K-SAGE CREEK 73(1)B.

N.T.S.: 82-G-2

SAGE CREEK COAL
FLATHEAD VALLEY, B.C.
REPORT ON EXPLORATION & GEOLOGY
JUNE TO SEPTEMBER, 1973

O. Cullingham
H. W. Marsh

December, 1973

00363 (3)

RIO TINTO CANADIAN EXPLORATION LIMITED

N.T.S. 82-G-2

SAGE CREEK COAL
FLATHEAD VALLEY, B. C.
REPORT ON EXPLORATION & GEOLOGY

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LIST OF ILLUSTRATIONS

Cont'd.

SAGE CREEK COAL

FLATHEAD VALLEY, B. C.

REPORT ON EXPLORATION & GEOLOGY

N.T.S.: 82-G-2

SUMMARY

A programme of bulk sampling, mapping and drilling was undertaken by Rio Tinto Canadian Exploration Limited from May to September, 1973. The bulk sampling programme involved approximately 2,149 feet of adit work in seven adits excavated to evaluate the coal quality on the north slope of South Hill and the north slope of North Hill. Access roads were mapped and several trenches dug along the roads in an attempt to locate the coal seams in outcrop and to aid in structure determination. This part of the programme met with only limited success. Three holes were drilled to intersect designated seams in close proximity to adits. The purpose of the drilling was to determine the usefulness of utilizing the Sidewall Density Tool as a reliable means of evaluating coal quality by comparing the ash determination from the Density Log against actual ash determination from the bulk samples. Only two of the three holes were completed, however, the two holes were thought adequate to carry out the experiment.

Results from previous exploration programmes are incorporated in this report which entails a complete re-evaluation of the geology of the property.

INTRODUCTION

Exploration at Sage Creek Coal commenced May 29th with the mobilization of the camp and construction of access roads and portal locations. The adit programme began in June and was concluded in September. During this time, five adits were concluded successfully, one partially and one had to be abandoned. Mapping of new road cuts was carried out during August and few trenches were dug in an attempt to locate seams and delineate structure. During the latter part of August a drilling rig was moved in and three holes were drilled. The drilling programme was concluded September 13th with the successful completion of two holes, however, the third hole had to be abandoned after three attempts failed because of shattered rock conditions.

McMeekin Construction Ltd. of Rocky Mountain House, Alberta, supplied the camp and catering and was also responsible for road and lease preparation and rehabilitation. The adit

excavation work was carried out by Treena Marie Company of Blairmore, Alberta under a subcontract to McMeekin Construction. The drilling contract was awarded to McAuley Drilling Company Ltd. of Edmonton, Alberta. Roke Oil Enterprises Ltd. of Calgary, Alberta carried out all downhole geophysical logging.

The author would also like to acknowledge the assistance and consultations of W. J. Hennessey who made several trips to the property during the course of the programme.

EXPLORATION

Exploration at Sage Creek Coal continued during the summer of 1973 with the main purpose to obtain bulk samples to further analyse the quality of coal. This was decided necessary before embarking on a large scale drilling programme. During the course of the bulk sampling programme several roads were cut and the geology mapped along them. Three holes were drilled for the express purpose of intersecting seams close to adit sites, and carrying out comparative ash determinations from Sidewall Density Logs against actual ash determination from bulk samples.

Adit Programme

Adit 73-4-N This adit is located at the north end of North Hill at approximate coordinates (U.T.M. grid system in feet) 17,857,680 N and 586,040 E and at an approximate elevation of 4690 feet A.S.L. Work on this adit commenced in June and was initially completed in July with a cross cut exposing Seam 4a. It should be mentioned that initial interpretation was that this seam was thought to be Seam 2, however, with subsequent investigation of stratigraphy it was agreed that this was Seam 4a. This adit was returned to late in August to excavate Seam 4b. After driving 80 to 90 feet through rock the attempt was abandoned as clearly some structural disturbance was present in this adit. A roll was encountered in the seam about 60 feet from the portal causing offsetting of the main drift about 60 feet to the west before being able to swing back along strike. The actual nature of this roll is uncertain and could be a slump feature. It is agreed, for the present, that adit 73-N-4 is located in a slump block.

W. Hennessey measured the seam as exposed in the cross-cut as 28 feet thick. This thickness compares favourably with the calculated thickness of Seam 4a intersected by drill hole S.C.C. 4 approximately 1200 feet to the southwest. A stratigraphic section and a geological profile at 1" = 5' are included in this report. Also included is a sketch plan of the adit at 1" = 20'.

Adit 73-4a-N This adit was located at the north end of North Hill some 120 feet below adit 73-4-N and was to excavate Seam

4. The approximate co-ordinates are: 17,857,800 N and 586,400 E and at an approximate elevation of 4,575 feet A.S.L. Work on the adit was abandoned when the coal seam was apparently cut off by rock and glacial till. Approximately 45 feet in from the portal a NW striking fault was encountered offsetting the seam between 15 and 20 feet to the northwest. At 85 feet in the coal was apparently pinched out by hanging wall and glacial till; although the portal was destroyed before the writer could examine it, it is suggested that another fault was encountered. It is suspected that this adit was located in a slump block. A tape and compass plot of the adit at 1" = 20' is attached to this report.

Adit 73-2-N This adit is located at the north end of North Hill and excavates Seam 2. The approximate co-ordinates are 17,857,500 N and 586,670 E and at an approximate elevation of 4,525 feet A.S.L. Work on this adit was completed in September. At approximately 40 feet in from the portal a fault (probably striking NW) was encountered causing a pinchout of the coal. A decision was made to drive the adit ahead through the rock; the seam was encountered after excavating approximately 40 feet of rock. An apparent offset of about 90 feet to the north is inferred, and probably results from a series of offsets. It should be noted that the area of outcrop of this seam is structurally disturbed with several small offsetting faults apparent.

The thickness of the seam as measured in the cross cut is 13.3 feet. This compares favourably with the calculated thickness of Seam 2 intersected by drill hole S.C.C. 32 of 14.5 feet. A cross section and a stratigraphic section of the seam at 1" = 5' are attached to this report. Also attached is a tape and compass plot of the adit at 1" = 20'.

Adit 73-5-S This adit excavated Seam 5 on the north slope of South Hill. The approximate co-ordinates of the portal are 17,849,020 N and 583,050 E and at an elevation of approximately 4,675 feet A.S.L. Work on the adit commenced in June and was completed in July.

The seam, as exposed at the cross cut, was measured by W. Hennessey as 24.4 feet thick. An estimated 12-14 feet of coal from the footwall is cut off by a steeply dipping reverse fault bringing the seam in abrupt contact with the basal sandstone unit. A possibility of the adit being excavated in a slump block and a cross section at 1" = 5' is attached. Also attached are a tape and compass plot of the adit at 1" = 20'.

Adit 73-5A-S This adit excavated Seam 5 on the north slope of South Hill some 1200 feet to the east of the above. The

approx. co-ordinates of the portal are 17,848,800 N and 584,310 E and at an approximate elevation of 4,585 ft.A.S.L.The thickness of the seam was measured at the cross-cut as 36.2 feet. Several small normal faults each having a displacement of less then 2 feet were clearly exposed in the face of the cross-cut. A stratigraphic section and a cross section at 1" = 5' are attached to this report. Also attached is a tape and compass plot of the adit at 1" = 20 ft.

Adit 73-4-S This adit was excavated in Seam 4 on the north slope of South Hill. The approximate co-ordinates are 17,848,400 N and 584,110 E and at an approximate elevation of 4,775 feet A.S.L. The total thickness of Seam 4 as measured in the cross cut is 52.25 feet; individually, seam 4a is 27.5 feet, seam 4b is 20 feet and the separating parting is 4.75 feet. A stratigraphic section and a cross section at 1" = 5' are attached to this report. Also attached is a tape and compass plot of the adit at 1" = 20'.

Adit 73-2-S This adit was excavated in Seam 2 on the north slope of South Hill. The approximate co-ordinates of the portal are 17,848,000 N and 584,970 E and at an approximate elevation of 4,780 feet A.S.L. The thickness of the exposed coal horizon as measured in the cross cut, is 16.75 feet, however, only the middle 10.8 feet was bulk sampled because of the shaly character of the uppermost and lowermost parts of the horizon. A stratigraphic section and a cross section at 1" = 5' are attached to this report. Also attached is a tape and compass plot of the adit at 1" = 20'.

Excavation and Mapping

A number of roads were constructed during the course of the summer both to provide access for drilling and adit construction and as exploratory cuts to locate seam exposures. An incorrect interpretation of the geology and seam locations at the north end of North Hill resulted in changes to the proposed adit programme and additional surface work to locate the seams. Only minimal success was met with in this regard. Several pits were dug to try and locate Seam 5, however, excessive thickness of glacial overburden prevented bedrock from being reached.

Mapping of the roads during June and July was carried out by W. Hennessey who visited the property on several occasions to advise on the construction of exploratory roads and pits. Mapping of the roads and supervision of additional exploratory cuts were carried out by the writer during the months of August and September.

Drilling

The drilling programme at Sage Creek got underway September 1 and was brought to a conclusion September 13 after successfully completing two of three holes.

Drill Hole S.C.C. 30, 30A and 30B

Hole 30 was designed to intersect Seam 4 in the proximity of Adit 73-4-S and is located at approximate co-ordinates 17,848,210 N and 584,190 E and at an approximate elevation of 4,860 feet A.S.L. The hole encountered bad caving in the coal seam at a depth of 105 feet and was abandoned. Two other attempts to drill at this location (S.C.C. 30A & 30B) were thwarted by shattered rock conditions. A visual log of the hole is attached to this report.

Drill Hole S.C.C. 31

This hole was designed to intersect Seam 5 in the proximity of Adit 73-5a-S and is located at approximate co-ordinates 17,848,590 N and 584,220 E and at an approximate elevation of 4,700 feet A.S.L. The hole was completed with some caving in the coal seam, however, was considered insufficient to give eroneous readings on the density log. The recovery of coal from the hole was poor and contained a high portion of coaly shale and carbonaceous shale. The total depth of the hole was 170 feet. The hole was probed with Gamma/Neutron, Sidewall Density, Expanded Sidewall Density and Caliper tools. The log traces are attached to this report.

Drill Hole S.C.C. 32

This hole was designed to intersect Seam 2 in the vicinity of Adit 73-2-N and is located at approximate co-ordinates 17,857,430 N and 586,540 E and at an approximate elevation of 4,580 feet A.S.L. This hole proved to be a good clean hole, however, samples were of a poor quality and no coal was recovered. The total depth of this hole was 150 feet. Gamma/Neutron, Sidewall Density, Expanded Sidewall Density, Caliper and SP/Resistance logs were run and are attached to this report. The Spontaneous Potential and Resistance logs were run as an experiment by Roke Oil Enterprises of Calgary at no additional cost to Rio. At this time, little benefit can be seen from using these logs, however, if the logs can be calibrated so that direct numerical readings can be read from the logs (S.P. in millivolts and Resistance in Ohms) then the logs might prove useful in qualitative analysis.

GEOLOGY

The stratigraphy and structure of the property has been described in earlier reports by the author and therefore only additional information or problems arising out of the summer programme will be discussed here. North Hill and South Hill will be dealt with separately as the relationship between the hills is still unresolved.

North Hill

Since the first drilling programme carried out on the hill during the winter of 1970-71, very little work has been done to determine structure. Modifications to the geology, however, have been necessitated by precise locating of drill holes and roads by surveying and by knowledge gained during construction of access roads to adit sites. The construction of roads at the north end of North Hill during the summer has revealed information necessitating more changes.

It became evident early in the programme that the surface occurrences of the seamsdid not proximate the inferred location as proposed in the writer's previous interpretation. An apparent swing of the strike more to the northeast has had the effect of reducing the northward extension of the Kootenay Formation. There is some evidence in the field for assuming a swing in strike, however, it should be pointed out that the termination of northward progression of the Formation would also result from offsetting against west-dipping normal faults. Disturbance to the strata is in evidence at various locations along the road and also in all the adits. It is the writer's opinion that much of the disturbance is caused by slump structures and glacial structures and are probably restricted to near-surface rocks. For the time being, it has been agreed to locate Adit 73-4-N in a slump block.

In his report of June 20, 1973, W. Hennessey discusses the possibility of a NW trending fault interesecting the surface approximately 250 feet to the east of S.C.C. 4. After further examination of the stratigraphy and consultations between the writer and W. Hennessey, it has been decided at this time to preclude the possibilities of the faulting in favour of stratigraphic and sedimentation changes. It must be stressed that this is not to say faulting does not occur but until more evidence is forthcoming it was agreed to accept the simpler interpretation. The same argument must be applied to the exclusion of a second fault intersecting hole S.C.C. 6 causing a reduced thickness of the strata between Seam 2 and 4a. At this time stratigraphic thinning has been invoked. There is no doubt that the area NE of a NW trending gully, between holes S.C.C. 8 and S.C.C. 10, poses difficulties in interpretation and a closely spaced drilling programme will ultimately be required to determine the structure.

Another area of concern at this time is associated with the surface exposure of Seam 5 on the south slope of North Hill. Structural contours delineating the top of Seam 5 do not readily conform to the interpreted surface trace of the seam and two adits driven into the seam during the summer of 1972 encountered some structural disturbance. The possibility of a fault, the surface

trace of which, passing between the interpreted outcrop of seams 4 and 5, can not be ruled out, however, no fault has been invoked at this time due to insufficient evidence and subsurface control. It is thought possible that a decollement structure might exist between the base of No. 5 seam and the underlying basal sandstone.

The present thinking for the bulk of North Hill, with the above mentioned exceptions, is that little structural interruption is likely to be interpreted, however, the writer wishes to reiterate on the existence of several small faults and structural distortions in evidence along road cuts throughout the hill. These disturbances appear minor in nature and are probably associated with glacial and slump structures. It is the writer's opinion that similar such disturbances might be expected at random throughout the hill.

Structural cross sections at 1" = 200' were drawn at 400-foot intervals and were used for calculating coal reserves. Four sections 17,852,260 N, 17,853,860 N, 17,854,660 N and 17,856,660 N have been included in this report to depict the general structure.

South Hill

New road exposures and excavations of seams have resulted in better surface control on the north slope of South Hill but have also posed new problems. An apparent reverse fault cutting off the footwall of Seam 5 was exposed in Adit 73-5-S. This could be a slump structure affecting a large block of rock, the extent of which is unknown.

The identification of a seam above Seam 4 but seemingly higher in the stratigraphic section than the defined location of Seam 2 has posed a problem. Whether this is actually Seam 2 or a new unnamed seam, the seam is of economical significance and is readily traced through the hill. The actual identification is a stratigraphic problem and should not affect reserves. The writer prefers that the nomenclature of Seam 2 be applied to this seam for the present; attached to this report is a stratigraphic correlation chart from North Hill to South Hill attempting to correlate this seam with Seam 2. The reader is also referred to a report by W. Hennessey of July 18-19, 1973, depicting this seam as a new seam developed higher in the Kootenay Formation. This problem will only be resolved by drilling a line of holes across Cabin Creek Valley.

The structural interpretation of S outh Hill is just that; an interpretation, based on a number of drill holes. The east block of the hill, the only block to have been investigated by drilling is divided into several fault blocks each upthrown to the east relative to the other. Further investigations of the hill will necessitate alterations to the traces of the faults and the probable intro-

duction or exclusion of some. However, the general picture of several fault blocks with enclosed seams striking NNE and dipping at approximately 30° to the ESE is not expected to change. Any changes required to the structure should not adversely affect the potential of that part of the Hill. Few changes were necessitated following the summer programme because of better surface control. Structural contours compiled on the top of seams 2, 4a and 5 were used to aid in interpreting structure. Because of lack of sufficient subsurface control the contouring is necessarily interpretive in some areas. Structural cross sections at 1" = 200' were constructed across the east block of South Hill at 400-foot intervals and were used to calculate coal reserves. Three of the sections, 17,845,460 N, 17,847,060 N and 17,847,860 N have been included in this report to depict the general structure.

Those areas south of (U.T.M. grid) 17,845,260 N and west of 581,000 E on South Hill have not been explored sufficiently to assess their potential, however, it is known that Kootenay rocks underlie the areas and that they have the potential of considerably increasing the reserves of the Hill.

COAL

As previously described, several adits were excavated into the seams on both hills. The purpose was to further evaluate the coal and to supply samples for marketing studies.

The quality of the coal is consistent with earlier analyses and shows the coal to be a medium volatile bituminous coal possessing favourable characteristics for coking. The following tables ~~is~~ are a brief summary of the analysis of the coal from bulk samples taken during 1973:

FOR THE ABOVE MENTIONED TABLES
REFER TO:

K · SAGE CREEK 73 (4) B
CONFIDENTIAL ANALYSIS FILE

CONCLUSIONS

1. The geology of North Hill is less structurally complicated than South Hill.

2. Reasonable confidence in the general geology of the North Hill is held except for the north end where the interpretation is questionable.

3. The general geology of the east block of South Hill is known, however, changes in the detailed geology are to be expected.

4. The southern and western extensions of South Hill are potential areas of consideration for mining, however, little is known of the structure.

5. Stratigraphic problems exist in connection with seam nomenclature and with seam correlation as applied to Seam 2 or those seams above Seam 4 in the section. For the time being, the economical seam above Seam 4 on both hills is considered as Seam 2.

6. Much of the structural disturbance in evidence along road cuts is thought to be associated with slump structures, glacial structures or adjustment structures.

7. The coal quality is a medium bituminous coal possessing characteristics favourable for coking. It compares favourably with other Kootenay coals in the Fernie Basin.

8. North Hill is underlain by probable coal reserves of 56.5 million long tons and a possible extra 10.5 million long tons to an elevation of 3,900 feet A.S.L.

9. South Hill is underlain by a probable 51.6 million long tons for the defined east slope block. Extensions of the coal-bearing Kootenay strata to the west and south have the potential for substantially increasing reserves.

RECOMMENDATIONS

1. An exploratory programme should be conducted over the areas yet undrilled (the west and south extensions of South Hill) to evaluate the potential of those areas.

2. To drill off all those areas considered favourable for open pit operations on a basic grid at 800-foot centres. Where problematic areas are encountered the grid should be tightened to 400-foot centres (i.e., north slope of North Hill).

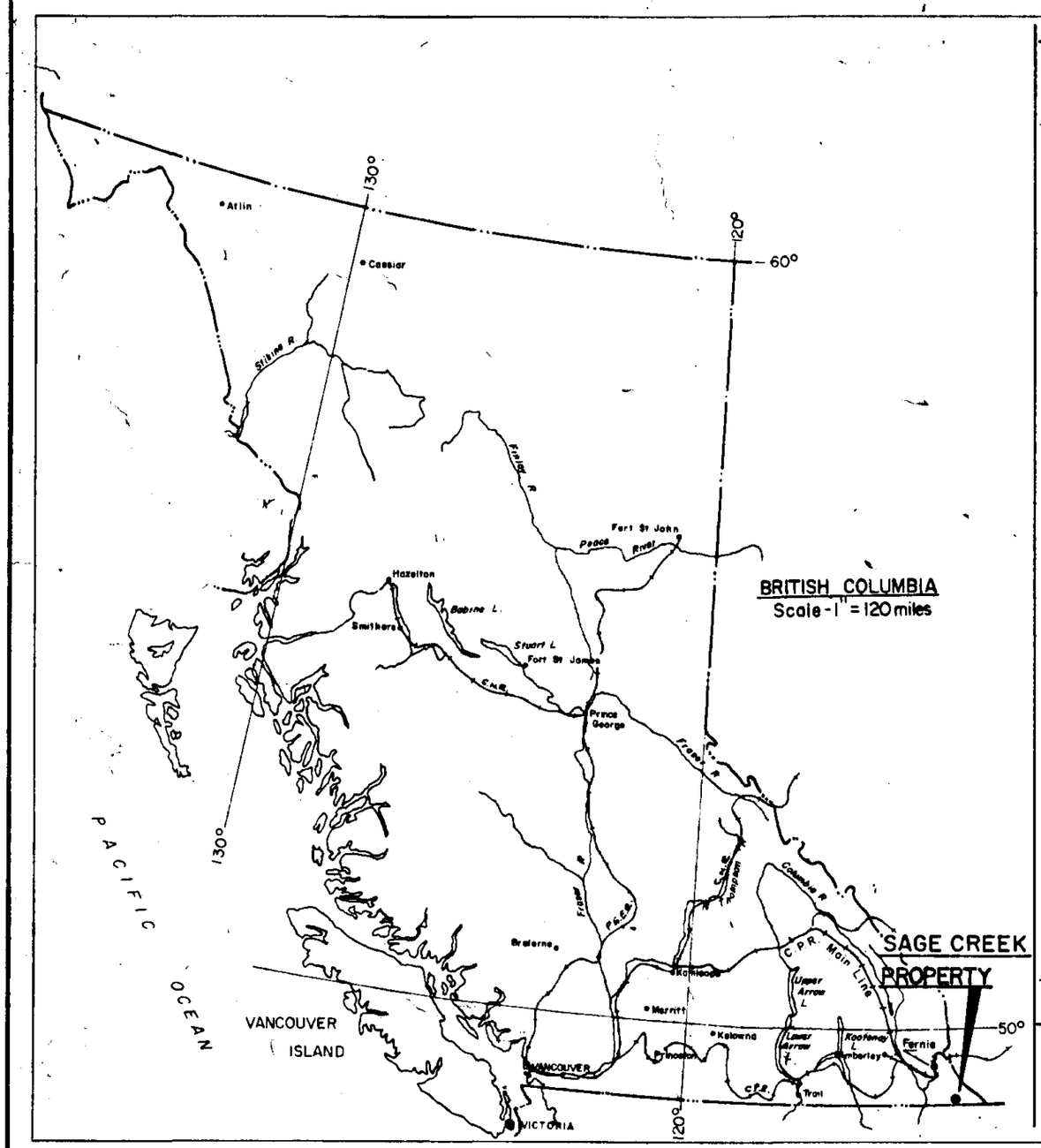
3. To test geological interpretation between holes at 800-foot intervals, several intermediary holes should be drilled.

