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

SAGE CREEK COAL LIMITED

FLATHEAD VALLEY, B.C.

GEOLOGICAL REPORT

SUPPLEMENTAL REPORT

TO REPORT ON EXPLORATION

OCTOBER, 1970 - MAY, 1971

~~Volume 1 of 2~~

November, 1971 O. Cullingham

RIO TINTO CANADIAN EXPLORATION LIMITED

quent to those listed below:

Denver, Colorado	D-896
Casper, Wyoming	CW-882
Billings, Montana	M-432
Calgary, Alberta	C-1006
Regina, Saskatchewan	R-1025

(CURRENT)

ROCK TYPES

- SIDERITE, bedded
- SANDSTONE
- SILTSTONE
- BENTONITE
- COAL
- SALT
- GYPSUM
- MARLSTONE, limy-dolomitic
- LIMESTONE
- DOLOMITE, primary
- DOLOMITE, secondary
- ANHYDRITE, primary
- ANHYDRITE, secondary
- SHALE, light gray
- SHALE, medium gray
- SHALE, dark gray
- SHALE, black
- COLORED SHALES, light hue
- COLORED SHALES, medium hue
- COLORED SHALES, dark hue
- CLAYSTONE, light gray
- CLAYSTONE, medium gray
- CLAYSTONE, dark gray
- CLAYSTONE, black
- COLORED CLAYSTONE, light hue
- COLORED CLAYSTONE, medium hue
- COLORED CLAYSTONE, dark hue
- GLACIAL TILL
- CONGLOMERATE, example, 40% cht, 40% ls, 10% dol pbl, 10% sdnd
- BRECCIA
- GRANITE WASH
- IGNEOUS, basic
- IGNEOUS, acidic
- VOLCANIC
- METAMORPHIC

ACCESSORIES THAT CAN BECOME A ROCK TYPE

percentage use of accessory symbols per ten-foot intervals	
0 to 5% = no symbols 5 to 20% = 1 symbol	20 to 40% = 2 symbols 40 to 50% = 3 symbols

- + ARKOSIC
- — ARGILLACEOUS, disseminated
- DOLOMITIC
- CALCAREOUS
- // ANHYDRITIC
- GYPSIFEROUS
- FLOATING SAND GRAIN
- SILTY
- SANDY
- / ARGILLITE GRAIN
- CHERT, light and dark
- CHERT, tripolitic
- CHERT, sandy and oolitic
- NODULES, Fe-st
- NODULES, limy
- NODULES, dolomitic
- NODULES, phosphatic
- NODULES, siderite
- SIDERITE PELLETS
- ~ GLAUCONITIC
- SALT CAST or INFILL

TEXTURE

- L LITHOGRAPHIC
- CX CRYPTOCRYSTALLINE
- e EARTHY
- C CHALKY

MISCELLANEOUS

- KARST TOPOGRAPHY
- ? VERY POOR SAMPLES (Questionable Interpretation)
- ? CAVINGS, cannot interpret
- NO SAMPLES

ROCK BUILDERS

percentage use of rock builder symbols per ten-foot intervals	
0 to 20% = F 20 to 50% = 1 symbol	50 to 70% = 2 symbols 70 to 100% = 3 symbols

- ALGAL, nondescript
- ALGAL, encrusting
- ALGAL, oötoid
- ALGAL, coralline
- BIOCLASTIC or FRAGMENTAL
- PSEUDO OÖLITES or PELLETS
- CORAL
- STROMATOPOROID
- BRYOZOA
- FORAMINIFERA
- CRINOID
- OÖLITES
- MOLLUSKS

ACCESSORIES

- MARL, limy
- MARL, dolomitic
- LIMESTONE STREAKS
- DOLOMITE STREAKS
- P PYRITE
- B BENTONITIC
- SILICEOUS
- — SHALE, laminae
- SIDERITE CEMENT
- S PLANT SPORES
- MINERAL CRYSTALS
- CALCITE CRYSTALS
- PLANT REMAINS
- FISH REMAINS
- F FOSSILS

360

ABBREVIATIONS OF DEPOSITIONAL ENVIRONMENTS

R — Residual
E — Eolian
G — Glacial
C — Colluvial

FLUVIAL
Ft — Turbulent
Fa — Agitated
Fi — Intermittent
Fq — Quiet
Fb — Bog

LACUSTRINE
Lt — Turbulent
La — Agitated
Li — Intermittent
Lq — Quiet
Lb — Bog
Lp — Penesaline
Ls — Saline
Lh — Hypersaline
Lr — Reef
Lo — Organic

LACUSTRINE STRAND
Bt — Turbulent
Ba — Agitated
Bi — Intermittent
Bq — Quiet
Bb — Bog

TRANSITIONAL or STRAND
Tt — Turbulent
Ta — Agitated
Ti — Intermittent
Tq — Quiet
Tb — Bog
Tp — Penesaline
Ts — Saline
Th — Hypersaline

MARINE
Mt — Turbulent
Ma — Agitated
Mi — Intermittent
Mq — Quiet
Me — Euxinic
Mp — Penesaline
Mr — Reef
Ms — Saline
Mh — Hypersaline
Mo — Organic

COMMON ABBREVIATIONS (CURRENT)

This list of abbreviations for the new graphic log form, adopted July 1, 1957, published by the A.A.P.G., September, 1957, Vol. 41, No. 9, pp. 2103-07, will be used on all logs with numbers including and subsequent to those listed below:

Denver, Colorado	D-896
Casper, Wyoming	CW-882
Billings, Montana	M-432
Calgary, Alberta	C-1036
Regina, Saskatchewan	R-1025

@	At
abnt	Abundant
abv	Above
acic	Acicular
aft	After
agg	Aggregate
aglm	Agglomerate
Alg	Algae (al)
alt	Altered (ing)
amb	Amber
amor	Amorphous
Amph	Amphipora
amt	Amount
andes	Andesite (ic)
ang	Angular
anhed	Anhedral
anhy	Anhydrite (ic)
apr	Apparent
aprox	Approximately (ly)
arag	Aragonite
aren	Arenaceous
arg	Argillaceous
argl	Argillite
ark	Arkose (ic)
asph	Asphalt (ic)
av	Average
bar	Barite (ic)
bcm	Become (ing)
bd	Bed
bdd	Bedded
bdg	Bedding
Belm	Belemnites
bent	Bentonite (ic)
bf	Buff
bioc	Bioclastic
biot	Biotite
bit	Bitumen (inous)
bl	Blue (ish)
bldr	Boulder (256 mm −)
blk	Black
blky	Blocky
bnd	Band (ed)
Brac	Brachiopod
brec	Breccia (ed)
bri	Bright
brit	Brittle
brn	Brown
Bry	Bryozoa
btry	Botryoidal
c	Coarse (ly)
¢	Core
calc	Calcite (areous)
carb	Carbonaceous
cbl	Cobble 64-256 mm)
Ceph	Cephalopod
cgl	Conglomerate
Chaet	Chaetetes
chal	Chalcedony
chit	Chitin (ous)
chk	Chalk (y)
choc	Chocolate
cht	Chert
chty	Cherty
c-in-c	Cone-in-cone
clas	Clastic
cln	Clean
clr	Clear
clus	Cluster
cly	Clay (ey)
clyst	Claystone
cmt	Cement (ed)
cncn	Concentric
cntr	Center (ed)
col	Color (ed)
com	Common
conc	Concretion (ionary)
conch	Conchoidal
Cono	Conodont
cons	Considerably
contm	Contaminated
coq	Coquina
Cor	Coral
cpct	Compact
cren	Crenulated
Crin	Crinoid (al)
crm	Cream
crnk	Crinkled
crpxl	Cryptocrystalline
ctc	Contact
ctgs	Cuttings
cvg	Caving
Cyp	Cypridopsis
dd	Dead
deb	Debris
decr	Decrease (ing)
dend	Dendrite (ic)
dia	Diameter
dif	Difference
dism	Disseminated
dk	Dark (er)
dns	Dense (er)
do	Ditto
dol	Dolomite (ic)
dolc	Dolocast (ic)
dolmd	Dolomold (ic)
dolst	Dolostone
drlg	Drilling
drsy	Druse (y)
dtrl	Detrital (us)
Ech	Echinoid
elg	Elongate
elip	Elliptical
Endo	Endothyra
enl	Enlarged
equiv	Equivalent
euhed	Euhedral
evap	Evaporitic
extr	Extrusion (ive)
f	Fine (ly)
fac	Facet (ed)
fau	Fauna
Fvst	Favosites
Fe	Iron-Ferruginous
Fe-st	Ironstone
fib	Fibrous
fig	Figure (d)
fis	Fissile
fl	Fill-filled
flat	Flattened
fld	Feldspar (thic)
flk	Flake
flky	Flaky
flor	Fluorescence
fls	Flesh
flt	Fault (ed)
fltg	Floating
fm	Formation
fnt	Faint (ly)
fol	Foliated
Foram	Foraminifera
fos	Fossil (iferous)
fr	Fair
frac	Fracture (ed)
frag	Fragment (al)
fri	Friable
fros	Frosted
frs	Fresh
Fus	Fusulinid
g	Good
Gast	Gastropod
gil	Gilsonite
gl	Glass (y)
glau	Glauconite (ic)
Glob	Globigerina
glos	Gloss (y)
gn	Green
gns	Gneiss
gr	Grain (ed)
gran	Granular
Grap	Graptolite
grd	Grade (ed)
grdg	Grading
grnl	Granule (2-4 mm)
grnt	Granite
grnt.w	Granite wash
grty	Gritty
gsy	Greasy
gvl	Gravel
gy	Gray
gyp	Gypsum (iferous)
gywk	Graywacke
hd	Hard
hem	Hematite (ic)
hex	Hexagonal
hi	High
hky	Hackly
hrtl	Horizontal
hvy	Heavy
hydc	Hydrocarbon
ig	Igneous
imbd	Imbedded
imp	Impression
incl	Included (sion)
incr	Increase (ing)
ind	Indurated
indst	Indistinct
Inoc	Inoceramus
intbd	Interbedded
intcl	Interclast(s)
intfrag	Interfragmental
intgran	Intergranular
intgwn	Intergrown
intlam	Interlaminated
intpt	Interpretation
intr	Intrusion (ive)
intstl	Interstitial
intv	Interval
intxl	Intercrystalline
Invrtb	Invertebrate
ireg	Irregular
irid	Iridescent
jasp	Jasper (oid)
jts	Joints
kao	Kaolin
lam	Laminated
lav	Lavender
lchd	Leached
len	Lentil (cular)
lg	Long
lig	Lignite (ic)
lith	Lithographic
lmn	Limonite (ic)
lmpy	Lumpy
lmy	Limy
lngl	Linguloid
low	Lower
lrg	Large (er)
ls	Limestone
lse	Loose
lstr	Lustre
lt	Light (er)
ltl	Little
m	Medium
magn	Magnetic
mar	Maroon
mas	Massive
mat	Material, matter
mbr	Member
mdst	Mudstone
meta	Metamorphic
msm	Metasomaticous
mica	Mica (ceous)
micfos	Microfossil (iferous)
mic-mica	Micro-Micaceous
micxl	Microcrystalline
mid	Middle
mky	Milky
mnr	Minor
mnrl	Mineral (ized)
mnut	Minute
mod	Moderate
Mol	Mollusca
mot	Mottled
mrlst	Marlstone
mtx	Matrix
musc	Muscovite
n	No, non
nac	Nacreous
nod	Nodule (ar)
num	Numerous
o	Oil
obj	Object
occ	Occasional
och	Ochre
od	Odor
olv	Olive
ooc	Oolicast (ic)
ool	Oolite (ic)
oom	Oomold (ic)
op	Opaque
org	Organic
orng	Orange
orth	Orthoclase
Ost	Ostracod
ox	Oxidized
p	Poor (ly)
pap	Paper (y)
Para	Paraparchites
pbl	Pebble (4-64 mm)
pbly	Pebbly
pch	Peach
Pdct	Productids
pel	Pellet
perm	Permeability
pet	Petroleum (iferous)
phos	Phosphate (ic)
piso	Pisolite (ic)
pit	Pitted
pk	Pink
plag	Plagioclase
plas	Plastic
Plcy	Pelecypod
pl fos	Plant fossils
plty	Platy
pol	Polish (ed)
por	Porous (sity)
porc	Porcelaneous
pos	Possible (ility)
p-p	Pin point
pred	Predominate (ly)
pres	Preserved (ation)
prim	Primary
pris	Prism (atic)
prly	Pearly
prob	Probable (ly)
prom	Prominent (ly)
psdo	Pseudo
pt	Part (ly)
ptg	Parting
purp	Purple
pyr	Pyrite (ic) (ized)
pyrbit	Pyrobitumen
pyrclas	Pyroclastic
qtz	Quartz
qtzc	Quartzitic
qtzs	Quartzose
qtzt	Quartzite
rad	Radiate (ing)
rd	Round (ed)
reg	Regular
repl	Replaced (ing) (ment)
resd	Residue (al)
rhmb	Rhomb (ic)
rk	Rock
rmn	Remains (nant)
rng	Range (ing)
ro	Rose
rr	Rare
rsns	Resinous
rthy	Earthy
s	Small
sa	Salt
sa-c	Salt cast (ic)
S	Sulphur
sach	Saccharoidal
sal	Salmon
s&p	Salt & pepper
sat	Saturated
sb	Sub
sc	Scales
scat	Scattered
sch	Schist
Scol	Scolecodonts
sd	Sand (1/16-2 mm)
sdy	Sandy
sec	Secondary
sed	Sediment (ary)
sel	Selenite
sft	Soft
sh	Shale
shad	Shadow
shy	Shaly
sid	Siderite (ic)
sil	Silica (eous)
sks	Slickensided
sl	Slight (ly)
slky	Silky
slt	Silt
sltst	Siltstone
slty	Silty
sm	Smooth
sol	Solution
sp	Spot (ted) (ty)
spec	Speck (ied)
Spfr	Spirifers
Spg	Sponge
sph	Spherules
sphal	Sphalerite
spic	Spicule (ar)
spl	Sample
splty	Splintery
Spr	Spore
sy-Ca	Sparry calcite
srt	Sort
srtd	Sorted
srtg	Sorting
ss	Sandstone
st	Stone
stn	Stain (ed) (ing)
str	Streak
strat	Strata (ified)
strg	Stringer
stri	Striated
Strom	Stromatoporoid
struc	Structure
styl	Stylolite (ic)
suc	Sucrosic
sug	Sugary
surf	Surface
srct	Sericite
sz	Size
tab	Tabular
Tent	Tentaculites
tex	Texture
tgh	Tough
thk	Thick
thn	Thin
thru	Throughout
tr	Trace
Trilo	Trilobite
trip	Tripoli (ic)
trnsl	Translucent
trnsp	Transparent
Troc	Trochiliscus
tt	Tight (ly)
tub	Tubular
tuf	Tuffaceous
unconf	Unconformity
uncons	Unconsolidated
uni	Uniform
up	Upper
v	Very
var	Variable
vcol	Varicolored
ves	Vesicular
vgt	Varigated
vit	Vitreous
vn	Vein
volc	Volcanics
vps	Very poor samples
vrtb	Vertebrate
vrtl	Vertical
vrvd	Varved
vug	Vug (gy) (ular)
/	With
w	Well
wh	White
wk	Weak
wthr	Weather
wthrd	Weathered
wtr	Water
wvy	Wavy
wxy	Waxy
xbd	Cross-bedded
xbdg	Cross-bedding
xl	Crystal (line)
xlam	Cross-laminated
yel	Yellow
zeo	Zeolite
zn	Zone

