12189	0.23						
			2		10.00	34.21	55.58	12800	0.24						
			3			38.01	61.99	14221	0.27						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 23  
Proximate and Ultimate Analyses of DFS-2 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
91-2	DFS-2	39-46	4	3.88	8.75	31.00	56.37	12525	0.21	73.48	4.76	1.31	11.46		53
			2		9.10	32.25	58.65	13031	0.22	76.44	4.50	1.37	8.34		
			3			35.48	64.52	14335	0.25	84.09	4.95	1.50	9.18		
86 Test Pit #2 Bulk Sample	DFS-2	11.5-18.6	4	10.64	8.67	29.63	51.06	10451	0.27	64.09	4.57	1.15	21.25		
			2		9.70	33.16	57.14	11695	0.30	71.72	3.78	1.29	13.21		
			3			36.72	63.28	12952	0.33	79.43	4.19	1.43	14.63		

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 24  
Proximate and Ultimate Analyses of DFS-3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
74	AH 73-5 DFS-3 ?	4.3-12.8	4	10.20	13.40	26.70	49.70	9651	0.20	58.50	4.30	1.10	22.50		
			2		14.92	29.73	55.35	10747	0.22	65.14	3.52	1.22	14.97		
			3			34.95	65.05	12632	0.26	76.57	4.13	1.44	17.60		
	83-4 Drill Cuttings DFS-3	51-58	4	3.68	14.75	29.02	52.55	11589	0.22						
			2		15.31	30.13	54.56	12032	0.22						
			3			35.58	64.42	14207	0.26						
		58-63	4	3.26	18.30	31.02	47.41	11199	0.29						
			2		18.92	32.07	49.01	11576	0.30						
			3			39.55	60.45	14277	0.36						
	Seam Average Raw Coal	51-63	1	3.51	16.23	29.93	50.41	11427	0.25						
			2		16.82	31.02	52.24	11843	0.26						
			3			37.29	62.71	14237	0.31						
	83-4 1.6 SPG Float DFS-3	51-58	4	3.68	4.80	31.57	59.95	13275	0.22	76.13	5.03	1.37	12.45	1.5	
			2		4.98	32.78	62.24	13782	0.22	79.04	4.79	1.42	9.54		
			3			34.50	65.50	14505	0.24	83.19	5.04	1.50	10.04		
		58-63	4	3.26	5.50	34.23	57.01	13359	0.33	75.56	5.25	1.43	11.91	1.5	
			2		5.69	35.38	58.93	13809	0.35	78.11	5.05	1.48	9.32		
			3			37.52	62.48	14642	0.37	82.82	5.36	1.57	9.88		
	Seam Average 1.6 SG Float	51-63	1	3.51	5.09	32.68	58.73	13310	0.27	75.89	5.12	1.40	12.23		
			2		5.28	33.87	60.87	13794	0.28	78.65	4.90	1.45	9.44		
			3			35.75	64.25	14562	0.30	83.03	5.17	1.53	9.97		
	83-4C Core Raw Coal Calculated DFS-3	52-54	4	3.84	10.65	27.33	58.18	12320							
			2		11.08	28.42	60.50	12812							
			3			31.96	68.04	14408							
		54-58	4	4.40	5.11	31.52	58.98	13056							
			2		5.34	32.97	61.69	13657							
			3			34.83	65.17	14427							

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 24  
Proximate and Ultimate Analyses of DFS-3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
75		58-62	4	4.61	5.78	33.90	55.71	12958							
			2		6.06	35.54	58.40	13584							
			3			31.96	68.04								
		62-64	4	3.64	13.69	33.90	55.71	11627							
			2		14.21	33.67	52.12	12066							
			3			39.25	60.75	14065							
		Raw Coal Seam Average	4	4.25	7.67	32.44	50.22	12665							
			2		8.01	33.19	58.80	13227							
			3			37.83	62.17	14379							
		83-4C Core 1.5 SG Float	4	3.84	5.18	28.36	62.62	13233	0.21	76.81	1.55	1.33	14.92	1.5	
			2		5.39	29.49	65.12	13761	0.21	79.88	1.16	1.39	11.97		
			3			31.17	68.83	14545	0.23	84.43	1.23	1.47	12.65		
		54-58	4	4.40	3.68	31.46	60.45	13397	0.19	76.93	5.12	1.40	12.68	2.0	
			2		3.85	32.91	63.24	14013	0.19	80.47	4.84	1.47	9.17		
			3			34.23	65.77	14575	0.20	83.70	5.04	1.53	9.54		
		58-62	4	4.61	3.23	33.77	58.40	13583	0.26	77.05	5.35	1.42	12.69	2.0	
			2		3.38	35.40	61.22	14240	0.28	80.77	5.07	1.49	9.01		
			3			36.64	63.36	14738	0.29	83.60	5.25	1.54	9.32		
		62-64	4	3.64	3.06	35.39	57.91	13357	0.49	75.24	5.37	1.41	14.43	2.5	
			2		3.17	36.73	60.10	13861	0.51	78.08	5.15	1.46	11.62		
			3			37.93	62.07	14315	0.53	80.64	5.32	1.51	12.01		
		Seam Average 1.5 SG Float	4	4.25	3.69	32.28	59.78	13430	0.26	76.73	4.64	1.40	13.28	2.0	
			2		3.85	33.71	62.43	14026	0.27	80.14	4.35	1.46	9.93		
			3			35.06	64.94	14588	0.28	83.35	4.52	1.52	10.33		
		83-4c 1.5 SG Sink	2		54.44	20.27	25.29	5581	0.12						
			3			44.48	55.52	12249	0.27						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed



Table 24  
Proximate and Ultimate Analyses of DFS-3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
		54-58	2		29.09	33.93	36.98	7985	0.10						
			3			47.85	52.15	11261	0.14						
		58-62	2		28.44	36.74	34.82	8110	0.12						
			3			51.34	48.66	11333	0.17						
		62-64	2		45.29	25.05	29.66	7009	0.24						
			3			45.79	54.21	12810	0.45						
Seam Average 1.5 SG Sinks		52-64	2		39.01	29.27	31.72	7270							
			3			47.99	52.01	11920							
91-1	DFS-3	36-48	4	3.99	8.12	31.39	56.50	12605	0.17	73.91	4.76	1.36	11.66	-	47
			2		8.46	32.70	58.84	13129	0.18	76.98	4.49	1.42	8.45		
			3			35.72	64.28	14343	0.20	84.10	4.90	1.55	9.23		

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 25  
Proximate and Ultimate Analyses of DFS-4 Seam, Deadfall Syncline

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
AH 73-4	DFS-4	3.0-13.5	4	10.20	5.60	31.00	53.20	10778	0.20	64.10	5.10	1.40	23.60		
			2		6.24	34.52	59.24	12002	0.22	71.38	4.41	1.56	16.19		
			3			36.82	63.18	12800	0.24	76.13	4.70	1.66	17.27		
AH 73-10	DFS-4 ?	5.2-7.5	4	10.20	8.40	26.40	55.00								
			2		9.35	29.40	61.25								
			3			32.43	67.57								
		7.5-11.2	4	10.60	5.70	30.00	53.70								
			2		6.38	33.56	60.00								
			3			35.85	64.01								
		11.2-14.2	4	10.50	4.80	30.90	53.80								
			2		5.36	34.51	60.11								
			3			36.46	64.97								
Seam Average	DFS-4	5.2-14.2	4	10.46	7.75	29.74	54.46								
			2		8.65	33.21	60.82								
			3			36.35	63.65								
AH 73-27	DFS-4	4.2-17.0	4	10.90	4.40	30.80	53.90	10669	0.20	64.00	5.00	1.30	25.10		
			2		4.94	34.57	60.49	11974	0.22	71.83	4.24	1.46	17.31		
			3			36.36	63.64	12596	0.24	75.56	4.46	1.53	18.20		
83-2 Drill Cuttings	DFS-4	61-64	4	4.35	11.46	26.81	57.39	12100	0.41						
			2		11.98	28.02	60.00	12651	0.43						
			3			31.84	68.16	14372	0.48						
		64-69	4	3.69	5.28	32.68	58.35	13354	0.28						
			2		5.49	33.93	60.59	13865	0.29						
			3			35.90	64.10	14670	0.31						
		69-71	4	3.46	16.77	30.68	49.09	11610	0.27						
			2		17.37	31.78	50.85	12026	0.28						
			3			38.46	61.54	14554	0.34						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 25  
Proximate and Ultimate Analyses of DFS-4 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
78	Seam Average Raw Coal	61-71	4	3.84	9.43	30.51	56.22	12629	0.32						
			2		9.81	31.73	58.47	13133	0.33						
			3			35.18	64.82	14561	0.37						
	83-2 1.6 SG Float	61-64	4	4.35	3.86	27.48	64.30	13422	0.37	77.24	4.85	1.44	12.23	1.5	
			2		4.04	28.73	67.23	14033	0.39	80.75	4.56	1.51	8.75		
			3			29.94	70.06	14623	0.40	84.15	4.76	1.57	9.12		
		64-69	4	3.69	2.44	33.56	60.31	13956	0.28	78.84	5.42	1.58	11.44	3.0	
			2		2.53	34.84	62.62	14491	0.29	81.86	5.20	1.64	8.48		
			3			35.75	64.25	14867	0.30	83.98	5.34	1.68	8.70		
		69-71	4	3.46	4.33	34.85	57.36	13700	0.28	76.95	5.48	1.61	11.35	4.0	
			2		4.48	36.10	59.42	14191	0.29	79.71	5.28	1.66	8.57		
			3			37.79	62.21	14857	0.31	83.45	5.52	1.74	8.98		
	Seam Average 1.6 SG Float	61-71	4	3.84	3.24	31.98	60.93	12687	0.31	77.99	5.26	1.55	11.66	2.8	
			2		3.37	33.26	63.36	13194	0.32	81.10	5.02	1.61	8.58		
			3			34.42	65.58	13654	0.33	83.93	5.20	1.67	8.88		
	83-3 Drill Cuttings	87-93	4	3.60	6.71	32.52	57.18	13048	0.26						
			2		6.96	33.73	59.31	13535	0.27						
			3			36.25	63.75	14548	0.29						
		93-96	4	3.34	10.78	32.62	53.26	12556	0.30						
			2		11.15	33.75	55.10	12990	0.32						
			3			37.98	62.02	14621	0.36						
	Seam Average Drill Cuttings	87-96	4	3.51	8.07	32.56	55.88	12884	0.28						
			2		8.36	33.74	57.91	13353	0.29						
			3			36.82	63.18	14571	0.32						
	83-3 1.6 SG Float	87-93	4	3.60	2.61	33.84	59.96	13654	0.28	77.79	5.28	1.67	12.38	2.0	
			2		2.70	35.10	62.20	14164	0.29	80.69	5.06	1.73	9.52		
			3			36.07	63.93	14557	0.30	82.93	5.20	1.78	9.79		

