

PROPERTY FILE

003491

82GSE034-07

Rio Algom
Rio Tinto

RIO ALGOM MINES LIMITED
ENGINEERING DEPARTMENT
Toronto, Canada

SAGE CREEK COKING PROPERTY

FLATHEAD VALLEY

SOUTHEASTERN BRITISH COLUMBIA

CANADA

PROPERTY FILE

May 15th, 1975
Rio Algom Limited
Toronto, Canada.

INTRODUCTION

Rio Algom Limited, has been exploring a large deposit of metallurgical coal in the Flathead Valley of southeastern British Columbia (see map attached).

Sage Creek Coal Limited is 60% owned and managed by Rio Algom Limited.

Rio Tinto Canadian Exploration carried out extensive geological work and surface drilling during the period 1970 to 1974 inclusive. In addition, underground bulk sampling and pilot plant washability test work were done during the summers of 1972, 1973, 1974. Washed samples from a pilot plant program performed by Birtley Engineering in Calgary, have been tested by the Metals Reduction Energy Centre, Mines Branch of the Department of Energy, Mines & Resources, Ottawa for coking characteristics. The carbonization results confirmed the presence of a large deposit of medium volatile bituminous coal of good coking quality.

A preliminary transportation study has been carried out and shows that a spur railway will have to be constructed from the site north through the Flathead Valley via McEvoy Pass to McGillivray on the CP main line east of Sparwood, B.C. It has been assumed that the clean coal will be transported from the site to Roberts Bank for trans-shipment to overseas markets although alternative market outlets are being investigated.

Following the extensive field work completed to date, an in-house feasibility study was completed in May 1975.

LOCATION AND ACCESS

The Sage Creek coal property, comprising approximately 24,000 acres in 51 coal licences, is located in the Flathead Valley of southeastern B.C., approximately 52 miles southeast of the town of Fernie, 10 miles west of the Alberta border and 10 miles north of the Montana border. The property can be reached by several gravel roads from the west, north and south. A 48 mile logging road from the Fernie highway is currently being upgraded to highway standards. The central part of the property lies at latitude 49°, 06' north and longitude 114°, 34' west. The nearest railway is the main line of the Canadian Pacific at Elke, B.C. - a distance of about 30 miles to the west (direct map distance). A possible alternative rail route could extend to the south into the United States to join up with the Burlington Northern Railway near Kalispell, Montana, a distance of about 45 miles. The rail distance from the proposed mine site to Roberts Bank on the Pacific Coast is approximately 700 miles.

GEOLOGY AND RESERVES

The identified coal reserves occur in the area now known as the North and South Hills.

Investigation of the property has included mapping, trenching, drilling and underground sampling. Drilling has been carried out on a grid pattern on 800 foot centres and consists of 78 holes totalling approximately 51,000 feet. Underground lateral work consists of 4,000 feet of drifts and cross-cuts from 12 adits. Bulk samples from all seams have been taken for analysis and

testing of coal quality and to check for possible oxidation along fault contact zones.

The coal seams underlying the Sage Creek property were deposited during Mesozoic time, and occur in the Kootenay Formation. Locally the Kootenay Formation occupies an east dipping monocline structure with the enclosed strata striking north to northeast, and dipping easterly at an average of 25° to 30°. On South Hill numerous, steeply dipping, north to northwest trending normal faults cut the strata causing apparent horizontal lengthening.

Three economically significant seams are identified on the property: Seam 5 - the lowest in the stratigraphic section - has an average thickness of 35 feet; seam 4 upper and 4 lower have average thickness of 27 and 20 feet respectively, and seam 2 - the highest in the stratigraphic section - has an average thickness of 10 to 12 feet. The approximate rock-to-coal ratio of the Kootenay Formation in the property area is 8:1.

In situ geological coal reserves have been calculated on a basis consistent with the proposed mining methods. A tabulation is shown in the following table:

(millions of long tons)

	<u>North Hill</u>	<u>South Hill</u>	<u>Total</u>
Proven	68.6	36.5	105.1
Probable, possible	<u>23.2</u>	<u>19.2</u>	<u>42.4</u>
	<u>91.8</u>	<u>55.7</u>	<u>147.5</u>

Additional exploratory work in the proven area is not expected to change the calculated reserves by more than 20%.

Based on geological sections and the preliminary design of the pits and assumptions made for mining recovery, it is expected that 110¹ million long tons of coal will be available for delivery to the wash plant.

MINING

The open pit mining method proposed is based on proven techniques using 20 yd. shovels, 170-ton trucks and 15yd. front-end loaders to remove raw coal from the mine at a rate of 5.3 million long tons per year. The overall stripping ratios are 9.7 cubic yards of waste per long ton of raw coal available for delivery to the washing plant for the North Hill and 8.6 for the South Hill.

