PR-DOWLING CREEK 77(1)A

BOW RIVER RESOURCES LTD/RAINIER ENERGY RESOURCES

BRI COAL MINING, LTD.

PEACE RIVER COAL PROJECT

NORTHEASTERN BRITISH COLUMBIA

N.T.S. 93-O-16

COAL LICENCES #3634 - #3654

OCTOBER 1977

Prepared By

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INDEX

For analysis information, refer to Confidential Coal Analysis File.

SUMMARY AND RECOMMENDATIONS

The 1977 exploration program failed to find an easy access from the outcrop into the Trojan Seam. The mantle of overburden along the northern boundary proved to be too thick for this purpose in the locations tested but this should not be taken at this stage to preclude the possibility of finding a more favorable site after further exploration. The Trojan Seam was discovered in the outcrop zone along Dowling Creek but its diminished thickness in this area and the washout/fault zone immediately to the east have seriously detracted from the otherwise favorable prospects at this location.

Since access into the seam to the thick coal areas by a drift now appears to be the only logical alternative, it is necessary to fully define the reserves of thick coal by further drill hole exploration along Canfor Road Line 400 before such a costly undertaking can be considered. Definition of seam thicknesses and outcrop potential along the northern boundary should also form part of a continued exploration program.

INTRODUCTION

This report has been prepared to present to the Department of Mines an update on the exploration activities undertaken during the licence year October, 1976, to October, 1977. As of October, 1976, all data concerned with exploration and past geological investigations was assembled into a report by Paul Dyson Consultants and presented to the Department at that date. Also during the latter part of 1976 Mr. W. Chang, M.Sc., who was in attendance on the property during the 1976-1977 program, continued further work of investigation particularly around the washout zone along Dowling Creek.

It is not considered necessary to repeat the introductory recital of data on location of the property, description of licences, and general geology as these have been adequately covered in previous reports. This report will, therefore, be concerned with reporting the results of the 1976-1977 program with comments on the corporate strategy which dictated the general direction of the on-site activities.

STATUS OF LICENCES AND OPERATORS

On March 19, 1976, an agreement was drawn up between Bow River Resources, LID/Rainier Energy Resources, Inc., the joint holders of the licences and Bri Coal Mining, Ltd., a company incorporated in British Columbia for the purpose of exploration on and development of the coal deposits on the licences. A copy of the agreement has been lodged with the Department of Mines. While provision was made in this agreement for a transfer of 50 percent interest in the licences to Bri Coal Mining, Ltd., subject to the consent of the Minister, no action was positively taken in 1976 to put this provision into effect. Instead, a program of exploration was undertaken by Bri Coal, the details of which were submitted for prior approval by the Department in January, 1976; the results being reported in October, 1976. This program was incomplete with respect to the Plan of Operations submitted due to corporate difficulties and lack of finance. This situation continued until January, 1977, when 85 percent of the Bri Coal shares were acquired by two residents of Chetwynd, British Columbia, who had other extensive business interests in that area. The corporate structure of Bri Coal Mining, Ltd., as presently constituted is therefore Mr. H. A. Hansen, Canadian citizen, Chetwynd, British Columbia; Miss Frances P. MacNeil, Canadian citizen, Chetwynd, British Columbia; and Mr. Hoon Kwak, Vancouver.

This company has now applied for the transfer of 50 percent of the interest in the licences from Bow River Resources, Ltd., and Rainier Energy, Inc., to Bri Coal Mining, Ltd.

OBJECTIVES OF BRI COAL MINING EXPLORATION 1977

Following the fundamental change in the Bri Coal Company structure, the exploration strategy was reoriented toward a faster development and exploration program designed to put the property into commercial production as soon as possible. A Supplemental Plan of Operation was submitted for approval in May, 1977, with these objectives in mind.

Encouragement to pursue this course of action was given by the preliminary results from marketing approaches to Korea, Argentina, and Spain. It appeared that while sales for large tonnages of each from the Peace River District would be very difficult to achieve, there was a market for smaller tonnages of competitively priced high-grade metallurgical coal. This appraisal of the marketing situation is still valid as indicated during continued efforts to define a market for this coal'.

Consequent upon the above philosophy, the supplemental plan of operation submitted in May, 1977, was designed to:

1. Find an outcrop of the Trojan Seam suitable for taking a 15-ton bulk sample for full analysis and washing tests. This requirement had become mandatory following the market negotiations in which every end user emphasized 'the necessity of obtaining bulk samples of clean coal to specification for coking tests. Examination of the geological data then in existence indicated that an outcrop of the seam would occur along the northernboundary of the licences at Gaylard Creek. A

surface and helicopter reconnaissance of this area was made, attended by Mr. Paul Dyson, which failed to find any suitable exposures due to the thick mantle of overburden. Several drill site locations were selected to prove the subcrop and thereby avoid extensive work by bulldozer. This program was designated on the plan submitted as "Proposed Shallow Drill Holes to Confirm ADIT Site Along Existing Trails."