4. To carry out sufficient trenching to gain surface control of all seams.

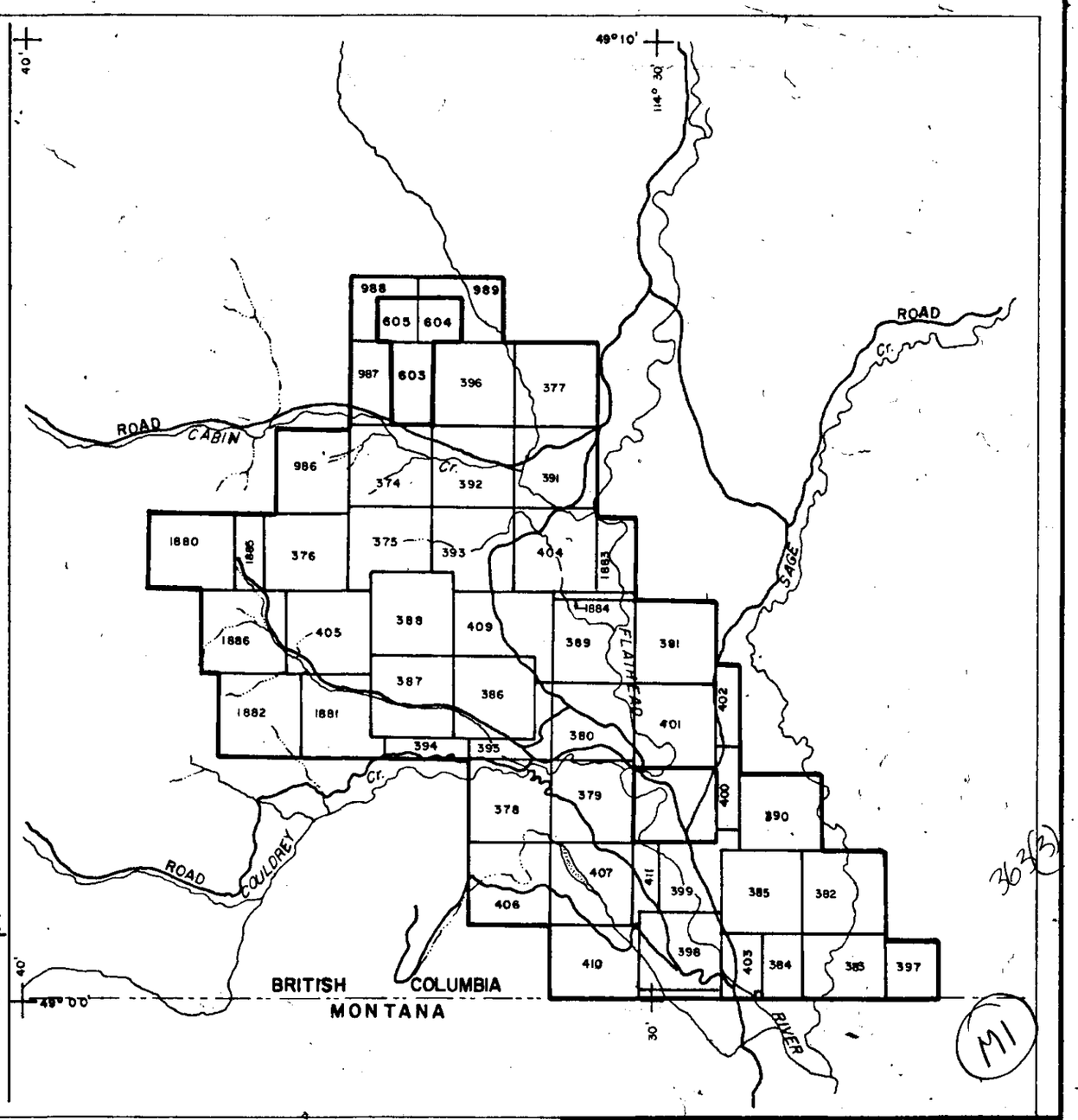
5. To undertake additional bulk sampling of all seams. This should be carried out only after geological control is obtained by drilling and trenching.

O. Cullingham

H.W. Marsh, P. Eng.



BRITISH COLUMBIA
Scale - 1" = 120 miles



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Note: All licenses have prefix C.L.

0 1 2 3 4 Miles
1:100,000

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SAGE CREEK COAL LIMITED — B. C.

LOCATION MAP

K-SAGE CREEK 73(1)B.

MAY 1971 R.A.B. / k.h. DWG L-2559

K - SAGE CREEK 73(3)B

ROTARY DRILL LOGS

SAGE CREEK COAL LTD

Rio Tinto.

RIO TINTO CANADIAN EXPLORATION LIMITED

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ROTARY DRILL RECORD

Hole No.: S.C.C. 30

Property: Sage Creek Coal

Location: South Hill
17,848,210 N
584,190 E

Elevation: N 4860' A.S.L.

Contractor: McAuley Drilling Co. Ltd.

Hole Size: 4-3/4"

Rig No.: 49

Date Commenced Drilling: September 1, 1973

Date Finished Drilling: September 3, 1973

Date Hole Completed: Not Completed

Logged By: R. A. Benkis

Date: September 2, 1973

Probed By: -

Date: -

Total Depth Drillers: 105 Feet

Depth of Overburden: 16-1/2 Ft.

Total Depth Logger: -

Water Level: ?

Bit Record

No.	Size	Make and Serial No.	R.P.M.	On	Off	Footage	Drilling Time
1	6 1/4"			0	20	20	
2	4 3/4"	W.M. 21564		20	105	85	

Surface Casing: 20 Ft. lift in hole.

Total Drilling Time: 10 1/2 hrs.

Standby Time for Logging: -

Total Down Time: -

Other Standby Time: -

Total Footage Chargeable: 105 Ft.

Total Chargeable Standby Time: -

Total Hourly Contact: 2 hrs.

Actual Moving Time Between Holes: 2 hrs

Chargeable Moving Time " " : 2 "

Remarks:-

Hole was abandoned due to extreme downhole caving.
Two other attempts to drill at this location were also abandoned.

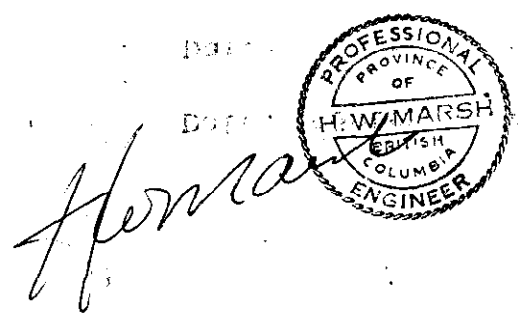
Probe Report:

Hole not logged.

Coal Horizons

Coal Horizon	Drillers Picks		Log Picks	
Seam 4	86	-	-	-

INTERVAL	UNIT THICKNESS	DESCRIPTION
0 - 16.5	16.5	Overburden - Shattered rock & fill.
16.5 - 25.0	9.5	Sandstone - M. gr., salt & pepper texture, rusty.
25.0 - 55.0	30.0	Siltstone - M. dk. gy., Fe stained,
55.0 - 75.0	20.0	Shale - M. dk. to dk. gy., some carb. material, slty.
75.0 - 86.0	11.0	Carbonaceous Shale - dk. gy. to blk., sks., quite carb. to slightly coaly.
86.0 - 105.0	19.0	COAL HORIZON NO. 4 Badly caved - Poor quality samples - Caving in coal caused abandonment of hole.
TD	105	



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ROTARY DRILL RECORD

Hole No.: S.C.C. 31

Property: SAGE CREEK COAL

Location: South Hill
17,848,590 N
584,220 E

Elevation: 4,700' A.S.L.

Contractor: McAuley Drilling Co. Ltd.

Hole Size: 5-1/8"

Rig No.: 49

Date Commenced Drilling: September 3, 1973

Date Finished Drilling: September 7, 1973

Date Hole Completed: September 7, 1973

Logged By: R. A. Benkis & O. Cullingham

Date: September 4 to 7, 1973

Probed By: Roke Oil Enterprises Ltd.

Date: September 7, 1973

Total Depth Drillers: 170 Feet

Depth of Overburden: 12 Ft.

Total Depth Logger: 170 Feet

Water Level: 4,689' A.S.L.

Bit Record

No.	Size	Make and Serial No.	R.P.M.	On	Off	Footage	Drilling Time
1	4-3/4"	W.M. 21564(used)					
2	6-1/4"	W.M.					
3	5-1/8"	W.M. 29738 (new)					

Surface Casing: -
Total Drilling Time: 33 hrs.
Total Down Time: Nil
Total Footage Chargeable: 170 Ft.
Total Hourly Contact: 16½ Hrs.

Standby Time for Logging: 2½ hrs.
Other Standby Time: -
Total Chargeable Standby Time: 2½ hrs.
Actual Moving Time Between Holes: 3 Hrs.
Chargeable Moving Time " " : 3 Hrs.

Remarks:-
Poor downhole conditions warranted switching to mud from air and reaming out hole. Poor quality of sample returned.

Probe Report:

Gamma Ray/Neutron Log	169 - 0	Open hole
Sidewall Density Log	169 - 0	Open hole

Coal Horizons

Coal Horizon	Drillers Picks		Log Picks	
Seam 5	84.5 - 130.3	45.8	86 - 131	45

INTERVAL	UNIT THICKNESS	DESCRIPTION
0 - 12	12	Overburden - Till and broken Rock.
12 - 55	43	Shale - Dark gray, in part carb., in part slty. 25 - 30 Sltst., m. dk. gy., v. sl. calc.
55 - 75	20	Sandstone - M. gray, M. gr., Slt. & ppr. texture, 70 - 75 ss, v. f. gr., slty., fragments of py. balls.
75 - 84.5	9.5	Shale - Carb., dk. gy. to blk., slty. at top of unit.
84.5 - 130.3	45.8	Coal Horizon #5
		Samples returned were contaminated and consisted of large portion of shale and coaly shale probably being washed in from above.
130.3 - 170	39.7	Sandstone - Basal sandstone unit - few frags. coal & coaly shale at top of unit. M. gray, f. - m. gr., mod. sort., v. little percentage chert. gr., sil., hd.
T.D.	170	

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
H. W. MARSH

RIO TINTO CANADIAN EXPLORATION LIMITED

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ROTARY DRILL RECORD

Hole No.: S.C.C. 32

Property: Sage Creek Coal

Location: North Hill
17,857,430N
586,540E

Elevation: 4580' A.S.L.

Contractor: McAuley Drilling Co. Ltd.

Hole Size: 5-1/8"

Rig No.: 49

Date Commenced Drilling: September 7, 1973

Date Finished Drilling: September 8, 1973

Date Hole Completed: September 8, 1973

Logged By: O. Cillingham

Date: September 8, 1973

Probed By: Roke Oil Enterprises Limited

Date: September 8, 1973

Total Depth Drillers: 150

Depth of Overburden: 14.5

Total Depth Logger: 149

Water Level: 4558' A.S.L.

Bit Record

No.	Size	Make and Serial No.	R.P.M.	On	Off	Footage	Drilling Time
1	6-1/4"			0	20	20	
2	5-1/8"	W.M. 29738 (used)		20	150	130	

Surface Casing: 20 ft. left in hole

Total Drilling Time: 10 hrs.

Total Down Time: Nil

Total Footage Chargeable: 150'

Total Hourly Contact: Nil

Standby Time for Logging: 3½ hrs.

Other Standby Time: -

Total Chargeable Standby Time: 3½ hrs.

Actual Moving Time Between Holes: 1½ hrs

Chargeable Moving Time " " : 1½ hrs

Remarks:- Hole drilled with mud - Good clean hole, however, samples were poor and no coal recovered.

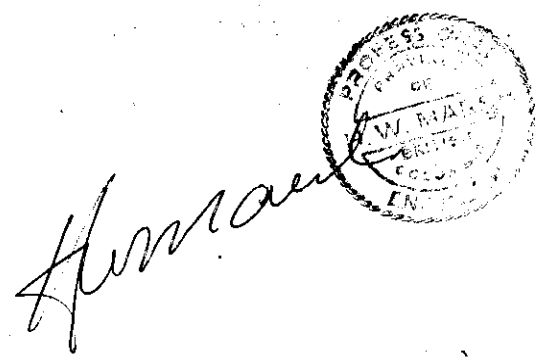
Probe Report:

Gamma Ray/Neutron Log	148 - 0	Open hole.
Sidewall Density Log	146 - 0	" "
S.P./Resistivity	129 - 20	" "

Coal Horizons

Coal Horizon	Drillers Picks		Log Picks	
Seam 2	62.1 - 81	18.9	62 - 79	17

UNIT PENETRATED	UNIT THICKNESS	DESCRIPTION
0 - 14.5	14.5	Overburden - Glacial till & broken rock.
14.5- 35	20.5	Shale - M dk. gy., to dk. gy., in part blocky, in part carb., few coaly frags.
35 - 50	15	Sandstone - M. gy., v.f. to f. gr., blocky, arg., in part to sdy shale, few carb. to coaly sh. frags.
50 - 62.1	12.1	Shale - Dk. gy., few frags. sdy. sh., in part carb.
62.1- 81	18.9	Coal Horizone No. 2
		No sample recovered.
81 - 90	9	Sandstone - M. dk. gy., f. gr., some carb. & coaly flecks, poorly sort., arg. matrix.
90 - 150	60	Shale - M. dk. gy. to dk. gy., in part sl. carb., blocky., some sky. sh. frags.
T.D.	150	



ROKE

GAMMA RAY NEUTRON LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.

LSD
SEC
TWP
RGE
W ____ M

COMPANY RIO TINTO CANADIAN EXPLORATION LTD

WELL SCC-31 (1)

LOCATION 17, 848, 450N 548, 250E SOUTH HILL

FIELD FLATHEAD VALLEY

PROVINCE BRITISH COLUMBIA

Other Services: DEN-GAL

Permanent Datum GROUND LEVEL Elev. ____
Log Measured from PIT RING .5 Ft. Above Perm. Datum
Well Depths Measured from ____

K.B. ____
CSG ____
G.L. ____

Run. No.	ONE	
Date	7 SEPTEMBER 73	
First Reading	169	
Last Reading	0	
Footage Logged	169	
Depth Reached	170	
Depth Driller	170	
Casing Roke		
Casing Driller		
Fluid Type	MUD	
Liquid Level	11 FEET	
Min. Diam.	6 1/8 INCH	
Rm @ °F		
Operating Time	1 1/2 HOURS	
Truck No.	32	
Recorded By	STM	Witnessed By GILLINGHAM

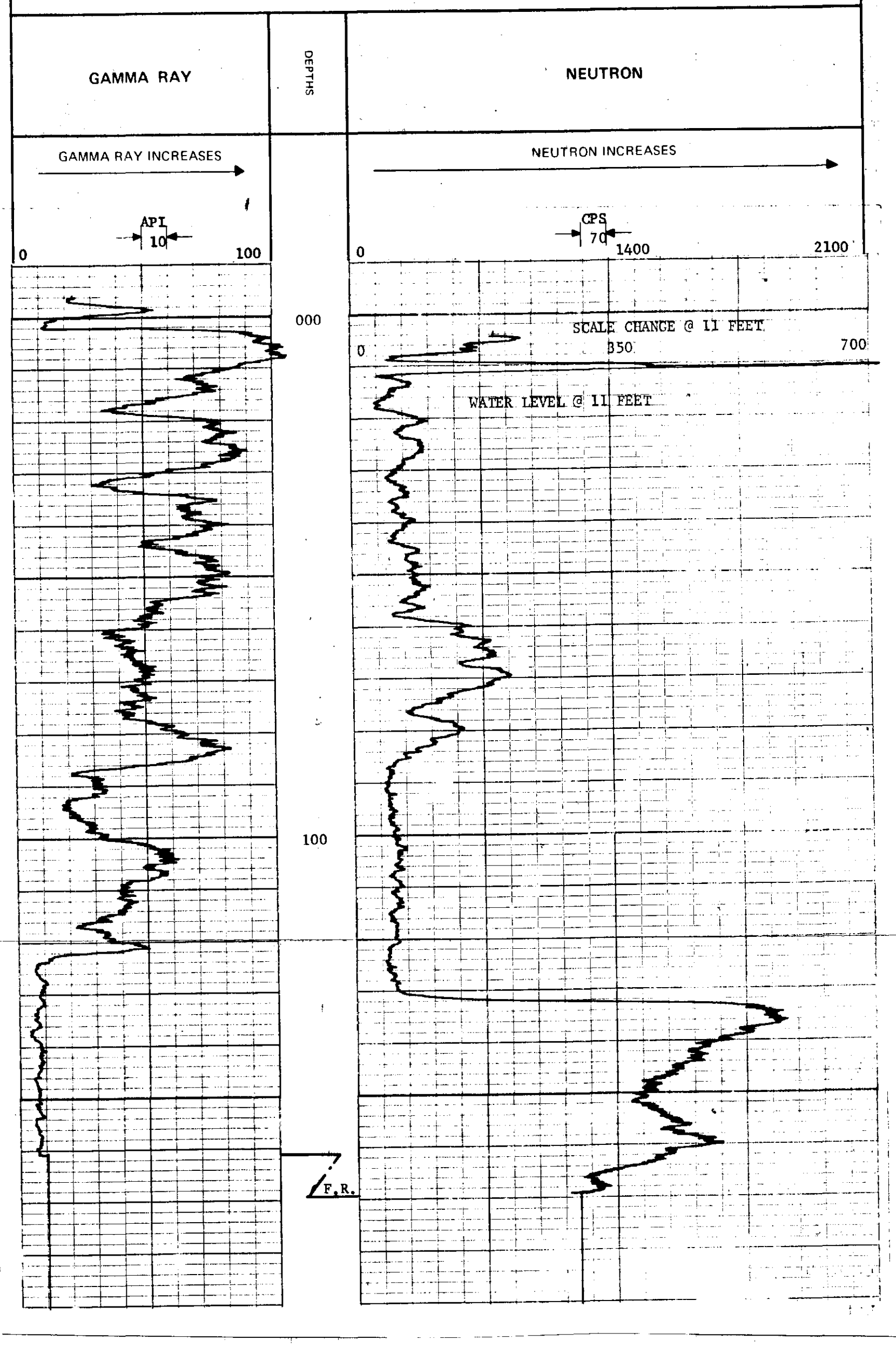
EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	$1\frac{11}{16}$	TOOL MODEL NO.	
DETECTOR MODEL NO.		DIAMETER	$1\frac{11}{16}$
TYPE	GEIGER	DETECTOR MODEL NO.	
LENGTH	18 INCH	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	8.55 FT.	LENGTH	6 INCH
		SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		SERIAL NO.	50
HOIST TRUCK NO.	32	SPACING	19 INCH
INSTRUMENT TRUCK NO.		TYPE	AmBe
TOOL SERIAL NO.	CGN27U4A-65	STRENGTH	3 CURRIE

LOGGING DATA

GENERAL				GAMMA RAY				NEUTRON			
RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED FT MIN	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API G. R. UNITS PER LOG DIV.	T. C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	API N. UNITS PER LOG DIV.
1	0	11	11	5	100	0	10 API	3	1000	10 L	70 CPS
	11	169	11	5	100	0	10 API	3	500	0	35 CPS

REMARKS



ROKE

SIDEWALL DENSILOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.