SAGE CREEK COAL LIMITED
FLATHEAD VALLEY, B.C.
GEOLOGICAL REPORT

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS (2)

SAGE CREEK COAL LTD., FLATHEAD VALLEY, B.C. GEOLOGICAL REPORT

SUMMARY

An exploration programme consisting of geological mapping and drilling was carried out for Sage Creek Coal Ltd. by Rio Tinto Canadian Exploration Limited from October, 1970 to May, 1971. Winter conditions made progress slow but the intersection of two large coal horizons and a number of smaller horizons compensated for the pace of the programme. The quality of the coal was established as medium volatile bituminous with favourable coking possibilities. Beyond this, due to poor sampling of the coal, little is really known and the true quality of the coal has yet to be determined.

ACKNOWLEDGEMENTS

Mr. W. J. Hennessey of Calgary has been our consultant and his contributions and advice are gratefully acknowledged. Mr. Hennessey made a number of visits to the property during the course of the programme and his assistance with day to day procedures made for a smoother, more efficient operation. Beneficial discussions with Mr. Hennessey have greatly assisted the author in preparing this report. Mr. R. A. Benkis is acknowledged for his advice and assistance during the full course of operations and for much of the data regarding coal analysis, both in quality and quantity. Much of the success of the programme is due to the services of Mr. L. Larkin who acted as expeditor and helper, overseeing the day to day progress of the operation. Mr. N. Sunderland is also recognized for aiding the progress of the programme.

INTRODUCTION

This report is designed as a supplement to a previous report, "Report On Exploration, October, 1970 to May, 1971" by R. A. Benkis and essentially deals with the geology of the property. For information regarding location, topography and details of the exploration programme, the reader is referred to the above named report.

A recent survey of the property, conducted by Dabbs Control Surveys Ltd. of Calgary, in July of 1971, has provided for accurate locations of bore holes and surface exposure of coal. This necessitated the re-drawing of structural cross sections and some modifications to the surface geology maps. Aerial photographs of the property at 1" to 1,000' and 1" to 2,000' were supplied by McElhanney Surveying and Engineering Ltd. of Vancouver from photography of August 25, 1971 and aided in modifications made to the surface geology maps.

PREVIOUS GEOLOGICAL EXPLORATION

The earliest geological mapping in the area was conducted by R. A. Daly (1) from 1901 - 1906 and involved only a general survey of the area immediately adjacent to the international boundary. T. D. Mackenzie (2) walked and mapped the area in 1914 and paid considerable attention to coal occurrences on Dally and Dilly Hills. In 1962 (3) and 1965 (4), two Geological Survey of Canada publications by R. A. Price resulted from field exploration carried out between 1955 and 1960 which describe a complex tectonic picture of the Fernie and Flathead map areas.

A coal exploration programme conducted by Pickands Mather & Co. was carried out during the fall of 1968 and the summer of 1969. This programme consisted of geological mapping and seven exploratory diamond drill holes.

Short adits were driven into the coal seams on the northeast-facing slope of Dilly Hill in the early 1900's and some coal was extracted from seams on the north-facing slope of Dally Hill and used for fuel for drilling rigs up until the early 1950's.

EXPLORATION CARRIED OUT BY SAGE CREEK COAL

A relatively short time, from early October to early November, 1970, was spent investigating the surface geology of the area. The short time spent on surface geology was due to the arrival of winter, making location of sparse outcrop impossible. During this time, a rough survey of existing roads up Dally and Dilly Hills was made and outcrop along the roads was plotted on a base map at 1" = 400 ft. A few sections along the roads were

....

(1) Daly, R. A., Geol. Surv. of Can., Mem. 38,1912.
(2) MacKenzie, J. D., Geol. Surv. of Can., Mem. 87, 1916.
(3) Price, R. A., Geol. Surv. of Can., Paper 61-24, 1962.
(4) Price, R. A., Geol. Surv. of Can., Mem. 336, 1965.

measured and strip logs drawn up at a suitable scale. Two trenches totalling approximately 12,000 feet were dug on Dally Hill in an attempt to expose bedrock. Little bedrock was encountered along the trench on the south-facing slope but some information was gathered. (See location map in pocket). Coal seams along the road were better exposed and measured.

On November 4th, a diamond drilling programme got underway to investigate the subsurface and to intersect the known coal seams for the purpose of analysis (Plate 4). Unfortunately, due to winter conditions and broken formations, progress was slow and coal recovery poor; seam #5 proved to be virtually unrecoverable. Three holes were completed by the end of March, 1971, at which time subsurface exploration was switched to rotary drilling. This method proved to be a lot faster and less difficulty with broken formations was encountered. Results of coal analysis though were disappointing; cavings from above the coal seams had salted the samples and increased the ash content. Seventeen holes for a total of 10,280 feet were drilled by rotary drilling before the programme was brought to a conclusion in late May, 1971.

A visual description of the lithology was prepared from core or rock chips from each hole and gamma and neutron probes were run. Sidewall density and caliper probes were run when possible in the last few holes. (Logs included in "Report on Exploration, October, 1970 to May, 1971" by R. A. Benkis).

During the construction of drill sites and access roads, some bedrock was exposed but due to accumulating snow and later the pace of drilling, no attempt was made to carry out further surface mapping. However, recognizable outcrops were noted and used in the development of a surface geology map.

GEOLOGY

General

Mesozoic and Cenozoic strata in this area are part of the Lewis Thrust plate and owe their position to subsequent downfaulting between two resistant blocks to the east and west. Numerous northwest-striking normal faults, steeply dipping to the west and southwest, cut the strata, causing horizontal lengthening. The largest of these faults is the Flathead Fault, with a maximum displacement of 25,000 feet, which extends along the southwestern side of the Clark Range.

Locally, the Kootenay Formation occupies the east flank of a northwest trending anticline with the apex of the anticline passing just to the west of Dally Hill. The strike of the beds is generally north-northeast and dips to the east at approximately 30°. The Kootenay Formation is truncated against the Harvey Fault to the northeast, the Flathead Fault to the east and southeast, and passes under the MacDonald Thrust Sheet to the southwest. To the northwest and west it lies conformably on the marine shales and siltstones of the Fernie Group.

Stratigraphy

TABLE OF FORMATIONS

Era	Period or Epoch	Group or Formation	Lithology	Thickness
Cenozoic	Quaternary		Glacial till, gravel, soil.	
		U N C O N F O R M I T Y		
	Tertiary (Eocene & Oligocene)	Kishenehn Formation	Non-marine conglomerate, breccia, sandstone, limestone & lignite.	(0-1500'+)
		U N C O N F O R M I T Y		
Mesozoic	Cretaceous	Blairmore Group	Sandstone, shale, conglomerate, thin coal seams. Mostly non-marine.	1500'-2000'
		D I S C O N F O R M I T Y		
	Cretaceous and Jurassic	Kootenay Formation	Non-marine, sandstone, conglomeratic sandstone, siltstone, shale and coal.	650'-850'
	Jurassic	Fernie Group	Marine sandstone siltstone, and shale.	± 1000'
		D I S C O N F O R M I T Y		
	Triassic	Spray River Formation	White to light gray calcareous quartzite.	± 2500'
		Erosional Disconformity		
Palaeozoic	Undivided		Limestone, dolomite, calcareous quartzites, siltstones and shales. Mostly marine.	

Palaeozoic

Palaeozoic rocks form the mountains to the east and west of the property and consist of limestone, dolomite, calcareous quartzites, siltstones and shales, mostly of marine origin.

Spray River Formation

The rocks of the Triassic Spray River Formation outcrop extensively to the west and northwest of the property and consist mainly of light coloured, very fine, well sorted, subangular grains of quartzite comented with a calcite cement. The formation lies disconformably on the underlying Palaeozoic rocks and in this area is estimated to be ± 2500 feet thick.

Fernie Group

The Fernie Group lies disconformably on the underlying Spray River Formation and is estimated to be ± 1000 feet thick. Outcrop of this formation is sparse but a trench on the west slope of Dally Hill exposes the upper part of the formation. The Fernie Formation was intersected by three drill holes and changes in lithology were observed.

The Fernie Group consists of gray and green gauconitic shales in its lower half and interbedded siltstones, sandstones and shales in the upper reaches.