2. Prove the southern extension of the Trojan Seam from the vicinity of the previously drilled holes along Dowling Creek where thicknesses of from 7' to 8'6" of -coal had been discovered. The locations of these new drill holes on the map were shown along the Line 400 logging road of Canfor which is a very convenient access to the locations of these proposed drill holes.

EXPLORATION RESULTS

During the 1976-1977 licence year only those drill holes designed to determine the location of the outcrop were in fact drilled. It should be understood that this series of eight drill holes was not commissioned with the objective of proving reserves or providing wide-range geological data so the necessity to electric log the holes was dispensed with.

Drill Hole 77-l

The first hole of the series was put down as an outcrop probe at a point approximately 600 feet south of Gaylard Creek. After penetrating 113 feet of overburden, the Gething formation was entered and the first coal seam struck at 143' to 145'6". Two other small seams were intersected at 154' to 154'6" and at 162' to 163'6". The total depth of the hole was 209 feet. In an attempt to identify the location of these seams in the stratigraphical column, Paul Dyson was called in for an opinionbuthe was unable to correlate the section. Another drill hole site was selected for 77-2 which was anticipated to be higher in the column.

Drill Hole 77-2

This location was drilled but the overburden was found to be 200 feet thick and when the Gething formation was entered only three small seams between 6 and 18 inches thick were intersected. It was deducted that these seams were below the Trojan and consequently of no interest.

Drill Hole 77.3

According to earlier geological maps, there appeared to be evidence that the Moosebar Formation outcropped along a ridge of high ground north of this drill site. When the drill had reached a depth of 200 feet in overburden, it was decided to abandon this hole as that amount of cover would preclude the possibility of exposing the seam.

Drill Hole 77-4

In order to establish the presence of the seam down the dip from the outcrop and to give another positive location for the seam in the area, a site was selected on the junction of two old bush tracks. Both the Superior and the Trojan seams were intersected as shown on Figure 1. The Trojan Seam was 42 inches thick with a small sandstone band present in the lower section. The Superior Seam was split by a 12-inch shale parting.

Drill Hole 77-5

After a reconnaissance survey to attempt to find a pattern for deposition of the glacial drift, another area for investigation was selected near Dowling Creek. Although the seam was expected to be thinner at this location, mining development could be planned to reach the thicker coals to the north via this access. Drill Hole 77-5 was put down to prove the general stratigraphy in the area. As shown on Figure 2 the Trojan Seam was intersected at a depth of 58 feet, but due to core loss there was some initial confusion between the Trojan and the sub-Trojan which appeared to have a local thickness of 48 inches. The final definition of the seams was fixed after drilling 77-6 and 77-7. The overburden was 34 feet at this site.

Drill Hole 77-6

This was put down nearer the subcrop to determine the angle of dip and to locate the exact subcrop of the Trojan. The overburden was 23 feet but the Trojan Seam had subcropped between the two holes so thatonlythe 27-inch thick sub-Trojan was intersected. This hole was deepened to 218 feet to prove any lower seams but as shown on Figure 3 these were only thin and not of economic interest.

Drill Hole 77-7

To confirm the above information by relating it to the Gething-Moosebar contact the next site for drill hole 77-7 was selected 400 feet to the east. The overburden was 44 feet thick and immediately on the subcrop broken pieces of coal were present indicating that the Moosebar contact was still further east. This broken coal was probably the remains of the Superior Seam at that point. Drilling continued to intersect the Trojan and the sub-Trojan as well as two thin seams of very bright coal at a depth of 166 feet and 171 feet, respectively. These two seams of bright coal were very useful as marker beds in subsequent correlations. The Trojan Seam was again 36 inches thick and contained the usual sandstone band (4") while the sub-Trojan had thinned out to 18 inches. The results are shown on Figure 4.

Drill Hole 77-8

To determine the progression of the Trojan Seam to the northeast, the final drill hole of the series was put down further to the northeast at a point south of original Drill Hole 71-2 which had apparently struck a

washout zone with no Trojan Seam being present. The same formation was unfortunately repeated in this drill hole in which little or no Trojan seam was intersected. A sandstone facies was present at the projected horizon for the Trojan Seam which again corresponded with a similar section in the 71-2 bore hole. From this information it was concluded that the washout zone trended north-south and that further exploration would be required to fully evaluate the possibility of gaining access to the reserves at this location.

INTERPOLATION OF TROJAN SEAM CONTOUR

On the map (pocket) entitled "Projected Contours for Trojan Seam" is assembled all the presently known data from bore hole and outcrop exploration. From this data the seam contours have been drawn at 100-foot intervals together with the seam outcrops and subcrops.