LSD SEC TWP RGE W.M.

COMPANY ROKE ENTRO CANADIAN EXPLORATION LTD.

WELL SOC-31

LOCATION 17- 8AA -A50 A 584.250 E. SOUTH 8TH 3.

FIELD PEAT HEAD DAIRY

PROVINCE BRITISH COLUMBIA

Permanent Datum GROUND LEVEL Elev.

Log Measured from R.T. RING 5 Ft. Above Perm. Datum

Drlg. Measured from

Other Services

GRN

K.B.

CSG.

G.L.

Run No.	ONE	TWO
Date	7 SEPTEMBER 73	7 SEPTEMBER 73
First Reading	168	140
Last Reading	50	90
Casing Logged	168	90
Depth Reached		
Depth Driller		
Casing Size		
Casing Weight		
Fluid Type	MUD	MUD
Liquid Level	11 FEET	11 FEET
Max. Diam.	6 1/8 INCH	6 1/8 INCH
Run # 9:		
Operating Time	1 1/2 HOURS	1 HOUR
Truck No.	32	32

Recorded By STH

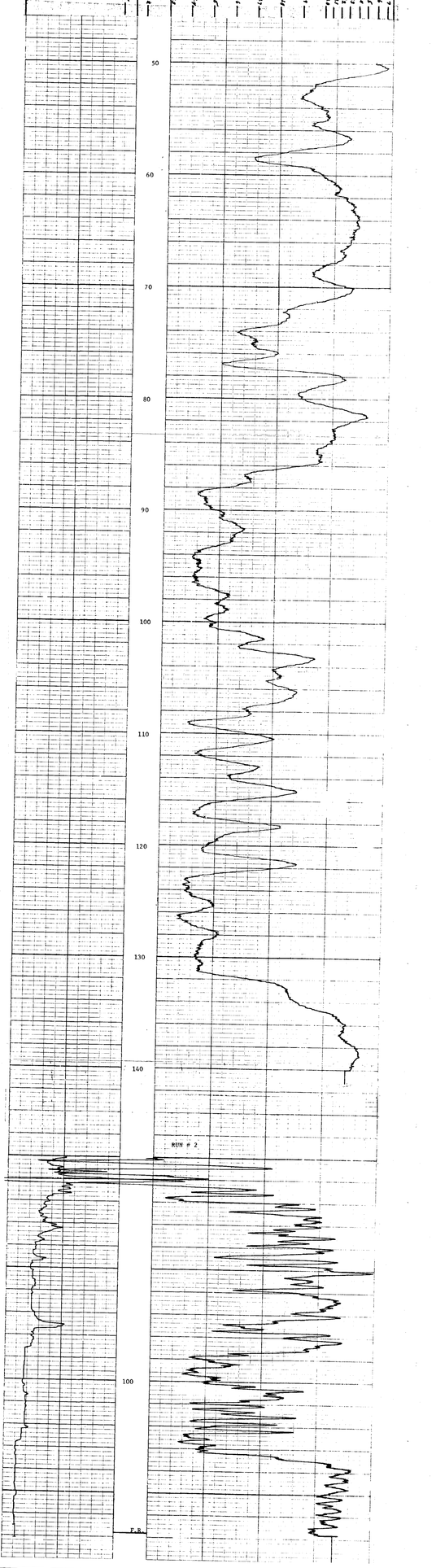
Witnessed By GRAHAMSON

363

LOGGING DATA

RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED FT/MIN	T.C. SEC	SENS SETTINGS	ZERO DIV. L OR R	CPS/DIV.
1	0	168	5	3	1000	4R	
2	50	140	5	3	1000	4R	

REMARKS



ROKE

GAMMA RAY NEUTRON LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.

LSD
SEC
TWP
RGE
W ___ M

COMPANY RIO TINTO CANADIAN EXPLORATION LTD

WELL SCC-32-

(L3)

LOCATION 17, 857, 440 N 586, 540 E NORTH HILL

FIELD FLAT HEAD VALLEY

PROVINCE BRITISH COLUMBIA

Permanent Datum GROUND LEVEL Elev

Log Measured from GROUND LEVEL Ft Above Perm Datum

Well Depths Measured from

Other Services: DENS CAL RES SP

K B
C S G
G L

Run No.	ONE		
Date	8 SEPTEMBER 73		
First Reading	148		
Last Reading	0		
Footage Logged	148		
Depth Reached	149		
Depth Driller	150		
Casing Rake	20 FEET		
Casing Driller			
Fluid Type	MUD		
Liquid Level	22 FEET		
Min. Diam.	5 1/8 INCH		
Rm @ °F			
Operating Time	1 1/2 HOURS		
Truck No.	32		
Recorded By	STM	Witnessed By	GILLINGHAM

363 (1)

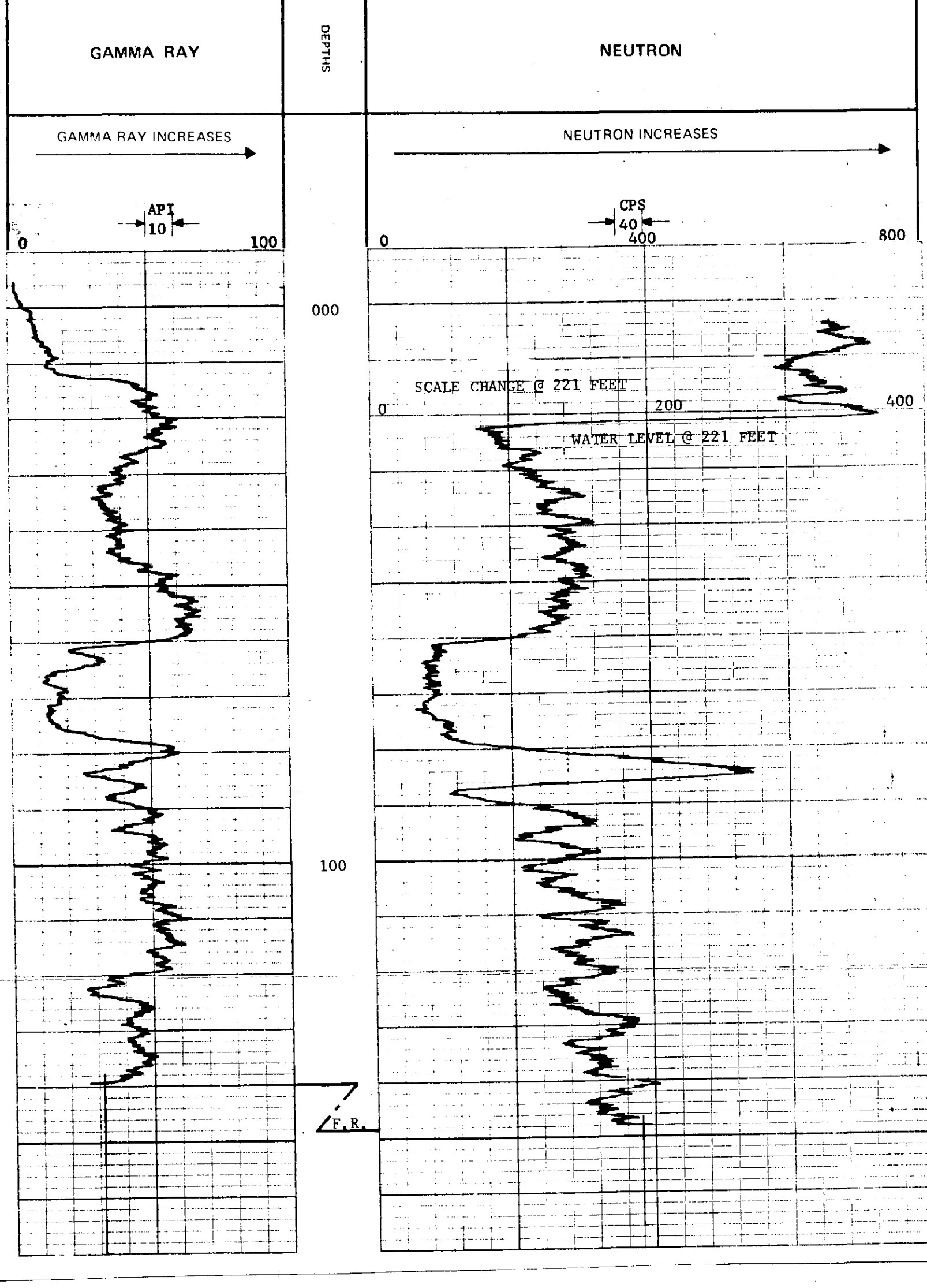
EQUIPMENT DATA

GAMMA RAY		NEUTRON	
RUN NO.	ONE	RUN NO.	ONE
TOOL MODEL NO.		LOG TYPE	NEUTRON/NEUTRON
DIAMETER	$1\frac{11}{16}$	TOOL MODEL NO.	
DETECTOR MODEL NO.		DIAMETER	$1\frac{11}{16}$
TYPE	GEIGER	DETECTOR MODEL NO.	
LENGTH	18 INCH	TYPE	PROPORTIONAL
DISTANCE TO N. SOURCE	8.55 FT.	LENGTH	6 INCH
		SOURCE MODEL NO.	MRC-N-SS-W
GENERAL		SERIAL NO.	50
HOIST TRUCK NO.	32	SPACING	19 INCH
INSTRUMENT TRUCK NO.		TYPE	AmBe
TOOL SERIAL NO.	CGN27U4A-65	STRENGTH	3 CURRIE

LOGGING DATA

RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED FT/MIN	GAMMA RAY T.C. SEC.	GAMMA RAY SENS SETTINGS	GAMMA RAY ZERO DIV. L OR R	GAMMA RAY API G. R. UNITS PER LOG DIV.	NEUTRON T. C. SEC.	NEUTRON SENS SETTINGS	NEUTRON ZERO DIV. L OR R	NEUTRON API N. UNITS PER LOG DIV.
1	0	22	11	5	100	0	10 API	3	1000	0	40 CPS
	22	148	11	5	100	0	10 API	3	500	0	20 CPS

REMARKS



ROKE

GAMMA RAY – RESISTANCE LOG

OIL ENTERPRISES LTD. CALGARY, ALBERTA

FILE NO.
LSD
SEC
TWP
RGE
W M

COMPANY RIO TINTO CANADIAN EXPLORATION LTD

WELL SCC-32

LOCATION 17, 857,440 N 586,540 E NORTH HILL

FIELD FLATHEAD VALLEY

PROVINCE BRITISH COLUMBIA

Other Services:
GRN DENS

Permanent Datum GROUND LEVEL Elev.
Log Measured from GROUND LEVEL Ft. Above Perm. Datum
Well Depths Measured from
K.B.
CSG
G.L.

Run. No.	ONE		
Date	8 SEPTEMBER 73		
First Reading	149		
Last Reading	20		
Footage Logged	129		
Depth Reached	150		
Depth Driller	150		
Casing Roke			
Casing Driller			
Fluid Type	MUD		
Liquid Level	22 FEET		
Min. Diam.	5 1/8 INCH		
Rm @ °F			
Operating Time	1 HOUR		
Truck No.	32		

363

Recorded By SIM Witnessed By CULLINGHAM

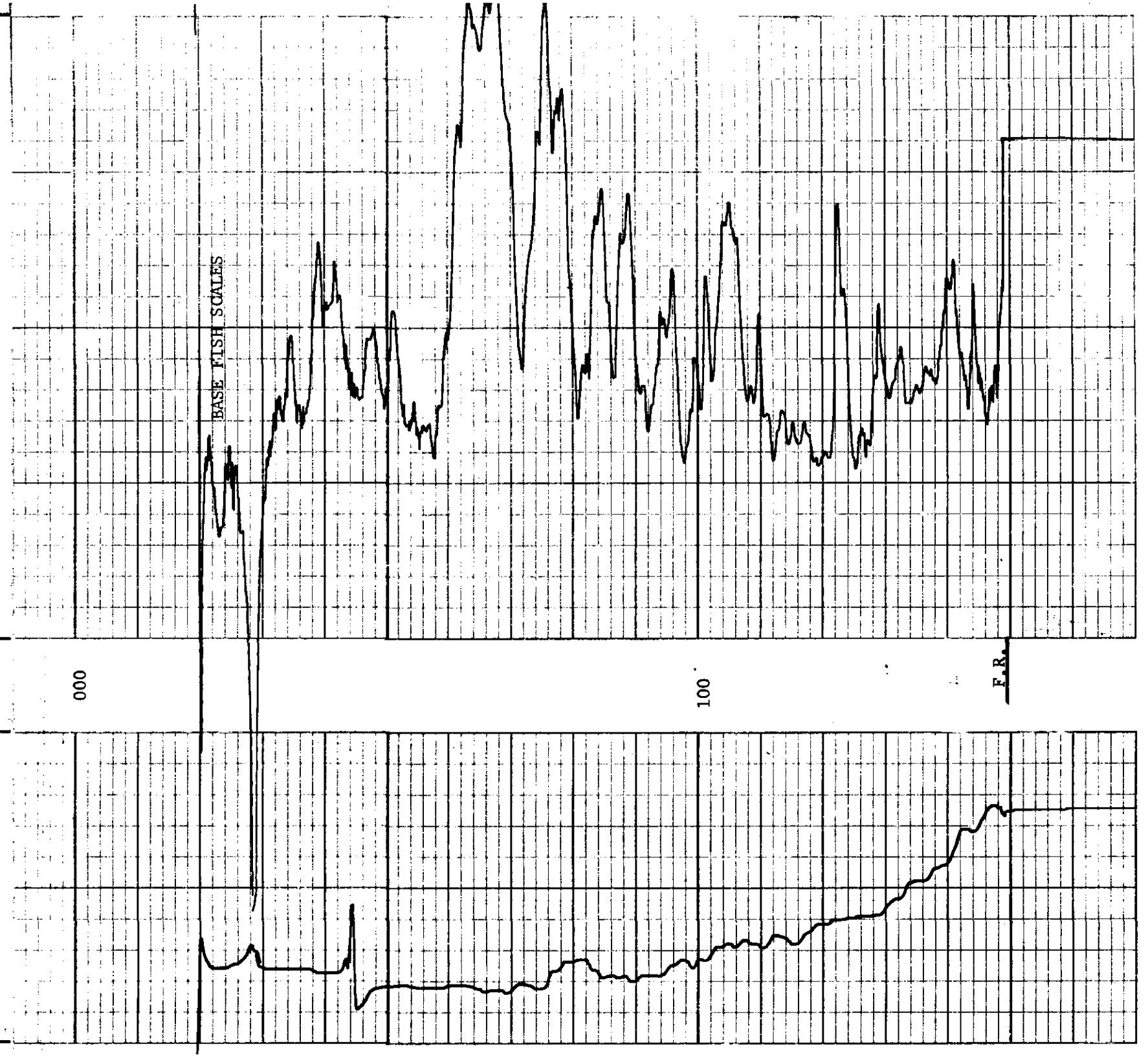
Remarks DEMONSTRATION

RESISTANCE — OHMS — 20

Depths

SPONTANEOUS - POTENTIAL (MILLIVOLTS) — SP — 10

GAMMA RAY API



ROKE

OIL ENTERPRISES LTD. CALGARY, ALBERTA

SIDEWALL DENSILOG

FILE NO.

L.SD
S.FC
TMP
FIGE
VL

COMPANY BIO TINTO CANADIAN EXPLORATION LTD.

WELL SCC - 32

LOCATION 17, 857, 440 N 586, 540 E NORTH HILL

FIELD FLATHEAD VALLEY

PROVINCE BRITISH COLUMBIA

Other Services

GRN GR-RES-SP

Permanent Datum GROUND LEVEL Elev.

Log Measured from GROUND LEVEL Ft. Above Perm. Datum

Well Depths Measured from KB

DF

GSC

GL

Run No.	ONE	TWO
Date	8 SEPTEMBER 73	8 SEPTEMBER 73
First Reading	146	100
Last Reading	0	60
Footage Logged	146	40
Depth Reached	149	101
Depth Driller	150	150
Casing Rake	20	20
Casing Driller		
Fluid Type	MUD	MUD
Liquid Level	22 FEET	22 FEET
Min. Diam.	5 1/8 INCH	5 1/8 INCH
Rm @ °F		
Operating Time	2 HOURS	2 HOURS
Truck No.	32	32

Recorded By STH Witnessed By CHILLINGHAM

363

LOGGING DATA

RUN NO.	DEPTHS FROM	DEPTHS TO	SPEED FT/MIN	T.C. SEC.	SENS SETTINGS	ZERO DIV. L OR R	CPS/DIV.
1	0	146	5	3	1000	4R	

REMARKS

CALIPER

HOLE DIAMETER (INCHES)

1.10 1.20 1.30 1.40

DEPTHS

1.50

DENSITY

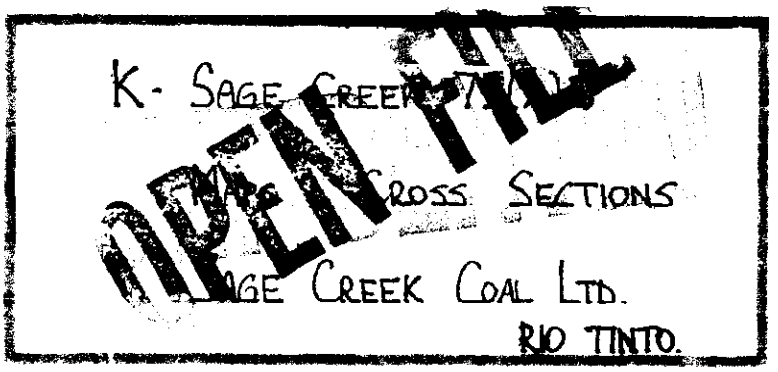
CPS

BULK DENSITY (GRAMS/CC)

1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70

60 70 80 90 100 000 100

F.P.


K- SAGE CREEK MAPS
CROSS SECTIONS
SAGE CREEK COAL LTD.
RIO TINTO.
OPEN FILE

00363 (4)

Rio Algom
Rio Tinto

SAGE CREEK COAL LTD.
C/O RIO TINTO CANADIAN EXPLORATION LTD.
2400 - 120 ADELAIDE STREET W.
TORONTO, ONTARIO

NAMES AND ADDRESSES TO ACCOMPANY STATEMENT OF COSTS

Adits	McMeekin Construction Ltd. Rocky Mountain House, Alberta	June 1, 1973- Sept 20,1973
Bulldozer	McMeekin Construction Ltd. Rocky Mountain House, Alberta	June 1, 1973- Sept.20,1973
Rotary Drilling	Mc Auley Drilling Co. Ltd. Edmonton, Alberta	Sept. 1,1973- Sept. 8,1973
Probing	Roke Oil Enterprises Ltd. 2716 - 32 Avenue S.W. Calgary, Alberta	Sept 5, 1973- Sept 8, 1973
Consultant	W. J. Hennessey Calgary, Alberta	June 1, 1973- Dec 30, 1973

Rio Algom-Rio Tinto Personnel:

B. Pewsey	Project Engineer	June 1, 1973- Dec 31, 1973
R.A. Benkis	Geologist	Sep. 1, 1973- Sep.15, 1973
O.Cullingham	Geologist	Aug. 1, 1973- Dec.31, 1973
R. Poon		Aug. 1, 1973- Sep.15, 1973

Rio Algom
Rio Tinto

SAGE CREEK COAL LTD.
c/o RIO TINTO CANADIAN EXPLORATION LTD.
2400 - 120 Adelaide Street, W.
Toronto, Ontario

STATEMENT OF COSTS

COAL LICENCES: 989, 396, 377, 391, 392, 393, 404, 389, 409, 381

	June 1, 1973- July 24, 1973	July 25,1973- Dec. 31,1973
Wages & Benefits	4,400.20	10,050.00
Maps & Reports		516.00
Food & Accommodation	1,425.00	2,700.00
Travel Within Province	200.00	416.00
Equipment Rental & Maintenance	700.00	2,150.00
Bulldozer	2,200.00	12,210.00
Adits	23,505.44	80,373.44
Consultants	500.00	1,991.00
Assaying	2,360.00	28,323.08
	35,290.64	138,213.52

H. W. Marsh (Agent for)
Exploration Manager
Rio Tinto Canadian Exploration Ltd.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
H. W. MARSH

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

See notes on reverse side before preparing this report.