COAL PREPARATION

The Coal Preparation Plant will consist of dense medium cyclones, water only cyclones and Froth flotation. This type of wash plant is now being successfully used by present Western coal producers.

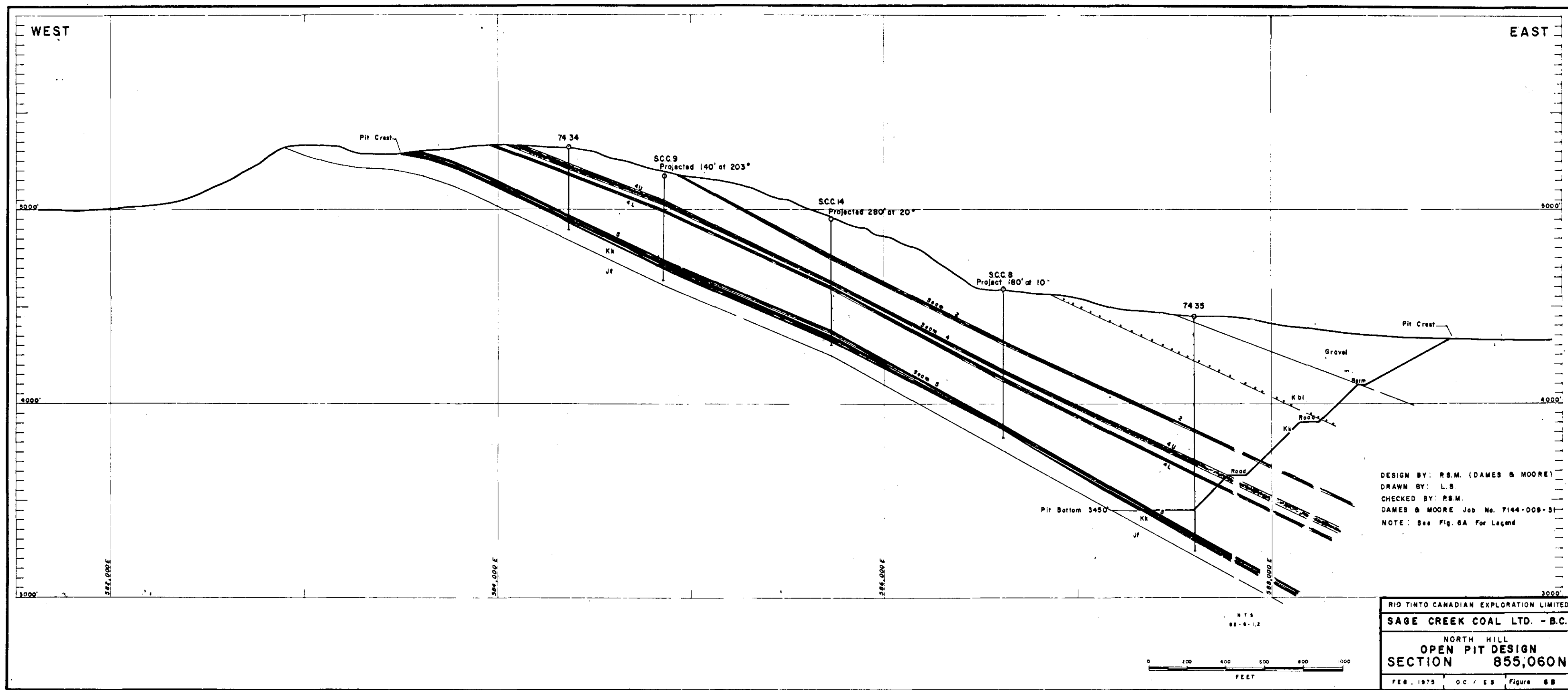
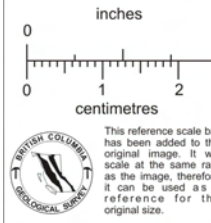
Coal samples obtained from adits, core drilling and reverse circulation rotary drilling, from both the North and South Hills have been tested in the Laboratory and Pilot Plant at Birtley Engineering in Calgary. The data from the sampling program has been augmented by the use of Density logs and Gamma Ray, Neutron logs in the drill holes. The tests have shown that the raw ash from the seams varies from 20% in Seam #2 to 38% in Seam #5.

The blended feed to the Coal Preparation Plant will have a raw ash content of 28%-30%.