Kootenay Formation

The Kootenay Formation consists of non-marine strata which lie conformably on the underlying marine shales and siltstones of the Fernie Group. Outcrop of the formation is found on Dally and Dilly Hills to the south and north of Cabin Creek and extends south to Burnham Creek and north to Howell Creek. Downdip extension of the Kootenay Formation passes underneath the valley floor of the Flathead River where it is truncated against the Flathead Fault.

The thickness of the Kootenay Formation in this area determined from drill hole data, varies between 650 feet and 850 feet and could be as much as 1150 feet as determined by J. D. Mackenzie, 1914. The Kootenay Formation consists of sandstone, conglomeratic sandstone, siltstone, shale and coal, deposited under varying and recurring conditions (bog to turbulent) of a fluvial and/or lacustrine environment. Lithological units within the formation are lenticular in shape and grade laterally into one another making correlation difficult. There appears to be no marker horizon within the formation, however, the coal seams are fairly characteristic throughout the property making correlation possible.

The Kootenay Formation in this area can be divided into four component members. The basal sandstone, lying conformably on the passage beds of the Fernie Group, is a beach sand, deposited under a strand environment. This unit varies in thickness from 40 feet to 80 feet and consists of medium light gray, very slightly carbonaceous, fine to medium, sub-rounded, moderately to well sorted grains of quartz and chert closely packed and cemented with silica and limonite cement. This sandstone is thick to massively bedded and exhibits cross bedding. The next member, designated the coal-bearing member, varies in thickness from 500 feet 152m to 600 feet 183m and consists of coal, shale, siltstone and sandstone. An average in excess of 100 feet 30.5m of coal in four seams (2+3, #4a, #4b & #5) has been intersected in this member. The shales are basically medium to dark gray, silty, blocky and slightly to very carbonaceous and the siltstones are medium grey, argillaceous and fairly hard. The sandstones are mostly medium gray, very fine to fine, sub-angular, poor to moderately sorted grains of quartz and chert floating in an argillaceous matrix. These sandstones are thin to thickly bedded and exhibit cross bedding. A hard, fine grained, cleaner sandstone lense of greatly varying thickness between coal seams #4b and #5, was intersected by a number of drill holes on Dilly Hill and also occurs as outcrop in a few locations. The third member consists of a resistant, medium gray, fine to coarse, poor to moderately sorted grains of quartz and chert with sporadic lenses of chert-quartz pebble conglomerate. This is an identifiable ridge-forming member which outcrops in a number of locations on the property. This unit varies in thickness from 40 to 120 feet and is interupted by lenses of hard siltstone and shale. The uppermost member consists mainly of recessive, fine grained sandstone, siltstone shale and a few thin coal seams. A coal seam (seam #1) from 5 1.52m to 10 3.05m feet thick, marks the base of this member and the erosional disconformity at the base of the Blairmore conglomerate marks the upper contact. The thickness of this unit varies from a few feet to in excess of 200 feet.

A few fragments of plant fossils were observed at random throughout the formation but only one horizon between coal seams #2 and #3 was noted for producing reasonably well preserved fossils.

Lithological descriptions of bore holes and traverses have been prepared in strip log form and were included in the "Report on Exploration, October, 1970 to May, 1971" by R. A. Benkis. Drill holes #2b and #11 intersected nearly the entire Kootenay Formation.

Blairmore Group

The Blairmore Formation lies disconformably on the underlying Kootenay Formation and is estimated to be from 1500 feet to 2000 feet thick in this area. A resistant conglomerate at the base of this formation approximately 80$\pm$ feet thick, is the only outcrop observed and exists in well defined ridges occurring mainly on the eastern slopes of Dally and Dilly Hills. Conglomerate ridges have also been observed at various locations throughout Dally Hill.

The lithology of the Blairmore Formation is mainly non-marine sandstone, shale, conglomerate and thin coal seams although some marine sediments also occur.

Kishenehn Formation

The Kishenehn Formation lies unconformably on the underlying Blairmore Formation and probably reaches thickness in excess of 1500 feet. Outcrop was observed by J. D. MacKenzie in the cutbanks of the Flathead River and the major tributaries cutting the property.

The lithology consists of non-marine conglomerate, breccia, coarse grained sandstone and freshwater limestone interbedded with clay and thin seams of lignite. Deposition seems to have been irregular and probably occurred concurrently with normal faulting in the area.

Quaternary

Quaternary deposits cover most of the Flathead Valley floor and consist mainly of gravels originating from the rocks of the Clarke Range to the east. Glacial till is found on the lower slopes of the hills and has also been located in some areas quite high on the hills.

Structural Geology

The structure of the Kootenay Formation is the east flank of the northwest-trending anticline with its apex passing just to the west of Dally Hill. A number of minor normal faults, sub-parallel to the Harvey and Flathead Faults, cut the strata causing an eastwest extension of the Kootenay Formation.

The structure of the Kootenay Formation is somewhat more complicated on Dally Hill than on Dilly Hill and therefore, the detailed structure of both hills will be dealt with separately.

Dilly Hill

The geology of Dilly Hill was investigated by a minimum amount of surface mapping and by a programme of 12 drill holes spaced throughout the hill for exploratory purposes. From data collected from the investigation, east-west cross sections at intervals of 400 feet across the property were constructed at a scale of 1" = 200' and a surface geology map produced at a scale of 1" = 400'. Aerial photographs were used to identify possible fault traces and ridges caused by resistant beds.

The beds strike approximately 10^{o}-15^{o} east of north and dip to the east at 20^{o}-30^{o}. Local variations in strike ranging from a few degrees west of north to as much as 30^{o} east of north, occur but this is normal in continental deposition. Few normal faults striking northwest and dipping steeply to the southwest interrupt the normal succession of strata causing downdip repetition. The normal faulting is minor and the largest stratigraphic displacement is estimated not to exceed 200 feet.

Correlation and structural interpretation are complicated by local erosional disconformities and the interfingering relationship of lithological units. Further subsurface exploration will undoubtedly modify the structural interpretation but is not expected to alter the general picture.

Dally Hill

The geology of Dally Hill was investigated by surface mapping, two east-west trenches and later by a drilling programme involving eight exploratory holes. Information accumulated to date is insufficient for a detailed structural interpretation but a general picture was compiled using aerial photographs to identify traces of faults and resistant beds.

The beds strike approximately north-northeast but vary from northwest to northeast. The dip is to the east at 10^{o} to greater than 40^{o} but averages out at 25^{o} to 30^{o}. Normal faults, sub-parallel to the Harvey and Flathead Faults, are more numerous than on Dilly Hill and generally are of greater magnitude with stratigraphic displacement possibly up to ~~800~~ 244m feet or greater in some cases. Total stratigraphic separation across the hill is in the neighbourhood of ~~2500~~ 762m feet to ~~3000~~ 914m feet. Some minor thrusting has been observed in the coal horizons.

A number of east-west cross sections were constructed through Dally Hill, however, due to the lack of reliable information, are highly interpretive. A surface geology map has been produced at 1" = 400 ' but is also highly interpretive.

COAL

Coal seams on Dally and Dilly Hills were exposed during the construction of access roads by Pickands Mather Co. in

1968 and 1969, but the exposures were poor because of subsequent weathering and bank encavements. The seams were cleaned out wherever possible, measured and sections prepared.

During the mapping and trenching programme in the fall of 1970 few areas of coal wash were located;however, an attempt at exposing bedrock in the vicinity by trenching, revealed little more information.

Coal intersected by the drilling programme conducted during the winter(1970-71),averaged in excess of ~~100~~ 30.5 m feet a hole and occurred in five horizons. Seam #1, highest in the stati-graphic succession, was intersected by drill holes #2b and #11 and was found to be ~~11~~ 3.35 m feet and 20 6.10 m feet respectively. The thickness of the seam from Hole #11 is unreliable because of caving and probably contains a large percentage of shale.

Seam #2+3 was intersected by most drill holes on Dilly Hill but by #19 only on Dally Hill and has an average thickness of ~~17~~ 5.18 m feet. Only in hole #2b was this horizon separated into two distinct seams of ~~18~~ 5.49 m feet and ~~7~~ 2.13 m feet respectively, thus accounting for the numbering system.

Seams #4a and #4b were intersected by all drill holes and have an average thickness of ~~28~~ 8.53 m feet and ~~15~~ 4.57 m feet respectively on Dilly Hill and a combined average thickness of ~~65~~ 19.8 m feet on Dally Hill. On Dilly Hill, the horizon was broken into two distinct seams but on Dally Hill, was essentially one seam with small shale bands separating the seam into at least two component parts.

Seam #5 was intersected by all holes and was found to have an average thickness of 40 12.2 m feet. The coal seam on Dilly Hill exhibited the same characteristics wherever intersected but on Dally Hill the seam became very shaly towards the top in hole #15. In holes #6 and #8 on the eastern slope of Dilly Hill, this seam (#5) appears to have thinned considerably. This could be true, in which case a trend of thinning to the east might be realized or locally, an erosional disconformity might exist. Another possibility is normal faulting displacing part of the seam

The coal recovered from the drilling programme was analyzed and established as medium volatile bituminous coal with favourable coking possibilities. However, because of poor recovery using diamond coring techniques, and contamination resulting in high ash content using rotary drilling techniques, the true quality of the coal has yet to be determined. As a guide line to the quality of coal, the results of analysis for seams #4a and #4b from drill hole #2b, are summarized below. Recovery of coal from the seams in this hole was greater than 90%. (Plate 5).

SEAM #4a		RAW COAL ANALYSIS							
INTERVAL	THK.	YIELD	ASH	V.M.	R.M.	F.C.	F.S.I.	B.T.U.	S.
488.6-496.1	7.5'		11.87	22.36	0.61	65.16	5½	13,290	0.39
496.5-504.0	7.5'		16.66	20.95	0.64	61.75	2½	12,390	0.20
504.0-506.4) 507.2-510.5)	5.7'		9.43	20.95	0.67	68.94	1½	13,700	0.32
510.5-517.5	7.0'		15.73	22.14	0.71	61.42	2½	12,670	0.23
AVERAGE			13.64	21.60	0.66	63.81	3	12,971	0.29

SEAM #4a		FLOAT ANALYSIS AT - 1.40 SPECIFIC GRAV.							
INTERVAL	THK.	YIELD	ASH	V.M.	R.M.	F.C.	F.S.I.	B.T.U.	S.
488.6-496.1	7.5'	70.63	5.45	24.12	0.61	69.82	5½	14,220	0.26
496.5-504.0	7.5'	46.60	6.05	23.06	0.64	70.25	5	14,140	0.27
504.0-506.4) 507.2-510.5)	5.7'	71.55	4.66	23.11	0.67	71.56	½	14,390	0.22
510.5-517.5	7.0'	56.57	5.18	23.20	0.71	70.91	4½	14,370	0.13
AVERAGE		59.93	5.32	23.33	0.62	70.51	5	14,280	0.22

SEAM #4b		RAW COAL ANALYSIS							
INTERVAL	THK.	YIELD	ASH	V.M.	R.M.	F.C.	F.S.I.	B.T.U.	S.
534.0-540.5	6.5'		26.67	19.03	0.64	53.66	1½	10,570	0.31
543.0-549.0	6.0'		21.04	20.49	0.74	57.73	4	11,610	0.32
549.0-557.0) 558.5-559.1)	8.6'		24.33	21.66	0.72	53.29	6½	11,160	0.28
AVERAGE			24.13	20.54	0.70	54.61	4	11,113	0.30

SEAM #4b		FLOAT ANALYSIS AT - 1.40 SPEC. GRAV.							
INTERVAL	THK.	YIELD	ASH	V.M.	R.M.	F.C.	F.S.I.	B.T.U.	S.
534.0-540.5	6.5'	37.36	8.67	21.71	0.64	68.98	3	13,930	0.27
543.0-549.0	6.0'	52.01	7.60	23.01	0.74	68.65	7	14,180	0.30
549.0-557.0) 558.5-559.1)	8.6'	41.58	7.58	23.71	0.72	67.99	8	14,290	0.22
AVERAGE		44.02	7.95	22.82	0.70	68.42	6	14,142	0.26

Probable coal reserves on Dilly Hill were calculated from the cross sections across the hill. The block used in the calculations lies between grid lines 344+00N on the south-facing slope and 404+00N on the north-facing slope and from the surface outcrop in the west down dip to 4,000 feet above sea level. The results are tabulated in a separate report of June 15, 1971, and therefore only the total probable reserves for Dilly Hill are presented in this report. A total of 53,563,210 short tons of coal was calculated. The reader should be aware that future exploration resulting in better geological control will change this figure, but it is believed to be accurate within ten per cent. ?