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Report of Exploration Work on Coal Licences

(Pursuant to section 8, Coal Mines Regulation Act)

1. Name of property Sage Creek Coal Ltd.

   Location Flathead Valley, B.C.

2. Coal licence numbers 989, 396, 377, 391, 392, 393, 404, 389, 409, 381.

3. Name and address of the Crown licensee:

   Sage Creek Coal Ltd.

   2400-120 Adelaide St. West., Toronto, Ontario. M5H 1W5.

4. Name and address of the operator, if different from (3) above:

   Rio Tinto Canadian Exploration Ltd.

   2400-120 Adelaide St. West, Toronto, Ontario. M5H 1W5.

5. The exploration work (~~is to be~~ / was) done during the period from June 1, 1973 (Date)

   to December 31, 1973. (Date)

6. Type of equipment ~~(to be)~~ used in the exploration work Diesel compressor, hard air drills, chain saw, D-8 catipillar.

7. Number of men ~~(to be)~~ employed 8

8. Give details of the exploration work ~~(to be)~~ done: Adits, roads

   (*a*) Road construction—total length 1,500 feet, width of clearing 20 feet.

   (*b*) Line cutting—total length NIL feet, width NIL feet, method NIL

   (*c*) Total area of drill-sites NIL square feet, number of sites NIL.

   (*d*) Total area of camp-sites NIL square feet, number of sites 1.

   (*e*) Total area of adits, refuse piles, stockpiles, etc. 6,000 square feet, number of adits 4.
   73-4N 13,740 cu ft; 73-4a-N 4,170 cu ft; 73-2N 7,830 cu ft; 73-2S 7,440 cu ft

   (*f*) Trenching and stripping—

   (i) Seam tracing—length NIL feet, width NIL feet, maximum depth NIL feet.

   (ii) Formation cross-cutting—length NIL feet, width NIL feet, maximum depth NIL feet.

   (iii) Test pits—total area NIL square feet, number of pits NIL maximum depth NIL feet.

   (iv) Stripping (other than above) for the purpose of NIL

   Total area NIL square feet, maximum depth NIL feet.

(g) List any other disturbances of the surface of the land not included above, and show the total areas and maximum depth of such disturbances NIL

(h) Clearing—the total area of land to be cleared for items 8 (a) to (g) above is 1 acres.

NOTE—The *Forest Act* has regulations pertaining to the cutting of trees, including such cutting for coal-exploration purposes. Check with the Forest Ranger or District Forester before the clearing of a forested area is undertaken.

(i) Will any watercourse be disturbed? If yes, give the details No.

NOTE—If yes, a water licence must be applied for from the Water Rights Branch, Department of Lands, Forests, and Water Resources, Victoria.

(Signature) H. W. Marsh

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — H. W. MARSH

Name H. W. Marsh
(Print)

Position Manager of Exploration

Date July 12, 1974

NOTES

1. This report is to be filed with the Minister of Mines and Petroleum Resources. It is to be submitted *annually* and *prior* to the start of the exploration work. At the conclusion of the work programme, or at the time of filing of the next annual report with the Minister, whichever is first, a follow-up report is to be submitted to the Chief Inspector of Mines (using this report form), listing the actual work which was done.

2. Each report is to be accompanied by a map at suitable scale of the licences held under the *Coal Act*. This map is to show the full extent of the exploration work as listed in (8) above. It should show lakes, streams, and inhabited places in the vicinity. It should show the topography and other physical features of the area. As a small-scale insert on this map, show the location of the property. (For administrative purposes, seven copies of this map are required.)

3. The filing of this report with the Minister does not relieve you of your responsibility to file a notice with the Chief Inspector of Mines, as required by section 7 (1) of the *Coal Mines Regulation Act*.

4. One copy of the report is to be forwarded to the District Inspector of Mines and one copy to the District Forest Ranger prior to the start of coal-exploration work on the coal licences.

NOTE—This replaces the use of the form *Notice of Opening of a Mine or Quarry, or of Work on a Mineral Property* for this purpose.

5. Subsection (2) of section 8 of the *Coal Mines Regulation Act* requires the filing of a reclamation report with the Minister. The information required in the reclamation report is outlined in subsection (3) of section 8 of the Act and in Item (3) of the Directive.

This reclamation report should be submitted with the initial report as per paragraph 1 above. If, for good reason it is not possible to do so, application should be made to the Minister for deferment, stating when the report will be submitted. The maximum deferment will not exceed six (6) months.

6. Reclamation of the surface of the land disturbed by the exploration work is to commence at the earliest possible date, commensurate with good operating practice. Prior to starting such reclamation work, the proposed reclamation programme is to be submitted to the Chief Inspector of Mines for approval. Upon completion of the reclamation programme, or any part of it, such should be reported to the Chief Inspector of Mines. Upon the completed reclamation work being approved, a proportionate reduction in the security deposit will be made.

10M-172-243

Rio Algom
Rio Tinto

SAGE CREEK COAL LTD.
C/O RIO TINTO CANADIAN EXPLORATION LTD.
2400 - 120 ADELAIDE STREET W.
TORONTO, ONTARIO

STATEMENT OF COSTS

COAL LICENCES: 388, 387, 374, 986, 375, 376, 386, 395, 380, 405

	June 1, 1973 - July 24,1973	July 25, 1973- Dec. 31, 1973
Wages & Benefits	3,143.00	8,700.80
Maps & Reports		516.00
Food & Accommodation	1,329.50	2,415.50
Travel within Province	200.00	416.00
Equipment Rental & Maintenance	600.00	1,975.00
Bulldozer	1,950.00	11,210.00
Adits	29,666.14	69,189.40
Consultants	500.00	2,000.72
Assaying	3,510.00	42,484.62
Rotary Drilling		6,610.75
Probing		550.00
	40,898.64	146,068.79

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
H. W. MARSH

H. W. Marsh (Agent for)
Exploration Manager
Rio Tinto Canadian Exploration Ltd.

#2

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

See notes on reverse side before *preparing this report.*

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Report of Exploration Work on Coal Licences

(Pursuant to section 8, Coal Mines Regulation Act)

1. Name of property Sage Creek Coal Ltd.

   Location Flathead Valley, B.C.

2. Coal licence numbers 388, 387, 374, 986, 375, 376, 386, 395, 380, 405.

3. Name and address of the Crown licensee:

   Sage Creek Coal Ltd.

   2400-120 Adelaide St. West, Toronto, Ontario. M5H 1W5.

4. Name and address of the operator, if different from (3) above:

   Rio Tinto Canadian Exploration Ltd.

   2400-120 Adelaide St. West, Toronto, Ontario. M5H 1W5.

5. The exploration work (~~is to be~~ was) done during the period from June 1, 1973 (Date) to December 31, 1973 (Date)

6. Type of equipment (~~to be~~) used in the exploration work Diesel compressor, hard air drills, chain saw, D-8 catipillar, 1970 Failing Model 1250 H.D. Roke geophysical logging probe.

7. Number of men (~~to be~~) employed 8

8. Give details of the exploration work (~~to be~~) done: Adits, Roads, Rotary Drilling.

   (*a*) Road construction—total length 2,000 feet, width of clearing 20 feet.

   (*b*) Line cutting—total length NIL feet, width NIL feet, method NIL

   (*c*) Total area of drill-sites 15,000 square feet, number of sites 3.

   (*d*) Total area of camp-sites NIL square feet, number of sites 1.

   (*e*) Total area of adits, refuse piles, stockpiles, etc. 5,000 square feet, number of adits 3.
   73-5S 9,390 cu ft; 73-5a-S 8,610 cu ft; 73-4S 13,290 cu ft.

   (*f*) Trenching and stripping—

   (i) Seam tracing—length NIL feet, width NIL feet, maximum depth NIL feet.

   (ii) Formation cross-cutting—length NIL feet, width NIL feet, maximum depth NIL feet.

   (iii) Test pits—total area NIL square feet, number of pits NIL maximum depth NIL feet.

   (iv) Stripping (other than above) for the purpose of NIL

   Total area NIL square feet, maximum depth NIL feet.

(g) List any other disturbances of the surface of the land not included above, and show the total areas and maximum depth of such disturbances. NIL

(h) Clearing—the total area of land to be cleared for items 8 (a) to (g) above is 1 acres.

NOTE—The *Forest Act* has regulations pertaining to the cutting of trees, including such cutting for coal-exploration purposes. Check with the Forest Ranger or District Forester before the clearing of a forested area is undertaken.

(i) Will any watercourse be disturbed? If yes, give the details. No

NOTE—If yes, a water licence must be applied for from the Water Rights Branch, Department of Lands, Forests, and Water Resources, Victoria.

(Signature) H. W. Marsh

Name H. W. Marsh (Print)

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H. W. MARSH

Position Manager of Exploration

Date July 12, 1974

NOTES

1. This report is to be filed with the Minister of Mines and Petroleum Resources. It is to be submitted *annually* and *prior* to the start of the exploration work. At the conclusion of the work programme, or at the time of filing of the next annual report with the Minister, whichever is first, a follow-up report is to be submitted to the Chief Inspector of Mines (using this report form), listing the actual work which was done.

2. Each report is to be accompanied by a map at suitable scale of the licences held under the *Coal Act*. This map is to show the full extent of the exploration work as listed in (8) above. It should show lakes, streams, and inhabited places in the vicinity. It should show the topography and other physical features of the area. As a small-scale insert on this map, show the location of the property. (For administrative purposes, seven copies of this map are required.)

3. The filing of this report with the Minister does not relieve you of your responsibility to file a notice with the Chief Inspector of Mines, as required by section 7 (1) of the *Coal Mines Regulation Act*.

4. One copy of the report is to be forwarded to the District Inspector of Mines and one copy to the District Forest Ranger prior to the start of coal-exploration work on the coal licences.

NOTE—This replaces the use of the form *Notice of Opening of a Mine or Quarry, or of Work on a Mineral Property* for this purpose.

5. Subsection (2) of section 8 of the *Coal Mines Regulation Act* requires the filing of a reclamation report with the Minister. The information required in the reclamation report is outlined in subsection (3) of section 8 of the Act and in Item (3) of the Directive.

This reclamation report should be submitted with the initial report as per paragraph 1 above. If, for good reason it is not possible to do so, application should be made to the Minister for deferment, stating when the report will be submitted. The maximum deferment will not exceed six (6) months.

6. Reclamation of the surface of the land disturbed by the exploration work is to commence at the earliest possible date, commensurate with good operating practice. Prior to starting such reclamation work, the proposed reclamation programme is to be submitted to the Chief Inspector of Mines for approval. Upon completion of the reclamation programme, or any part of it, such should be reported to the Chief Inspector of Mines. Upon the completed reclamation work being approved, a proportionate reduction in the security deposit will be made.

10M-172-243

Rio Algom
Rio Tinto

JUL 25 '74 AM

DEPT. OF MINES
AND PETROLEUM RESOURCES

July 23, 1974

Assistant Deputy Minister,
Dept. of Mines and Petroleum Resources,
Government of British Columbia,
Victoria, B.C.

Attention: Mr. R. Rutherford 8071

Dear Sir:

Re: SAGE CREEK COAL LTD.

We enclose the following as assessment credit on the above mentioned property.

a) Map showing location of Adit 74-4S No. 2 Adit, 73-2S and 73-5AS

b) Report of Exploration Work on Coal Licences 392 and 374.

c) Statement of Costs (estimated to July 24, 1974).

d) List of personnel working on the project.

Plan of adits showing this work will be forwarded within 30 days.

Would you please forward forms pertaining to the new Act. We would also appreciate receiving advice as to obtaining a free Miners Licence for Sage Creek Coal Ltd.

Yours very truly,

RIO TINTO CANADIAN EXPLORATION LIMITED

D J Gervais

D. J. Gervais

:dr
Encls.

C.L.'s 374 & 392.

Rio Tinto Canadian Exploration Limited
120 ADELAIDE STREET WEST, TORONTO 1, CANADA 416/367-4000 TELEX 02-2204 CABLE/RIOCANEX

THE GOVERNMENT OF THE PROVINCE OF BRITISH COLUMBIA

See notes on reverse side before preparing this report.

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Report of Exploration Work on Coal Licences

(Pursuant to section 8, Coal Mines Regulation Act)

1. Name of property SAGE CREEK COAL LTD.

   Location Flathead Valley, B. C.

2. Coal licence numbers 374

3. Name and address of the Crown licensee:

   Sage Creek Coal Ltd., 2400 - 120 Adelaide St. W.,
   Toronto, Ontario M5H 1W5

4. Name and address of the operator, if different from (3) above:

   Rio Tinto Canadian Exploration Limited

5. The exploration work (~~is to be~~ was) done during the period from May 27, 1974 (Date)
   to July 24, 1974 (Date)

6. Type of equipment (~~to be~~) used in the exploration work Compressor, Air Picks,
   D-7 Tractor

7. Number of men (~~to be~~) employed 10

8. Give details of the exploration work (~~to be~~) done: Adit and Extractions of Bulk Samples.

   (*a*) Road construction—total length Nil feet, width of clearing Nil feet.

   (*b*) Line cutting—total length Nil feet, width Nil feet, method Nil

   (*c*) Total area of drill-sites Nil square feet, number of sites Nil.

   (*d*) Total area of camp-sites Nil square feet, number of sites 1.

   (*e*) Total area of adits, refuse piles, stockpiles, etc. 5,000 square feet, number of adits 1.

   74-4 S

   (*f*) Trenching and stripping—

   (*i*) Seam tracing—length Nil feet, width Nil feet, maximum depth Nil feet.

   (ii) Formation cross-cutting—length Nil feet, width Nil feet, maximum depth Nil feet.

   (iii) Test pits—total area Nil square feet, number of pits Nil maximum depth Nil feet.

   (iv) Stripping (other than above) for the purpose of Nil

   Total area Nil square feet, maximum depth Nil feet.

(*g*) List any other disturbances of the surface of the land not included above, and show the total areas and maximum depth of such disturbances Nil

(*h*) Clearing—the total area of land to be cleared for items 8 (*a*) to (*g*) above is 0.1 acres.

NOTE—The *Forest Act* has regulations pertaining to the cutting of trees, including such cutting for coal-exploration purposes. Check with the Forest Ranger or District Forester before the clearing of a forested area is undertaken.

(*i*) Will any watercourse be disturbed? If yes, give the details Nil

NOTE—If yes, a water licence must be applied for from the Water Rights Branch, Department of Lands, Forests, and Water Resources, Victoria.

(*Signature*) H.W. Marsh

Name H. W. Marsh,
(Print)

Position Manager of Exploration

Date July 23, 1974

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H. W. MARSH

NOTES

1. This report is to be filed with the Minister of Mines and Petroleum Resources. It is to be submitted *annually* and *prior* to the start of the exploration work. At the conclusion of the work programme, or at the time of filing of the next annual report with the Minister, whichever is first, a follow-up report is to be submitted to the Chief Inspector of Mines (using this report form), listing the actual work which was done.

2. Each report is to be accompanied by a map at suitable scale of the licences held under the *Coal Act*. This map is to show the full extent of the exploration work as listed in (8) above. It should show lakes, streams, and inhabited places in the vicinity. It should show the topography and other physical features of the area. As a small-scale insert on this map, show the location of the property. (For administrative purposes, seven copies of this map are required.)

3. The filing of this report with the Minister does not relieve you of your responsibility to file a notice with the Chief Inspector of Mines, as required by section 7 (1) of the *Coal Mines Regulation Act*.

4. One copy of the report is to be forwarded to the District Inspector of Mines and one copy to the District Forest Ranger prior to the start of coal-exploration work on the coal licences.

NOTE—This replaces the use of the form *Notice of Opening of a Mine or Quarry, or of Work on a Mineral Property* for this purpose.

5. Subsection (2) of section 8 of the *Coal Mines Regulation Act* requires the filing of a reclamation report with the Minister. The information required in the reclamation report is outlined in subsection (3) of section 8 of the Act and in Item (3) of the Directive.

This reclamation report should be submitted with the initial report as per paragraph 1 above. If, for good reason it is not possible to do so, application should be made to the Minister for deferment, stating when the report will be submitted. The maximum deferment will not exceed six (6) months.

6. Reclamation of the surface of the land disturbed by the exploration work is to commence at the earliest possible date, commensurate with good operating practice. Prior to starting such reclamation work, the proposed reclamation programme is to be submitted to the Chief Inspector of Mines for approval. Upon completion of the reclamation programme, or any part of it, such should be reported to the Chief Inspector of Mines. Upon the completed reclamation work being approved, a proportionate reduction in the security deposit will be made.

10M-172-243

Rio Algom
Rio Tinto

SAGE CREEK COAL LTD.
C/O RIO TINTO CANADIAN EXPLORATION LTD.
2400 - 120 Adelaide Street W.
Toronto, Ontario.

STATEMENT OF ESTIMATED COSTS

COAL LICENCE: 374

	May 27 - June 30, 1974	July 1 - 24
Wages & Benefits	$7,900.00	
Food & Accomodations	3,000.00	
Travel within province	1,700.00	
Bulldozer	5,000.00	
Adits	23,035.00	
Consultants	500.00	
	$41,135.00	$40,000.00

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H. W. MARSH

H.W. Marsh, (Agent for)
Exploration Manager
Rio Tinto Canadian Exploration Ltd.

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

See notes on reverse side before preparing this report.

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

Report of Exploration Work on Coal Licences

(Pursuant to section 8, Coal Mines Regulation Act)

1. Name of property SAGE CREEK COAL LTD.,

   Location FLATHEAD VALLEY, B. C.

2. Coal licence numbers 392

3. Name and address of the Crown licensee:

   Sage Creek Coal Ltd., 2400 - 120 Adelaide St. W.,
   Toronto, Ontario M5H 1W5

4. Name and address of the operator, if different from (3) above:

   Rio Tinto Canadian Exploration Limited,

5. The exploration work (~~was~~ was) done during the period from May 27, 1974 (Date)
   to July 24, 1974 (Date)

6. Type of equipment (~~used~~) used in the exploration work Compressor, Air Picks,
   D-7 Tractor

7. Number of men (~~employed~~) employed 10

8. Give details of the exploration work (~~done~~) done: Extraction of Bulk Samples.

   (*a*) Road construction—total length Nil feet, width of clearing Nil feet.

   (*b*) Line cutting—total length Nil feet, width Nil feet, method Nil

   (*c*) Total area of drill-sites Nil square feet, number of sites Nil.

   (*d*) Total area of camp-sites Nil square feet, number of sites Nil.
   No. 2, 73-2 S (48 tons approx.)

   (*e*) Total area of adits, refuse piles, stockpiles, etc. Nil square feet, number of adits 2 (old)

   (*f*) Trenching and stripping—

   (*i*) Seam tracing—length Nil feet, width Nil feet, maximum depth Nil feet.

   (ii) Formation cross-cutting—length Nil feet, width Nil feet, maximum depth Nil feet.

   (*iii*) Test pits—total area Nil square feet, number of pits Nil maximum depth Nil feet.

   (iv) Stripping (other than above) for the purpose of Nil

   Total area Nil square feet, maximum depth Nil feet.

(*g*) List any other disturbances of the surface of the land not included above, and show the total areas and maximum depth of such disturbances Nil

(*h*) Clearing—the total area of land to be cleared for items 8 (*a*) to (*g*) above is 0.1 acres.