In the northern section where the first attempts to find an outcrop were made, it can be seen there is a considerable disparity between the projected outcrop (green line) and the subcrop (red line). On the assumption that the seam was present to the south of the projected outcrop (which location was partially confirmed by uncovering the Trojan Seam in the side cut of Line 400 roadway to the north of Licence 3645 as indicated) the first three (3) drill holes were put down along the old existing roadway to prove the extension of the seam from the drill hole sites along Gething Creek. These three holes, however, did not intersect the Moosebar shales below the overburden but encountered Gething shales, siltstones and mudstones with occurrences of small coal seams. It was, therefore, deduced that the section entered was below the Trojan horizon and that glacial erosion had wiped out the seam in a channel along Gaylord Creek leaving behind up to 200 feet of drift in its place. The outcrop observation on Line 400 must therefore be an outlier with a gap in the seam deposition between the projected outcrop and the subcrop. Since the depth of overburden and the unfavorable topography appeared to make further attempts to locate the seam for sampling purposes impractical, the exploration activities were moved to Dowling Creek. In the proeess, drill hole D.D.H. 77-4 was put down at the location shown on the map to confirm

the presence of the Trojan but it was disappointing to discover that the seam had thinned out between D.D.H. 71-3 (8 ft. 6 in.) and D.D.H. 77-4 (3 ft. 6 in.), a distance of 2,500 feet. An analysis of the Trojan Seam in D.D.H. 77-4 is shown on Figure 7.

A section through D.D.H.'s 6, 5, 7 and 8 is. shown on Figure 6. In the correlation of these intersections two thin seams of very bright coal occurring in close proximity to each other some 50 to 60 feet below the Trojan Seam were used as marker beds. The Trojan Seam was intersected in D.D.H. 77-5 at58 feet where it was 3 feet thick. Similarly, in D.D.H. 77-7 it was 3 feet thick at a depth of 108 feet. In an effort to prove the continuity of the seam to the east, the drill hole 77-8 was put down south of the washout zone discovered in D.D.H. 71-2 during the 1971 exploration program (Refer Dyson Report). A similar washout was discovered in D.D.H. 77-8 confirming the extension of the seam erosion to the south.

From the work of Chang (1976), several outcrops of the Trojan Seam with thicknesses 1 to 3 feet were discovered immediately to the west of D.D.H. 71-2 in Dowling Creek. It is apparent, using the Moosebar shale/Gething contact in D.D.H. 71-2 as a marker horizon, that the Trojan Seam horizon should have been at 140 feet in the drill hole. This requires a seam displacement of approximately 170 feet over a horizontal distance of 500 feet which would indicate the presence of a fault in conjunction with the washout. This proposition is strengthened by a consideration of the overall seam contours which similarly can be interpreted as requiring a fault to explain the differences in elevations in the same area. Further

drilling will be required to fully elucidate the actual occurrences and formations in this area.