Probable coal reserves on Dally Hill were calculated from a cross section (294+00N) for one block only. A strike length of 3,000 feet and a dip length of approximately 2,700 feet from outcrop to a base level of 4,000 feet above sea level were used in the calculations. A total of 28,441,000 short tons was arrived at. The reserves for Dally Hill will increase as more information is accumulated and it is expected will eventually exceed 80,000,000 short tons.

CONCLUSIONS

1. The Kootenay Formation in the area of interest varies from 650 feet to 850 feet.

2. The dip of the beds is to the east at an average of 30° but varies from 10° to 40°.

3. The normal stratigraphic succession is interupted by a number of normal faults striking northwest - southeast causing down dip repetition of the strata.

4. Dally Hill appears more structurally complicated than Dilly Hill.

5. Three major coal horizons are consistent over the property with a combined total thickness of approximately 70 to 80 feet.

6. The quality of the coal is uncertain but is a medium volatile bituminous coal with good coking potential.

7. The total probable reserves of coal have been calculated at 82,000,000 short tons but this figure could double when adding in possible reserves from Dally Hill.

RECOMMENDATIONS

The realization of a mining situation is dependent on the quality of the coal and therefore, the next stage of exploration should be adit driving for the purpose of bulk sampling. Both seams #4 and #5 should be sampled on Dilly Hill and Dally Hill for a total of four adits .

Concurrent with adit driving, additional surface mapping should be carried out, especially on Dally Hill, in an attempt to walk out resistant beds and to prove or disprove the present surface geological maps. The use of a helicopter for a few days at the outset and the conclusion of such a programme would prove very helpful in spotting areas to investigate and for tying in information accumulated.

If analysis of coal recovered from the first two adits on Dilly Hill proves to be of a mining quality, then an extensive exploratory drill programme should be carried out on Dally Hill to prove out additional reserves of coal.

Owen Cullingham

November, 1971
Toronto, Ontario.

Owen Cullingham

REFERENCES

BENKIS, R. A. 1971 — "Report on Exploration, Sage Creek Coal Ltd., Flathead Valley, B.C.", October, 1970 - May, 1971.

EFFINGER, F. D.et al · 1969 — "Flathead Exploration Programme - Cabin Creek Prospect, British Columbia." Private Report - October, 1969.

HENNESSEY, W. J. 1971 — "Structural Interpretation Dilly Hill, British Columbia." Private Report, May, 1971.

- - - - - 1971 — "Structural Interpretation, Dally Hill, British Columbia." Private Report, June, 1971.

MACKENZIE, J. D. 1916 — "Geology of a Portion of the Flathead Coal Area, British Columbia." G.S.C. Memoïr 87, 1916.

PRICE, R. A. 1962 — "Fernie Map Area, East Half, Alberta and British Columbia." G.S.C. Paper 61-24, 1962.

- - - - - 1965 — "Flathead Map Area, British Columbia and Alberta." G.S.C. Memoir 336, 1965.

PLATE 1

View from Dilly Hill, looking northeast.

PLATE 2

Communication problems! Yagi Antennae at top of Dilly Hill provided for, "weather permitting", communications.

PLATE 3

Flathead forestry road in March. View looking east toward Clarke Range in the background.

PLATE 4

Diamond Drill rig.
S.C.C. #2B, February,
1971.

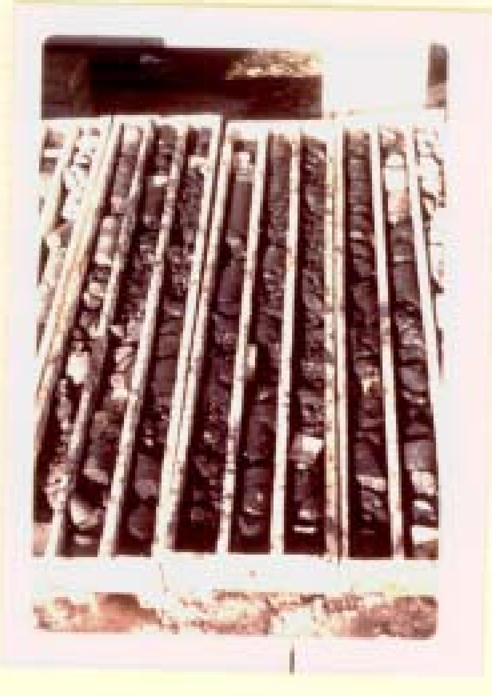


PLATE 5

Coal core from Seam #4B,
recovered from Diamond
Drill Hole S.C.C. #2B.

K-SAGE CREEK 71(3)B

(L1)

RIO TINTO CANADIAN EXPLORATION LIMITED

DRILL & CORE LOG

PROPERTY: SAGE CREEK COAL LTD. - 8601

TRENCH No. T-1

LOCATION: Dally Hill

AZIMUTH:

ELEVATION:

DIP:

TOTAL DEPTH:

PROBE DEPTH:

DIP TESTS:

HOLE SIZE:

CORE SIZE:

DATE STARTED:

AIR: ☐ WATER: ☐

DATE COMPLETED:

LOGGED BY:

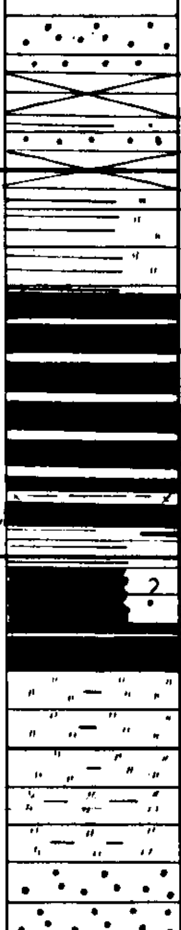
DATE:

CONTRACTOR:

PROBED BY:

DATE:

360 (1) SC 71(3)B



FORMATION TOPS	DEPTH	POROSITY TYPE	LITHOLOGY	GRAIN or CRYSTAL SIZE in mm's	ROUNDING	SORTING	DESCRIPTION	ANALYSIS	ENGINEERING DATA
				m	a	m	m. gr. ss, m. gy - wthrg. to lt. brn gy (ochre) lmn stn.		
							Crrd Intvl. prob. fault zone below		
	50'			v.f	a	w	v.f. gr. ss, lt. gy, lmn stn, jointed well bdd grades		
							Crrd. Intvl. slump, contains, v.f. gr. ss & sh frag.		
		e e					dk, gy, sh - slty coal stringers & ptgs. 17°/40°E		
	100'	1/					Coal - type A-B - bnds of fusain sh ptgs & lenses intra formational folding shearing - sks 23°/32° E & 20°/36° E fault 10' displacement 350°/50° E		
							dk, gy, sh, carb sh, slty sh to f. gr. ss, coal stringers		
							Coal questionable interpretation, pos. a fault at lower contact		
							Coal - sh ptgs. sks		
	150'	e p p x x		slt v.f	a	w	m. gy. v.f. gr. ss. xbdd, lmn. - well sorted, wthrg to lt. gy ochre Grades upward into m. dk gy arg. sltst xbdd - lmn - carb. ptgs. jointed slty sh bnds.		

K-SAGE CREEK 71(3)B

RIO TINTO CANADIAN EXPLORATION LIMITED

DRILL & CORE LOG

PROPERTY: SAGE CREEK COAL LTD. 8601

LOCATION: Dally Hill

TRENCH No. T-2

AZIMUTH:

ELEVATION:

DIP:

TOTAL DEPTH:

PROBE DEPTH:

DIP TESTS:

HOLE SIZE:

CORE SIZE:

DATE STARTED:

AIR: ☐ WATER: ☐

L2

DATE COMPLETED:

LOGGED BY:

DATE:

CONTRACTOR:

PROBED BY:

DATE:

360 (1) SC 71(3)B

FORMATION TOPS	DEPTH	POROSITY TYPE	LITHOLOGY	GRAIN or CRYSTAL SIZE in mm's	ROUNDING	SORTING	DESCRIPTION	ANALYSIS	ENGINEERING DATA
							Coal wash in recessive feature		
							dk. gy. sh. some slty sh bnds - carb. sh bnds & coal stringers - platy - jointed. lmn stn. 360° / 55° E		
							Coal sh ptgs.		
				¼			dk, gy, sh, coal stringers - some slty sh platy - friable		
							v. lmn. v. slty sh bnds,		
							m. dk gy sh / coal stringers		
				¼			coal / sh ptgs.		
							m. dk. gy. sh. carb. lmn - coal bnd.		
							coal / sh ptgs.		
	50'						dk, gy, sh. carb. lmn. coal bnd. 25° / 17° E		
							cvrd. intvl.		
							dk, gy, sh, sl. slty, platy, carb. ptgs. lmn stn. - coal bnds.		
							coal / sh. ptgs.		
							dk, gy, m. gy sh, slty sh, bnd of 1" platy & friable, coal ptgs & bnds		
							Coal - sks - sh ptg.		
							dk, gy, sh, lmn stn, fault. normal.		
	100'								
	150'								

K-SAGE CREEK 71(3)B

RIO TINTO CANADIAN EXPLORATION LIMITED

DRILL & CORE LOG

PROPERTY: SAGE CREEK COAL LTD.			TRENCH No. T-3
LOCATION: Dally Hill			
AZIMUTH:	ELEVATION:	DIP:	
TOTAL DEPTH:	PROBE DEPTH:	DIP TESTS:	
HOLE SIZE:	CORE SIZE:		
DATE STARTED:	AIR: ☐ WATER: ☐		
DATE COMPLETED:	LOGGED BY:	DATE:	
CONTRACTOR:	PROBED BY:	DATE:	

360 (1) SC 71(3)B (L3)