NOTE—The *Forest Act* has regulations pertaining to the cutting of trees, including such cutting for coal-exploration purposes. Check with the Forest Ranger or District Forester before the clearing of a forested area is undertaken.

(*i*) Will any watercourse be disturbed? If yes, give the details No

NOTE—If yes, a water licence must be applied for from the Water Rights Branch, Department of Lands, Forests, and Water Resources, Victoria.

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H. W. MARSH

(*Signature*) H. W. Marsh

Name H. W. Marsh
(Print)

Position Manager of Exploration

Date July 23, 1974

NOTES

1. This report is to be filed with the Minister of Mines and Petroleum Resources. It is to be submitted *annually* and *prior* to the start of the exploration work. At the conclusion of the work programme, or at the time of filing of the next annual report with the Minister, whichever is first, a follow-up report is to be submitted to the Chief Inspector of Mines (using this report form), listing the actual work which was done.

2. Each report is to be accompanied by a map at suitable scale of the licences held under the *Coal Act*. This map is to show the full extent of the exploration work as listed in (8) above. It should show lakes, streams, and inhabited places in the vicinity. It should show the topography and other physical features of the area. As a small-scale insert on this map, show the location of the property. (For administrative purposes, seven copies of this map are required.)

3. The filing of this report with the Minister does not relieve you of your responsibility to file a notice with the Chief Inspector of Mines, as required by section 7 (1) of the *Coal Mines Regulation Act*.

4. One copy of the report is to be forwarded to the District Inspector of Mines and one copy to the District Forest Ranger prior to the start of coal-exploration work on the coal licences.

NOTE—This replaces the use of the form *Notice of Opening of a Mine or Quarry, or of Work on a Mineral Property* for this purpose.

5. Subsection (2) of section 8 of the *Coal Mines Regulation Act* requires the filing of a reclamation report with the Minister. The information required in the reclamation report is outlined in subsection (3) of section 8 of the Act and in Item (3) of the Directive.

This reclamation report should be submitted with the initial report as per paragraph 1 above. If, for good reason it is not possible to do so, application should be made to the Minister for deferment, stating when the report will be submitted. The maximum deferment will not exceed six (6) months.

6. Reclamation of the surface of the land disturbed by the exploration work is to commence at the earliest possible date, commensurate with good operating practice. Prior to starting such reclamation work, the proposed reclamation programme is to be submitted to the Chief Inspector of Mines for approval. Upon completion of the reclamation programme, or any part of it, such should be reported to the Chief Inspector of Mines. Upon the completed reclamation work being approved, a proportionate reduction in the security deposit will be made.

10M-172-243

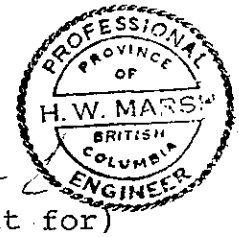
Rio Algom
Rio Tinto

SAGE CREEK COAL LTD.
C/O RIO TINTO CANADIAN EXPLORATION LTD.
2400 - 120 Adelaide Street W.
Toronto, Ontario

STATEMENT OF ESTIMATED COSTS

COAL LICENCE: 392

	May 27 - June 30, 1974
Wages & Benefits	3,200.00
Food & Accomodation	1,600.00
Travel Within Provinces	350.00
Bulldozer	1,000.00
Adits (bulk samples)	6,500.00
	$12,650.00



H.W. Marsh, (Agent for)
Exploration Manager
Rio Tinto Canadian Exploration Ltd.

Rio Algom
Rio Tinto

SAGE CREEK COAL LTD.
C/O RIO TINTO CANADIAN EXPLORATION LTD.
2400 - 120 ADELAIDE STREET W.
TORONTO, ONTARIO

NAMES AND ADDRESSES TO ACCOMPANY ESTIMATED STATEMENT OF COSTS

Adits	McMeekin Construction Ltd. Rocky Mountain House, Alberta
Bulldozer	McMeekin Construction Ltd. Rocky Mountain House, Alberta
Food & Accomodation	McMeekin Construction Ltd. Rocky Mountain House, Alberta
Consultant	W.J. Hennessey Calgary, Alberta

Rio Algom - Rio Tinto Personnel:

B. Pewsey	Project Engineer
O. Cullingham	Geologist
P. Bedford	Project Manager

Rio Algom
Rio Tinto

July 10, 1974

Assistant Deputy Minister
Dept. of Mines and Petroleum Resources
Government of British Columbia
VICTORIA, B. C.

Attention: Mr. R. Rutherford

Dear Sir:

RE: SAGE CREEK COAL LTD.

We enclose herewith applications to group coal licences on the above mentioned property.

Our cheque in the amount of $2.00 to cover cost of transaction is attached.

Yours very truly,

RIO TINTO CANADIAN EXPLORATION LIMITED

D. J. Gervais

DJG/ll
encl.

cc; Accounts

JUL 16

DEPT. OF MINES
AND PETROLEUM RESOURCES

7692

Rio Tinto Canadian Exploration Limited
120 ADELAIDE STREET WEST, TORONTO CANADA M5H 1W5 416/367-4000 TELEX 02-2204 CABLE/RIOCANEX

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

COAL ACT

APPLICATION TO GROUP

Land District Kootenay

Location Flathead Forest Area
Flathead River, B.C.

Date of Application July 10, 1974

We, the undersigned licensees* of the following adjacent coal licences, desire to group them according to the provisions of the Coal Act:-

Licence Number	Signature of Licensee
~~988~~ 388	D. J. Gervais
~~987~~ 387	
374	Agent for
986	
375	Rio Tinto
376	Can. Expl.
~~1885~~ 386	Ltd.
~~1880~~ 395	
~~1886~~ 380	
405	

*May be signed by agent on behalf of licensee

Recording Fee $1.00

DEPARTMENT OF MINES AND PETROLEUM RESOURCES

COAL ACT

APPLICATION TO GROUP

Land District Kootenay

Location Flathead Forest Area
Flathead River, B.C.

Date of Application July 10, 1974

We, the undersigned licensees* of the following adjacent coal licences, desire to group them according to the provisions of the Coal Act:-

Licence Number	Signature of Licensee
989	D J Gervais
396	Agent for
377	Rio Tinto Can.
391	Expl Ltd.
392	
393	
404	
~~388~~ 389	
409	
~~387~~ 381	

*May be signed by agent on behalf of licensee

MEMORANDUM

FROM THE

DEPARTMENT OF MINES
AND PETROLEUM RESOURCES

TO Mr. A.R. Corner,
Administrator for Coal,
Dept. of Mines & Petroleum Resources.

VICTORIA, B.C., August 22, 19 74

WHEN REPLYING PLEASE REFER
REF TO FILE No. 0226

Re: Sage Creek Coal Limited.

In reference to the material recently submitted by Rio Tinto on work done on the Sage Creek coal licenses, I think the plans attached to the letter dated August 16 from Mr. D.J. Gervais should be added to the technical report submitted earlier.

The plans and short report submitted by W.J. Hennessey relates to work done in July and August this year, and therefore will perhaps be supplemented by other reports. I would suggest that Mr. Bell should file this material for the present.

AUG 23 '74 DM

A.R.C. James, P.Eng.,
Senior Inspector of Mines.

ARCJ:sl

encls - 2.

DEPT. OF MINES
AND PETROLEUM RESOURCES

Mr Bell

MEMORANDUM

5 2 - C - 20

TO Mr. A.R. Corner,

Administration Division, Mining Titles.

FROM THE

DEPARTMENT OF MINES
AND PETROLEUM RESOURCES

VICTORIA, B.C., August 6, 19 74

WHEN REPLYING PLEASE REFER
TO FILE No.

Re: Sage Creek Coal Ltd.

I have examined the attached report and letters dated July 10, 12, and 23 relating to expenditures on the above property by Rio Tinto in 1973.

I think the report contains an adequate description and evaluation of the work done. I would suggest that the report be passed on to Mr. Bell for his examination and comments.

It is a little difficult to relate the items of work expenditure since the expenditures are not clearly related in the letters to actual amount of work done. In devising a standard form for this purpose, I think we will have to require that a description must be given of what each item of expenditure is for. However, I consider the total expenditure of $360,471.59 is quite consistent with the total amount of work done in 1973 which included 6 adits, totalling 2,180 feet, 12 rotary drill holes totalling 6,700 feet, 5 miles of road construction, together with bulk sampling and analysis. I would therefore recommend acceptance of the statements.

A.R.C. James, P.Eng.,
Senior Inspector of Mines.

ARCJ:bh

AUG 7 '74 AM

DEPT. OF MINES
AND PETROLEUM RESOURCES

I have received with thanks 1/C 2 374-007 as they are fully allowed 8538

COPY for G Bell 8/8

REFERRED TO	DATE
D.M.	
ADM (M)	
ADM (P)	
O.S.C.	
O.F.R.	
	✓ 8/8

ARC ✓ 8/8 Cells

Rio Algom
Rio Tinto

July 12, 1974

Assistant Deputy Minister,
Dept. of Mines and Petroleum Resources,
Government of British Columbia,
VICTORIA, B.C.

Attention: Mr. R. Rutherford

Dear Sir:

Re: SAGE CREEK COAL LTD. copy attached

With reference to my letter of July 10, 1974 regarding application to group, I submit the following as assessment credit.

7751

a) Report on Exploration and Geology, June to September, 1973, by O. Cullingham and H. W. Marsh.

b) Report of exploration work on Coal Licences, Groups 1 and 2.

c) Statement of costs, Groups 1 and 2.

d) List of contractors and personnel to accompany statement of costs.

e) Our cheque in the amount of $68,812.00 to cover the following costs:

Group #1

Coal Licences 989, 396, 377, 391, 392, 393, 404, 389, 409, 381.

10 Coal Licences @ $25.00 each	$ 250.00
Rental fee @ $1.00/acre, 6,038 acres	6,038.00
Work submitted @ $5.00/acre, 6,038 x $5.00 ($30,190.00)	
	$6,288.00

Rio Tinto Canadian Exploration Limited
120 ADELAIDE STREET WEST, TORONTO CANADA M5H 1W5 416/367-4000 TELEX 02-2204 CABLE/RIOCANEX

Group #2

Coal Licences 388, 387, 374, 986, 375, 376, 386, 395, 380, 405.

10 Coal Licences @ $25.00 each	$ 250.00
Rental fee @ $1.00/acre, 5,691 acres	5,691.00
Work submitted @ $5.00/acre, 5,691 x $5.00 ($28,455.00)	
	$5,941.00

Coal Licences 988, 987, 394, 401, 402, 390, 400, 379, 378, 406, 407, 411, 399, 385, 382, 397, 383, 384, 403, 398, 410.

21 Coal Licences @ $25.00 each	$ 525.00
Rental fee @ $1.00/acre, 9,343 acres	9,343.00
Payment in lieu @ $5.00, 9,343 x $5.00	46,715.00
	$56,583.00
GRAND TOTAL =	$68,812.00

May we bring to your attention that our statement of costs for the two new groups have been broken down into two work periods, i.e., June-July 24/73 - July 25-December 31/73. The old Act had no provision for excess work credit, therefore no attempt was made to file the work for the period prior to July 25, 1973.

In our submission dated July 9, 1973:

Old Group No. 1 - work valued at		$38,723.32
- work required for renewal		35,895.00
	EXCESS	2,828.32
Old Group No. 2 - work valued at		68,892.19
- work required for renewal		40,222.50
	EXCESS	28,669.69
Old Group No. 3 - work values at		39,761.57
- work used for renewal		37,155.00
	EXCESS	2,606.57
	TOTAL EXCESS	$34,104.58

Would you please confirm the amount of excess work which will remain after the renewal of these licences in 1974.

We would appreciate receiving a copy of Bill 92 at your earliest convenience.

Yours very truly,

RIO TINTO CANADIAN EXPLORATION LIMITED

D J Gervais

:dr

D. J. GERVAIS

cc; P. Bedford
B. Pewsey
H. W. Marsh
R. D. Nimmo

LEGEND

- JF — JURASSIC - FERNIE Fm
- Ks — CRETACEOUS - KOOTENAY Fm
- Ksl — CRETACEOUS - BLAIRMORE Gp
- Ts — TERTIARY - KISKINELKIN Fm
- Zone of Outcrop
- Contact
  Defined, Inferred, Kootenay - Blairmore
- Coal seam (surface trace)
- Coal seam, seam name
- Normal fault with direction (inferred)
- Thrust fault
- Strike with dip direction and angle
- Drill hole (Sage Creek Coal)
- Drill hole (Shell)
- Adit location
- L 9384 — Lot number
- CL 667 — Coal Licence number

NORTH HILL

SOUTH HILL

73-54

73-25

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LIMITED

GEOLOGICAL MAP

July 79

D.C. / L. Nagy DWG. S-4490-A

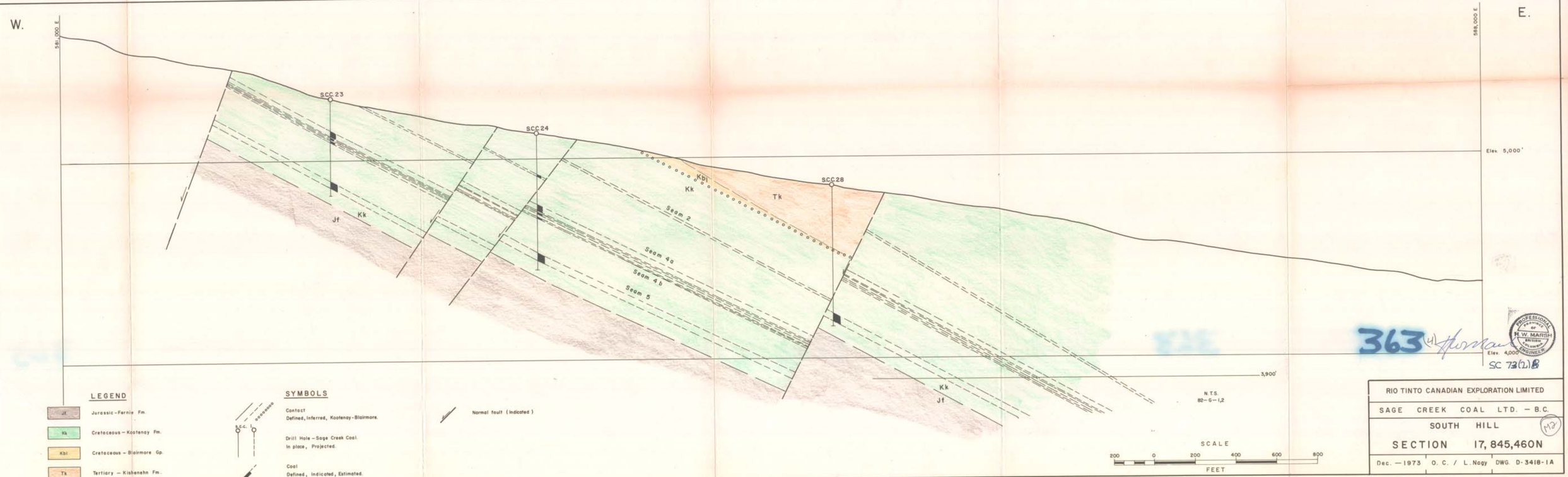
SCALE

FEET

8/C

363 (4)

M1

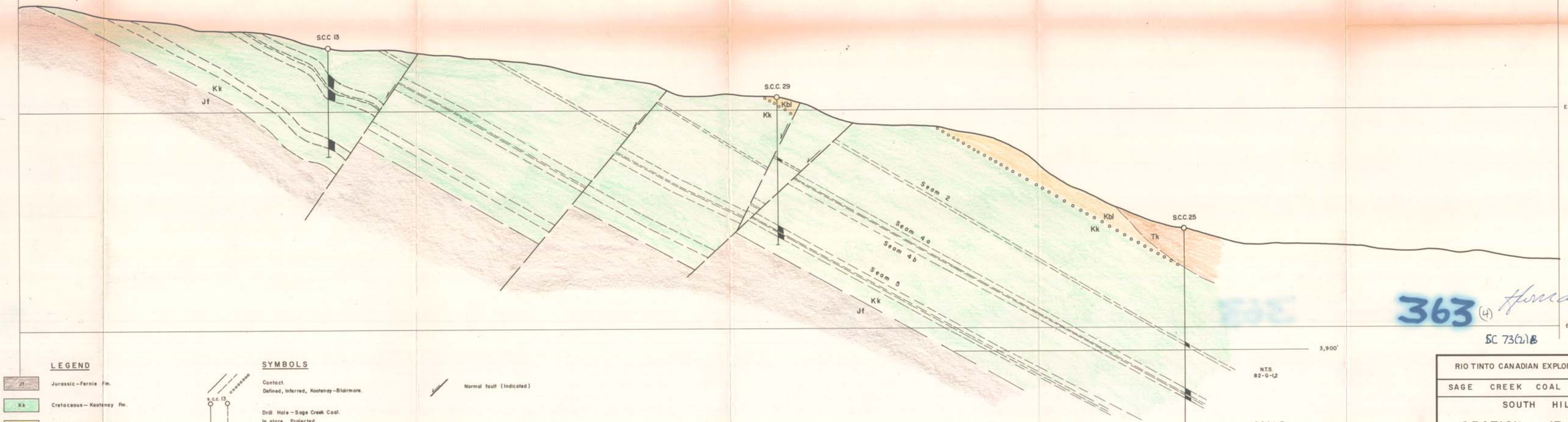

W.
E.
581,000 E.
588,000 E.
SCC 23
SCC 24
SCC 28
Elev. 5,000'
Elev. 4,000'
3,900'
Jf
Kk
Kbl
Tk
Seam 2
Seam 4a
Seam 4b
Seam 5
LEGEND
Jf Jurassic – Fernie Fm.
Kk Cretaceous – Kootenay Fm.
Kbl Cretaceous – Blairmore Gp.
Tk Tertiary – Kishenehn Fm.
SYMBOLS
Contact
Defined, Inferred, Kootenay-Blairmore.
Drill Hole – Sage Creek Coal.
In place, Projected.
Coal
Defined, Indicated, Estimated.
Normal fault (Indicated)
N.T.S.
82-G-1,2
SCALE
200 0 200 400 600 800
FEET
RIO TINTO CANADIAN EXPLORATION LIMITED
SAGE CREEK COAL LTD. – B.C.
SOUTH HILL
SECTION 17, 845,460N
Dec. – 1973 O. C. / L. Nagy DWG. D-3418-1A
PROFESSIONAL ENGINEER H. W. MARSH BRITISH COLUMBIA
363
SC 73(2)B

W.

E.

581,000 E.

585,000 E.



N.T.S. 82-G-12

SCALE

200 0 200 400 600 800

FEET

LEGEND

- Jf — Jurassic – Fernie Fm.
- Kk — Cretaceous – Kootenay Fm.
- Kbl — Cretaceous – Blairmore Gp.
- Tk — Tertiary – Kishenehn FM.

SYMBOLS

Contact.
Defined, Inferred, Kootenay – Blairmore.

Drill Hole – Sage Creek Coal.
In place, Projected.

Coal
Defined, Indicated, Estimated.