FIG. 1

STRATIGRAPHICAL SECTION

D. D. H. 77-4

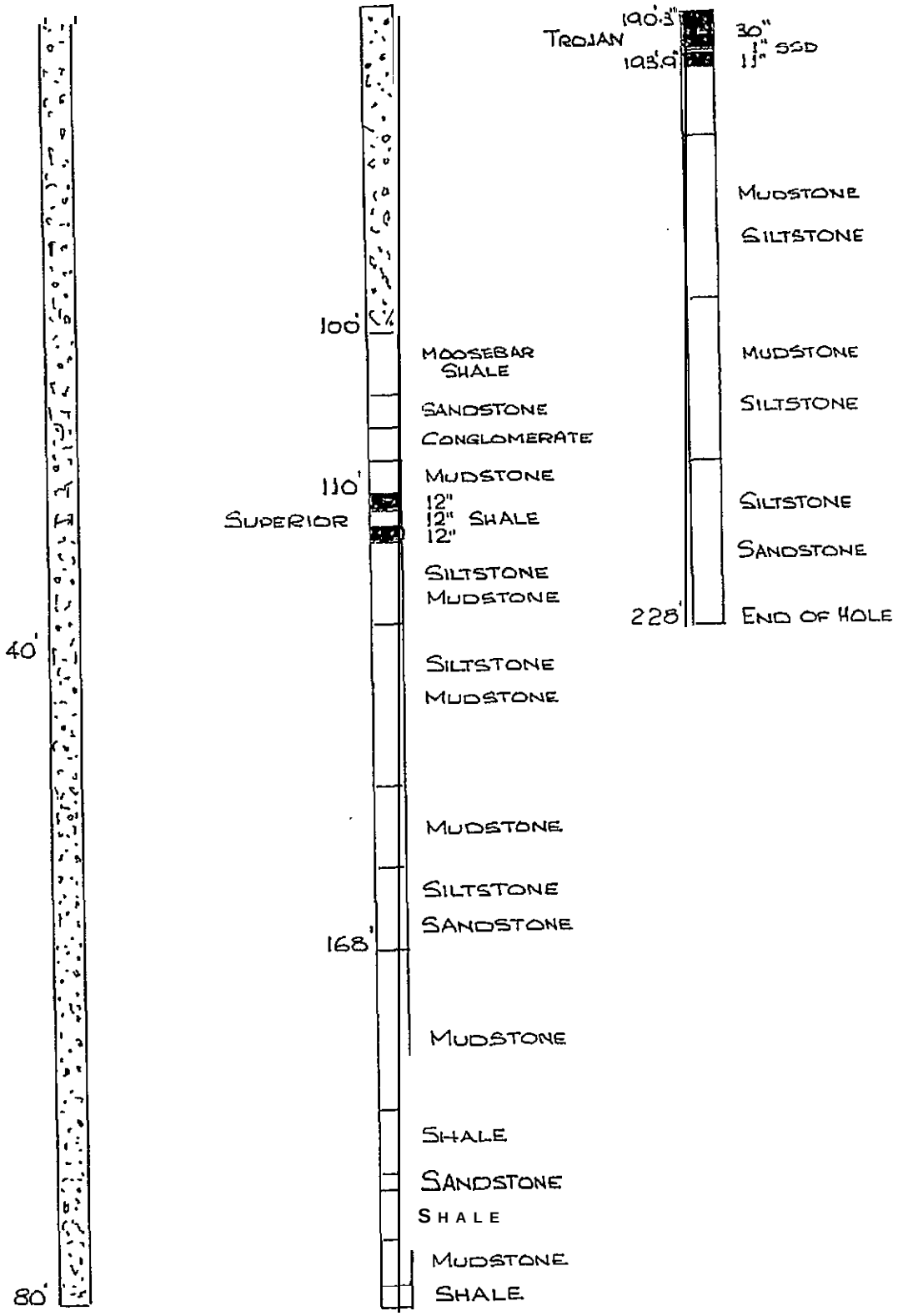


FIG. 2

STRATIGRAPHICAL SECTION

D.D.H 77-5

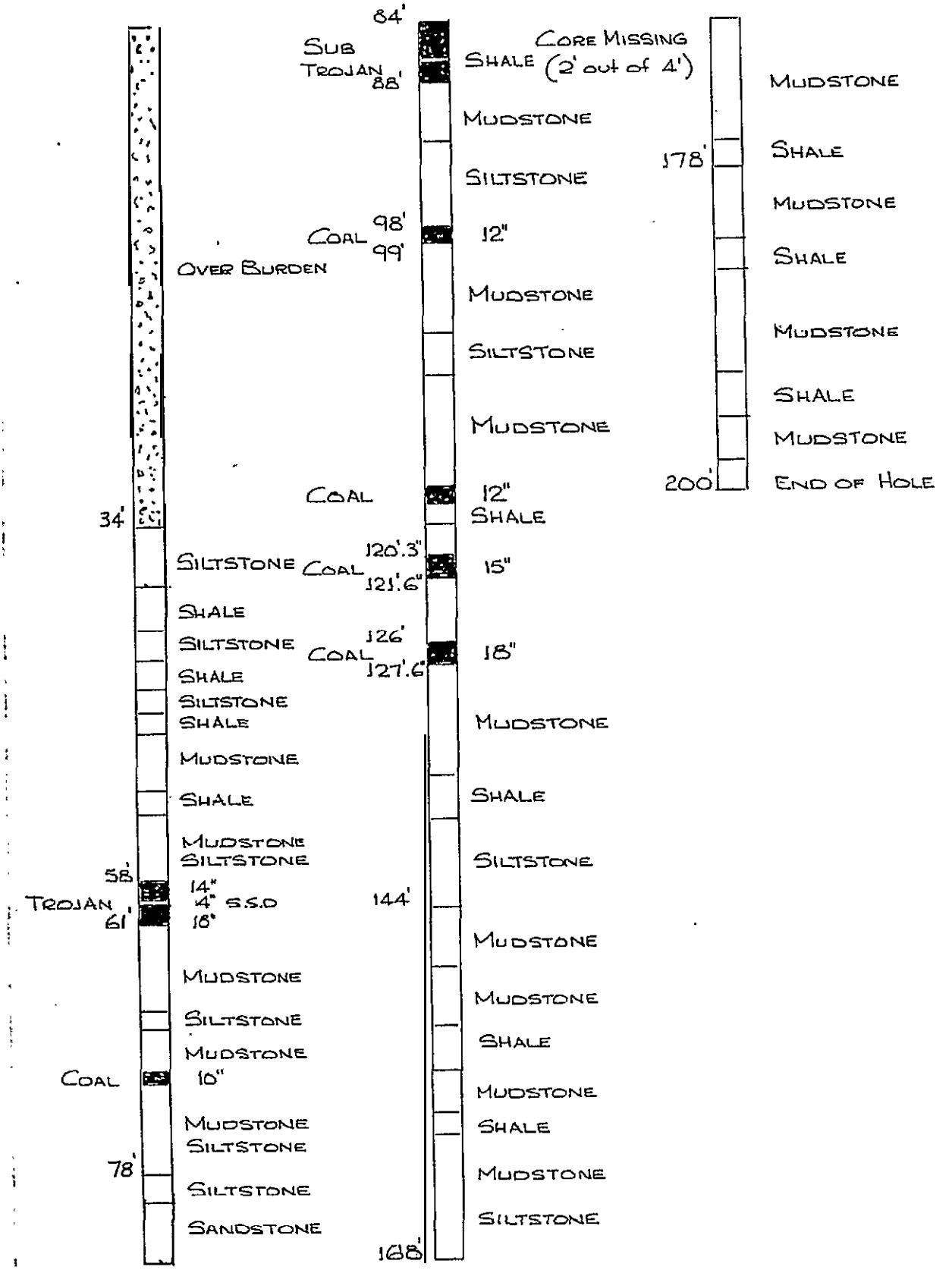


FIG. 3

STRATIGRAPHICAL SECTION.