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 25  
Proximate and Ultimate Analyses of DFS-4 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average 1.6 SG Float  '87-Pit Channel Sample	DFS-4	93-96	4	3.34	3.64	36.13	56.89	13692	0.31	77.14	5.45	1.67	11.79	2.5	
			2		3.76	37.38	58.86	14165	0.33	79.80	5.25	1.73	9.13		
			3			38.84	61.16	14719	0.34	82.92	5.46	1.80	9.48		
		87-96	4	3.51	2.94	34.60	58.95	13667	0.29	77.57	5.33	1.67	12.20		
			2		3.05	35.86	61.09	14164	0.30	80.39	5.12	1.73	9.41		
			3			36.99	63.01	14610	0.31	82.92	5.28	1.78	9.71		
		18-19	4	10.44	4.13	21.44	63.99	10769	0.10	65.00	4.73	1.19	24.85		
			2		4.61	23.94	71.45	12025	0.12	72.57	3.98	1.33	17.40		
			3			25.10	74.90	12606	0.12	76.08	4.17	1.39	18.24		
		19-20	4	10.54	5.22	24.62	59.62	10612	0.10	60.51	4.58	1.15	28.43		
			2		5.84	27.52	66.64	11862	0.11	67.64	3.81	1.28	21.32		
			3			29.23	70.77	12597	0.12	71.83	4.04	1.36	22.64		
		20-21	4	10.63	2.20	26.14	61.03	10903	0.11	66.39	4.75	1.21	25.33		
			2		2.47	29.25	68.28	12199	0.12	74.29	3.98	1.36	17.81		
			3			29.99	70.01	12508	0.13	76.17	4.09	1.39	18.23		
		21-22	4	10.87	1.67	31.13	56.33	10889	0.09	60.50	5.20	1.17	31.37		
			2		1.87	34.93	63.20	12217	0.10	67.88	4.46	1.31	24.36		
			3			35.60	64.40	12451	0.10	69.18	4.55	1.34	24.83		
		22-23	4	11.60	1.51	32.57	54.33	10757	0.09	63.50	5.14	1.35	28.41		
			2		1.70	36.84	61.46	12168	0.10	71.84	4.35	1.53	20.48		
			3			37.48	62.52	12379	0.10	71.08	4.42	1.55	20.84		
		23-34	4	11.12	6.06	31.94	50.88	10149	0.10	56.99	5.07	1.20	30.58		
			2		6.82	35.93	57.25	11419	0.11	64.12	4.31	1.35	23.29		
			3			38.56	61.44	12255	0.12	68.82	4.62	1.45	25.00		
		24-25	4	14.03	1.63	33.23	51.10	10393	0.14	61.99	5.54	1.43	29.26		
			2		1.90	38.66	59.44	12089	0.17	72.11	4.62	1.66	19.54		
			3			39.41	60.59	12323	0.17	73.51	4.71	1.69	19.92		

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 25  
Proximate and Ultimate Analyses of DFS-4 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
08	DFS-4	25-26	4	13.95	1.63	33.27	51.15	10552	0.12	59.54	5.52	1.53	31.66	0	56
			2		1.89	38.67	59.44	12262	0.14	69.20	4.60	1.78	22.40		
			3			39.41	60.59	12498	0.15	70.53	4.69	1.81	22.83		
		26-27	4	11.62	3.82	32.10	52.46	10619	0.14	62.42	5.13	0.95	27.54		
			2		4.33	36.32	59.36	12015	0.16	70.63	4.33	1.07	19.48		
			3			37.96	62.04	12558	0.17	73.82	4.52	1.12	20.36		
		Seam Average	4	11.64	3.08	29.65	55.62	10628	0.11	61.88	5.08	1.25	28.60		
			2		3.49	33.56	62.95	12028	0.13	70.03	4.27	1.41	20.67		
			3			34.77	65.23	12463	0.13	72.56	4.42	1.46	21.42		
		'91-Pit Channel Sample	4	9.41	3.57	26.32	60.7	11363	0.20	69.89	11.44	1.31	20.56		
			2		3.94	29.05	67.01	12543	0.22	77.15	3.74	1.45	13.48		
			3			30.24	69.76	13057	0.23	80.31	3.90	1.51	14.03		
		32.5-35	4	7.70	3.01	31.39	57.90	12043	0.20	71.25	5.00	1.55	18.97	0	57
			2		3.26	34.01	62.73	13048	0.22	77.19	4.50	1.68	13.13		
			3			35.16	64.84	13488	0.22	79.79	4.65	1.74	13.58		
		35-37.5	4	8.31	3.71	32.85	55.13	11666	0.19	69.35	5.08	1.61	20.04	0	65
			2		4.04	35.82	60.13	12724	0.21	75.64	4.53	1.76	13.80		
			3			37.33	62.67	13260	0.22	78.83	4.72	1.83	14.38		
		37.5-40	4	6.93	4.01	32.17	56.89	12194	0.26	71.54	5.08	1.49	17.60	0	58
			2		4.31	34.56	61.12	13102	0.28	76.86	4.63	1.60	12.30		
			3			36.12	63.88	13692	0.29	80.33	4.84	1.68	12.84		
		Seam Average	4	8.09	3.58	30.66	57.67	11814	0.21	70.50	4.90	1.49	19.32		
			2		3.89	33.36	62.75	12854	0.23	76.71	4.35	1.62	13.20		
			3			34.71	65.29	13374	0.24	79.81	4.53	1.69	13.73		

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 26  
Proximate and Ultimate Analyses of K1 Seam, Deadfall Syncline

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
81	AH 73-23	4.5-7.9	4	12.50	10.40	30.20	46.90	9424	0.20	57.20	4.80	1.10	26.30		
			2		11.89	34.51	53.60	10770	0.23	65.37	3.89	1.26	17.37		
			3			39.17	60.83	12223	0.26	74.19	4.41	1.43	19.71		
		7.9-10.9	4	11.80	15.10	29.60	43.50								
			2		17.12	33.56	49.32								
			3			40.49	59.51								
	Seam Average	4.5-10.9	4	12.17	12.59	29.91	45.31								
			2		14.34	34.06	51.59								
			3			39.76	60.24								
	83-9 Drill Cuttings	55-58	4	3.25	30.13	25.91	40.70	9403	0.26						
			2		31.14	26.78	42.07	9719	0.27						
			3			38.90	61.10	14115	0.40						
82	83-9 1.6 SG Float	55-58	4	3.25	7.23	32.42	57.10	13100	0.35	74.12	5.00	1.32	11.99	1.5	
			2		7.47	33.51	59.02	13540	0.36	76.61	4.79	1.37	9.41		
			3			36.22	63.78	14633	0.39	82.79	5.18	1.48	10.17		
	84-106 Core	39.1-41.3	1	3.12	76.34	9.83	10.71	1597	0.15						
			2		78.80	10.15	11.05	1648	0.15						
			3			47.86	52.14	7774	0.71						
		41.3-43.4	1	5.08	14.71	29.50	50.70	11565	0.29						
			2		15.50	31.08	53.42	12184	0.31						
			3			36.78	63.22	14418	0.36						
		43.4-45.0	1	4.93	21.30	29.64	44.14	10716	0.23						
			2		22.40	31.17	46.43	11272	0.24						
			3			40.17	59.83	14526	0.31						
		45.0-46.8	1	4.79	17.49	32.13	45.59	11297	0.38						
			2		18.37	33.74	47.89	11865	0.40						
			3			41.34	58.66	14536	0.49						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 26

Proximate and Ultimate Analyses of K1 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average		41.3-46.8	1	4.93	17.62	30.50	46.95	11223	0.31						
			2		18.53	32.08	49.38	11805	0.33						
			3			39.38	60.62	14491	0.40						
84-107 Surface Sample	Un-correlated	6.0-7.0	1	16.81	6.62	28.78	47.79	9550	0.23						
			2		7.95	34.59	57.45	11480	0.28						
			3			37.58	62.42	12472	0.30						
DH91-3	K1	26.5-30.5	5	2.20	19.77	27.57	50.46	11090	0.22						
			2		20.21	28.19	51.60	11339	0.22						
			3			35.33	64.67	14212	0.28						
DH91-4	K1	62.5-67	5	1.77	26.35	28.40	43.48	10220	0.25						
			2		26.82	28.91	44.26	10404	0.25						
			3			39.51	60.49	14218	0.35						
DH91-11	K1	127-131	5	1.54	14.60	32.72	51.14	12050	0.21						
			2		14.83	33.23	51.94	12238	0.21						
			3			39.02	60.98	14369	0.25						
		131-132	5	1.37	27.58	28.49	42.56	10030	0.26						
			2		27.96	28.89	43.15	10169	0.26						
			3			40.10	59.90	14117	0.37						
Seam Average	K1	127-132	5	1.51	17.20	31.89	49.42	11645	0.22						
			2		17.46	32.38	50.18	11824	0.22						
			3			39.23	60.77	14325	0.27						
DH91-12	K1	293-299.5	5	1.51	19.92	31.29	47.28	11100	0.22						
			2		20.23	31.77	48.00	11270	0.22						
			3			39.82	60.18	14128	0.28						
DH91-13	K1	181.5-184.5	5	1.79	18.63	28.94	50.64	11280	0.27						
			2		18.97	29.47	51.56	11486	0.27						
			3			36.37	63.63	14174	0.34						

\*1 - As Received Moisture  
 2 - Moisture Free  
 3 - Moisture and Ash Free  
 4 - Equilibrium Moisture  
 5 - As Analyzed

Table 27  
Proximate and Ultimate Analyses of K2 Seam, Deadfall Syncline

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
DH91-3	K2	124.5-126	1	1.79	17.18	32.28	48.75	11840	0.44						
			2		17.49	32.87	49.64	12056	0.45						
			3			39.84	60.16	14612	0.54						
DH91-4	K2	141.5-143	1	1.68	25.61	26.84	45.87	10450	0.29						
			2		26.05	27.30	46.65	10629	0.29						
			3			36.91	63.09	14372	0.40						
DH91-9	K2	7-11	1	1.49	13.48	32.59	52.44	12440	0.32						
			2		13.68	33.08	53.23	12628	0.32						
			3			38.33	61.67	14630	0.38						

\*1 - As Received Moisture  
 2 - Moisture Free  
 3 - Moisture and Ash Free  
 4 - Equilibrium Moisture  
 5 - As Analyzed



Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
48	AH 73-8	4.5-19.2	4	11.20	10.50	29.30	49.00	9643	0.20	58.40	4.60	1.10	25.20		
			2		11.82	33.00	55.18	10859	0.23	65.77	3.77	1.24	17.18		
			3			37.42	62.58	12315	0.26	74.58	4.27	1.40	19.48		
	AH 73-25	4.0-8.0	4	13.10	11.80	28.10	47.00								
			2		13.58	32.34	54.09								
			3			37.42	62.58								
		8.0-12.0	4	11.40	31.70	21.80	35.10								
			2		35.78	24.60	39.62								
			3			38.31	61.69								
		12.0-17.3	4	9.70	9.00	29.60	51.70								
			2		9.97	32.78	57.25								
			3			36.41	63.59								
	Seam Average	4-17.3	4	11.23	16.71	26.80	45.27								
			2		18.82	30.19	51.00								
			3			37.19	62.81								
	83-8 Drill Cuttings	25-28	4	3.44	15.91	30.25	50.40	11607	0.27						
			2		16.48	31.33	52.19	12021	0.28						
			3			37.51	62.49	14392	0.33						
		28-33	4	3.19	12.46	32.83	51.52	12210	0.22						
			2		12.87	33.91	53.22	12612	0.22						
			3			38.92	61.08	14475	0.26						
		33-38	4	3.22	8.66	33.80	54.32	12869	0.23						
			2		8.95	34.93	56.13	13297	0.23						
			3			38.36	61.64	14604	0.26						
	Seam Average	25-38	4	3.26	11.80	32.61	52.34	12322	0.23						
			2		12.20	33.71	54.10	12737	0.24						
			3			38.39	61.61	14507	0.27						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
85	K3	25-28	4	3.44	6.65	33.26	56.64	13039	0.32	74.90	5.08	1.29	11.75	1.5	
			2		6.89	34.45	58.66	13504	0.34	77.57	4.86	1.34	9.01		
			3			37.00	63.00	14503	0.36	83.31	5.22	1.43	9.68		
		28-33	4	3.19	8.58	34.69	53.54	12918	0.21	73.20	5.10	1.22	11.68	2.0	
			2		8.87	35.83	55.30	13344	0.21	75.61	4.90	1.26	9.14		
			3			39.32	60.68	14642	0.23	82.97	5.38	1.39	10.03		
		33-38	4	3.22	3.98	35.30	57.50	13694	0.20	77.45	5.43	1.28	11.67	2.0	
			2		4.11	36.47	59.42	14150	0.20	80.02	5.24	1.32	9.10		
			3			38.04	61.96	14756	0.21	83.45	5.46	1.38	9.49		
		Seam Average 1.6 Floats	4	3.26	6.37	34.59	55.78	13245	0.23	75.23	5.22	1.26	11.70	2.0	
			2		6.58	35.76	57.66	13691	0.24	77.76	5.02	1.30	9.10		
			3			38.28	61.72	14655	0.26	83.24	5.37	1.39	9.74		
	K3	51-52	4	3.43	10.30	29.72	56.55	12459	0.37	70.96	4.90	1.25	12.22		
			2		10.66	30.78	58.56	12901	0.39	73.48	4.68	1.29	9.50		
			3			34.45	65.55	14441	0.43	82.25	5.24	1.44	10.64		
		52-53	4	3.59	6.20	34.30	55.91	13157	0.26	74.13	5.51	1.35	12.55		
			2		6.43	35.57	58.00	13647	0.27	76.89	5.30	1.40	9.71		
			3			38.02	61.98	14585	0.29	82.17	5.66	1.50	10.38		
		53-54	4	3.37	14.69	30.84	51.11	11555	0.17	66.66	4.80	1.18	12.51		
			2		15.20	31.91	52.89	11958	0.17	68.98	4.57	1.23	9.85		
			3			37.63	62.37	14101	0.20	81.35	5.39	1.45	11.61		
		54-55	4	4.39	7.24	32.99	55.38	12763	0.17	72.93	5.22	1.22	13.21		
			2		7.57	34.50	57.92	13349	0.18	76.28	4.94	1.28	9.74		
			3			37.33	62.67	14443	0.20	82.54	5.35	1.38	10.54		
		55-56	4	3.07	20.33	27.90	48.70	10874	0.18	63.18	4.50	0.96	10.85		
			2		20.98	28.78	50.24	11218	0.18	65.18	4.29	0.99	8.38		
			3			36.43	63.57	14196	0.23	82.49	5.42	1.26	10.61		