FORMATION TOPS	DEPTH	POROSITY TYPE	LITHOLOGY	GRAIN or CRYSTAL SIZE in mm's	ROUNDING	SORTING	DESCRIPTION	ANALYSIS	ENGINEERING DATA
	50'			m / c / m	a / a-r / a	m / m / m	m, gy. to m. lt. gy. m. gr. ss a. gr. bnd. of ss appr. gran. congl. massive, hard, ridge former lmn stn - lmn gr. uthrg. to orche a m. dk. gy. 05° / 36° E		
	100'						m. - m. dk. gy. sh. - coal ptgs. a bnd. carb. pl. frag. v. f. gr. ss. - m. m dk. gy. ochre uthrg. lmn. stn. - bndd. grades upward. into m. dk. gy. sltst. to arg. sltst a slty sh.		
	150'			m / m	a / a	w / w	m - m lt. gy. m. gr. ss. ochre uthrg. lmn stn. - hard.		
							m. gy. slty sh. bnd. of m. dk. gy. sh. coal stringer. m. dk. gy. arg. sltst. / bnd. of m. dk gy. slty sh.		
				v.f	a	m	m. dk, gy, v. f. gr. bnd. of ss. uthrg. to orche lmn stn.		
	200'						dk. gy. arg. sltst. - ochre uthrg. lmn. stn. bd. blocky, jointed. m. - c. gr. ss.		
							covd. Intvl.		
	250'						m - c, gr. ss - m lt. gy sup. texture. Intbd. v. f. gr. ss - m. gy. w sorted. w, arg. sltst - m. gy a slty SH: m, dk, gy		
							m - f gr. ss - m lt gy sup tex. uthrg. to lt. gy brn (ochre) lmn stn. - hard.		
	300'						v. f. gr. ss to arg. sltst, platy m. gy.		
				f.m	a	m	m. f, gr. ss - m. lt. gy, sup. tex. uthrg. to lt. gy brn. (orche) lmn stn.		
							crvd Intvl. m-f gr. ss. a some arg sltst.		
							m. gy, m-c, gr. ss, poor mod. sorting and grades upward into m-f. gr. ss		
							m. dk. gy sh		
							Covrd Intrl. some f. gr. ss a dk, gy sh frag.		
							m. dk. gy sh		
							m gy m gr. sup. ss.		
	350'						covrd Intvl. sh a f gr. ss debris - slump. some coal wash		
							m. dk, gy, slty sh uthrg to lt. gy brn (ochre) lmn stn		
							m. gy, arg. sltst - uthrg to lt. gy brn. (orche) lmn stn. 10° / 37°C		
							slty sh / coal strng. m. dk, gy.		
	400'						coal - arg. ptgs. variable dip. sks shearing 360° / 31°E slumped		
							dk, gy, slty sh 360° / 14°E		
							coal		
							dk. gy. slty sh. arg. sltst bnd. coal stringers		
							m. dk, gy, sl. slty sh - coal bnd. / coal string. 9° / 34° E		
	450'						Possible fault zone Crrd. Intvl. - Breccia		
							arg. sltst - m, dk, gy. normal fault 2' displacement		
							slty sh m- dk, gy, crumbly grading upward into m- dk gy arg. sltst / coal stringers normal fault of 2' displacement		
							crrd Intvl. - possible fault zone - coal wash in area		
	500'						crrd. Intvl. - prob. slty sh. to arg. sltst - m dk, gy lmn coal string. Slumped recessive intvl. angular lumps of same ss as below - questionable interpretation		
							f - m, gr. m gy ss as below		
							f - m, gr. m gy ss, uthrg to lt brn. gy (orche) bnd of arg. sltst / carb. ptgs.		
							m, dk, gy sh - bnds of slty sh coal string. jointed.		
							m - dk, gy arg. sltst, intbd. / m - dk, gy		
							crrd Intvl.		
	600'						m. - m lt gy m. gr. ss sup. texture dk, chert gr. 17° / 41° E		
							Sharp contact / sh below xddd - jointed		
	650'						m. dk, gy, sh. grading upward to m gy. arg. sltst. near top of unit bnds. of sltst a v. f. gr. ss lt. gy brn. uthrg. / lmn stn. 17° / 49° E		
	700'						10° / 30° E		
	750'						Coal - bdg. slip. sheared - highly dstrbd. coal 345° / 32° E ? variable dips a striftes		
							fault (thrust?) displacement unknown 360° / 50° E		
							dk. gy. slty sh / arg. sltst. bnd.		
							m. gy. sltst, sl. arg. br. jointd, lt. gy. brn. uthrg. lmn stn.		
							coal / sh stringers 18° / 31° E		
							dk. gy. slty sh. mod. chert frag.		
							coal / sh. / coal stringers - slumped		
							m. dk. gy. sh - lt gy. brn. uthrg (orche) / some slty sh bnds		
							arg. sltst bnds		
	800'						coal / arg. ptgs. a stringers - sh bnds slty sh / coal string. a bnds - carb. ptgs - pl. rems 35° / 16° E		

K-SAGE CREEK 71(3)B

RIO TINTO CANADIAN EXPLORATION LIMITED

DRILL & CORE LOG

PROPERTY: SAGE CREEK COAL		TRENCH No. T-4
LOCATION: Dilly Hill - Along Road		
AZIMUTH:	ELEVATION:	DIP:
TOTAL DEPTH:	PROBE DEPTH:	DIP TESTS:
HOLE SIZE:	CORE SIZE:	
DATE STARTED:	AIR: ☐ WATER: ☐	
DATE COMPLETED:	LOGGED BY:	DATE:
CONTRACTOR:	PROBED BY:	DATE:

360 (1) SC 71(3)B (L4)

FORMATION TOPS	DEPTH	POROSITY TYPE	LITHOLOGY	GRAIN or CRYSTAL SIZE in mm's	ROUNDING	SORTING	DESCRIPTION	ANALYSIS	ENGINEERING DATA
		p		slt			sltst: m.gy, ochre wthrg. lmn stn. sl. arg. 08°/ 33°E		
		x		f / m-c / f / m-c / f / m-c	a / a / a	m / m / m	ss: ochre wthrg. m. dk. gy. lmn, stn. f gr. ss bands of m-c gr. lighter in colour bd. resistant. 40°/136°E		
		e					SH: dk. gy, fri, plty, wthrg to lt. br. gy		
		e					SH: m. to m. lt. gy. slty in part, platy, lmn stn wthrg. to orche.		
	50'	e		i.f.	a	p.	sh/sltst/ss orche wthrg. lmn, stn, arg. to slty minor ss of v.f.gr. arg.		
		p / x / x		slt / f-m / f-m			SS: m.gy. f-m. gr. lmn stn hard well bdd to massive		
	100'						covd. interval - coal wash seam # 2		
							sltst to ss/SH m.gy, to m.dk gy, arg. sltst to arg. v.f. gr. ss. intbd. with slty sh. some carb. ptgs. pl. frag. 35°/26°E Small normal fault. 15°/60°E		
							Coal some arg. beds, Seam # 3		
							SH: m. dk. gy. slty, platy ochre wthrg. lmn stn. 20°/24°E		
	150'								

K-SAGE ~~CREEK~~ 71(3)B

RIO TINTO CANADIAN EXPLORATION LIMITED

DRILL & CORE LOG

PROPERTY: SAGE CREEK COAL			TRENCH No. T-5
LOCATION: Dilly Hill - Along Road			
AZIMUTH:	ELEVATION:		DIP:
TOTAL DEPTH:	PROBE DEPTH:		DIP TESTS:
HOLE SIZE:	CORE SIZE:		
DATE STARTED:	AIR: ☐	WATER: ☐	
DATE COMPLETED:	LOGGED BY:		DATE:
CONTRACTOR:	PROBED BY:		DATE:

360 (1) SC 71(3)B (LS)

FORMATION TOPS	DEPTH	POROSITY TYPE	LITHOLOGY	GRAIN or CRYSTAL SIZE in mm's	ROUNDING	SORTING	DESCRIPTION	ANALYSIS	ENGINEERING DATA
				f-v.f	a	m	f gr. to v. f gr. ss – m gy brn, intbd arg. sltst & slty sh rubble outcrop poor bdg.		
	50'								
				f-vf	a	m			
				f-vf	a	m			
							Crd. Intvl. possible #1 Coal Seam		
				f-m	a	w	f. m. gr. ss, lt. m. gy. brn. chunky xbdd. slty sh. m-gy- ochre wthrg / lmn stn. platy intbd. m. dk gy sh. – wthrgs to m. lt. gy. Friable 20° / 28° E		
	100'								
	150'								
				f-m	a	w			
				c	a-r	m			
				f-m	a	w	f-m. gr. ss / c gr. ss bnd. m. gy. / ochre wthrg, lmn stn. – some lmn gr. x bdd. 25° / 21° E		
				f-m	a	w			
	200'								
							sl. arg. sltst. & bnd. of slty sh. m. gy, ochre wthrg. lmn stn. platy to thn bdd.		
							Crd Intvl.		
							Coal wash Seams 2 & 3		
							m. dk. gy. sh. / carb. ptgs. – coalified pl. frag.		
	250'								
							m. gy. sltst. grading upward into v.f.-f gr. ss ochre wthrg. / lmn stn. hard & resist. slty sh. stringers 03° / 21° E		
	300'								
							Curd. Interval		
	350'								
							coal – arg. sh, ptgs & sh bnds Coal is dstrbd – possible repetition by fault thru coal. Seam # 4a		
	400'								
							lt. gy. wthrg. m. gy. sh. – carb. ptg. coalified pl. frag.		
							Coal Seam # 4b.		
	450'								

1(- SAGE CREEK 71(3)B

RIO TINTO CANADIAN EXPLORATION LIMITED

DRILL & CORE LOG

PROPERTY: SAGE CREEK COAL LTD. - 8601

TRENCH No. T-6

LOCATION: Dally Hill

AZIMUTH:

ELEVATION:

DIP:

TOTAL DEPTH:

PROBE DEPTH:

DIP TESTS:

HOLE SIZE:

CORE SIZE:

DATE STARTED:

AIR: ☐ WATER: ☐

DATE COMPLETED:

LOGGED BY:

DATE:

CONTRACTOR:

PROBED BY:

DATE:

360 (1) SC 71(3)B (26)

FORMATION TOPS	DEPTH	POROSITY TYPE	LITHOLOGY	GRAIN or CRYSTAL SIZE in mm's	ROUNDING	SORTING	DESCRIPTION	ANALYSIS	ENGINEERING DATA
	0								
		x		c	a	m	SS: m. gy. c. gr. to granular congl.		
		x		c	a	m	sugary texture, hard. massive 350°/45° E		
		e					SH: m. gy. carb. ptgs.		
		x		c	a	m			
							SS: m. gy. c. gr. well to massive bdd.		
				c	a	m			
							Breccia Zone Some coal wash		
		x		f	a	m	SS: m. gy. brn. wthrg. well bdd. distorted.		
				slt			sh/sltst: m. gy. m. - dk. gy. carb.		
	50'						Cvrd. Interval		
		x					ss/sltst: m. gy. brn. wthrg. slt. to v. f gr. finely bdd., x bdd. 340°/41°E		
				f	a	m			
				m	a	m	SS: m. lt. to m. gy, hd. coarsening		
				m-c	a	m	downward in granule congl.		
		x		m-c	a	m	Middle Kootenay Member		
	100'								

K-SAGE CREEK 71(3)B

RIO TINTO CANADIAN EXPLORATION LIMITED

DRILL & CORE LOG

PROPERTY: SAGE CREEK COAL LTD.			TRENCH No. T-7
LOCATION: North facing slope of Dally Hill			
AZIMUTH:	ELEVATION:		DIP:
TOTAL DEPTH:	PROBE DEPTH:		DIP TESTS:
HOLE SIZE:	CORE SIZE:		
DATE STARTED:	AIR: ☐	WATER: ☐	
DATE COMPLETED:	LOGGED BY:		DATE:
CONTRACTOR:	PROBED BY:		DATE:

360 (1) SC 71(3)B (L7)

FORMATION TOPS	DEPTH	POROSITY TYPE	LITHOLOGY	GRAIN or CRYSTAL SIZE in mm's	ROUNDING	SORTING	DESCRIPTION	ANALYSIS	ENGINEERING DATA
		x		f-m	a-r	m	SS: lt. grn. gy. f-m, gr. sugary texture wthrg. to m. gy. brn. hard. sil. lmn. stn. 348° / 36° E		
							Cvrd. Intvl.		
	50'	x		f-m	a-r	m	SS. as above		
	100						Crd. Intvl. Badly brocken zone		
		x		v.f / slt / v.f	r	w	SS / sltst: m. dk, gy, brn. v.f. gr. well sorted. thinly bdd / intbdd of m. dk. gy. sltst.		
							Bericia zone pos. fault zone		
		x		v.f.			SS: m. gy. brn. v.f. gr. SS.		
							cvrd. Interval: Topographically recessive area - coal wash.		
		x, p		v.f.	r	w	SS/Sltst: m. dk. gy. massive to well bdd v.f. to f. gr. intbd with bnds of sltst. sltst becomes more pronounced downward pos. passage beds in the Fernie group. Some sh. bnds occuring in sequence		
		x, p		v.f-f / slt / v.f-f	r	w	360° / 21° E near top of unit 010° / 12° E near base of unit		
		e					SH: m. dk, gy, micro-mica, few sltst. bnds, Fernie shale		
		x					Coverd Interval. Occessional outcrop of v.f. gr. ss. Appears disturbed Possible fault zone		
							Covered Interval: a topographically recessive area. Coal wash observed. Attempted deeper trenching but to no avail.		
		p, e					Sltst / sh: m. gy. to m. lt. gy. thinly bdd. few bnds. of v.f. gr. ss.		
							Covered Interval		
		p, e					Sltst / sh: m. gy. thinly bdd. - Fractured. and jointed.		
							Coverd Interval		
		e					SH: m. gy. some slty sh bnds. Thinly to lam. bdg.		
		x					SS / sltst: m. gy. v.f. to f. gr. intbds. of arg. sltst		
		e, p					SH: m. to m. dk. gy. / thn. bnd. of arg. sltst. Intbds: of m. gy. bd. sltst.		
		p, e		slt					
							Coverd Interval		
		e					SH: m. gy. brn. soft, some silty sh. bnds.		