D.D.H 77-6

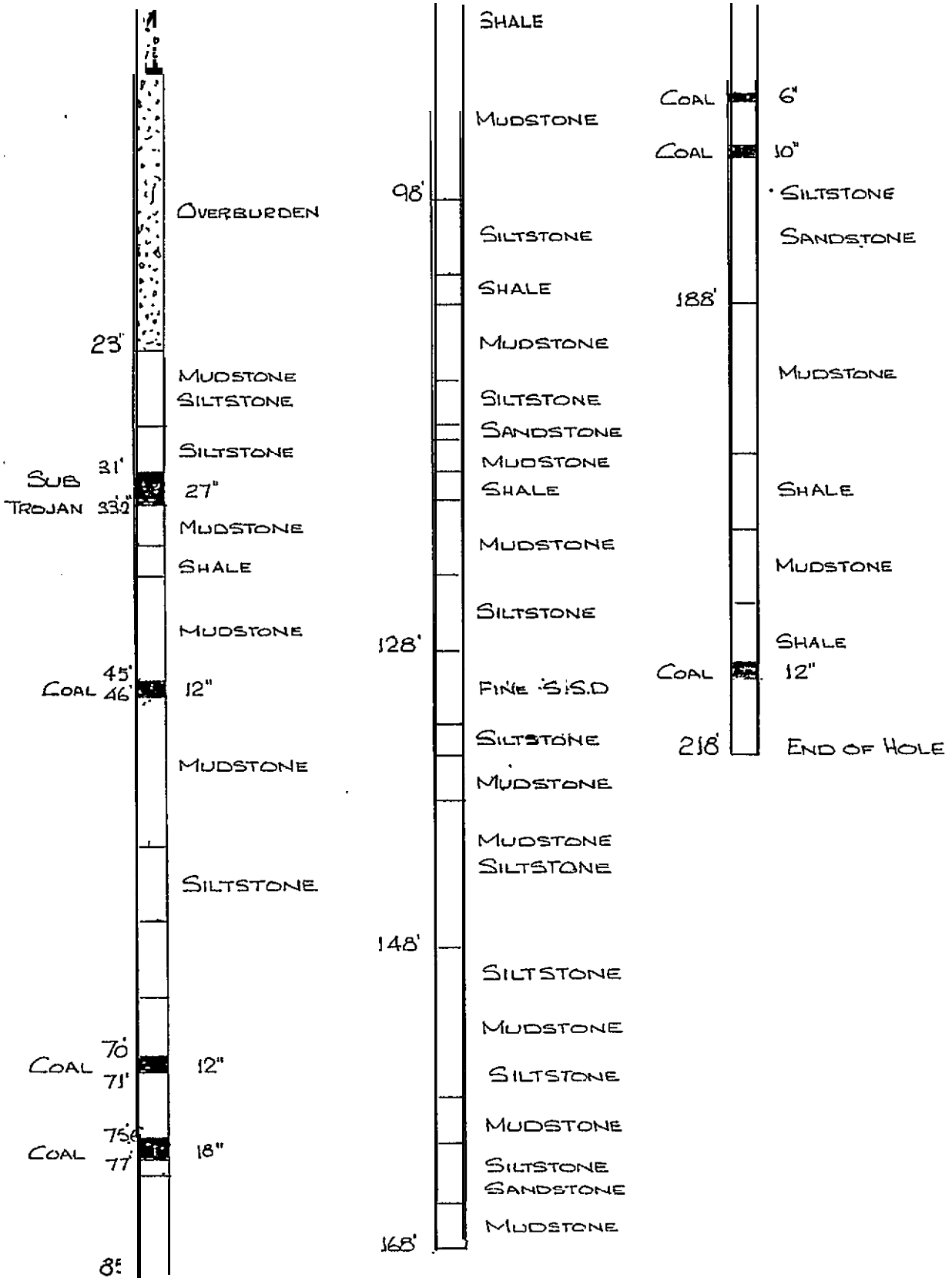


FIG. 4
STRATIGRAPHICAL SECTION