\*1 - As Received Moisture  
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3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
		56-57	4	3.44	20.20	27.89	48.47	10659	0.15	61.65	4.49	0.99	12.53		
			2		20.92	28.88	50.20	11039	0.15	63.84	4.25	1.02	9.81		
			3			36.52	63.48	13960	0.19	80.73	5.37	1.29	12.41		
		57-58	4	3.59	2.91	34.40	59.10	13705	0.18	77.86	5.56	1.27	12.22		
			2		3.02	35.68	61.30	14215	0.18	80.76	5.35	1.32	9.37		
			3			36.79	63.21	14657	0.19	83.28	5.51	1.36	9.66		
		58-59	4	2.98	2.63	39.43	54.95	13966	0.16	78.28	5.78	1.43	11.72		
			2		2.71	40.64	56.64	14394	0.16	80.68	5.61	1.48	9.35		
			3			41.78	58.22	14796	0.17	82.93	5.77	1.52	9.62		
		59-60	4	3.22	3.04	36.77	56.97	13767	0.22	78.01	5.67	1.35	11.72		
			2		3.14	38.00	58.87	14225	0.22	80.61	5.48	1.40	9.15		
			3			39.23	60.77	14685	0.23	83.22	5.66	1.44	9.45		
		60-61	4	6.61	2.44	32.17	58.77	13374	0.14	75.88	5.63	1.17	14.73		
			2		2.62	34.45	62.93	14320	0.15	81.25	5.24	1.26	9.48		
			3			35.38	64.62	14705	0.16	83.44	4.38	1.29	9.74		
		61-62	4	3.56	3.90	35.50	57.04	13485	0.19	76.68	5.51	1.25	12.47		
			2		4.04	36.81	59.15	13983	0.19	79.51	5.30	1.30	9.65		
			3			38.36	61.64	14572	0.20	82.86	5.52	1.35	10.06		
		62-63	4	3.44	3.78	35.98	56.80	13550	0.19	76.74	5.64	1.21	12.44		
			2		3.91	37.26	58.82	14032	0.19	79.47	5.45	1.26	9.72		
			3			38.78	61.22	14604	0.20	82.71	5.67	1.31	10.12		
		63-64	4	5.24	6.31	33.19	55.26	12881	0.20	73.09	5.39	1.21	13.80		
			2		6.66	35.03	58.31	13593	0.21	77.13	5.07	1.28	9.65		
			3			37.52	62.48	14563	0.23	82.63	5.43	1.37	10.34		
		64-65	4	3.40	8.72	33.47	54.41	12934	0.29	72.94	5.20	1.22	11.62		
			2		9.03	34.65	56.32	13390	0.31	75.51	4.99	1.26	8.90		
			3			38.09	61.91	14719	0.34	83.00	5.49	1.39	9.79		

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
87	K3	51-55	4	3.51	10.58	32.10	53.80	12492							
			2		10.96	33.27	55.76	12946							
			3			37.37	62.63	14540							
		55-58	4	3.46	13.10	31.29	52.15	11958							
			2		13.57	32.41	54.02	12387							
			3			37.50	62.50	14332							
		58-62	4	3.44	2.89	37.16	56.51	13159							
			2		2.99	38.48	58.52	13628							
			3			39.67	60.33	14048							
		62-65	4	3.51	6.61	35.16	54.72	13150							
			2		6.84	36.44	56.71	13628							
			3			39.12	60.88	14630							
	Raw Coal Seam Average	51-65	4	3.48	8.07	34.03	54.42	12892							
			2		8.36	35.26	56.38	13357							
			3			38.48	61.52	14576							
	K3	51-55	4	3.51	5.36	33.66	57.46	13448	0.33	76.16	5.28	1.30	11.56	2.0	
			2		5.56	34.89	59.55	13937	0.35	78.93	5.06	1.35	8.75		
			3			36.94	63.06	14757	0.37	83.58	5.36	1.43	9.26		
		55-58	4	3.46	5.57	33.61	57.35	13360	0.20	76.21	5.42	1.19	11.40	2.0	
			2		5.77	34.82	59.41	13839	0.21	78.94	5.21	1.23	8.63		
			3			36.95	63.05	14687	0.23	83.78	5.53	1.31	9.15		
		58-62	4	3.44	2.18	37.08	57.30	13987	0.21	78.84	5.67	1.31	11.79	4.0	
			2		2.25	38.40	59.35	14486	0.21	81.65	5.47	1.36	9.05		
			3			39.29	60.71	14820	0.22	83.54	5.60	1.39	9.25		
		62-65	4	3.51	3.57	36.01	56.91	13694	0.23	77.23	5.57	1.21	12.19	2.5	
			2		3.70	37.32	58.98	14192	0.24	80.04	5.36	1.26	9.40		
			3			38.76	61.24	14737	0.25	83.11	5.57	1.30	9.76		

\*1 - As Received Moisture  
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3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average 1.5 SG Float		51-65	4	3.48	4.01	35.24	57.27	13654	0.25	77.24	5.49	1.26	11.75	2.5	
			2		4.15	36.51	59.33	14146	0.26	80.03	5.28	1.31	8.97		
			3			38.09	61.91	14758	0.27	83.50	5.51	1.37	9.35		
83-8C 1.5 SG Sink		51-55	2		43.34	23.59	33.07	7010	0.22						
			3			41.64	58.36	12371	0.39						
		55-58	2		44.20	22.96	32.84	6684	0.13						
			3			41.15	58.85	11980	0.24						
		58-62	2		32.03	41.69	26.28	6747	0.07						
			3			61.33	68.67	9926	0.10						
		62-65	2		46.32	25.43	28.25	6577	0.17						
			3			47.37	52.63	12252	0.32						
Seam Average 1.5 SG Sinks		51-65	2		43.38	24.81	31.81	6796							
			3			43.82	56.18	12003							
83-10 Drill Cuttings	K3	69-74	4	3.42	15.51	30.89	50.18	11514	0.24						
			2		16.06	31.98	51.95	11922	0.25						
			3			38.10	61.90	14204	0.30						
		74-79	4	3.53	5.66	34.72	56.08	13228	0.20						
			2		5.87	35.99	58.14	13712	0.20						
			3			38.24	61.76	14567	0.22						
		79-84	4	3.41	4.96	36.32	55.30	13351	0.19						
			2		5.14	37.61	57.25	13822	0.19						
			3			39.64	60.36	14571	0.20						

\*1 - As Received Moisture  
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3 - Moisture and Ash Free  
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5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
69	Seam Average Raw Coal	69-84	4	3.45	8.71	33.98	53.86	12698	0.20						
			2		9.02	35.19	55.78	13152	0.21						
			3			38.68	61.32	14456	0.23						
	83-10 1.6 SPG Float	69-74	4	3.42	6.85	32.97	56.76	13102	0.27	74.57	5.14	1.14	12.02	1.5	
			2		7.10	34.14	58.77	13566	0.28	77.21	4.93	1.18	9.30		
			3			36.74	63.26	14602	0.31	83.11	5.30	1.27	10.02		
		74-79	4	3.53	3.39	34.64	58.43	13706	0.20	77.75	5.43	1.10	12.14	2.0	
			2		3.52	35.91	60.57	14208	0.20	80.59	5.21	1.14	9.34		
			3			37.22	62.78	14726	0.21	83.53	5.41	1.18	9.68		
		79-84	4	3.41	2.70	36.03	57.86	13876	0.19	77.80	5.56	1.09	12.66	2.0	
			2		2.79	37.30	59.91	14366	0.19	80.55	5.36	1.13	9.97		
			3			38.37	61.63	14778	0.20	82.86	5.52	1.17	10.26		
		69-84	4	3.45	4.32	34.55	57.69	13562	0.21	76.71	5.38	1.11	12.27	2.0	
			2		4.47	35.78	59.75	14047	0.22	79.45	5.17	1.15	9.54		
			3			37.45	62.55	14704	0.23	83.17	5.41	1.20	9.99		
	83-11 Drill Cuttings	47-50	4	3.36	23.30	27.96	45.38	10449	0.29						
			2		24.11	28.93	46.95	10812	0.30						
			3			38.13	61.87	14248	0.40						
		50-55	4	3.52	15.83	31.73	48.92	11436	0.21						
			2		16.41	32.88	50.71	11853	0.22						
			3			39.34	60.66	14180	0.27						
		55-60	4	3.14	13.77	33.33	49.75	12028	0.20						
			2		14.22	34.41	51.37	12417	0.20						
			3			40.12	59.88	14476	0.24						
		60-65	4	3.46	9.16	34.33	53.05	12736	0.20						
			2		9.49	35.56	54.95	13193	0.20						
			3			39.29	60.71	14576	0.22						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
96	K3 ?	65-68	4	3.30	15.23	32.58	48.89	11805	0.23						
			2		15.75	33.69	50.56	12208	0.23						
			3			39.99	60.01	14490	0.28						
		47-68	4	3.36	14.74	32.31	49.60	11798	0.21						
			2		15.25	33.43	51.32	12208	0.22						
			3			39.45	60.55	14405	0.26						
		47-50	4	3.36	6.06	33.24	57.35	13302	0.34	75.43	5.16	1.18	11.83	2	
			2		6.27	34.39	59.34	13765	0.35	78.06	4.95	1.22	9.15		
			3			36.69	63.31	14685	0.38	83.28	5.29	1.30	9.76		
		50-55	4	3.52	4.22	34.94	57.32	13653	0.22	76.87	5.42	1.15	12.12	2	
			2		4.37	36.22	59.41	14151	0.22	79.68	5.21	1.20	9.32		
			3			37.88	62.12	14798	0.23	83.32	5.45	1.25	9.75		
		55-60	4	3.14	3.10	36.70	57.06	13888	0.23	77.86	5.61	1.27	11.93	2.5	
			2		3.20	37.89	58.91	14338	0.23	80.38	5.43	1.32	9.44		
			3			39.15	60.85	14812	0.24	83.04	5.61	1.36	9.75		
		60-65	4	3.46	2.48	36.38	57.68	13979	0.18	78.33	5.59	1.18	12.24	3.5	
			2		2.57	37.68	59.75	14480	0.18	81.13	5.39	1.22	9.50		
			3			38.68	61.32	14862	0.19	83.27	5.53	1.26	9.75		
		65-68	4	3.30	3.90	36.30	56.50	13696	0.22	76.88	5.53	1.17	12.29	2.0	
			2		4.04	37.54	58.43	14163	0.23	79.51	5.34	1.21	9.68		
			3			39.12	60.88	14759	0.24	82.85	5.56	1.26	10.08		
		47-68	4	3.36	3.76	35.65	57.23	13742	0.22	77.25	5.49	1.20	12.08	2.5	
			2		3.89	36.89	59.22	14220	0.23	79.94	5.29	1.24	9.41		
			3			38.38	61.62	14796	0.24	83.18	5.50	1.29	9.79		
		47-51	4	3.57	9.99	33.35	53.10	12494							
			2		10.36	34.58	55.07	12957							
			3			38.58	61.42	14454							