K- SAGE CREEK 71(2)B-2

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

SAGE CREEK COAL LIMITED

FLATHEAD VALLEY, B.C.

GEOLOGICAL REPORT

SUPPLEMENTAL REPORT

TO REPORT ON EXPLORATION

OCTOBER, 1970 - MAY, 1971

~~Volume 2 of 2~~

OPEN FILE

November, 1971

O. Cullingham

GEOLOGICAL BRANCH
ASSESSMENT REPORT

00 360 (3)

RIO TINTO CANADIAN EXPLORATION LIMITED

(MI)

LEGEND

CRETACEOUS

K_{bl}	Blairmore Formation
K_k	Kootenay Formation

JURASSIC

J_f	Fernie Formation

SCALE

0 400 800 1200 1600

One Inch = 400 Feet

360 (3)

K-SAGE CREEK 71(2)B-3

RIO TINTO CANADIAN EXPLORATION LTD.		
SAGE CREEK COAL LIMITED — B. C.		
SECTION ALONG LINE 70,000 E		
JULY 1971	O.R.C. / k.h.	DWG. D-2563

360

K-SAGE CREEK 71(2)B-2

LEGEND

Bore hole

Kbl / Kk Contact - Blairmore Group / Kootenay Formation

Kk / Jf Contact - Kootenay Formation / Fernie Group

Middle Kootenay sandstone member

Coal

Normal fault

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

SCALE
200 0 200 400 600 800
One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED
SAGE CREEK COAL LTD. - B.C.
DALLY HILL SECTION 27,800 N (W 1/2)
Dec. - 1971	O.C. / e.k.	DWG. D-3366A-1

360(3)

K SAGE CREEK 71(2)B-2

LEGEND

- Bore hole
- Kbl / Kk — Contact - Blairmore Group / Kootenay Formation
- Kk / Jf — Contact - Kootenay Formation / Fernie Group
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
DALLY HILL SECTION 27,800 N (E 1/2)		
Dec. - 1971	O.C. / e.k.	DWG. D-3366A-2

360 (3)

K- SAGE CREEK 71(2)B-2

LEGEND

- Bore hole
- Kbl / Kk — Contact - Blairmore Group / Kootenay Formation
- Kk / Jf — Contact - Kootenay Formation / Fernie Group
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
DALLY HILL SECTION 28,200 N (W ½)		
Dec. - 1971	O.C. / e.k.	DWG. D-3366A-3

360

K-SAGE CREEK 71(2)B-2

LEGEND

Bore hole

Kbl / Kk — Contact - Blairmore Group / Kootenay Formation

Kk / Jf — Contact - Kootenay Formation / Fernie Group

Middle Kootenay sandstone member

Coal

Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

DALLY HILL

SECTION 28,200 N (E 1/2)

Dec. - 1971	O.C. / e.k.	DWG. D-3366A-4

M6

360(3)

K-SAGE CREEK 71(2)B-2

LEGEND

Bore hole

Contact - Blairmore Group / Kootenay Formation (Kbl / Kk)

Contact - Kootenay Formation / Fernie Group (Kk / Jf)

Middle Kootenay sandstone member

Coal

Normal fault

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

SCALE
200 0 200 400 600 800
One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

DALLY HILL

SECTION 29,400 N (W 1/2)

Dec. - 1971	O.C. / e.k.	DWG. D-3366A-5

K-SAGE CREEK 71(2)B-2

LEGEND

- Bore hole
- Kbl / Kk — Contact - Blairmore Group / Kootenay Formation
- Kk / Jf — Contact - Kootenay Formation / Fernie Group
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED
SAGE CREEK COAL LTD. - B.C.
DALLY HILL SECTION 29,400 N (E 1/2)
Dec. -1971 | O.C. / e.k. | DWG. D-3366A-6

K- SAGE CREEK 71(2)A-7

LEGEND

Bore hole

Kbl / Kk Contact - Blairmore Group / Kootenay Formation

Kk / Jf Contact - Kootenay Formation / Fernie Group

Middle Kootenay sandstone member

Coal

Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED
SAGE CREEK COAL LTD. - B.C.
DALLY HILL
SECTION 30, 200 N (W 1/2)
Dec. - 1971	O.C. / e.k.	DWG. D-3366A-7

360(3)

K-SAGE CREEK 71(2)B-2

LEGEND

- Bore hole
- Contact - Blairmore Group / Kootenay Formation (Kbl / Kk)
- Contact - Kootenay Formation / Fernie Group (Kk / Jf)
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

DALLY HILL

SECTION 30,200 N (E 1/2)

Dec. -1971	O.C. / e.k.	DWG. D-3366A-8

K-SAGE CREEK 71(2)B-2

LEGEND

- Bore hole
- Kbl / Kk — Contact - Blairmore Group / Kootenay Formation
- Kk / Jf — Contact - Kootenay Formation / Fernie Group
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

DALLY HILL

SECTION 31,000 N (E 1/2)

Dec. - 1971	O.C. / e.k.	DWG. D-3366A-9

360(3)

(M11)

K-SAGE CREEK 71(2)B-2

LEGEND

Bore hole

Kbl / Kk — Contact - Blairmore Group / Kootenay Formation

Kk / Jf — Contact - Kootenay Formation / Fernie Group

Middle Kootenay sandstone member

Coal

Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
DALLY HILL SECTION 31,400 N (E ½)		
Dec. - 1971	O.C. / e.k.	DWG. D-3366A-10

(M12)

360(3)

K-SAGE CREEK 71(2)B-2

LEGEND

Bore hole

Kbl / Kk Contact - Blairmore Group / Kootenay Formation

Kk / Jf Contact - Kootenay Formation / Fernie Group

Middle Kootenay sandstone member

Coal

Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. – B.C.		
DILLY HILL		
SECTION 34,600N		
Dec. -1971	O.C. / e.k.	DWG. D-3366A-11

M13

360 (3)

LEGEND

Bore hole	Middle Kootenay sandstone member
Kbl / Kk — Contact - Blairmore Group / Kootenay Formation	Coal
Kk / Jf — Contact - Kootenay Formation / Fernie Group	Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

K-SAGECREEK 71(2)B-2

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

DILLY HILL

SECTION 35,000 N

Dec. - 1971	O.C. / e.k.	DWG. D-3366A-12

M14

360 (3)

K-SAGE CREEK 71(2)B-2

LEGEND

- Bore hole
- Kbl / Kk — Contact - Blairmore Group / Kootenay Formation
- Kk / Jf — Contact - Kootenay Formation / Fernie Group
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
DILLY HILL SECTION 35,400N		
Dec. - 1971	O.C. / e.k.	DWG. D-3366A-13

K-SAGE CREEK 71(2)B-2

360

M15

LEGEND

Bore hole

Kbl / Kk Contact - Blairmore Group / Kootenay Formation

Kk / Jf Contact - Kootenay Formation / Fernie Group

Middle Kootenay sandstone member

Coal

Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

DILLY HILL

SECTION 35,800N

Dec. - 1971	O.C. / e.k.	DWG. D-3366A-14

M16

360(3)

K-SAGE CREEK 71(2)B-2

LEGEND

Bore hole

Kbl / Kk — Contact - Blairmore Group / Kootenay Formation

Kk / Jf — Contact - Kootenay Formation / Fernie Group

Middle Kootenay sandstone member

Coal

Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
DILLY HILL		
SECTION 36,200 N		
Dec. - 1971	O.C. / e.k.	DWG. D-3366A-15

LEGEND

Bore hole	Middle Kootenay sandstone member
Kbl / Kk — Contact - Blairmore Group / Kootenay Formation	Coal
Kk / Jf — Contact - Kootenay Formation / Fernie Group	Normal fault

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

SCALE
200 0 200 400 600 800
One Inch = 200 Feet

360 (3)

M17

K-SAGE CREEK 71(2)B-2

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

DILLY HILL

SECTION 36,600 N

Dec. - 1971	O.C. / e.k.	DWG. D-3366A-16

360 (5)

K - SAGE CREEK 71(2)A-2.

LEGEND

- Bore hole
- Kbl / Kk — Contact - Blairmore Group / Kootenay Formation
- Kk / Jf — Contact - Kootenay Formation / Fernie Group
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE
200 0 200 400 600 800
One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
DILLY HILL		
SECTION 37,000N		
Dec. - 1971	O.C. / e.k.	DWG. D-3366A-17

M19

360(3)

K-SAGE CREEK 71(2)B-2

LEGEND

Bore hole

Kbl / Kk Contact - Blairmore Group / Kootenay Formation

Kk / Jf Contact - Kootenay Formation / Fernie Group

Middle Kootenay sandstone member

Coal

Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

DILLY HILL

SECTION 37,400N

Dec. - 1971	O.C. / e.k.	DWG. D-3366A-18

M20

360(3)

K-SAGE CREEK 71(3)B-2

LEGEND

Bore hole

Contact - Blairmore Group / Kootenay Formation (Kbl / Kk)

Contact - Kootenay Formation / Fernie Group (Kk / Jf)

Middle Kootenay sandstone member

Coal

Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
DILLY HILL SECTION 37,800N		
Dec. - 1971	O.C. / e.k.	DWG. D-3366A-19

M21

360

K-SAGE CREEK 71(2)B-2

LEGEND

Bore hole

Contact - Blairmore Group / Kootenay Formation

Contact - Kootenay Formation / Fernie Group

Middle Kootenay sandstone member

Coal

Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

DILLY HILL

SECTION 38,200N

Dec. - 1971	O.C. / e.k.	DWG. D-3366A-20

360 (3)

M22

K-SAGE CREEK 71(2)B-2

LEGEND

- Bore hole
- Kbl / Kk — Contact - Blairmore Group / Kootenay Formation
- Kk / Jf — Contact - Kootenay Formation / Fernie Group
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

DILLY HILL

SECTION 38,600N

Dec. - 1971	O.C. / e.k.	DWG. D-3366A-21

LEGEND

- Bore hole
- Kbl / Kk — Contact - Blairmore Group / Kootenay Formation
- Kk / Jf — Contact - Kootenay Formation / Fernie Group
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

360 (3)

K-SAGE CREEK 71(2)B-2

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
DILLY HILL SECTION 39,000N		
Dec. - 1971	O.C. / e.k.	DWG. D-3366A-22

M24

360(3)

K- SAGE CREEK 71(2)B-2

LEGEND

- Bore hole
- Kbl / Kk — Contact - Blairmore Group / Kootenay Formation
- Kk / Jf — Contact - Kootenay Formation / Fernie Group
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE
200 0 200 400 600 800
One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. – B.C.