D.D.H 77-7

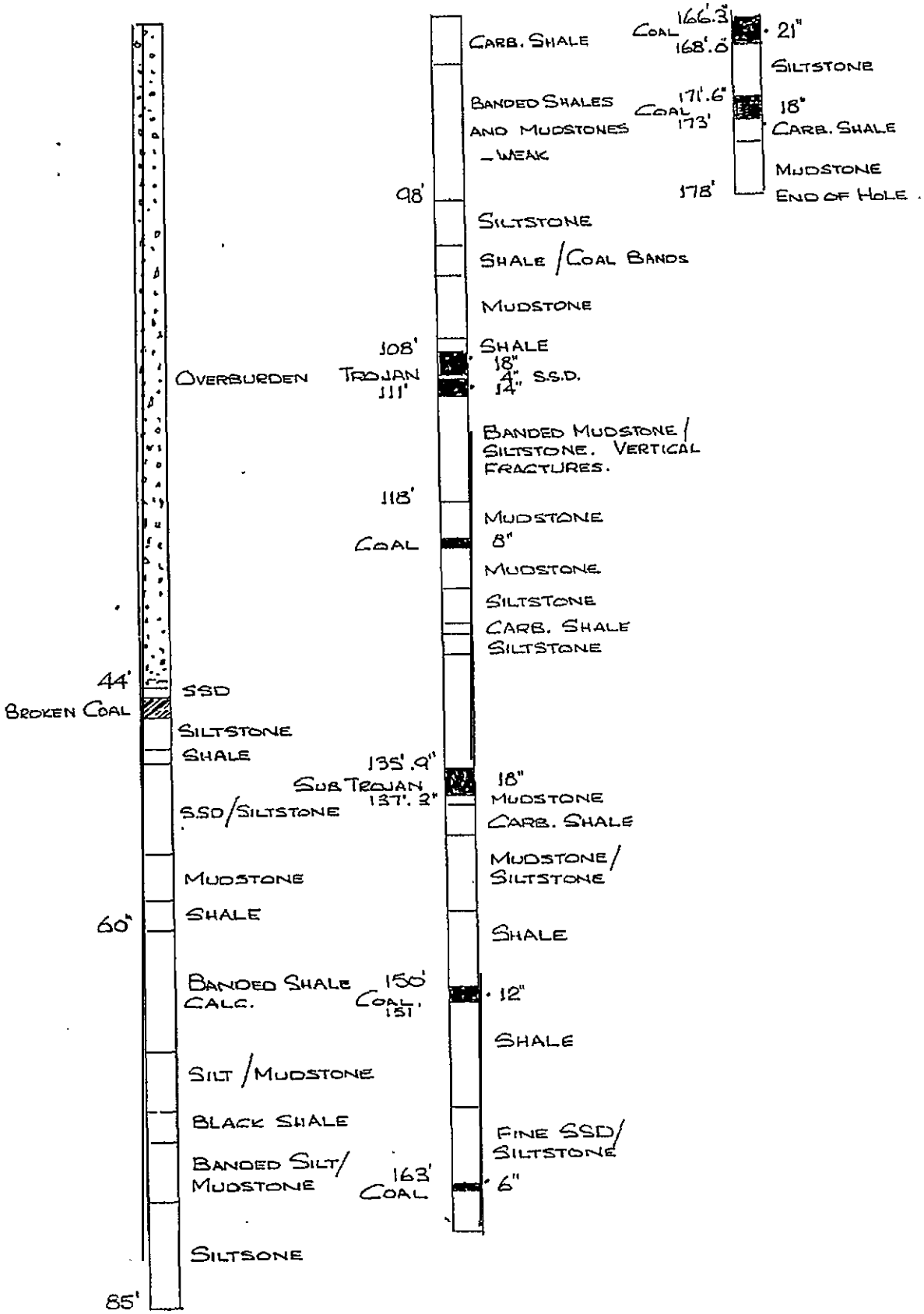


FIG. 5

STRATIGRAPHICAL SECTION