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
91	Raw Coal Seam Average	51-55	4	3.69	13.32	30.02	52.96	11784							
			2		13.83	31.17	54.99	12235							
			3			36.17	63.83	14199							
		55-58	4	3.48	2.80	39.14	54.58	13822							
			2		2.90	40.55	56.55	14320							
			3			41.76	58.24	14748							
		58-62	4	3.61	2.46	35.93	58.00	13834							
			2		2.55	37.28	60.17	14352							
			3			38.26	61.74	14728							
		62-64	4	3.66	5.74	34.69	55.90	13280							
			2		5.96	36.01	58.02	13784							
			3			38.29	61.71	14658							
		47-64	4	3.60	7.23	34.36	54.81	12969							
			2		7.50	35.64	56.86	13453							
			3			38.53	61.47	14544							
	83-11c Core 1.5 SG Float	47-51	4	3.57	4.41	35.00	57.02	13499	0.36	76.62	5.43	1.15	12.03	2.0	
			2		4.57	36.30	59.13	13998	0.38	79.46	5.22	1.19	9.19		
			3			38.04	61.96	14669	0.39	83.26	5.47	1.24	9.63		
		51-55	4	3.69	4.77	33.03	58.50	13442	0.21	76.65	5.24	1.13	11.99	2.5	
			2		4.96	34.30	60.74	13957	0.21	79.59	5.02	1.18	9.05		
			3			36.09	63.91	14685	0.22	83.74	5.28	1.24	9.52		
		55-58	4	3.48	1.81	39.17	55.54	14104	0.20	79.16	6.03	1.19	11.61	6.0	
			2		1.88	40.58	57.54	14613	0.20	82.01	5.84	1.24	8.83		
			3			41.35	58.65	14892	0.21	83.58	5.95	1.26	9.00		
		58-62	4	3.61	1.86	35.89	58.64	13986	0.19	78.93	5.71	1.19	12.11	2.5	
			2		1.93	37.23	60.84	14509	0.19	81.89	5.51	1.24	9.24		
			3			37.96	62.04	14795	0.20	83.50	5.62	1.26	9.42		

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed



Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
		62-64	4	3.66	4.09	35.07	57.18	13591	0.30	76.84	5.60	1.15	12.01	2.5	
			2		4.25	36.40	59.35	14108	0.31	79.76	5.39	1.20	9.09		
			3			38.02	61.98	14733	0.33	83.29	5.63	1.25	9.50		
Seam Average 1.5 SG Float		47-64	4	3.60	3.28	35.65	57.46	13742	0.24	77.74	5.61	1.17	11.97	3.0	
			2		3.40	36.98	59.61	14255	0.25	80.64	5.40	1.21	9.10		
			3			38.28	61.72	14757	0.26	83.48	5.59	1.25	9.42		
11c Core 1.5 SG Sink	K3	47-51	2		44.48	24.42	31.10	6821	0.25						
			3			43.98	56.02	12285	0.46						
		51-55	2		38.45	22.50	39.05	7457	0.16						
			3			36.56	63.44	12116	0.26						
		55-58	2		27.33	39.93	32.74	7286	0.16						
			3			54.95	45.05	10026	0.22						
		58-62	2		38.38	40.09	21.53	5277	0.54						
			3			65.07	34.93	8564	0.88						
		62-64	2		43.17	27.62	29.22	6745	0.71						
			3			48.59	51.41	11869	1.25						
Seam Average 1.5 SG Sinks		47-64	2		39.79	25.03	35.17	7144							
			3			41.57	58.43	11865							
84-108 Core	K3	20.6-22.4	1	4.97	2.26	34.36	58.41	13565	0.29						
	?		2		2.38	36.15	61.46	14274	0.31						
			3			37.04	62.96	14622	0.31						

\*1 - As Received Moisture  
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5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
93		22.4-24.7	1	4.02	8.09	35.18	52.70	12930	0.23						
			2		8.43	36.66	54.91	13472	0.24						
			3			40.03	59.97	14712	0.27						
		24.7-25.0	1	5.23	79.42	8.86	6.48	1270	0.09						
			2		83.81	9.35	6.84	1340	0.09						
			3			57.75	42.25	8275	0.56						
		30.0-31.4	1	4.80	15.03	33.24	46.93	11682	0.38						
			2		15.79	34.91	49.30	12271	0.40						
			3			41.46	58.54	14573	0.47						
		31.4-32.0	1	7.36	34.75	24.77	33.11	8165	0.58						
			2		37.52	26.74	35.74	8814	0.62						
			3			42.80	57.20	14105	0.99						
		Seam Average	1	4.82	14.11	32.28	48.79	11800	0.30						
			2		14.82	33.91	51.26	12398	0.32						
			3			39.82	60.18	14555	0.37						
	84-109b Core	46.4-48.5	1	4.37	21.87	28.45	45.30	10501	0.33						
			2		22.87	29.76	47.37	10981	0.35						
			3			38.58	61.42	14237	0.45						
		48.5-50.5	1	4.68	5.70	35.68	53.94	13166	0.22						
			2		5.98	37.43	56.59	13812	0.23						
			3			39.81	60.19	14690	0.25						
		50.5-52.5	1	4.53	13.60	29.40	52.47	11662	0.16						
			2		14.24	30.79	54.96	12215	0.17						
			3			35.91	64.09	14244	0.20						
		52.5-54.2	1	4.69	9.16	30.26	55.89	12422	0.18						
			2		9.61	31.75	58.64	13033	0.19						
			3			35.12	64.88	14418	0.21						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
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5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
		54.2-56.1	1	5.07	2.37	32.84	59.71	13620	0.17						
			2		2.50	34.59	62.90	14347	0.18						
			3			35.48	64.52	14715	0.19						
		56.1-57.6	1	5.20	8.74	33.49	52.57	12498	0.21						
			2		9.22	35.33	55.45	13184	0.22						
			3			38.92	61.08	14523	0.25						
Seam Average		46.4-57.6	1	4.7	10.83	31.49	52.98	12218	0.21						
			2		11.36	33.04	55.29	12821	0.22						
			3			37.28	62.72	14464	0.25						
84-109 Core	K3	16.0-18.7	1	5.81	8.19	31.70	54.30	12301	0.34						
			2		8.70	33.65	57.65	13059	0.36						
			3			36.86	63.14	14303	0.39						
		18.7-20.2	1	3.92	13.56	32.81	49.71	12010	0.19						
			2		14.11	34.15	51.73	12501	0.19						
			3			39.76	60.24	14555	0.22						
		20.2-23.4	1	4.76	8.72	30.05	56.47	12451	0.17						
			2		9.16	31.56	59.29	13073	0.18						
			3			34.74	65.26	14391	0.20						
		23.4-25.2	1	4.49	3.83	33.65	58.03	13416	0.18						
			2		4.01	35.24	60.76	14046	0.19						
			3			36.71	63.29	14633	0.20						
		25.2-26.9	1	4.18	8.11	34.90	52.81	12883	0.25						
			2		8.46	36.42	55.11	13445	0.26						
			3			39.79	60.21	14688	0.29						
		27.2-27.5	1	5.06	35.67	23.93	35.34	8367	0.40						
			2		37.57	25.20	37.23	8813	0.42						
			3			40.37	59.63	14117	0.67						

\*1 - As Received Moisture  
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3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average		16-26.9	1	4.76	9.32	31.93	53.99	12437	0.23						
			2		9.79	33.53	56.69	13059	0.24						
			3			37.16	62.84	14475	0.27						
84-117	K3	22.3-24.1	1	14.40	11.80	26.35	47.46	9216	0.31						
			2		13.78	30.78	55.44	10766	0.36						
			3			35.70	64.30	12487	0.41						
		24.1-25.6	1	15.15	4.70	29.42	50.73	9911	0.21						
			2		5.54	34.68	59.78	11681	0.24						
			3			36.71	63.29	12366	0.26						
		25.6-27.6	1	13.58	11.10	26.54	48.79	9365	0.17						
			2		12.84	30.71	56.45	10837	0.19						
			3			35.23	64.77	12433	0.22						
		27.6-29.6	1	13.53	9.04	27.85	49.57	9476	0.17						
			2		10.46	32.21	57.33	10959	0.19						
			3			35.97	64.03	12239	0.22						
		29.6-31.4	1	15.95	2.72	30.69	50.64	9752	0.15						
			2		3.24	36.51	60.25	11602	0.18						
			3			37.73	62.27	11990	0.19						
		31.4-34.0	1	16.21	3.94	30.56	49.29	9627	0.20						
			2		4.71	36.47	58.83	11490	0.24						
			3			38.27	61.73	12057	0.25						
Seam Average		22.3-34.0	1	14.84	7.21	29.12	48.83	9548	0.20						
			2		8.47	34.19	57.34	11212	0.23						
			3			37.36	62.64	12249	0.26						
84-118 Core	K3	28.6-30.0	1	5.22	17.92	29.77	47.09	11028	0.34						
			2		18.91	31.41	49.69	11635	0.36						
			3			38.73	61.27	14348	0.44						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
		30.0-32.5	1	6.58	20.33	26.18	46.91	10413	0.20						
			2		21.76	28.03	50.21	11147	0.21						
			3			35.82	64.18	14247	0.27						
		32.5-35.0	1	4.62	15.30	28.41	51.66	11491	0.91						
			2		16.04	29.79	54.17	12047	0.20						
			3			35.48	64.52	14349	0.24						
		35.0-36.3	1	5.06	3.37	35.01	56.56	13437	0.20						
			2		3.55	36.87	59.58	14153	0.21						
			3			38.23	61.77	14673	0.22						
		36.3-38.1	1	4.85	3.79	34.27	57.09	13378	0.20						
			2		3.99	36.02	59.99	14059	0.21						
			3			37.51	62.49	14643	0.22						
		38.1-39.7	1	4.48	7.05	34.72	53.76	12993	0.25						
			2		7.38	36.34	56.28	13602	0.26						
			3			39.24	60.76	14685	0.28						
Seam Average		28-6-39.7	1	5.12	11.98	30.90	52.00	12008	0.22						
			2		12.63	32.57	54.81	12656	0.23						
			3			37.27	62.73	14485	0.27						
84-119b Core	K3	36.5-38.2	1	4.84	11.69	31.85	51.62	12137	0.29						
			2		12.29	33.47	54.24	12754	0.30						
			3			38.16	61.84	14540	0.35						
		38.2-40.0	1	4.25	9.08	32.49	54.18	12591	0.18						
			2		9.48	33.93	56.58	13150	0.19						
			3			37.49	62.51	14528	0.21						
		40.0-41.7	1	4.51	11.50	29.71	54.28	12237	0.17						
			2		12.04	31.11	56.85	12815	0.18						
			3			35.37	64.63	14570	0.21						