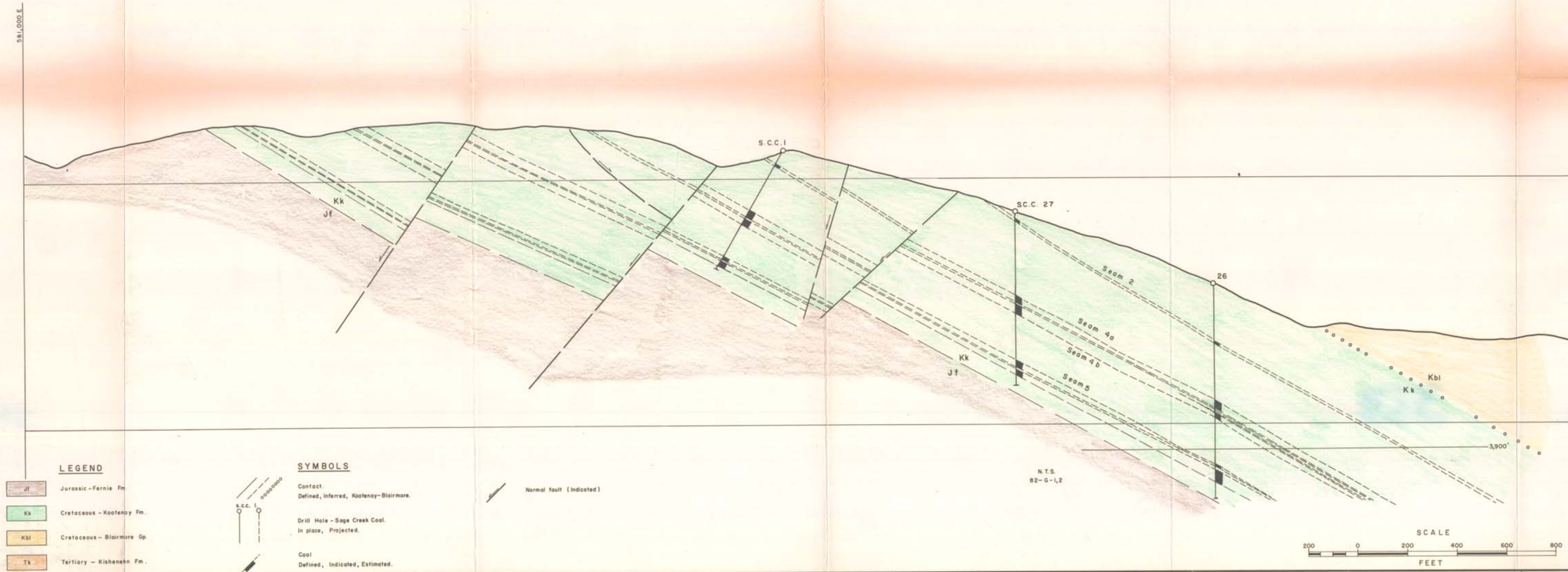
Normal fault (Indicated)

PROFESSIONAL ENGINEER OF H. W. MARSH BRITISH COLUMBIA

363 (4) Hunca

SC 73(2)18

RIO TINTO CANADIAN EXPLORATION LIMITED	
SAGE CREEK COAL LTD. – B.C.	
SOUTH HILL	
SECTION 17,847,060 N	(M3)
Dec. – 1973	O. C. / L. Nagy DWG. D-3418-3A



LEGEND

Jf	Jurassic - Fernie Fm.
Kk	Cretaceous - Kootenay Fm.
Kbl	Cretaceous - Blairmore Gp.
Tk	Tertiary - Kishenehn Fm.

SYMBOLS

Contact.
Defined, Inferred, Kootenay-Blairmore.

Drill Hole - Sage Creek Coal.
In place, Projected.

Coal
Defined, Indicated, Estimated.

Normal fault (Indicated)

PROFESSIONAL ENGINEER H. W. MARSH REGISTERED ENGINEER

363(4) Hurcxa

SC 73(2)18

RIO TINTO CANADIAN EXPLORATION LIMITED	
SAGE CREEK COAL LTD. — B.C.	
SOUTH HILL	(M4)
SECTION 17,847,860N	
Dec. — 1973	O. C. / L. Nagy DWG. D-3418-5A

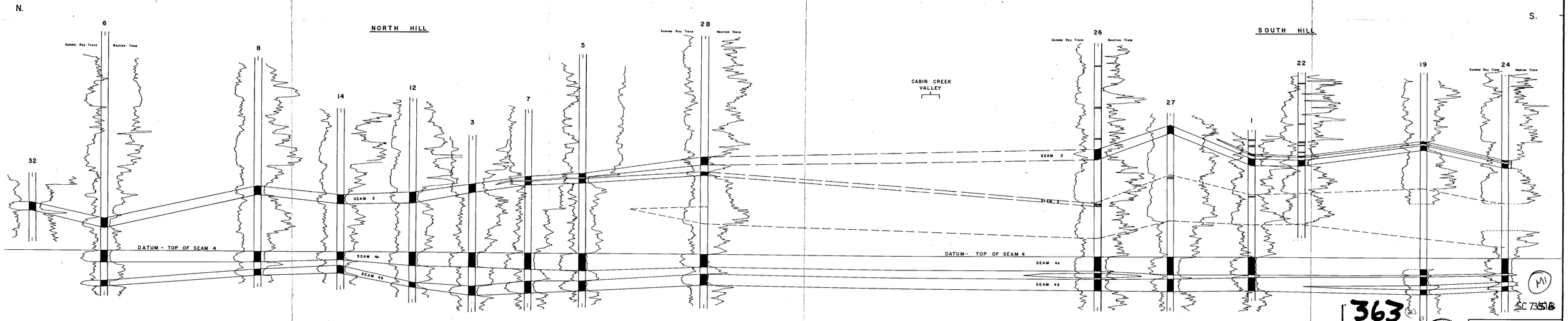
K · SAGE CREEK 73(5)B

SEAM & ADIT DATA

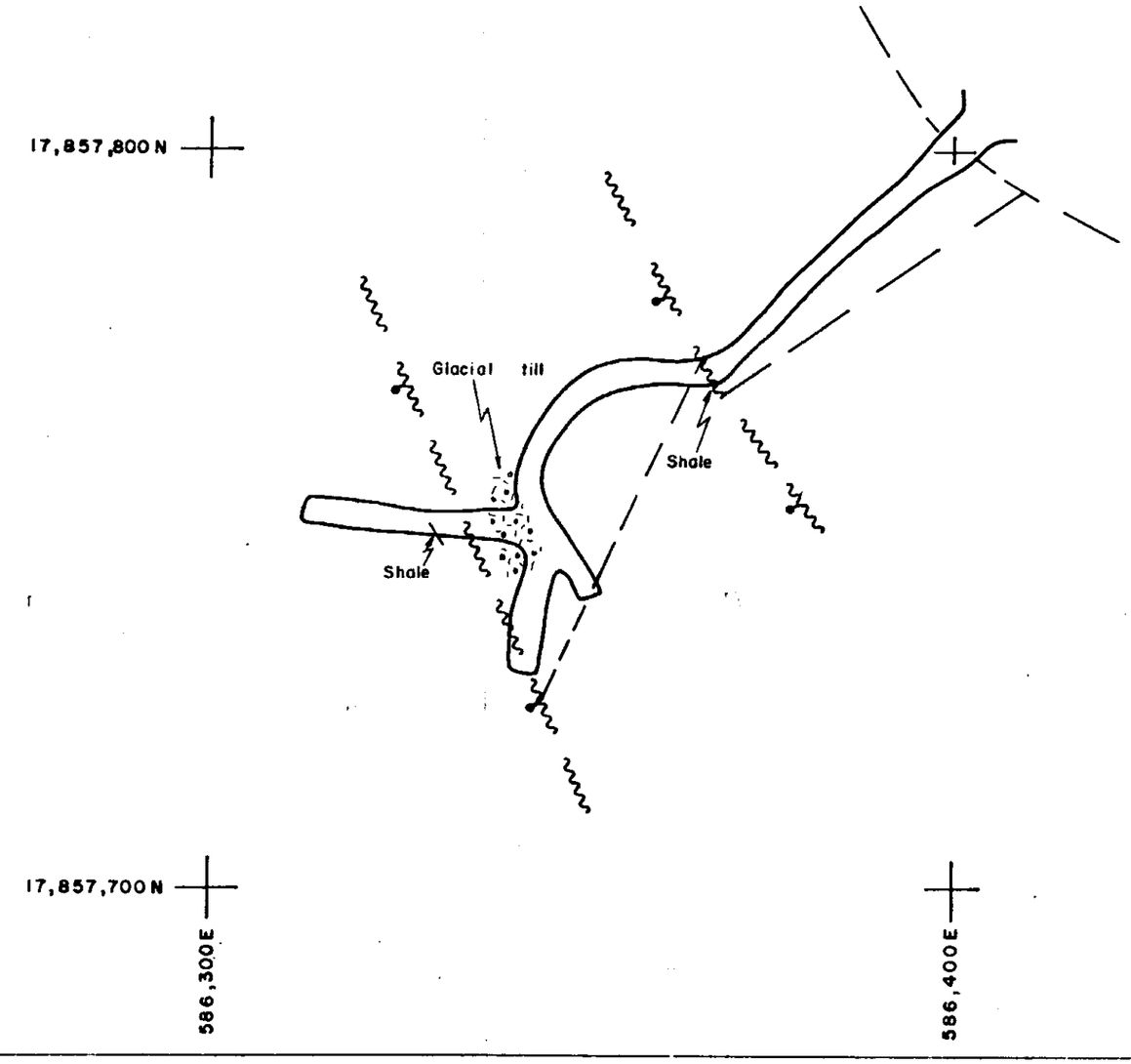
SAGE CREEK COAL LTD

RIO TINTO.

00 363(2)


N.
S.
NORTH HILL
SOUTH HILL
CABIN CREEK VALLEY
Gamma Ray Trace
Neutron Trace
6
8
14
12
3
7
5
28
32
26
27
1
22
19
24
SEAM 2
SEAM 4a
SEAM 4b
DATUM - TOP OF SEAM 4
DATUM- TOP OF SEAM 4
VERTICAL SCALE 1" = 100 FEET
HORIZONTAL SCALE 1" = 1320 FEET
PROFESSIONAL ENGINEERS PROVINCE OF BRITISH COLUMBIA H. W. MARSH
RIO TINTO CANADIAN EXPLORATION LTD.
SAGE CREEK COAL LTD. - B.C.
STRATIGRAPHIC CORRELATION CHART ABOVE SEAM 4
Dec., 1973
D.C.C./L. Nagy
Map No. 1
SC 73-5-18

363



363

PLAN

Tape and Compass Survey
(measured by B. Pewsey ; Sept., 1973)

M2

PROFESSIONAL ENGINEER — PROVINCE OF BRITISH COLUMBIA — H. W. MARSH

SC 73(5)B

NORTH HILL

A. N.

SCALE
0 20 40 60 80
One Inch = 20 Feet

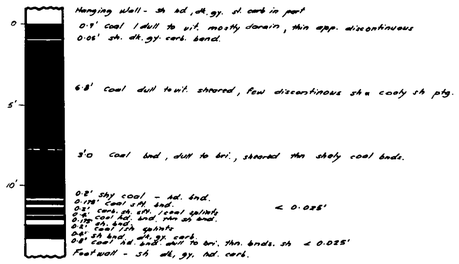
RIO TINTO CANADIAN EXPLORATION LTD.

SAGE CREEK COAL LTD. — B.C.

ADIT No. 73 - 4a - N

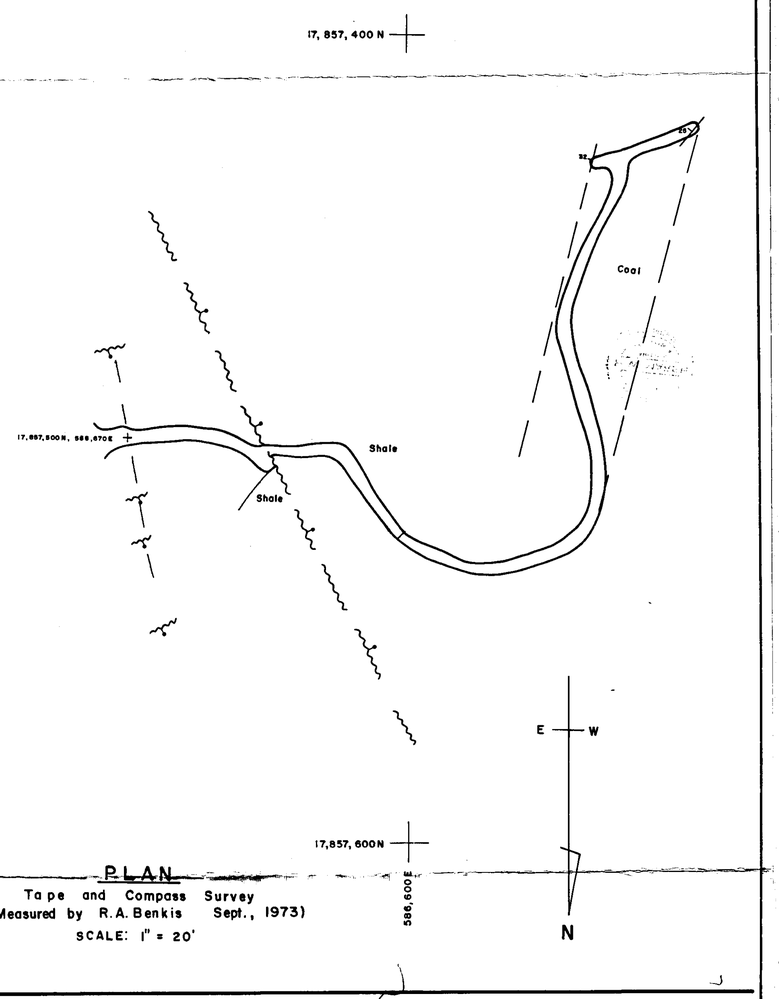
34A N

Dec., 1973	O.C. / L. Nagy	DWG. G- 2645



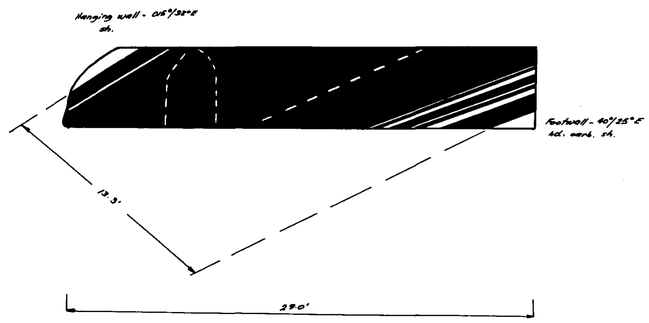
SECTION

SOUTH FACE
(Measured at waist height by O.C. Sept., 1973)
SCALE: 1" = 5'



PLAN

Tape and Compass Survey
(Measured by R.A. Benkis Sept., 1973)
SCALE: 1" = 20'



E. W.

CROSS - CUT

SOUTH FACE OF CROSS-CUT
(Measured by O.C. Sept., 1973)
SCALE: 1" = 5'

N.T.S.
82-G-1,2

363(2)

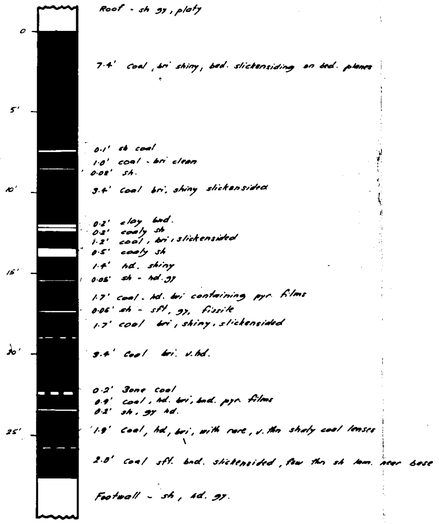
SC 73(5)B

NORTH HILL

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA A.W. MARS

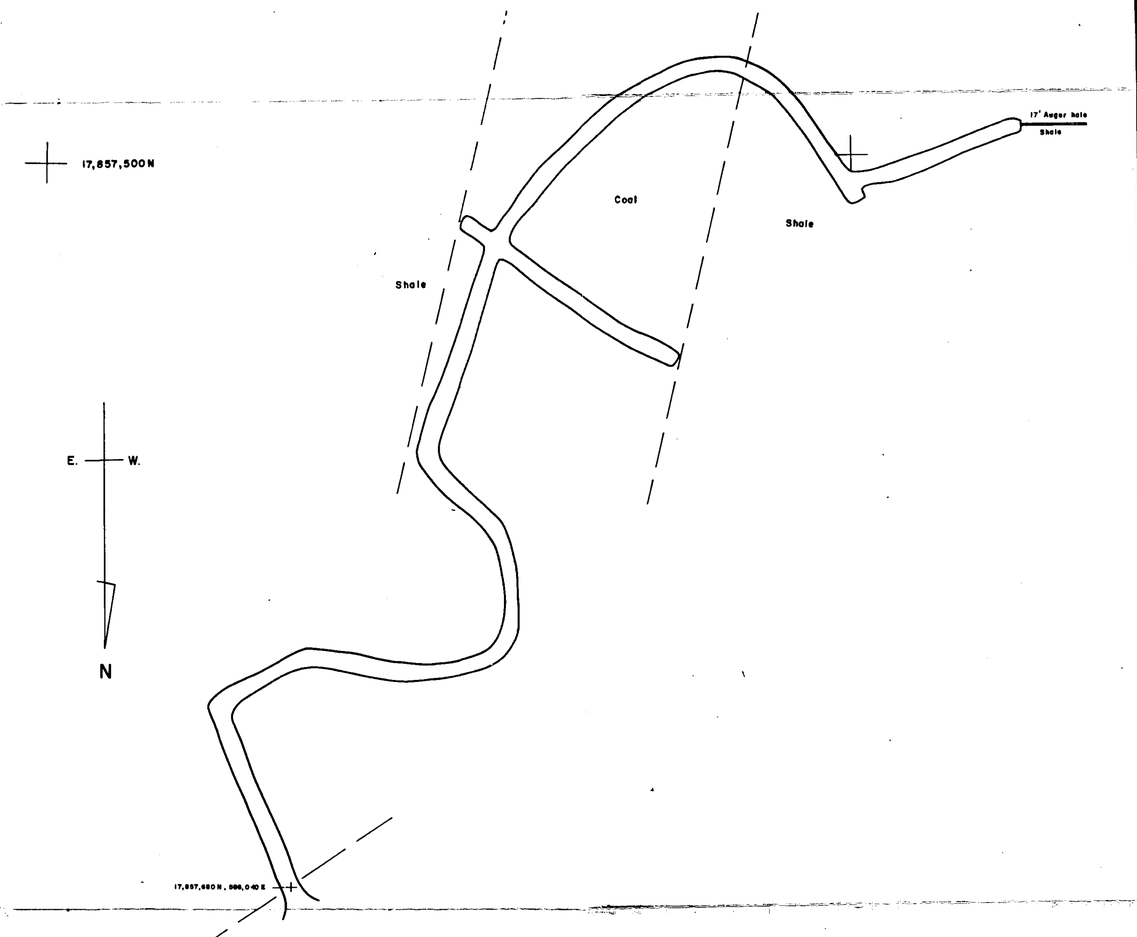
(M3)

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD — B.C.		
ADIT No. 73-2-N, SEAM 2		
32-N		
Dec, 1973	O.C. / L. Nagy	DWG. G-3448-1



SECTION

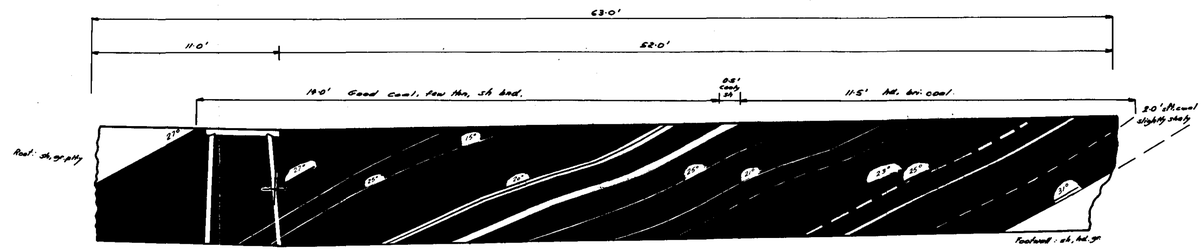
SOUTH FACE
(Measured at waist height by W. J. Hennessey July, 1973)
SCALE: 1" = 5'



PLAN

Tape and Compass Survey
(Measured by B. Pewsey July, August, 1973)
SCALE: 1" = 20'

E. W.



CROSS-CUT

SOUTH FACE OF CROSS-CUT
(Measured by B. Pewsey and W. Hennessey, July, 1973)
SCALE: 1" = 5'

N.T.S.
82-G-1,2

363(2)