D.D.H 77-8

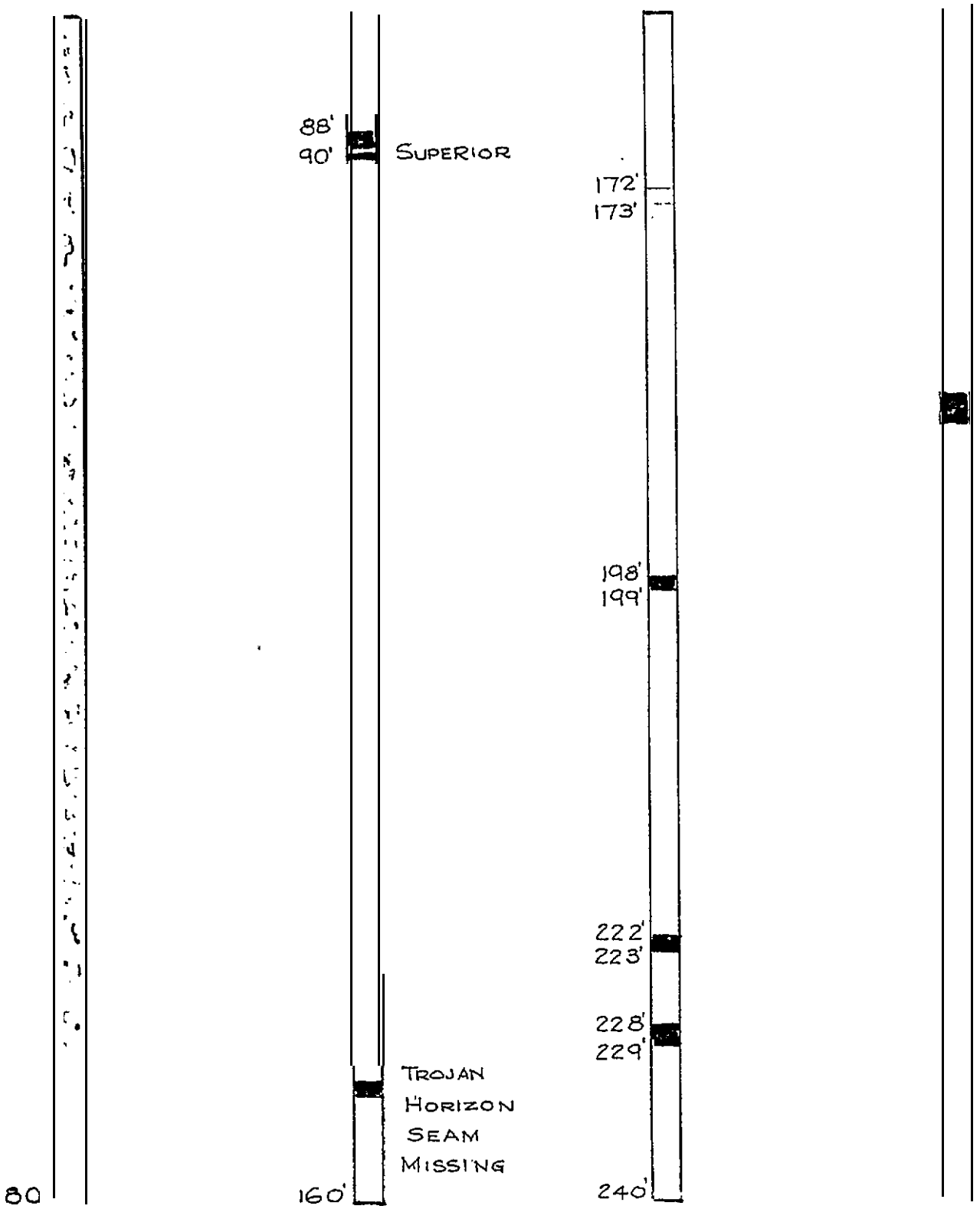
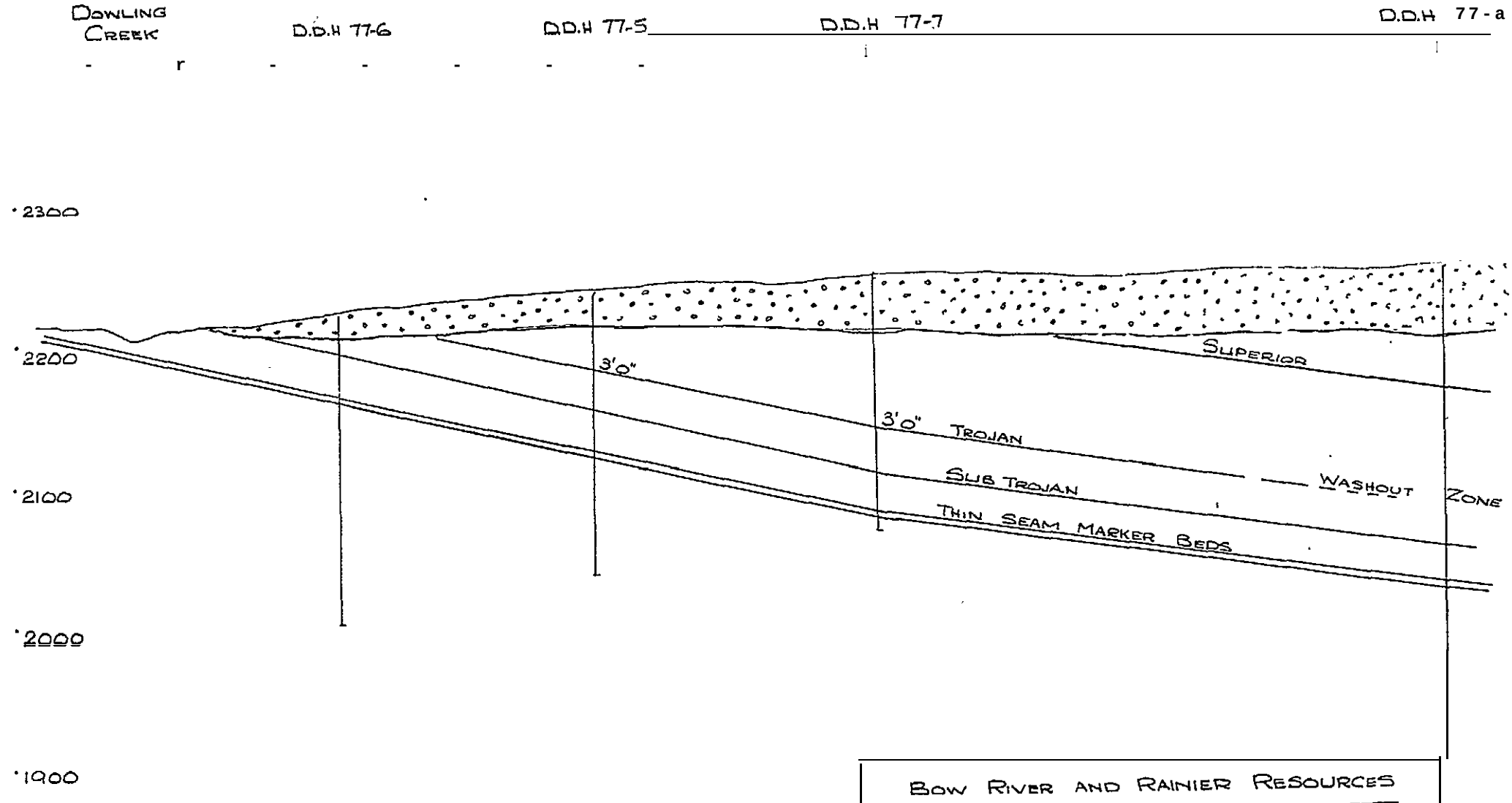