\*1 - As Received Moisture  
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3 - Moisture and Ash Free  
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5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
97		41.7-43.4	1	4.21	12.47	31.35	51.97	11959	0.18						
			2		13.02	32.73	54.25	12485	0.19						
			3			37.63	62.37	14354	0.22						
		43.4-45.0	1	5.06	3.40	34.21	57.33	13375	0.17						
			2		3.58	36.04	60.38	14087	0.18						
			3			37.38	62.62	14611	0.19						
		45.0-46.8	1	4.97	5.77	33.85	55.41	13019	0.19						
			2		6.07	35.62	58.31	13700	0.20						
			3			37.92	62.08	14586	0.22						
		46.8-48.1	1	4.85	4.62	35.62	54.91	13393	0.30						
			2		4.86	37.44	57.71	14076	0.31						
			3			39.35	60.65	14794	0.33						
		Seam Average	1	4.65	8.58	32.58	54.19	12636	0.21						
			2		9.00	34.17	56.83	14301	0.22						
			3			37.55	62.45	15715	0.04						
	K3	41.2-44.0	1	4.99	12.64	31.10	51.28	11983	0.22						
			2		13.30	32.73	53.97	12612	0.23						
			3			37.75	62.25	14547	0.27						
		44.0-46.7	1	5.02	12.69	29.32	52.97	11915	0.16						
			2		13.36	30.86	55.77	12545	0.17						
			3			35.62	64.38	14479	0.20						
		46.7-48.2	1	4.59	6.08	35.94	53.39	12980	0.19						
			2		6.37	37.67	55.96	13605	0.20						
			3			40.23	59.77	14531	0.22						
		48.2-50.0	1	5.28	2.46	33.60	58.66	13652	0.18						
			2		2.60	35.47	61.93	14413	0.19						
			3			36.42	63.58	14797	0.20						

\*1 - As Received Moisture  
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5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
		50.0-52.8	1	5.04	5.75	33.99	55.22	13077	0.22						
			2		6.05	35.79	58.15	13771	0.23						
			3			38.10	61.90	14659	0.25						
Seam Average		41.2-52.8	1	5.00	8.66	32.37	53.97	12603	0.20						
			2		9.12	34.07	56.81	14319	0.21						
			3			37.49	62.51	15755	0.23						
84-121 Core	K3	30.1-32.0	1	6.81	7.58	31.12	54.48	11841	0.29						
			2		8.14	33.40	58.46	12706	0.31						
			3			36.36	63.64	13832	0.33						
		32.0-35.0	1	5.09	10.56	31.67	52.69	12218	0.18						
			2		11.12	33.36	55.52	12873	0.19						
			3			37.54	62.46	14484	0.22						
		35.0-36.9	1	4.66	18.07	24.74	52.52	10946	0.19						
			2		18.96	25.95	55.09	11481	0.20						
			3			32.02	67.98	14166	0.25						
		36.9-38.5	1	4.90	2.96	36.32	55.81	13533	0.19						
			2		3.12	38.20	58.69	14230	0.20						
			3			39.42	60.58	14688	0.21						
		38.5-40.0	1	5.96	3.14	33.81	57.09	13317	0.18						
			2		3.34	35.96	60.71	14161	0.19						
			3			37.20	62.80	14650	0.20						
		40.0-42.5	1	4.44	6.18	34.15	55.24	13036	0.22						
			2		6.47	35.73	57.80	13642	0.23						
			3			38.20	61.80	14585	0.25						
Seam Average		30.1-42.5	1	4.60	8.77	31.72	54.91	12398	0.21						
			2		9.19	33.25	57.56	12996	0.22						
			3			36.62	63.38	14311	0.24						

\*1 - As Received Moisture  
 2 - Moisture Free  
 3 - Moisture and Ash Free  
 4 - Equilibrium Moisture  
 5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
99	K3	95.3-96.8	1	4.40	7.39	31.60	56.62	12813	0.39	73.17	5.02	1.16	12.87		
			2		7.73	33.05	59.22	13403	0.41	76.54	4.74	1.21	9.37		
			3			35.82	64.18	14525	0.44	82.95	5.14	1.31	10.16		
		96.8-98.4	1	4.25	12.40	31.16	52.19	12023	0.19	68.37	4.82	1.07	13.15		
			2		12.95	32.54	54.50	12557	0.20	71.40	4.54	1.12	9.79		
			3			37.39	62.61	14426	0.23	82.02	5.22	1.29	11.24		
		98.4-100.0	1	3.98	8.93	33.49	53.60	12538	0.16	71.96	4.98	1.20	12.77		
			2		9.30	34.88	55.83	13058	0.16	74.94	4.72	1.25	9.63		
			3			38.45	61.55	14396	0.18	82.62	5.20	1.38	10.62		
		100.0-101.7	1	4.76	16.79	29.19	49.26	10920	0.16	64.02	4.33	1.05	13.65		
			2		17.63	30.65	51.72	11466	0.17	67.22	3.99	1.10	9.89		
			3			37.21	62.79	13921	0.21	81.61	4.84	1.34	12.00		
		101.7-104.4	1	4.78	3.51	37.85	53.87	13458	0.17	75.62	5.60	1.30	13.80		
			2		3.68	39.75	56.57	14134	0.18	79.42	5.32	1.37	10.03		
			3			41.27	58.73	14674	0.19	82.45	5.52	1.42	10.42		
		105.0-108.0	1	5.09	3.02	35.80	56.09	13504	0.17	76.54	5.56	1.23	13.48		
			2		3.18	37.72	59.09	14229	0.18	80.64	5.26	1.30	9.44		
			3			38.96	61.04	14696	0.19	83.29	5.70	1.34	9.48		
	Seam Average	95.3-104.4													
		105.0-108.0	1	4.63	7.62	33.89	53.86	12722	0.19	72.45	5.15	1.19	13.36	2.5	56
			2		7.99	35.54	56.47	13340	0.20	75.97	4.86	1.25	9.74		
			3			38.62	61.38	14498	0.22	82.56	5.28	1.36	10.58		

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed



Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
DH91-1	K3	24-27	5	1.94	4.62	32.08	61.36	13680	0.26						
			2		4.71	32.71	62.57	13951	0.27						
			3			34.33	65.67	14640	0.28						
		27-30	5	2.10	17.06	28.62	52.22	11630	0.16						
			2		17.43	29.23	53.34	11879	0.16						
			3			35.40	64.60	14386	0.20						
		34-36	5	2.11	6.54	33.96	57.39	13260	0.24						
			2		6.68	34.69	58.63	13546	0.25						
			3			37.18	62.82	14516	0.26						
		Seam Average	5	2.04	9.77	31.25	56.93	12806	0.22						
			2		9.97	31.90	58.12	13073	0.22						
			3			35.43	64.57	14521	0.24						
DH91-2	K3	144-150	5	2.02	15.12	30.37	52.49	11980	0.21						
			2		15.43	31.00	53.57	12227	0.21						
			3			36.65	63.35	14458	0.25						
DH91-3	K3	241.5-246	5	1.51	13.65	31.88	52.96	12260	0.19						
			2		13.86	32.37	53.77	12448	0.19						
			3			37.58	62.42	14451	0.22						
		246-251	5	1.50	6.70	34.99	56.81	13440	0.18						
			2		6.80	35.52	57.68	13645	0.18						
			3			38.12	61.88	14641	0.20						
		251-254	5	1.52	7.24	34.89	56.35	13350	0.19						
			2		7.35	35.43	57.22	13556	0.19						
			3			38.24	61.76	14632	0.21						
		298.5-301.5	5	1.55	10.62	33.10	54.73	12770	0.22						
			2		10.79	33.62	55.59	12971	0.22						
			3			37.69	62.31	14539	0.25						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
T01	K3	301.5-306.5	5	1.39	9.63	32.69	56.29	12850	0.19						
			2		9.77	33.15	57.08	13031	0.19						
			3			36.74	63.26	14441	0.21						
		306.5-311.5	5	1.41	2.88	38.92	56.79	14210	0.18						
			2		2.92	39.48	57.60	14413	0.18						
			3			40.66	59.34	14847	0.19						
		311.5-313.5	5	1.55	6.93	36.92	54.60	13480	0.19						
			2		7.04	37.50	55.46	13692	0.19						
			3			40.34	59.66	14729	0.21						
	Seam Average	298.5-313.5	5	1.45	7.22	35.41	55.92	13371	0.19						
			2		7.33	35.93	56.74	13568	0.19						
			3			38.77	61.23	14641	0.21						
	DH91-5	54-56	4	3.07	4.02	34.32	58.59	13632	0.32	78.42	5.26	1.28	10.70	2.5	60
			2		4.15	35.40	60.45	14063	0.33	80.90	5.07	1.32	8.23		
			3			36.94	63.06	14672	0.34	84.40	5.29	1.38	8.58		
		56-58	4	2.91	13.70	32.01	51.38	11925	0.24	69.11	4.64	1.05	11.27	1.0	58
			2		14.11	32.97	52.92	12283	0.24	71.18	4.44	1.08	8.95		
			3			38.38	61.62	14301	0.28	82.87	5.17	1.25	10.42		
		58-60	4	2.70	15.40	29.47	52.43	11639	0.23	68.18	4.35	0.96	10.89	1.5	57
			2		15.83	30.29	53.89	11962	0.23	70.07	4.16	0.98	8.73		
			3			35.98	64.02	14212	0.28	83.24	4.94	1.17	10.37		
		60-62	4	3.01	3.48	35.16	58.36	13605	0.22	78.03	5.37	1.20	11.71	3.0	61
			2		3.58	36.25	60.17	14028	0.22	80.45	5.19	1.24	9.31		
			3			37.59	62.41	14549	0.23	83.44	5.38	1.28	9.66		
		62-71.3	4	3.09	3.54	36.52	56.85	13805	0.24	77.89	5.40	1.11	11.82	4.5	61
			2		3.66	37.68	58.66	14245	0.24	80.37	5.21	1.14	9.37		
			3			39.11	60.89	14786	0.25	83.43	5.41	1.19	9.73		