DILLY HILL
SECTION 39,400N

Dec. -1971	O.C. / e.k.	DWG. D-3366A-23

M25

360(3)

K - SAGE CREEK 71(2)A-2

LEGEND

- Bore hole
- Kbl / Kk — Contact - Blairmore Group / Kootenay Formation
- Kk / Jf — Contact - Kootenay Formation / Fernie Group
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE

200 0 200 400 600 800

One Inch = 200 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED		
SAGE CREEK COAL LTD. - B.C.		
DILLY HILL		
SECTION 39,800N		
Dec. - 1971	O.C. / e.k.	DWG. D-3366A-24

360(3)

LEGEND

- Bore hole
- Kbl / Kk — Contact - Blairmore Group / Kootenay Formation
- Kk / Jf — Contact - Kootenay Formation / Fernie Group
- Middle Kootenay sandstone member
- Coal
- Normal fault

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

SCALE
200 0 200 400 600 800
One Inch = 200 Feet

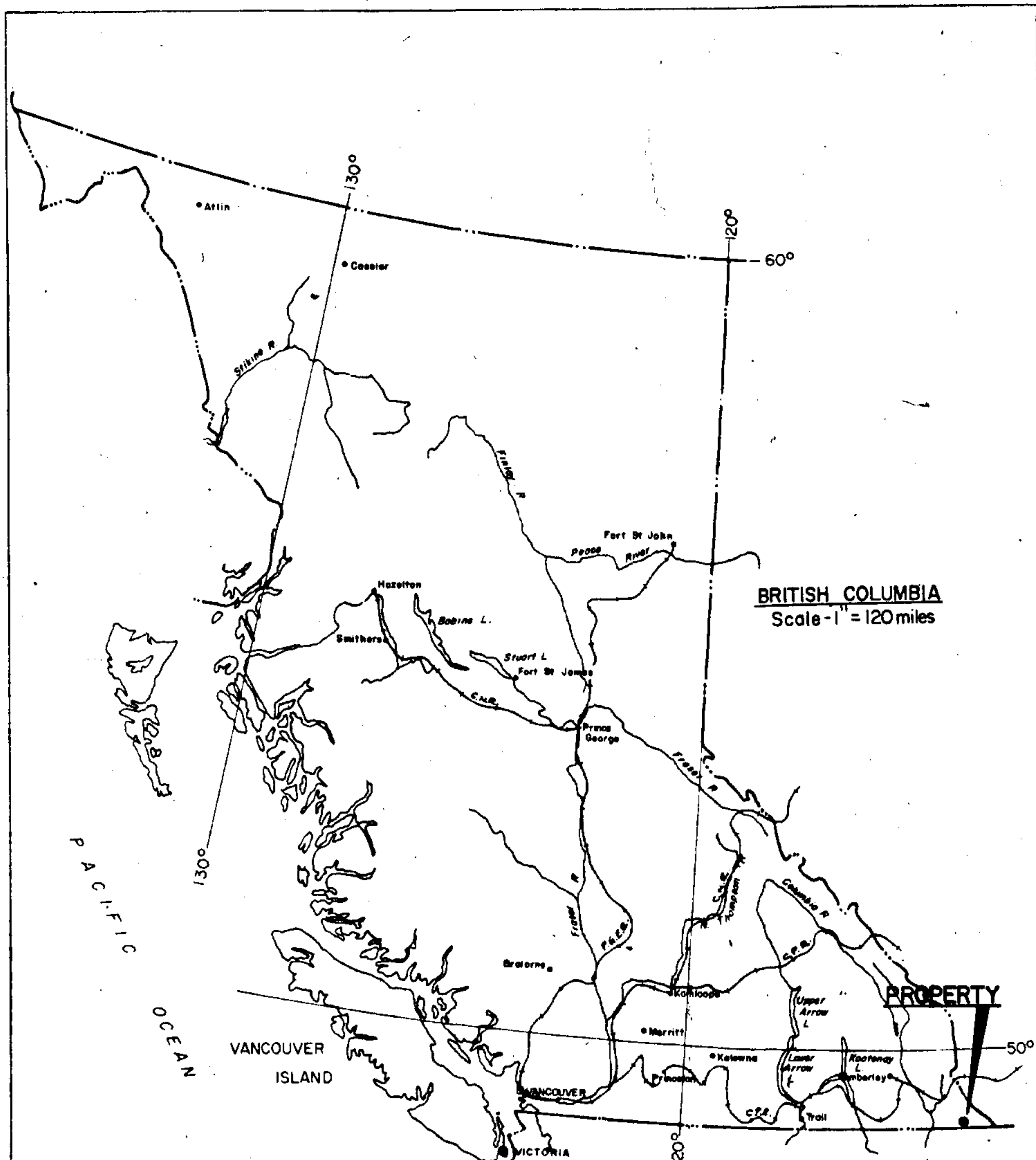
K-SAGE CREEK 71(2)B-2

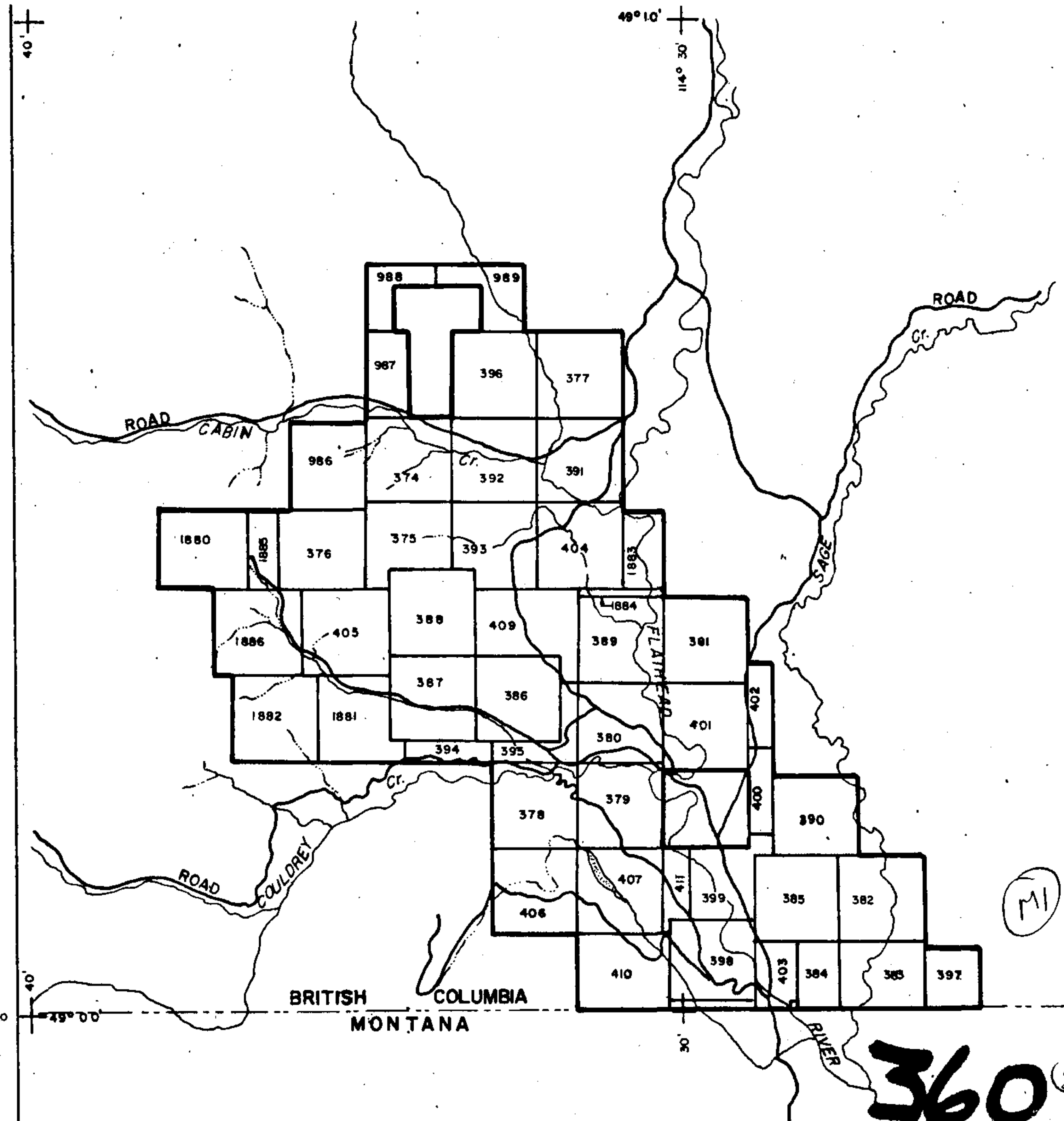
RIO TINTO CANADIAN EXPLORATION LIMITED
SAGE CREEK COAL LTD. - B.C.
DILLY HILL SECTION 40,200N
Dec. -1971 | O.C. / e.k. | DWG. D-3366A-25

K - SAGE CREEK 71(2)B-1

REPORT & GEOLOGICAL
MAPS.
SAGE CREEK COAL LTD
RIO TINTO.

00360 (2)





0 1 2 3 4 Miles

1:100,000

M1

360(2)

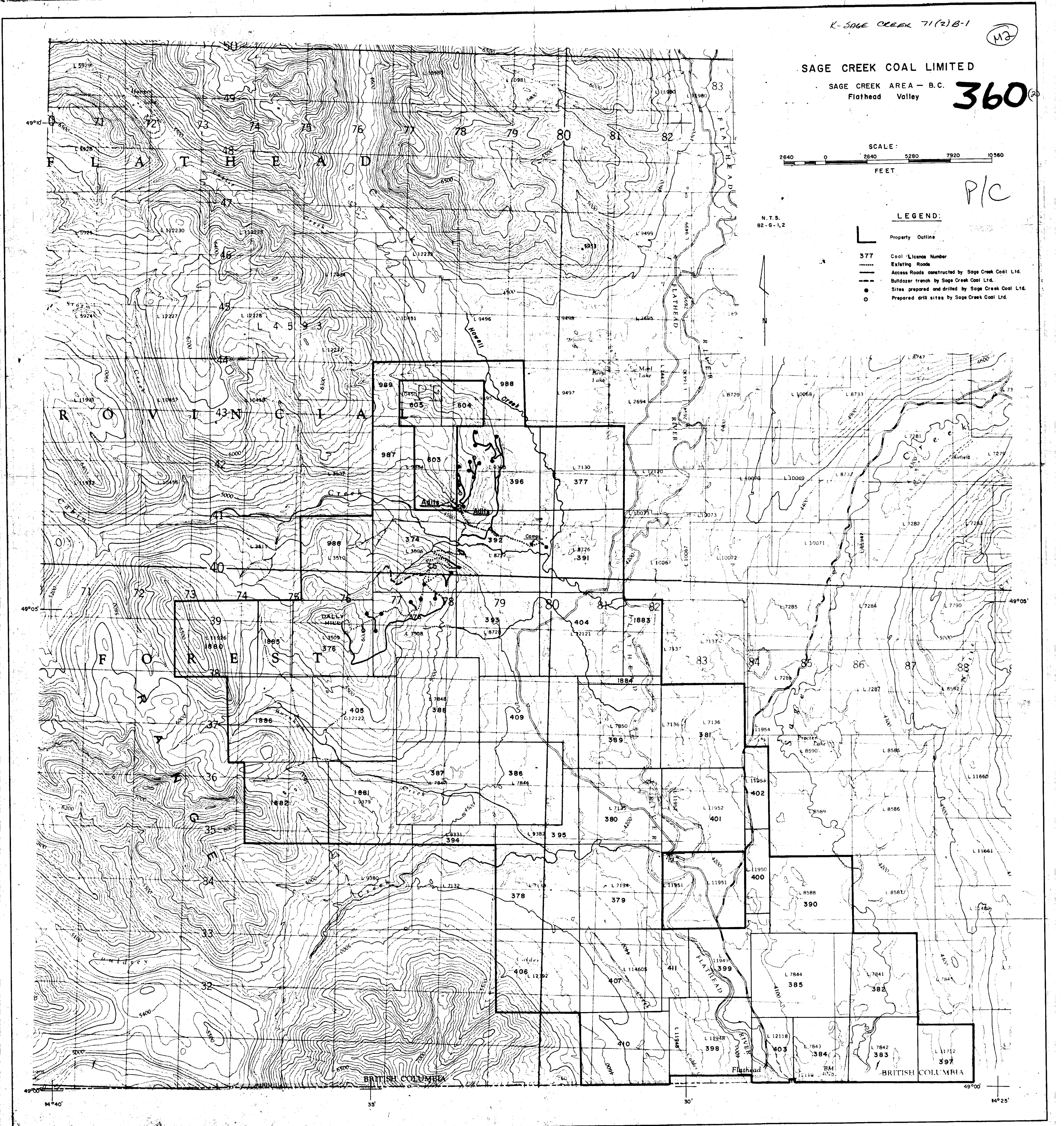
RIO TINTO CANADIAN EXPLORATION LTD.

SAGE CREEK COAL LIMITED —— B. C.