FIG. 6



BOW RIVER AND RAINIER RESOURCES

Section Through Drillholes

D.D.H 77-6, 77-5, 77-7 and 77-8

Horizontal Scale : 1" = 200 Ft.

THE ROBERTS CONSULTING CORPORATION

122° 20' W

122° 15' W

3645

3644

3643

3647

3646

3642

outcrop

77-1

77-2

77-3

77-4

77-5

77-6

77-7

77-8

71-1

71-2

71-3

71-4

76-1

76-4

2500

2600

2700

2800

2900

3000

3500

2000

2100

2200

2300

2400

1900

1800

1700

1600

512

Bow River and Rainier Resources

PR- DOWLING CREEK 77(2)A

Projected Contours For

Trojan Seam

Scale: 4 Ins to 1 Mile

#1

The Roberts Consulting Corporation

122°20'W

122°15'W

56°

55°59'

3645

3644

3643

3647

3646

3642

77-1

77-2

77-3

77-4

77-5

77-6

77-7

77-8

71-1

71-2

71-3

71-4

76-1

76-4

2500

2600

2700

2800

2900

3000

3500

2000

2100

2200

2300

2400

1900

512

Bow River and Rainier Resources

PR - DOWLING CREEK 77(2)A

Exploration Program 1971 - 1977

#2

● Diamond Drillholes 1971

● " " 1976

▼ " " 1977

Scale:
4 ins to 1 mile

The Roberts Consulting Corporation

FIGURE 7

COAL - UTAH MINES EXPLORATION

DOWLING CREEK

TROJAN SEAM

190.3-193.6

DDH 77-4

Moisture Free Basis

Sp. Gravity	% Weight	FSI	Elementary Data % Ash	% S	% VM	% FC	Btu	Cumulative Data % Weight	% Ash	% S	% VM	% FC	Btu
1.400 Float	66.17	7 1/2	3.98	0.83	25.86	70.16	14680	66.17	3.98	0.83	25.56	70.16	1469
1.600 Float	10.38	6 1/2	27.04	0.69	23.16	49.80	10860	76.55	7.11	0.81	25.49	67.40	1416
1.600 Sink	23.45	1	58.01	0.36	15.85	26.14	5829	100.00	19.04'	0.71	23.23	57.13	1221
Total	100.00		19.04	0.71	23.23	57.73	12208						

HEAD ANALYSIS

	% H_2O	% Ash	% S	% VM	% FC	Btu	FSI
Air Dried Basis	1.59	17.79	0.70	22.89	57.73	12115	6
Moisture Free		18.08	0.71	23.26	58.66	12311	