\*1 - As Received Moisture  
 2 - Moisture Free  
 3 - Moisture and Ash Free  
 4 - Equilibrium Moisture  
 5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average	K3	54-71.3	4	3.01	6.13	34.77	56.08	13294	0.25	75.83	5.17	1.12	11.50		
			2		6.32	35.85	57.82	13707	0.26	78.18	4.98	1.15	9.10		
			3			38.27	61.73	14631	0.28	83.46	5.32	1.23	9.71		
DH91-7	K3	32.5-34.5	4	3.62	3.26	33.03	60.09	13635	0.43	78.01	5.19	1.34	11.77	2.0	56
			2		3.38	34.27	62.34	14147	0.45	80.94	4.97	1.39	8.87		
			3			35.47	64.53	14642	0.46	83.77	5.14	1.44	9.19		
		34.5-36.5	4	4.83	14.89	29.90	50.38	11589	0.23	68.04	4.86	1.15	10.82	1.5	52
			2		15.64	31.42	52.94	12177	0.24	71.50	4.54	1.21	6.86		
			3			37.25	62.75	14435	0.29	84.76	5.38	1.43	8.13		
		36.5-38.5	4	3.72	12.98	26.79	56.51	11783	0.19	69.67	4.29	1.04	11.84	1.5	61
			2		13.48	27.83	58.69	12238	0.19	72.36	4.02	1.08	8.87		
			3			32.16	67.84	14145	0.22	83.64	4.65	1.24	10.25		
		38.5-40.5	4	3.78	5.21	32.63	58.38	13294	0.23	76.12	5.05	1.29	12.10	2.0	58
			2		5.41	33.91	60.68	13816	0.23	79.11	4.81	1.34	9.09		
			3			35.85	64.15	14607	0.25	83.64	5.09	1.42	9.60		
		40.5-50	4	2.97	3.43	37.00	56.60	13915	0.22	78.73	5.47	1.33	10.82	5.0	61
			2		3.53	38.13	58.33	14341	0.22	81.14	5.29	1.38	8.44		
			3			39.53	60.47	14866	0.23	84.11	5.49	1.43	8.75		
Seam Average	K3	32.5-50	4	3.44	6.02	34.07	56.48	13303	0.24	76.09	5.19	1.27	11.19		
			2		6.23	35.28	58.49	13777	0.25	78.80	4.98	1.32	8.42		
			3			37.63	62.37	14693	0.27	84.04	5.31	1.40	8.98		
DH91-7	K3	36.5-41.5	5	1.32	15.55	30.42	52.71	11830	0.20						
			2		15.76	30.83	53.42	11988	0.20						
			3			36.59	63.41	14231	0.24						
		41.5-46.5	5	1.29	4.40	37.70	56.61	13920	0.24						
			2		4.46	38.19	57.35	14102	0.24						
			3			39.97	60.03	14760	0.25						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average	K3	36.5-46.5	5	1.31	9.98	34.06	54.66	12874	0.22						
			2		10.11	34.51	55.39	13045	0.22						
			3			38.39	61.61	14512	0.24						
DH91-9	K3	144-147	5	1.37	11.86	32.01	54.76	12570	0.27						
			2		12.02	32.45	55.52	12745	0.27						
			3			36.89	63.11	14487	0.31						
		147-152	5	1.68	12.19	31.67	54.46	12480	0.19						
			2		12.40	32.21	55.39	12693	0.19						
			3			36.77	63.23	14490	0.22						
		152-157	5	1.55	4.50	37.94	56.01	13940	0.18						
			2		4.57	38.54	56.89	14159	0.18						
			3			40.38	59.62	14838	0.19						
		157-159	5	1.61	5.38	36.73	56.28	13740	0.19						
			2		5.47	37.33	57.20	13965	0.19						
			3			39.49	60.51	14773	0.20						
		Seam Average	5	1.57	8.65	34.50	55.28	13134	0.20						
			2		8.79	35.05	56.16	13344	0.20						
			3			38.43	61.57	14630	0.22						
DH91-10	K3	129-131.5	5	1.67	21.82	29.37	47.14	10740	0.18						
			2		22.19	29.87	47.94	10922	0.18						
			3			38.39	61.61	14037	0.24						
		131.5-136.5	5	1.59	15.01	31.63	51.77	12040	0.16						
			2		15.25	32.14	52.61	12235	0.16						
			3			37.93	62.07	14436	0.19						
		136.5-140.5	5	1.68	6.06	34.60	57.66	13530	0.22						
			2		6.16	35.19	58.65	13761	0.22						
			3			37.50	62.50	14665	0.24						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average	K3	129.0-140.5	5	1.64	13.38	32.17	52.82	12275	0.19						
			2		13.60	32.71	53.70	12480	0.19						
			3			37.86	62.14	14444	0.22						
DH91-10c	K3	129-141.5	4	3.32	9.49	32.37	54.82	12639	0.21	72.80	4.88	1.22	11.41	1.5	54
			2		9.82	33.48	56.70	13073	0.21	75.30	4.66	1.26	8.75		
			3			37.12	62.88	14496	0.24	83.50	5.17	1.39	9.70		
DH91-11	K3	356.5-361	5	1.40	12.28	32.99	53.33	12390	0.17						
			2		12.45	33.46	54.09	12566	0.17						
			3			38.22	61.78	14354	0.20						
		361-366	1	1.64	10.70	31.48	56.18	12780	0.19						
			2		10.88	32.00	57.12	12993	0.19						
			3			35.91	64.09	14579	0.22						
		366-367	1	1.60	7.10	35.89	55.41	13460	0.25						
			2		7.22	36.47	56.31	13679	0.25						
			3			39.31	60.69	14743	0.27						
Seam Average	K3	356.5-367.0	5	1.53	11.03	32.54	54.89	12678	0.19						
			2		11.20	33.05	55.74	12875	0.19						
			3			37.22	62.78	14499	0.21						
DH9-13	K3	401-406	5	1.55	15.92	31.59	50.94	11920	0.21						
			2		16.17	32.09	51.74	12108	0.21						
			3			38.28	61.72	14443	0.25						
		406-411	5	1.46	8.95	32.55	57.04	13110	0.18						
			2		9.08	33.03	57.89	13304	0.18						
			3			36.33	63.67	14633	0.20						
DH9-13	K3	411-417	5	1.34	6.77	34.91	56.98	13420	0.18						
			2		6.86	35.38	57.75	13602	0.18						
			3			37.99	62.01	14604	0.20						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 28  
Proximate and Ultimate Analysis of K3 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average	K3	401-417	5	1.44	10.31	33.14	55.11	12854	0.19						
			2		10.46	33.62	55.92	13042	0.19						
			3			37.55	62.45	14566	0.21						

\*1 - As Received Moisture  
 2 - Moisture Free  
 3 - Moisture and Ash Free  
 4 - Equilibrium Moisture  
 5 - As Analyzed

Table 29  
Proximate and Ultimate Analysis of K4 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
AH 73-24	K4	3.8-10.0	4	12.10	10.50	29.60	47.80	9480	0.20	57.10	4.70	1.00	26.50		
			2		11.95	33.67	54.38	10785	0.23	64.96	3.81	1.14	17.92		
			3			38.24	61.76	12248	0.26	73.77	4.32	1.29	20.35		
83-10 Drill Cuttings	K4	125-130	4	3.28	11.32	33.31	52.10	12430	0.26						
			2		11.70	34.44	53.86	12852	0.27						
			3			39.00	61.00	14555	0.31						
83-10 1.6 SG Float	K4	125-130	4	3.28	2.90	35.20	58.61	13890	0.26	78.14	5.57	1.15	11.97	2.0	
			2		3.00	36.40	60.60	14361	0.27	80.79	5.38	1.19	9.36		
			3			37.52	62.48	14806	0.28	83.29	5.55	1.23	9.65		
DH91-1	K4	96.5-99	5	2.22	18.82	29.74	49.22	11610	0.36						
			2		19.25	30.42	50.34	11874	0.37						
			3			37.66	62.34	14704	0.46						
DH91-2	K4	210-213.5	5	2.03	10.17	32.76	55.04	12920	0.29						
			2		10.38	33.44	56.18	13188	0.30						
			3			37.31	62.69	14715	0.33						
DH91-3	K4	317-321	5	1.51	28.33	28.04	42.12	10110	0.24						
			2		28.76	28.47	42.77	10265	0.24						
			3			39.97	60.03	14410	0.34						
DH91-4	K4	354.5-360	5	1.58	16.74	33.88	47.80	12000	0.21						
			2		17.01	34.42	48.57	12193	0.21						
			3			41.48	58.52	14691	0.26						
DH91-5	K4	116-117	5	1.67	9.64	35.38	53.31	13020	0.21						
			2		9.80	35.98	54.22	13241	0.21						
			3			39.89	60.11	14680	0.24						
DH91-6	K4	94-99	5	1.75	18.83	30.09	49.33	11590	0.21						
			2		19.17	30.63	50.21	11796	0.21						
			3			37.89	62.11	14593	0.26						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 29  
Proximate and Ultimate Analysis of K4 Seam, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average	K4	99.5-100	5	1.31	61.49	16.94	20.26	4680	0.23						
			2		62.31	17.16	20.53	4761	0.23						
			3			45.54	54.46	12631	0.62						
DH 91-7 Core	K4	94-100	5	1.71	22.70	28.91	46.70	10965	0.21						
			2		23.09	29.41	47.51	11156	0.21						
			3			38.24	61.76	14505	0.27						
	K4	102.5-104.5	4	3.09	5.63	33.66	57.62	13439	0.25	77.75	5.14	1.33	9.90	2.5	55
			2		5.81	34.74	59.45	13868	0.25	80.23	4.95	1.37	7.38		
			3			36.88	63.12	14723	0.27	85.18	5.26	1.46	7.84		
		104.5-106.9	5	3.30	3.02	35.36	58.31	13847	0.25	78.68	5.39	1.33	11.34	3.0	53
			2		3.13	36.57	60.30	14319	0.25	81.36	5.19	1.37	8.69		
			3			37.75	62.25	14781	0.26	83.99	5.36	1.42	8.98		
Seam Average		102.5-106.9	5	3.20	4.21	34.60	57.99	13662	0.24	78.26	5.28	1.33	10.68		
			2		4.35	35.74	59.91	14114	0.25	80.85	5.08	1.37	8.10		
			3			37.37	62.63	14755	0.26	84.52	5.32	1.44	8.46		
DH91-9	K4	218.5-223	5	1.91	7.09	34.67	56.33	13500	0.26						
			2		7.23	35.35	57.43	13763	0.27						
			3			38.10	61.90	14835	0.29						
DH91-10	K4	197-201	5	1.67	21.15	29.58	47.60	11460	0.27						
			2		21.51	30.08	48.41	11655	0.27						
			3			38.33	61.67	14848	0.35						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed



Table 30  
Proximate Analyses of K5 Seam, Deadfall Syncline

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
DH91-6	K5	252-257	5	1.70	36.23	25.42	36.65	8840	0.24						
			2		36.86	25.86	37.28	8993	0.24						
			3			40.95	59.05	14242	0.39						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 31  
Proximate and Ultimate Analyses of 20, 21 and Uncorrelated Seams, Deadfall Syncline

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
AH 73-2	20	2.7-7.5	4	9.90	20.10	28.40	41.60								
			2		22.31	31.52	46.17								
			3			40.57	59.43								
AH 73-3	20	3.0-9.8	4	12.20	12.60	28.50	46.70	9197							
			2		14.35	32.46	53.19	10475							
			3			37.90	62.10	12230							
AH 73-1	21	4.5-17.5	4	6.60	26.80	23.40	43.20	8586	0.20	51.30	3.70	0.80	17.20		
	Seam Average		2		28.69	25.05	46.25	9193	0.21	54.93	3.17	0.86	12.14		
			3			35.14	64.86	12892	0.30	77.03	4.45	1.20	17.03		
		4.5-8.0	4	7.00	17.10	23.20	52.70								
			2		18.39	24.95	56.67								
			3			30.57	69.43								
		8.0-12.0	4	11.30	32.00	22.00	34.70								
			2		36.08	24.80	39.12								
			3			38.80	61.20								
		12.0-16.0	4	6.60	31.70	22.10	39.60								
			2		33.94	23.66	42.40								
			3			35.82	64.18								
		16.0-17.5	4	6.40	33.80	23.20	36.60								
			2		36.11	24.79	39.10								
			3			38.80	61.20								
83-12 Drill Cuttings	21	33-40	4	4.47	25.77	24.36	45.40	9375	0.15						
			2		26.97	25.50	47.52	9813	0.15						
			3			34.93	65.07	13438	0.21						
83-12 1.6 SG Float	21	33-40	4	4.47	11.27	27.44	56.82	11924	0.17	69.75	4.44	1.19	13.18	0	
			2		11.80	28.72	59.48	12482	0.17	73.01	4.13	1.24	9.64		
			3			32.56	67.44	14152	0.20	82.78	4.68	1.41	10.93		

\*1 - As Received Moisture  
 2 - Moisture Free  
 3 - Moisture and Ash Free  
 4 - Equilibrium Moisture  
 5 - As Analyzed