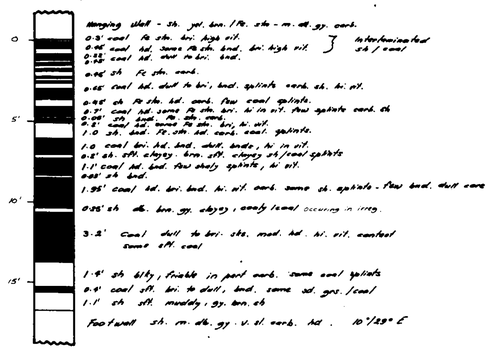
PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H.W. MARSH

SC 7365B

NORTH HILL

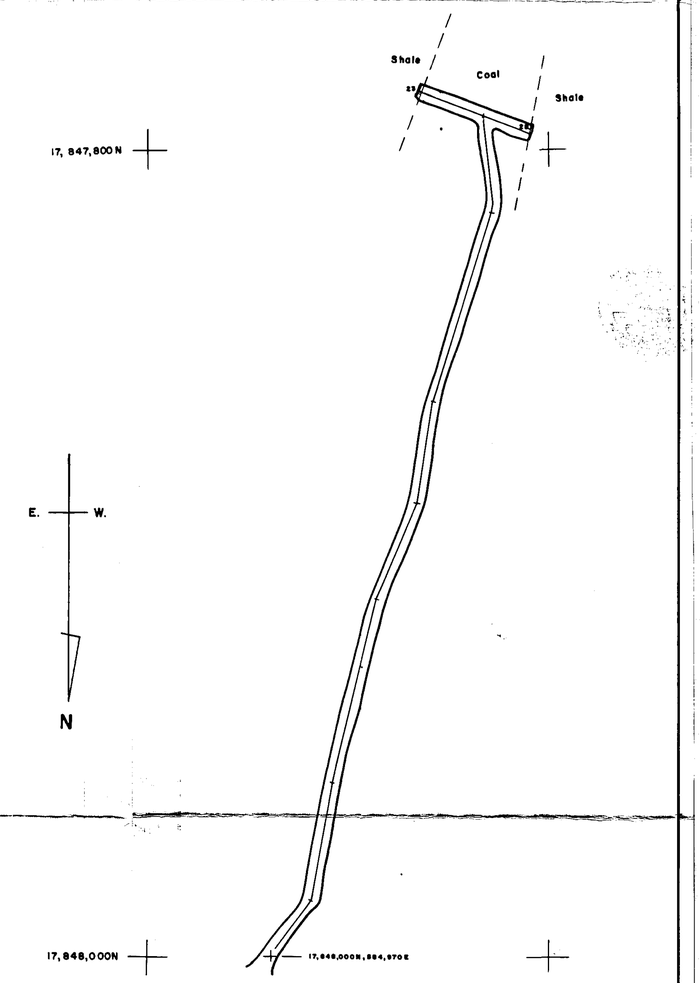
(M4)

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. — B.C.		
ADIT No.73-4-N, SEAM 4a 34AN		
Dec, 1973	Q.C. / L. Nagy	DWG. G-3448-2



SECTION

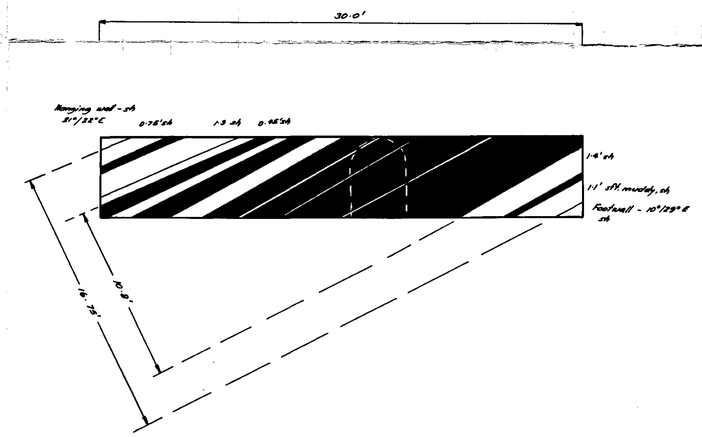
SOUTH FACE
(Measured at waist height by O.C. Aug., 1973)
SCALE: 1" = 5'



PLAN

Tape and Compass Survey
(Measured by O.C. Aug., 1973)
SCALE: 1" = 20'

E. W.



CROSS - CUT

SOUTH FACE OF CROSS-CUT
(Measured by O.C. Aug., 1973)
SCALE: 1" = 5'

N.T.S.
82-G-1,2

363 (21)

SC 73651B

SOUTH HILL

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD — B.C.

ADIT No. 73-2-S, SEAM 2 (15)
3d-S

Dec, 1973 | O.C. / L. Nagy | DWG. G-3448-3

Hanging Wall - sh. dk. gy. sl. carb. in part. Fr. sh. bd. fractured - slickensided contact.
0.4' sh. dk. gy. coal splints
1.0' Coal / sh. sft. muddy frac. in part some bri. bnd. coal.
0.5' Coal mod. hd. shlt / few bri. bnds. some sft. patches
0.5' sh / shaly coal - some coal splints
0.9' coal, hd., shlt to bri. bnd. slickensiltrain.
0.075' sh band.
1.2' Coal sft. to hd. shlt to bri. bnd. few sh. splints
0.12' shaly coal - sft. muddy frac. Fr. sh. coal splints.
0.15' sh. ply. / coal splints
0.35' Coal sft. to hd. shlt to bri. Fr. sh. slickensiltrain
0.1' sh dk. gy. carb. Fr. sh.

3.7' Coal - hd. Fr. sh. bnd. slickensiltrain, shlt to bri. few thin sh. ptgs.

0.2' sh. bnd / thin coal splints mod. hd.
0.8' coal, shlt to bri. sheared / altera-wk.
0.35' sh/coal crushed zone.
1.3' coal sft. to hd. shlt to bri. Fr. sh. altera-wk.
0.1' carb-sh bnd. Fr. sh.

3.0' coal sft. to hd. Fr. sh. few coaly sh ptgs. shlt to bri. altera-wk.

1.0' coal / sh ptgs. sft. to hd. Fr. sh. altera-wk.
0.1' carb. sh. Fr. sh.
0.4' coal sft. muddy texture / dirty
0.48' coal sft. some sh. splints Fr. sh. some intr. hd. altera-wk.
0.62' coal sft. muddy texture
0.7' coal sft. Pinnate, shlt to bri. some muddy texture.
0.85' coal sft. shlt muddy texture, coaly sh splints

1.75' coal bnd. sft. to mod. hd. some sft. muddy texture intr., shlt to bri. altera-wk.

0.05' sh bnd. dk. gy. carb.
1.05' coal, clean mod. hd. bri. altera-wk.
0.885' coal / sh bnd. = splints of sh. coal = shaly coal
1.1' coal mod. hd. clean bnd. altera-wk.
0.3' sh bnd. / coal splints
1.05' coal clean bnd. bri. altera-wk.
0.2' coal sft. mushy shlt
1.0' coal fairly clean, bri. bnd. sheared
0.35' sh. sft. dk. gy. some splints
0.05' coal bri. coal bnd.
0.3' sh. mod. hd. some coal splints = ply.
0.325' coal shlt to bri. sheared, coaly sh ply.

1.975' sh / coaly sh / coal dk. gy. carb. to coaly sh. some coal ptgs.

2.8' sh. dk. gy. in part. carb. silty.

1.0' Coal fairly clean, mod. hd., bnd. shlt to bri. altera-wk.
0.125' sh. bnd.

3.8' Coal bnd. hd. shlt to bri. few sh. splints ∠0.025

0.12' sh. bnd.
1.2' coal hd. bnd. shlt to bri. upp. fairly clean
0.05' sh bnd.
0.8' coal mod. hd. bnd shlt / few bri. bnd.
0.05' sh ply.

3.0' Coal hd. shlt bnd. few sft. muddy textured intr. few bnd. = ply. carb. sh.

0.2' sh. ply. / splints of coal

3.0' Coal sft. to hd. sheared vessel seemingly discontinous sh ply.

0.6' coal sft. muddy coal intr.
0.45' coal sft. bnd. / few sh ply.
0.05' sh ply.

3.7' Coal sft. muddy texture in part some hd. coal bnd. shlt to v.t. sheared

0.3' mud. bnd. / coal splash
0.3' coal sft. shlt, sheared.

3.2' coal hd. shlt, several coaly sh ply.

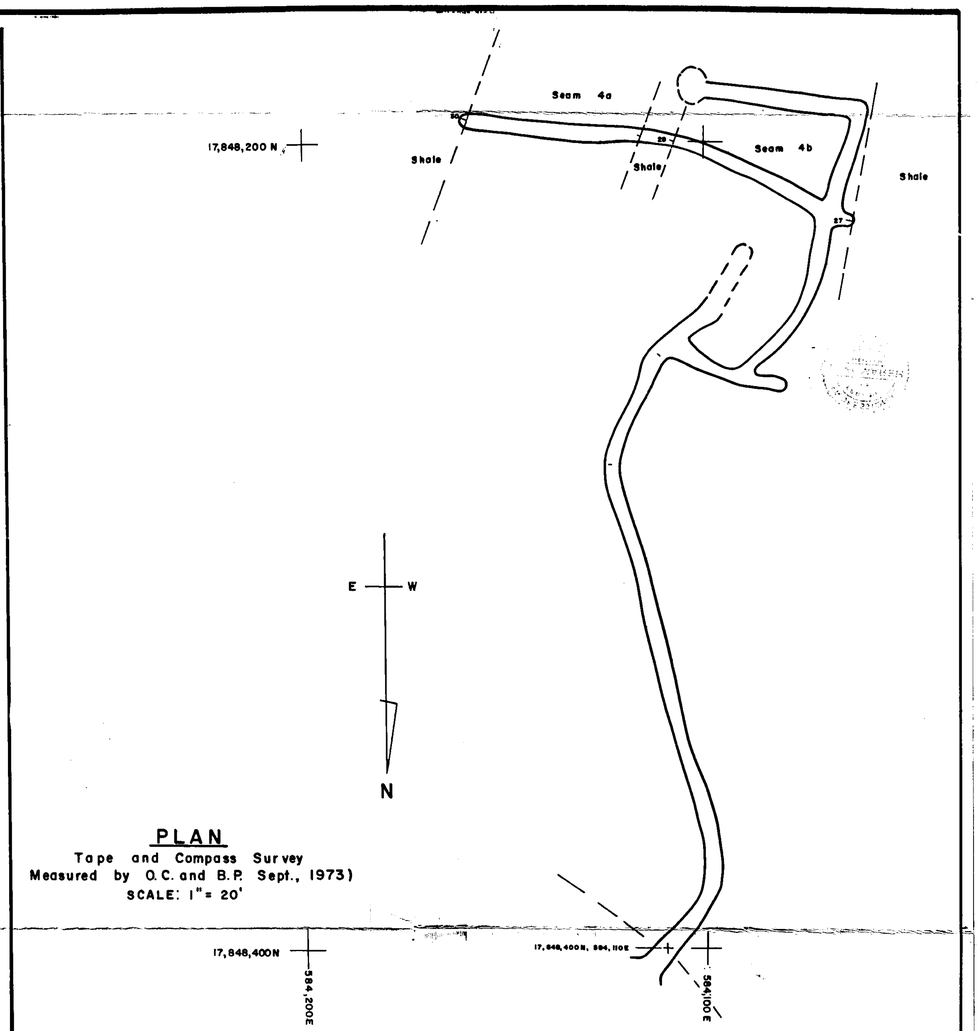
Footwall sh.-dk.gy. carb. in part hd.

SECTION

SOUTH - FACE

(Measured at waist height by O.C. Sept., 1973)

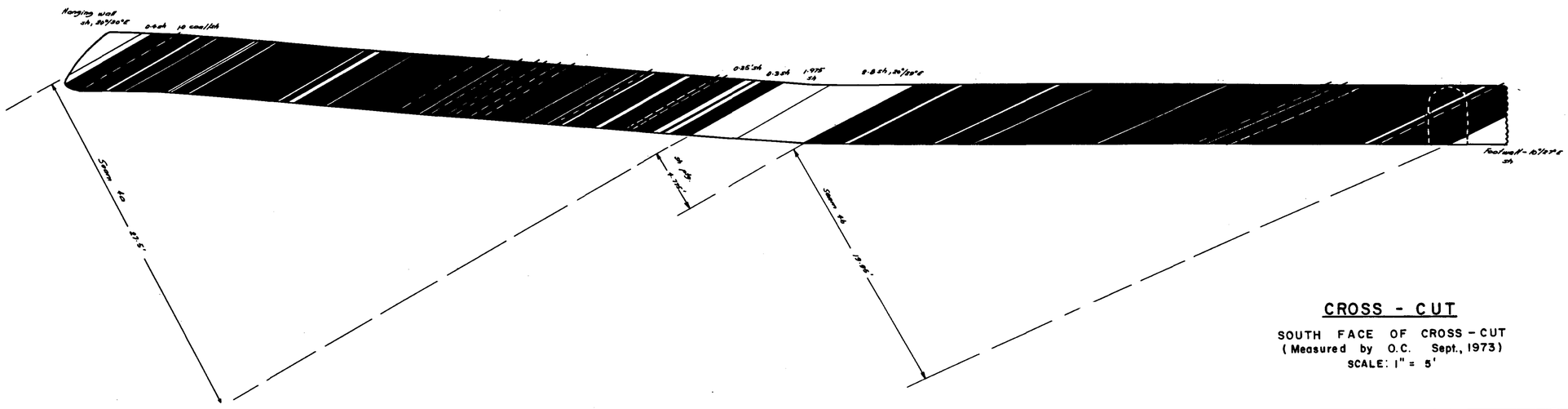
SCALE: 1" = 5'



PLAN

Tape and Compass Survey
Measured by O.C. and B.P. Sept., 1973)
SCALE: 1" = 20'

E.



W.

CROSS - CUT

SOUTH FACE OF CROSS - CUT
(Measured by O.C. Sept., 1973)
SCALE: 1" = 5'

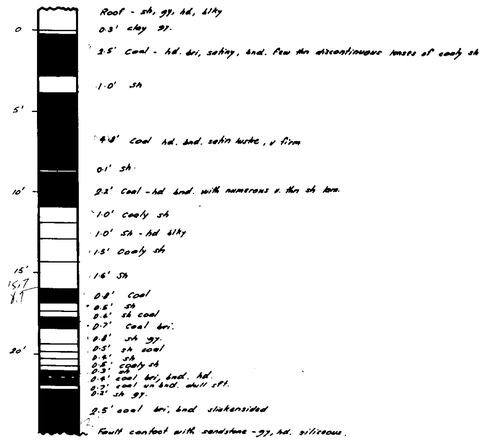
N.T.S.
82-G-1,2

363

SC 73(5)B

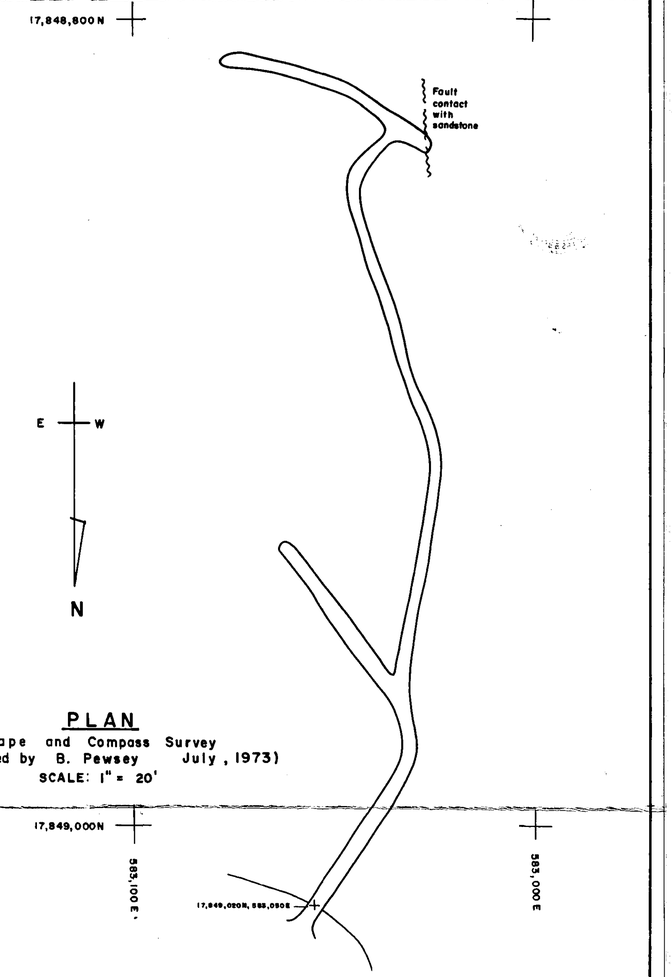
SOUTH HILL

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. — B.C.		
ADIT No. 73-4-S, SEAMS 4a, 4b (34-S)		
Dec, 1973	O.C. / L. Nagy	DWG. G-3448-4



SECTION

SOUTH FACE
(Measured at waist height by B. Pewsey and W. Hennessey July, 1973)
SCALE: 1" = 5'

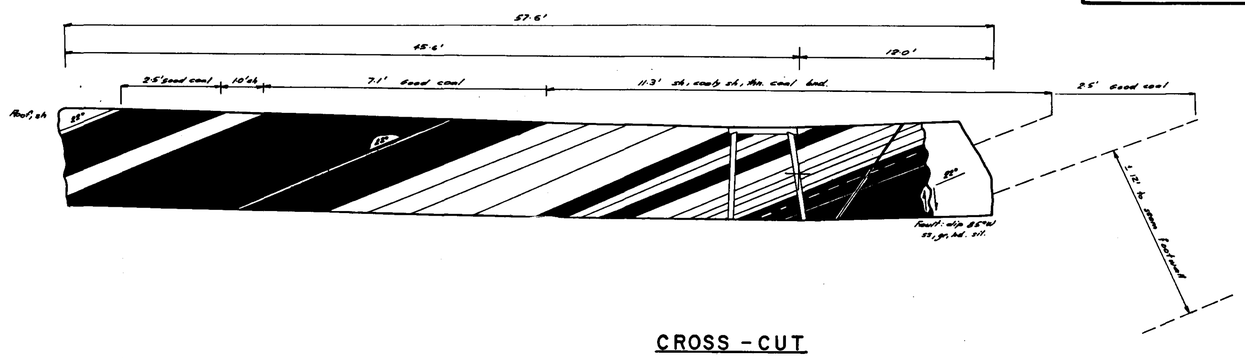


PLAN

Tape and Compass Survey
(Measured by B. Pewsey July, 1973)
SCALE: 1" = 20'

E.

W.