LOCATION MAP

K-SAGE CREEK 71 (2) B-1

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


K-SAGE CREEK 71(2)B-1
M2
SAGE CREEK COAL LIMITED
SAGE CREEK AREA — B.C.
Flathead Valley
360(2)
SCALE:
2640 0 2640 5280 7920 10560
FEET
P/C
N.T.S.
82-G-1,2
LEGEND:
Property Outline
377 Coal Licence Number
Existing Roads
Access Roads constructed by Sage Creek Coal Ltd.
Bulldozer trench by Sage Creek Coal Ltd.
Sites prepared and drilled by Sage Creek Coal Ltd.
Prepared drill sites by Sage Creek Coal Ltd.
N
FLATHEAD
PROVINCIAL
FOREST
RANGE
FLATHEAD RIVER
Howell Creek
Cabin Creek
Adits
Camp
DALLY HILL
Airfield
Proctor Lake
BRITISH COLUMBIA
49°10'
49°05'
49°00'
114°40'
35'
30'
114°25'

DWG: L-3365-A.
K-SAGE CREEK 71(2)B-1
M3
SAGE CREEK COAL LIMITED
360(2)
FLATHEAD VALLY-B.C.
PROPERTY PLAN
"DILLY HILL"
Scale:
400 0 400 800 1200 1600
FEET
N.T.S.
82-G-1,2
O. Cullingham Dec. 1971
Note: TOPOGRAPHY BY J.C. SPROUGLE & ASSOCIATIES LTD.
INDEX MAP
CANADA
U.S.A.
BRITISH COLUMBIA
MONTANA
LEGEND
Road, loose surface
Trail, cut line
Lot
Graticule
Building
Bridge
Horizontal Control Point with elevation
Elevation, approximate
Drainage pattern
Lake or river
Marsh or Swamp
Marsh or Swamp in water
Index contour
Intermediate contour
Sand or gravel along drainage pattern
Depression Contour
Tree, coniferous or deciduous
Ground Control Point, with elevation
Rapids
Drill hole by Sage Creek Coal LTD.
Drill hole by Stelco
Trench
Access road
Property boundary
T.N.
MAGNETIC NORTH
ANNUAL MAGNETIC CHANGE DECREASING 3'5 ANNUALLY
CROWS NEST INDUSTRIES
HOWELL CREEK
CABIN CREEK
L 10451
L 9496
L 9498
L 9495
L 9497
L 10450
L 9385
L 9384
L 3507
L 3506
L 8727
114°34'
114°33'
49°07'
49°06'
40,200 N
39,800 N
39,400 N
38,600 N
38,200 N
37,800 N
37,400 N
37,000 N
36,600 N
36,200 N
35,800 N
35,400 N
35,000 N
S.C.C.-4
S.C.C.-6
S.C.C.-10
S.C.C.-9
S.C.C.-14
S.C.C.-8
S.C.C.-12
S.C.C.-7
S.C.C.-11
S.C.C.-5
S.C.C.-2A
S.C.C.-2B
R2

114°36'
114°35'
114°34'
L 3507
L 3511
L 3510
L 3506
L 3508
L 3509
L 12122
L 7848
L 7847
L 9379
49°05'
49°04'
S.C.C.-13
S.C.C.-15
S.C.C.-16
S.C.C.-16A
S.C.C.-17
S.C.C.-18
S.C.C.-20
S.C.C.-20A
St-3
St-4
St-5
St-6
St-7
T-6
T-7
T-8
70,000 E
CLEARING

A


DWG: L-4381-A
K-SAGE CREEK 71(2)B-1
M4
SAGE CREEK COAL LIMITED
FLATHEAD VALLY-B.C.
360
PROPERTY PLAN
"DALLY HILL"
Scale:
400 0 400 800 1200 1600
FEET
N.T.S
82-G-1,2
O. Cullingham Dec. 1971
Note: TOPOGRAPHY BY: J.C. SPROUGLE & ASSOCIATIES LTD
LEGEND
Road, loose surface
Trail, cut line
L15 Lot
Graticule
Building
Bridge
Horizontal Control Point with elevation
Elevation, approximate
Drainage pattern
Lake or river
Marsh or Swamp
Marsh or Swamp in water
Index contour
Intermediate contour
Sand or gravel along drainage pattern
Depression Contour
Tree, coniferous or deciduous
Ground Control Point, with elevation
Rapids
S.C.C-1 Drill hole by Sage Creek Coal LTD.
St-3 Drill hole by Stelco
Access road
T-6 Trench
x Coal wash
INDEX MAP
CANADA BRITISH COLUMBIA
U.S.A. MONTANA
CABIN CREEK
34,600 N
29,400 N
70,000 E
L 8727
L 8728
L 8726
L 7848
CL 388
L 7847
L 7846
L 7850
L 12121
S.C.C-13
S.C.C-19
S.C.C-3
St-2
St-3
St-5
St-6
T-6
Seam-4
Seam-5
Seam-6
CLEARING
114°34'
114°33'
114°32'
49°05'
49°04'
ANNUAL MAGNETIC CHANGE DECREASING 3.5' ANNUALLY
B

L 10450
574,000.0 E.
576,000.0 E.
578,000.0 E.
580,000.0 E.
582,000.0 E.
584,000.0 E.
17,858,000.0 N.
17,856,000.0 N.
17,854,000.0 N.
17,852,000.0 N.
17,850,000.0 N.
17,848,000.0 N.
17,846,000.0 N.
17,844,000.0 N.
17,842,000.0 N.
17,840,000.0 N.
CROWS NEST INDUSTRIES
L 3507
L 9348
CABIN CREEK
L 3511
L 3510
L 3506
L 3509
L 3508
L 7848
L 9379
L 12122

CO-ORDINATES
U.T.M. Zone 11
TRUE ORIGIN

STATION NO.	STATION DESCRIPTION	NORTHING (FT.)	EASTING (FT.)	GEODETIC ELEVATION (FT.)
1	SCC	17847838.499	584077.955	5108.14
2+2A	"	52087.049	584703.629	5020.19
2B	"	52075.125	584738.385	5019.78
3	"	54520.260	584380.263	5378.48
4	"	56783.753	585449.281	5049.27
5	"	53366.864	584417.232	5339.75
6	"	56552.180	586655.816	4633.22
7	"	53979.710	584336.173	5378.51
8	"	54882.203	586597.487	4590.21
9	"	55190.951	584918.526	5170.50
10	"	56027.321	585698.124	4844.34
11	"	53942.740	585284.025	5126.68
12	"	54351.266	584995.164	5192.38
13	"	47107.699	582432.771	5286.25
14	"	54798.547	585681.139	4944.77
15	"	46023.848	582223.169	5341.16
16	"	45010.487	579626.706	5831.97
16A	"	44943.940	579619.916	5832.87
17	"	44956.861	578092.062	6067.46
18	"	44095.283	579041.511	5937.61
19	"	46323.178	583039.438	5236.28
20A	"	45754.516	581772.799	5454.15
1	ST	17852142.132	584785.300	5056.52
2	"	51107.326	585172.158	4569.64
3	"	49028.152	584649.579	4448.70
4	"	45971.896	580667.837	5684.92
5	"	48039.061	583505.520	5215.66
6	"	46338.217	583593.711	5189.57
7	"	44465.911	577903.896	6288.80
101	Coal Wash	17849085.562	583055.967	4682.62
102	" "	48321.338	583308.634	4707.07
103	Coal	48714.666	583802.359	4750.77
104	"	48673.466	583774.871	4777.55
105	Coal Wash	48826.326	583254.832	4776.57
106	Coal	48402.698	584136.043	4793.50
107	"	48315.522	584037.923	4950.49
108	"	48283.849	583887.434	4300.85
109	"	48449.899	582936.782	5003.05
112	"	48207.702	582805.199	5131.78
114	"	48672.146	583685.254	4790.13
115	"	48317.038	582427.896	5079.41
116	"	48316.670	582494.967	5072.45
117	"	48175.102	582494.350	5112.69
121	"	44524.665	576917.086	6341.61
122	"	44597.333	576457.255	6361.59
150	Coal Wash	46639.501	583163.389	5213.62
151	" "	46567.732	583139.574	5212.97
201	" "	51847.309	584015.388	4687.65
204	Coal	52121.963	584580.491	4993.76
207	Coal Wash	52542.806	584461.320	5153.31
231	Coal	51700.026	584476.186	4779.09
232	"	51730.222	584562.087	4775.44
233	"	52399.752	584022.084	4917.80
234	"	52374.191	584062.039	4922.40
235	Coal Wash	52169.656	584354.097	4959.42
312	" "	17854386.549	584976.941	5134.00

n 3

360 (2)

K-SAGE CREEK 71(2)B-1

RIO TINTO CANADIAN EXPLORATION LTD.
FLATHEAD VALLEY AREA B.C.
"DILLY HILL" – "DALLY HILL"

SCALE: 400 FEET TO 1 INCH

LEGEND
- drill hole by Sage Creek Coal Ltd.
- drill hole by Stelco
- Coal
- Coal Wash
- L78 Lot outline
- property outline areas 2, 3.
- boundary of Crows Nest Industries
- Grid reference points

Prepared by: DABBS CONTROL SURVEYS LTD. AUG. 1971 71-157


K-SAGE CREEK 71(2)B-1
DWG : G-3377
M6
360(2)
SAGE CREEK COAL LIMITED
FLATHEAD VALLY-B.C.
SURFACE GEOLOGY
"DILLY HILL"
O. Cullingham Dec. 1971
Scale:
400 0 400 800 1200 1600
FEET
N.T.S.
82-G-1,2
NOTE:
For Legend See Sheet No. 2
CROWS NEST INDUSTRIES
Howell Creek
Cabin Creek
(40,200)
402+00 N
(35,000)
350+00 N
70,000 E
Jf
Kk
Kbl
Seam No. 5
Seam No. 4b
Seam No. 4a
Seam No. 2-3
S.C.C.-4
S.C.C.-6
S.C.C.-10
S.C.C.-9
S.C.C.-14
S.C.C.-8
S.C.C.-3
S.C.C.-12
S.C.C.-7
S.C.C.-11
S.C.C.-5
S.C.C.-2
S.C.C.-2B
St-1
KEY
3
2
T.N.
M.N.
RIO TINTO CANADIAN EXPLORATION LIMITED

K-SAGE CREEK 71(2)B-1

DWG: G-4390

SAGE CREEK COAL LIMITED

360 (2)

(M7)

FLATHEAD VALLY-B.C.

SURFACE GEOLOGY

"DALLY HILL"

O. Cullingham Dec. 1971

Scale:

400 0 400 800 1200 1600

FEET

N.T.S.

82-G-1,2

LEGEND:

CRETACEOUS

Kbl Blairmore Formation

Kk Kootenay Formation

JURASSIC

Jf Fernie Formation

SYMBOLS:

36 Strike and dip

Coal seam

X Coal wash

S.C.C.-1 Drill hole by Sage Creek Coal LTD

St.-1 Drill hole by Stelco

Adit

Base of Middle Kootenay Sandstone

Basal Blairmore Conglomerate

Fault showing direction of down throw

Surface trace of thrust fault

KEY

3

2

T.N.

M.N.

RIO TINTO CANADIAN EXPLORATION LIMITED

N

LEGEND:

4200 Structure contours at 100' intervals

Fault showing direction of down throw

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

SCALE

400 0 400 800 1200 1600

One Inch = 400 Feet

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

STRUCTURE CONTOUR MAP
BASE OF No. 5 SEAM

Dec. — 1971	O.C. / e.k.	DWG. G - 3378

N

LEGEND:

4500 Water table contours - approximate

Inferred

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

360 (2)

(M9)

SCALE

400 0 400 800 1200 1600

One Inch = 400 Feet

K-SAGE CREEK 71 (2)B-1

RIO TINTO CANADIAN EXPLORATION LIMITED

SAGE CREEK COAL LTD. - B.C.

WATER TABLE CONTOURS

Dec. — 1971	O.C. / e.k.	DWG. Misc.-3379