Table 31  
Proximate and Ultimate Analyses of 20, 21 and Uncorrelated Seams, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
110	21	32-35	4	4.98	15.74	22.73	56.56	10848							
			2		16.57	23.92	59.52	11417							
			3			28.67	71.33	13685							
		35-38	4	4.94	20.87	26.27	47.93	10132							
			2		21.95	27.63	50.42	10659							
			3			35.40	64.60	13657							
		38-41	4	3.74	32.00	23.84	40.42	8534							
			2		33.24	24.77	41.99	8866							
			3			37.10	62.90	13280							
		41-42	4	4.15	8.31	33.26	54.28	12475							
			2		8.67	34.70	56.63	13015							
			3			37.99	62.01	14251							
	Raw Coal Seam Average	32-42	4	4.51	21.38	25.17	48.93	10107							
			2		22.39	26.36	51.24	10584							
			3			33.96	66.04	13637							
	21	32-35	4	4.98	10.16	23.35	61.51	11991	0.30	70.91	4.30	1.06	13.27	0	
			2		10.69	24.57	64.74	12619	0.32	74.63	3.94	1.12	9.31		
			3			27.51	72.49	14129	0.36	83.56	4.41	1.25	10.42		
		35-38	4	4.94	7.98	28.99	58.09	12445	0.16	72.33	4.86	1.30	13.38	1.5	
			2		8.39	30.50	61.11	13091	0.16	76.08	4.53	1.37	9.46		
			3			33.29	66.71	14291	0.18	83.05	4.94	1.50	10.33		
		38-41	4	3.74	10.16	29.41	56.69	12332	0.20	71.35	4.70	1.23	12.37	1.5	
			2		10.55	30.56	58.89	12811	0.20	74.12	4.45	1.28	9.39		
			3			34.16	65.84	14323	0.23	82.86	4.98	1.43	10.50		
		41-42	4	4.15	4.89	33.80	57.16	13172	0.41	74.75	5.33	1.37	13.25	2.0	
			2		5.10	35.27	59.63	13742	0.43	77.98	5.08	1.43	9.98		
			3			37.16	62.84	14481	0.45	82.18	5.35	1.51	10.52		

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 31  
Proximate and Ultimate Analyses of 20, 21 and Uncorrelated Seams, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average		32-42	4	4.51	8.53	28.08	58.88	12417	0.25	72.21	4.73	1.23	13.06	1.0	
1.5 SG Float			2		8.93	29.41	61.66	13003	0.26	75.62	4.42	1.29	9.48		
			3			32.29	67.71	14278	0.29	83.04	4.85	1.42	10.42		
13C	21	32-35	2		24.63	23.02	52.36	9770	0.19						
1.5 SG Sink			3			30.54	69.46	12962	0.26						
		35-38	2		49.85	21.72	28.43	5654	0.10						
			3			43.32	56.68	11275	0.20						
		38-41	2		42.55	22.39	35.06	7247	0.15						
			3			38.97	61.03	12615	0.27						
		41-42	2		35.90	30.35	33.75	7479	0.04						
			3			47.35	52.65	11667	0.06						
Seam Average		32-42	2		38.92	22.63	38.46	7616							
1.5 SG Sinks			3			37.05	62.95	12469							
83-16	Un-	96-99	4	3.00	28.25	29.41	39.33	9829	0.28						
Drill	Correlated		2		29.13	30.32	40.55	10133	0.28						
Cuttings			3			42.79	57.21	14297	0.40						
		100-102	4	2.87	26.09	33.10	37.94	10160	0.25						
			2		26.86	34.08	39.06	10461	0.25						
			3			46.60	53.40	14303	0.35						
		102-109	4	3.21	16.59	33.37	46.83	11583	0.23						
			2		17.14	34.48	48.39	11967	0.23						
			3			41.61	58.39	14442	0.28						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 31  
Proximate and Ultimate Analyses of 20, 21 and Uncorrelated Seams, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
Seam Average Raw Coal		96-109	4	3.10	21.09	32.34	43.49	10909	0.24						
			2		21.76	33.37	44.88	11258	0.25						
			3			42.65	57.35	14389	0.32						
83-16 1.6 SG Float	Un-Correlated	96-99	4	3.00	15.80	32.13	49.07	11904	0.29	67.24	4.77	1.24	10.66	1.5	
			2		16.29	33.12	50.59	12272	0.30	69.32	4.57	1.27	8.27		
			3			39.57	60.43	14660	0.36	82.81	5.46	1.52	9.85		
		100-102	4	2.87	11.20	37.74	48.20	12711	0.25	70.70	5.45	1.50	10.91	2.0	
			2		11.53	38.85	49.62	13086	0.25	72.78	5.29	1.54	8.61		
			3			43.92	56.08	14791	0.29	82.27	5.97	1.74	9.73		
		102-109	4	3.21	8.36	35.47	52.96	13003	0.23	73.18	5.37	1.40	11.46	2.5	
			2		8.64	36.64	54.72	13434	0.23	75.61	5.18	1.45	8.89		
			3			40.11	59.89	14705	0.25	82.76	5.67	1.58	9.73		
Seam Average 1.6 Float		100-109	4	3.10	10.69	35.01	51.20	12680	0.24	71.29	5.24	1.38	11.16	2.0	
			2		11.03	36.13	52.84	13086	0.25	73.57	5.05	1.42	8.68		
			3			40.61	59.39	14708	0.28	82.69	5.68	1.60	9.76		
83-17 Drill Cuttings	Un-Correlated	62-67	4	4.38	20.63	31.19	43.81	10374	0.43						
			2		21.57	32.61	45.81	10850	0.45						
			3			41.59	58.41	13834	0.58						
		67-72	4	4.45	21.32	32.05	42.18	10305	0.49						
			2		22.31	33.54	44.15	10785	0.51						
			3			43.17	56.83	13883	0.66						
Seam Average		62-72	4	4.42	20.97	31.62	42.99	10340	0.46						
			2		21.94	33.08	44.98	10818	0.48						
			3			42.38	57.62	13859	0.61						
83-17 1.6 SG Float		62-67	4	4.38	12.84	32.44	50.34	11735	0.38	66.56	4.91	1.33	13.98	1.0	
			2		13.43	33.92	52.65	12273	0.40	69.61	4.62	1.40	10.55		
			3			39.19	60.81	14176	0.46	80.41	5.34	1.61	12.19		

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 31  
Proximate and Ultimate Analyses of 20, 21 and Uncorrelated Seams, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
		67-72	4	4.45	11.87	33.78	49.89	11948	0.41	67.57	5.10	1.43	13.62	1.5	
			2		12.42	35.36	52.22	12504	0.43	70.71	4.81	1.50	10.12		
			3			40.37	59.63	14278	0.49	80.75	5.50	1.71	11.56		
Seam Average 1.6 Float		62-72	4	4.42	12.36	33.11	50.12	11841	0.40	67.06	5.01	1.39	13.79	1.0	
			2		12.93	34.64	52.44	12389	0.42	70.16	4.72	1.45	10.32		
			3			39.78	60.22	14229	0.48	80.58	5.42	1.67	11.85		
83-17C Core Raw Coal Calculated	Un- correlated	66-68	4	4.91	6.66	33.01	55.44	12550							
			2		7.00	34.71	58.30	13198							
			3			37.32	62.88	14191							
		68-71	4	4.68	6.28	35.04	54.00	12832							
			2		6.59	36.76	56.65	13462							
			3			39.35	60.65	14412							
Raw Coal Seam Average		66-71	4	4.77	6.43	34.23	54.57	12719							
			2		6.75	35.94	57.31	13356							
			3			38.54	61.46	14323							
83-17C 1.5 SG Float		66-68	4	4.91	3.45	33.41	58.22	13243	0.50	75.62	5.29	1.45	13.70	2.0	
			2		3.63	35.14	61.23	13927	0.52	79.52	4.98	1.52	9.82		
			3			36.46	63.54	14452	0.54	82.52	5.17	1.58	10.19		
		68-71	4	4.68	1.99	35.86	57.46	13553	0.44	76.71	5.53	1.60	13.72	2.0	
			2		2.09	37.63	60.28	14219	0.46	80.48	5.25	1.68	10.03		
			3			38.43	61.57	14523	0.47	82.20	5.37	1.72	10.25		
Seam Average 1.5 SG Float		66-71	4	4.77	2.57	34.89	57.77	13430	0.46	76.28	5.43	1.54	13.72	2.0	
			2		2.70	36.64	60.66	14103	0.48	80.10	5.14	1.62	9.96		
			3			37.66	62.34	14494	0.49	82.32	5.28	1.66	10.24		
17C 1.5 Sink		66-68	2		41.03	30.35	28.62	5831	0.58						
			3			51.46	48.54	9887	0.98						

\*1 - As Received Moisture  
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3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed

Table 31  
Proximate and Ultimate Analyses of 20, 21 and Uncorrelated Seams, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
		68-71	2		60.53	26.38	13.09	4385	0.40						
			3			66.83	33.17	11111	1.02						
Seam Average		66-71	2		51.99	28.12	19.89	5018							
1.5 SG Sink			3			58.57	41.43	10452							
83-19 Raw Coal	Un-Correlated	Outcrop	4	20.23	22.78	25.88	31.11	6663	0.24						
			2		28.56	32.44	39.00	8353	0.30						
			3			45.41	54.59	11692	0.42						
83-19 1.6 SG Float	Un-Correlated	Outcrop	4	20.23	11.83	28.79	39.16	7877	0.29	48.86	5.15	1.18	32.71	0	
			2		14.82	36.09	49.09	9874	0.36	61.25	3.62	1.47	18.48		
			3			42.37	57.63	11593	0.42	71.91	4.24	1.73	21.70		
83-20 Drill Cuttings	Un-Correlated	4-6.5	4	8.00	33.02	25.45	33.53	7566	0.38						
			2		35.89	27.67	36.44	8224	0.42						
			3			43.16	56.84	12828	0.65						
83-20 1.6 SG Float	?	4-6.5	4	8.00	21.66	28.66	41.68	9095	0.40	53.33	4.45	1.21	18.95	0	
			2		23.54	31.15	45.31	9886	0.44	57.97	3.87	1.32	12.87		
			3			40.74	59.26	12930	0.57	75.81	5.06	1.72	16.83		
83-21 Drill Cuttings	Un-Correlated	78-83	4	3.48	9.20	35.69	51.64	12710	0.23						
			2		9.53	36.97	53.50	13168	0.23						
			3			40.87	59.13	14555	0.26						
		83-84	4	3.14	7.69	36.46	52.70	13176	0.20						
			2		7.94	37.65	54.41	13603	0.20						
			3			40.89	59.11	14777	0.22						
Seam Average		78-84	4	3.42	8.94	35.81	51.82	12788	0.22						
Raw Coal			2		9.26	37.08	53.65	13241	0.23						
			3			40.86	59.14	14592	0.25						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
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5 - As Analyzed

Table 31  
Proximate and Ultimate Analyses of 20, 21 and Uncorrelated Seams, Deadfall Syncline (continued)

Drill Hole Number	Seam No.	Depth Interval (feet)	Basis	Moisture, %	Ash, %	Volatile Matter, %	Fixed Carbon, %	Heating Value, Btu/lb	Sulfur, %	C, %	H, %	N, %	O, %	FSI	HGI
115	?	78-83	1	3.48	4.78	37.18	54.56	13507	0.21	75.07	5.52	1.60	12.82	2.5	
			2		4.95	38.52	56.53	13994	0.21	77.78	5.32	1.66	10.08		
			3			40.53	59.47	14723	0.22	81.83	5.60	1.75	10.60		
		83-84	1	3.14	4.26	37.26	55.34	13766	0.20	77.36	5.68	1.37	11.14	3.0	
			2		4.40	38.46	57.14	14212	0.20	79.87	5.50	1.42	8.62		
			3			40.23	59.77	14866	0.21	83.54	5.75	1.48	9.01		
		Seam Average 1.6 SG Float	1	3.42	4.69	37.19	54.69	13550	0.20	75.46	5.55	1.56	12.53		
			2		4.86	38.51	56.63	14030	0.21	78.13	5.35	1.62	9.83		
			3			40.48	59.52	14747	0.22	82.12	5.62	1.70	10.33		
	Un-Correlated	50-52.5	1	4.10	23.37	29.82	42.71	10277	0.35						
			2		24.37	31.09	44.54	10717	0.37						
			3			41.11	58.89	14170	0.49						
	-	50-52.5	1	4.10	6.42	34.11	55.37	12983	0.41	773.68	5.23	1.55	12.71	1.5	
			2		6.70	35.57	57.73	13538	0.43	776.83	4.98	1.61	9.46		
			3			38.12	61.88	14510	0.46	882.34	5.34	1.73	10.13		
	un-correlated	112-117.5	5	1.49	19.87	28.23	50.41	11210	0.27						
			2		20.17	28.66	51.17	11380	0.27						
			3			35.90	64.10	14255	0.34						
		199-200	5	1.41	11.28	30.76	56.55	12660	0.44						
			2		11.44	31.20	57.36	12841	0.45						
			3			35.23	64.77	14500	0.50						
	un-correlated	21-25	5	1.70	13.51	32.33	52.46	12170	0.44						
			2		13.74	32.89	53.37	12380	0.45						
			3			38.13	61.87	14353	0.52						
	un-correlated	21.5-24	5	1.76	13.14	32.11	52.99	12490	0.30						
			2		13.38	32.69	53.94	12714	0.31						
			3			37.73	62.27	14677	0.35						