CROSS - CUT

SOUTH FACE OF CROSS-CUT
(Measured by B. Pewsey and W. Hennessey, July, 1973)
SCALE: 1" = 5'

N.T.S.
82-G-1,2

363(a)

SC 73(5)B

SOUTH HILL

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H.W. MARSH

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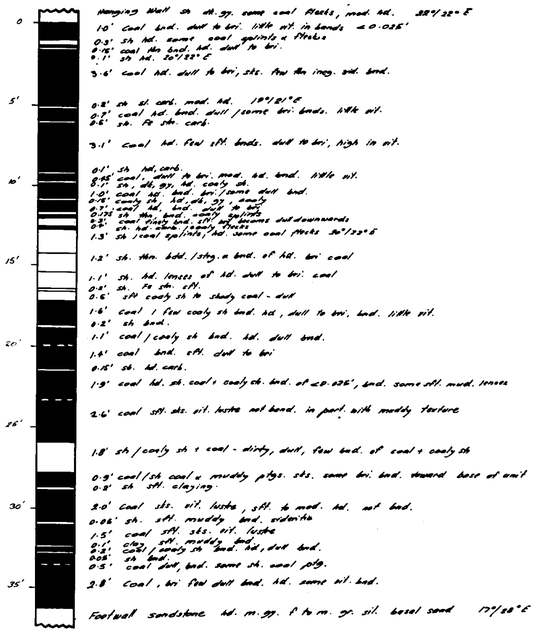
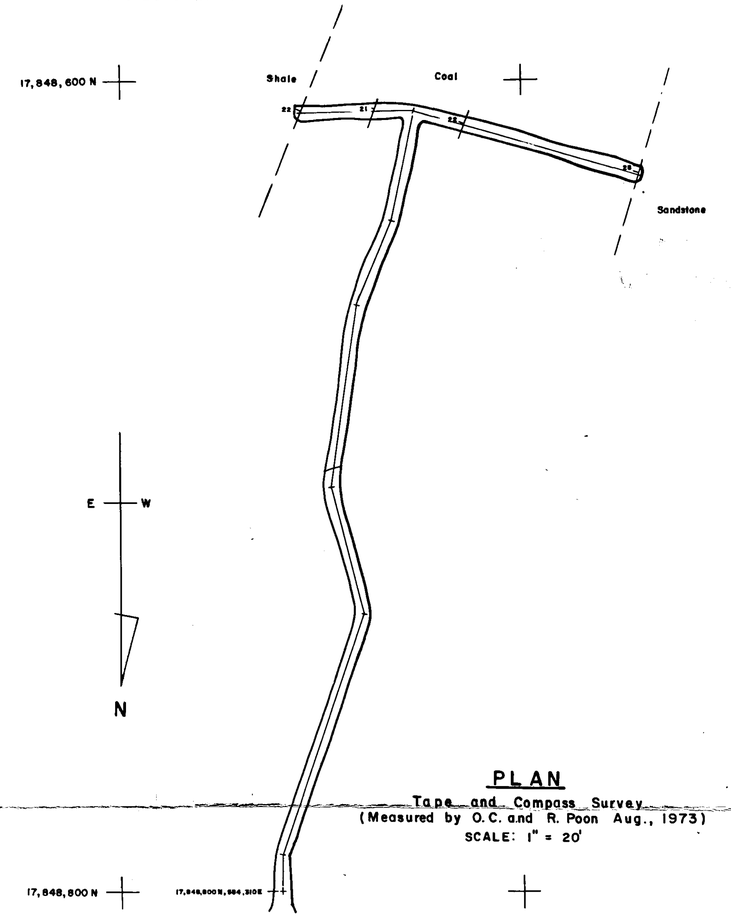
RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. — B.C.		
ADIT No.73-5-S, SEAM 5 (35-S)		
Dec, 1973	O.C. / L. Nagy	DWG. G-3448-5



SECTION

SOUTH FACE
(Measured at waist height by O.C. Aug., 1973)
SCALE: 1" = 5'



PLAN

Tape and Compass Survey
(Measured by O.C. and R. Poon Aug., 1973)
SCALE: 1" = 20'

E. W.

CROSS - CUT

SOUTH FACE OF CROSS-CUT
(Measured by O.C. and R. Poon Aug., 1973)
SCALE: 1" = 5'

N.T.S.
82-G-1,2

363(2)

SC 73(5)B

SOUTH HILL

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H.W. MARSH

MB

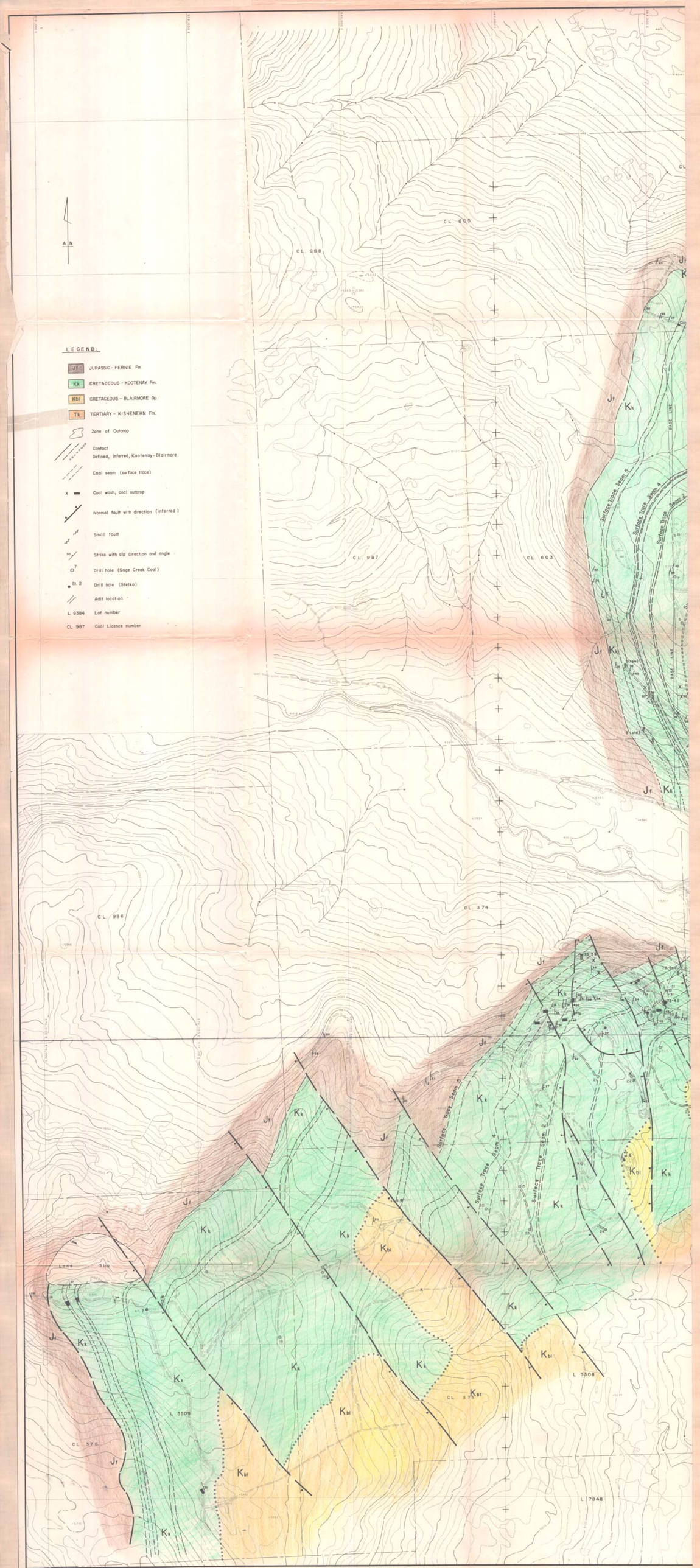
RIO TINTO CANADIAN EXPLORATION LIMITED

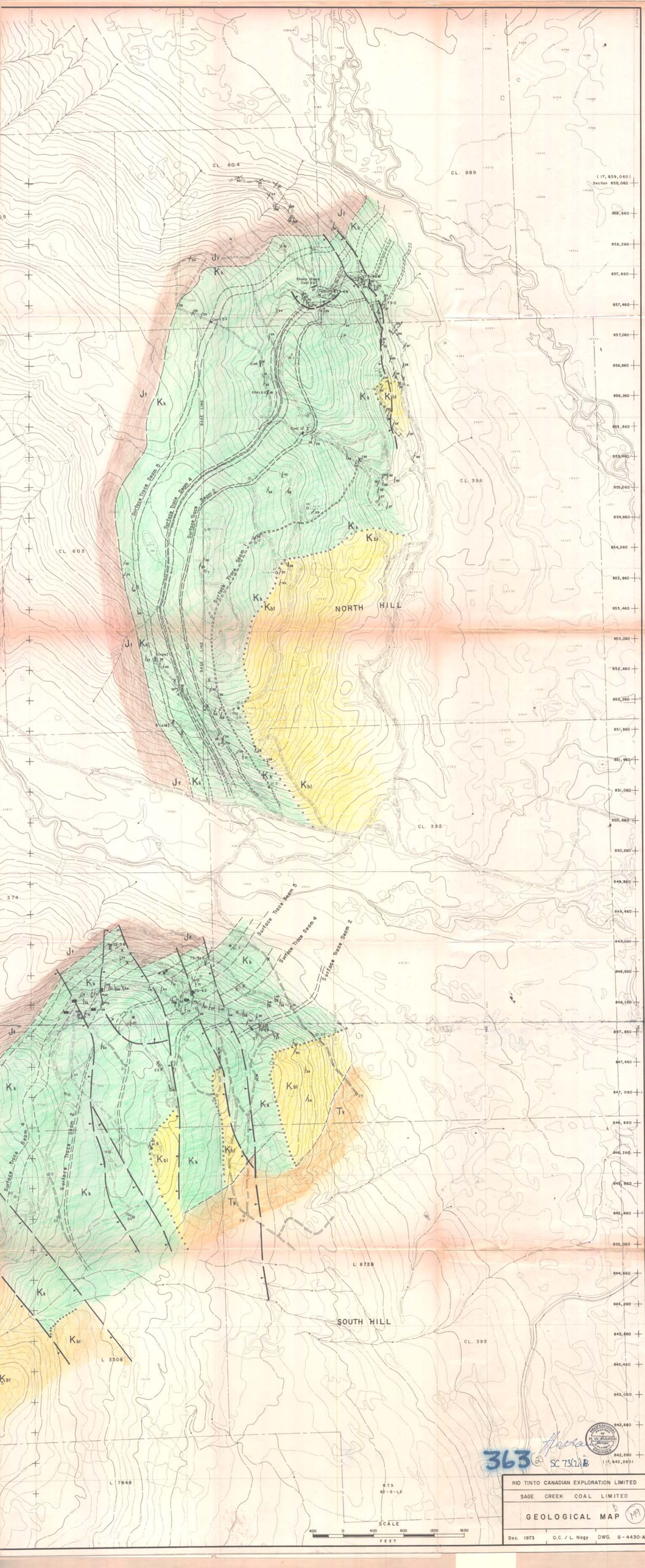
SAGE CREEK COAL LTD. — B.C.

ADIT No. 73-5a-S, SEAM 5

35A S'

Dec, 1973 | O.C. / L. Nagy | DWG. G-3448-6


LEGEND:
Jf JURASSIC - FERNIE Fm
Kk CRETACEOUS - KOOTENAY Fm.
Kbl CRETACEOUS - BLAIRMORE Gp.
Tk TERTIARY - KISHENEHN Fm.
Zone of Outcrop
Contact
Defined, Inferred, Kootenay-Blairmore
Coal seam (surface trace)
Coal wash, coal outcrop
Normal fault with direction (inferred)
Small fault
Strike with dip direction and angle
Drill hole (Sage Creek Coal)
Drill hole (Stelko)
Adit location
L 9384 Lot number
CL 987 Coal Licence number
A N
CL 988
CL 685
CL 987
CL 603
CL 986
CL 374
CL 376
L 3509
L 3508
L 7848
Surface Trace Seam 5
Surface Trace Seam 4
Surface Trace Seam 3
Surface Trace Seam 2
Jf
Kk
Kbl
Tk



363 Area SC 73(2)B

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LIMITED

GEOLOGICAL MAP 149

Dec. 1973 | O.C. / L. Nagy | DWG. G-4430-A

W.

E.

S.C.C. 28
Projected

Jf

Kk

Seam 2

Seam 4a

Seam 4b

Seam 5

Kbl

Kk

Elev 4,000'

3,900'

3,500'

3,000'

BASE LINE

363(2)

SC 73(2)B

M10

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
H.W. MARSH

LEGEND

- Jf — Jurassic – Fernie Fm.
- Kk — Cretaceous – Kootenay Fm.
- Kbl — Cretaceous – Blairmore Gp.
- Tk — Tertiary – Kishenehn Fm.

S.C.C. 28

SYMBOLS

- Contact. Defined, Inferred, Kootenay–Blairmore.
- Drill Hole – Sage Creek Coal. In place, Projected.
- Coal. Defined, Indicated, Estimated.
- Normal fault (Indicated)

N.T.S.
82-G-1,2

SCALE

200 0 200 400 600 800

FEET

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. — B.C.

NORTH HILL

SECTION 17,852,260

Dec. — 1973 O. C. / L. Nagy DWG. D-3397-1

W.

E.

S.C.C. 3
Projected 120'

S.C.C. 12
Projected 320'

S.C.C. 14
Projected 160'

S.C.C. 8
Projected 240'

Kk

Jf

Seam 2

Seam 4a

Seam 4b

Seam 5

Elev. 4,000'

3,900'

3,500'

3,000'

BASE LINE

SC 73(2)B

363 (2)

H.W. MARSH
PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA

LEGEND

- Jf — Jurassic – Fernie Fm.
- Kk — Cretaceous – Kootenay Fm.
- Kbl — Cretaceous – Blairmore Gp.
- Tk — Tertiary – Kishenehn Fm.

SYMBOLS

- Contact — Defined, Inferred, Kootenay – Blairmore
- S.C.C. 8 — Drill Hole – Sage Creek Coal in place, Projected
- Coal — Defined, Indicated, Estimated
- Normal fault (indicated)

N.T.S.
82-G-1,2

SCALE
200 0 200 400 600 800
FEET

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. — B.C.

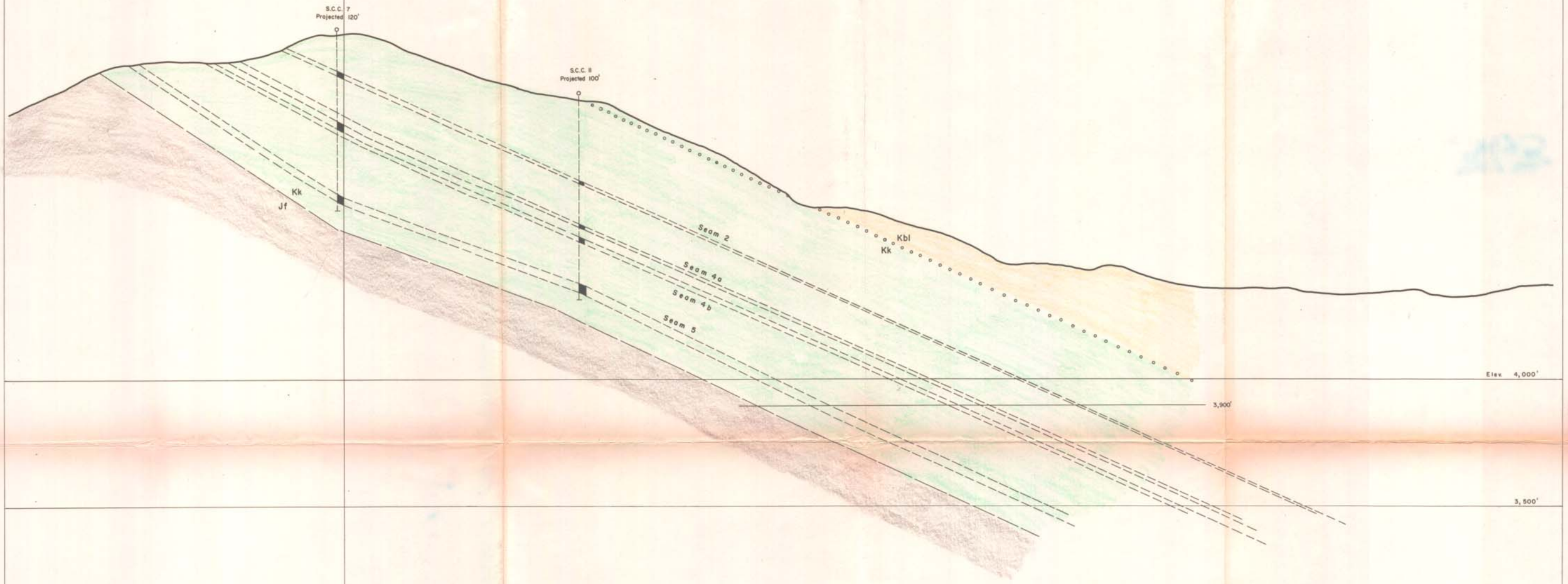
NORTH HILL

SECTION 17,854,660

Dec. — 1973 | O. C. / L. Nagy | DWG. D-3397-3

W.

E.



LEGEND

- Jf — Jurassic – Fernie Fm.
- Kk — Cretaceous – Kootenay Fm.
- Kbl — Cretaceous – Blairmore Gp.
- Tk — Tertiary – Kishenehn Fm.

SYMBOLS

- Contact — Defined, Inferred, Kootenay – Blairmore
- S.C.C. 28 — Drill Hole – Sage Creek Coal in place, Projected
- Coal — Defined, Indicated, Estimated
- Normal fault (Indicated)

N.T.S.
82-G-1,2

SCALE
200 0 200 400 600 800
FEET

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. — B.C.

NORTH HILL

SECTION 17,853,860

Dec. — 1973 | O. C. / L. Nagy | DWG. D-3397-2

M12

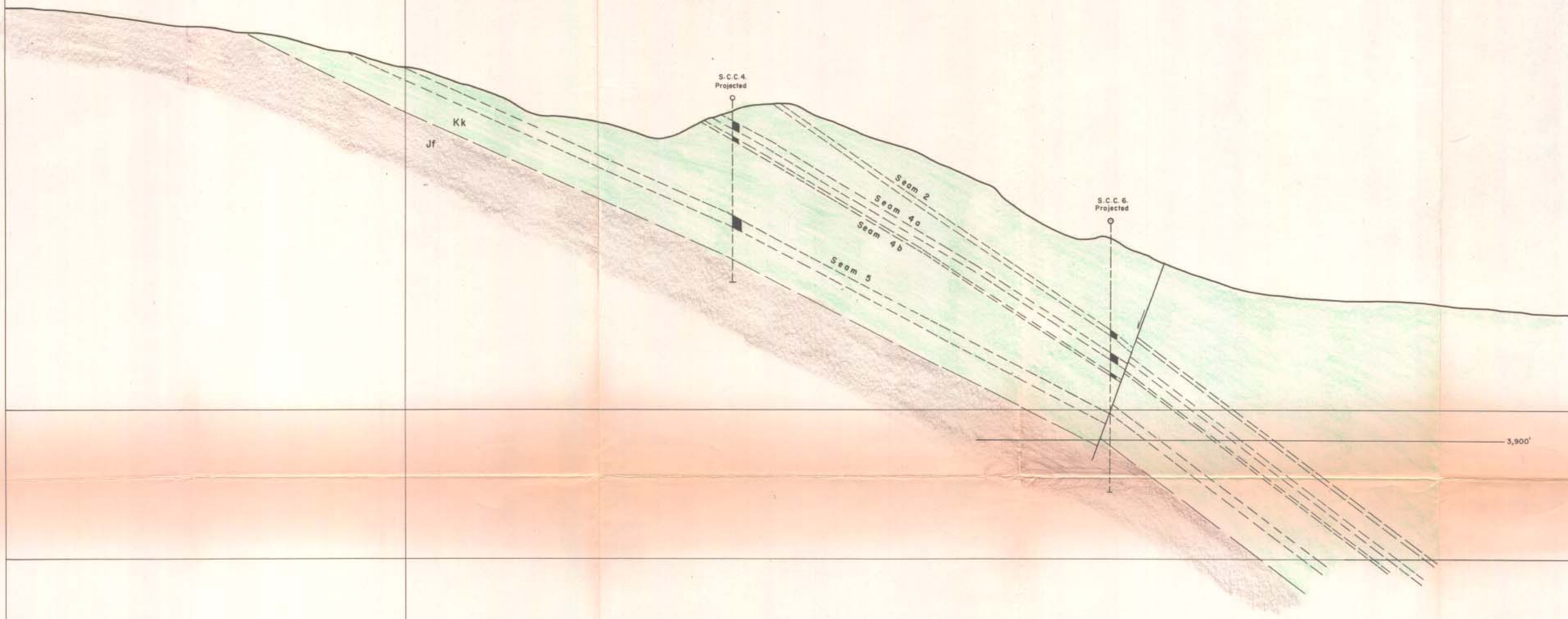
363

SC 73(2)18

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA H. W. MARSH

W.

E.



LEGEND

- Jf — Jurassic - Fernie Fm.
- Kk — Cretaceous - Kootenay Fm.
- Kbl — Cretaceous – Blairmore Gp.
- Tk — Tertiary – Kishenehn Fm.

SYMBOLS

Contact.
Defined, Inferred, Kootenay–Blairmore.

S.C.C. 1

Drill Hole - Sage Creek Coal.
In place, Projected.

Coal
Defined, Indicated, Estimated.

Normal fault (Indicated)

N.T.S.
82-G-1,2

SCALE
200 0 200 400 600 800
FEET

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. – B.C.

NORTH HILL

SECTION 17,856,660

Dec. – 1973 | O. C. / L. Nagy | DWG. D-3397-4

M13

SC 73(2)B

363 (2)

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
H. W. MARSH