\*1 - As Received Moisture  
2 - Moisture Free  
3 - Moisture and Ash Free  
4 - Equilibrium Moisture  
5 - As Analyzed



Table 32.  
Concentration of Major and Minor Elements as a Percent of High Temperature Ash and Ash Fusibility Data for  
Deadfall Syncline Coal Samples

Drill Hole No.	86 Test Pit				91 Pit Channel Sample					
	86 Test Pit #3	91-2	#2 Bulk Sample	Seam Average	91-1					Seam Average
Seam No.	DFS-1	DFS-2	DFS-2	DFS-2	DFS-3	DFS-4	DFS-4	DFS-4	DFS-4	DFS-4
Depth, Interval, Ft.	4-6	39-46	11.5-18.6	-	36-48	30-32.5	32.5-35.0	35.0-37.5	37.5-40	30-40
Elemental Analysis										
Ash, WL %										
SiO <sub>2</sub>	52.6	28.0	31.1	29.6	31.0	32.6	23.1	22.2	22.1	25.0
Al <sub>2</sub> O <sub>3</sub>	33.4	24.0	23.4	23.7	22.9	27.5	31.7	32.9	34.1	31.6
TiO <sub>2</sub>	1.37	1.15	1.20	1.18	0.79	0.78	0.95	0.98	1.16	0.97
Fe <sub>2</sub> O <sub>3</sub>	3.36	11.3	12.8	12.1	16.2	4.62	6.20	4.39	4.39	4.83
CaO	3.92	13.2	15.0	14.1	10.3	10.1	10.7	13.2	10.4	11.1
MgO	1.62	6.72	7.03	6.88	6.72	3.93	6.46	8.46	5.02	5.94
Na <sub>2</sub> O	1.64	4.17	4.16	4.16	1.54	2.39	3.09	4.87	5.58	4.06
K <sub>2</sub> O	1.46	0.79	1.49	1.14	1.17	0.35	0.28	0.19	1.16	0.52
P <sub>2</sub> O <sub>5</sub>	-	1.76	-	1.76	1.59	4.51	0.50	1.12	3.27	2.45
SO <sub>3</sub>	0.85	4.70	4.33	4.51	4.23	8.68	9.53	7.90	9.55	8.90
SrO	-	0.28	-	0.28	0.22	0.94	0.27	0.33	0.60	0.55
BaO	-	1.41	-	1.41	0.82	2.09	1.66	1.36	1.89	1.76
MnO	0.03	0.07	0.09	0.08	0.14	0.01	0.01	0.01	0.01	0.01
Base: Acid Ratio	0.14	0.68	0.73	-	0.66	0.35	0.48	0.55	0.46	0.46
T250* Temp. °F	2850	2215	2200	-	2225	2465	2335	2285	2352	2352
Fusibility on Temp. of Ash °F										
<u>REDUCING</u>										
Initial Deformation	1875(?)	2055	2057	-	2065	2335	2195	2095	2170	2196
Softening	2800+	2075	2238	-	2115	2370	2290	2210	2285	2287
Hemispherical	2800+	2080	2284	-	2120	2390	2350	2235	2320	2321
Fluid	2800+	2090	2487	-	2130	2410	2650	2390	2440	2463
<u>OXIDIZING</u>										
Initial Deformation	1850(?)	2245	2087	-	2230	2375	2330	2330	2400	2360
Softening	2800+	2405	2256	-	2350	2390	2455	2550	2495	2474
Hemispherical	2800+	2440	2296	-	2370	2400	2525	2650	2565	2537
Fluid	2800+	2465	2497	-	2400	2450	2800+	2800+	2595	2655

\*Sage, W.L., and McBry, J.B., Relationship of Coal-Ash Viscosity to Chemical Composition, Journal of Engineering for Power, April 1960, Trans ASME, p. 145-155.

Table 32.  
Concentration of Major and Minor Elements as a Percent of High Temperature Ash and Ash Fusibility Data for  
Deadfall Syncline Coal Samples (continued)

Drill Hole No.	91.5						Seam
	84-122						Average
Seam No.	K3	K3	K3	K3	K3	K3	K3
Depth, Interval, Ft.	95.3-108	54-56	56-58	58-60	60-62	62-71.3	54.0-71.3
Elemental Analysis							
Ash, Wt. %							
SiO <sub>2</sub>	30.9	19.8	35.0	38.5	8.03	19.4	28.24
Al <sub>2</sub> O <sub>3</sub>	29.2	23.5	37.1	39.2	24.9	25.7	32.33
TiO <sub>2</sub>	0.68	0.69	1.13	1.08	1.18	0.90	1.01
Fe <sub>2</sub> O <sub>3</sub>	4.84	8.04	2.38	1.86	6.73	6.53	4.24
CaO	17.5	14.8	7.62	5.53	25.7	15.7	11.26
MgO	6.69	8.32	4.71	2.94	13.3	8.90	6.34
Na <sub>2</sub> O	6.86	7.16	4.62	5.59	9.96	8.81	6.75
K <sub>2</sub> O	0.56	0.82	0.44	0.47	0.48	0.60	0.53
P <sub>2</sub> O <sub>5</sub>	0.76	0.84	0.90	0.66	0.21	0.63	0.70
SO <sub>3</sub>	1.50	11.83	4.26	3.08	7.58	10.80	6.75
SrO	0.23	0.30	0.21	0.21	0.23	0.27	0.24
BaO	1.09	2.23	1.07	0.70	1.25	1.40	1.17
MnO	0.02	0.04	0.01	0.01	0.01	0.01	0.01
Base: Acid Ratio	0.60	0.89	0.27	0.21	1.65	0.88	0.47
T250* Temp. °F	2257	2170	2565	2665	2400	2172	2340
Fusibility on Temp. of Ash °F							
<u>REDUCING</u>							
Initial Deformation	2093	2070	2160	2400	2180	2100	2147
Softening	2143	2150	2410	2450	2215	2165	2230
Hemispherical	-	2175	2425	2495	2220	2210	2264
Fluid	2189	2195	2450	2600	2235	2300	2332
<u>OXIDIZING</u>							
Initial Deformation	-	2375	2180	2385	2430	2400	2373
Softening	-	2490	2335	2490	2500	2525	2492
Hemispherical	-	2500	2380	2515	2510	2540	2510
Fluid	-	2515	2500	2550	2550	2555	2542

\*Sage, W.L., and McIlroy, J.B., Relationship of Coal-Ash Viscosity to Chemical Composition, Journal of Engineering for Power, April 1960, Trans ASME, p. 145-155.

Table 32.  
Concentration of Major and Minor Elements as a Percent of High Temperature Ash and Ash Fusibility Data for  
Deadfall Syncline Coal Samples (continued)

Drill Hole No.	91-7					Seam Average	91-10C	Seam Average
	K3	K3	K3	K3	K3	K3	K3	K3
Seam No.	K3	K3	K3	K3	K3	K3	K3	K3
Depth, Interval, Ft.	32.5- 34.5	34.5- 36.5	36.5- 38.5	38.5- 40.5	40.5- 50.0	32.5- 50.0	129.0- 141.5	-
Elemental Analysis Ash, Wt. %								
SiO <sub>2</sub>	14.8	42.3	32.7	17.6	15.8	27.66	33.9	29.8
Al <sub>2</sub> O <sub>3</sub>	30.2	37.4	30.4	25.8	24.7	30.19	33.8	31.4
TiO <sub>2</sub>	0.90	0.77	0.81	0.37	0.84	0.77	0.90	0.56
Fe <sub>2</sub> O <sub>3</sub>	7.60	1.60	2.71	4.96	6.77	4.16	3.33	4.15
CaO	10.9	4.37	10.3	17.8	14.8	10.76	8.62	11.5
MgO	5.20	3.00	7.21	9.64	9.70	6.89	4.24	6.14
Na <sub>2</sub> O	5.04	3.76	6.84	6.70	9.37	6.61	7.14	6.81
K <sub>2</sub> O	0.46	0.79	0.46	0.71	0.86	0.70	0.66	0.61
P <sub>2</sub> O <sub>5</sub>	4.74	0.43	0.36	2.46	0.73	0.97	0.88	0.83
SO <sub>3</sub>	12.88	3.15	5.88	7.95	10.00	7.00	3.00	4.93
SrO	0.92	0.13	0.15	0.79	0.32	0.31	0.27	0.26
BaO	3.94	1.19	1.24	3.12	1.67	1.71	1.56	1.39
MnO	0.02	0.01	0.01	0.02	0.02	0.01	0.01	0.01
Base: Acid Ratio	0.64	0.17	0.43	0.91	1.00	0.50	0.35	-
T250* Temp. °F	2235	2750	2377	2165	2160	2320	2465	-
Fusibility on Temp. of Ash °F								
<b>REDUCING</b>								
Initial Deformation	2125	2090	2170	2250	2080	2158	2115	-
Softening	2320	2145	2185	2260	2125	2221	2175	-
Hemispherical	2410	2175	2200	2270	2150	2254	2190	-
Fluid	2480	2225	2225	2295	2270	2348	2300	-
<b>OXIDIZING</b>								
Initial Deformation	2370	2425	2150	2300	2405	2362	2260	-
Softening	2565	2550	2350	2490	2525	2508	2315	-
Hemispherical	2610	2625	2400	2510	2545	2541	2340	-
Fluid	2775	2800+	2495	2525	2580	2611	2450	-

\*Sage, W.L., and McIlroy, J.B., Relationship of Coal-Ash Viscosity to Chemical Composition, Journal of Engineering for Power, April 1960, Trans ASME, p. 145-155.

Table 32.  
Concentration of Major and Minor Elements as a Percent of High Temperature Ash and Ash Fusibility Data for  
Deadfall Syncline Coal Samples (continued)

Drill Hole No.	91-7	-	Seam Average
Seam No.	K4	-	-
Depth, Interval, Ft.	102.5- 104.5	104.5- 106.5	102.5- 106.5
Elemental Analysis			
Ash, Wt. %			
SiO <sub>2</sub>	33.6	9.94	24.31
Al <sub>2</sub> O <sub>3</sub>	33.9	21.2	28.91
TiO <sub>2</sub>	0.85	1.02	0.92
Fe <sub>2</sub> O <sub>3</sub>	3.31	8.2	5.23
CaO	7.74	20.8	12.87
MgO	4.49	12.9	7.79
Na <sub>2</sub> O	6.50	9.18	7.55
K <sub>2</sub> O	0.54	0.52	0.53
P <sub>2</sub> O <sub>5</sub>	1.54	-	0.94
SO <sub>3</sub>	4.80	11.45	7.41
SrO	0.34	0.23	0.30
BaO	1.51	1.69	1.58
MnO	0.01	0.02	0.01
Base: Acid Ratio	0.33	1.60	0.63
T250* Temp. °F	2490	2340	2240
Fusibility on Temp. of Ash °F			
<u>REDUCING</u>			
Initial Deformation	2090	2200	2150
Softening	2190	2240	2217
Hemispherical	2270	2280	2275
Fluid	2400	2460	2432
<u>OXIDIZING</u>			
Initial Deformation	2290	2450	2377
Softening	2380	2550	2472
Hemispherical	2435	2600	2525
Fluid	2475	2650	2570

\*Sage, W.L., and McIlroy, J.B., Relationship of Coal-Ash Viscosity to Chemical Composition, Journal of Engineering for Power, April 1960, Trans ASME, p. 145-155.