The percentage yield from the Coal Preparation Plant will be 60% when processing coal from the North Hill and 53% when processing coal from the South Hill; the clean coal ash content will be 9.5±0.5%. On this basis the annual production of saleable metallurgical coal will be 3 million long tons. Approximate analysis of clean coal blend of all three seams is shown below:

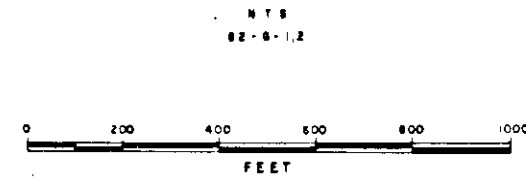
Ash	- 9.5%
Raw Moisture	- 1.6%
Volatile Matter	- 22.5%
Free Carbon	- 66%
Sulphur	- 0.4%
Free Swelling Index	- 6.5
BTU's/lb	- 14,000

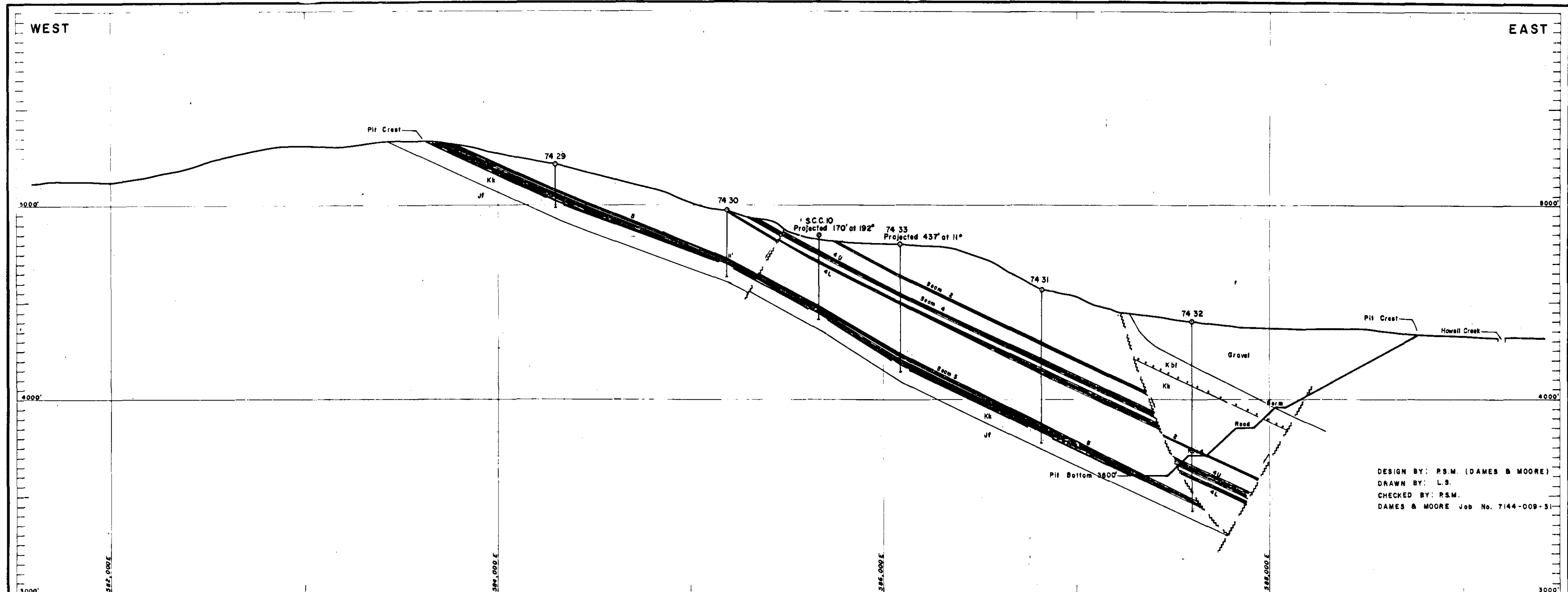
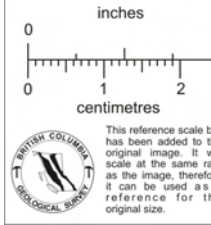
The final feasibility study is scheduled for completion by June, 1976. If marketing and financing arrangements can be completed by the end of 1976, Sage Creek Coal could be in production by July, 1979.



DESIGN BY: R.S.M. (DAMES & MOORE)
 DRAWN BY: L.S.
 CHECKED BY: R.S.M.
 DAMES & MOORE Job No. 7144-009-31
 NOTE: See Fig. 6A For Legend

RIO TINTO CANADIAN EXPLORATION LIMITED
 SAGE CREEK COAL LTD. - B.C.
 NORTH HILL
 OPEN PIT DESIGN
 SECTION 855,060N
 FEB. 1975 OC / ES Figure 6B

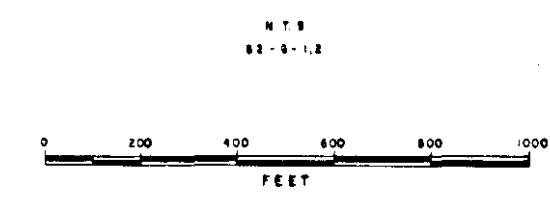




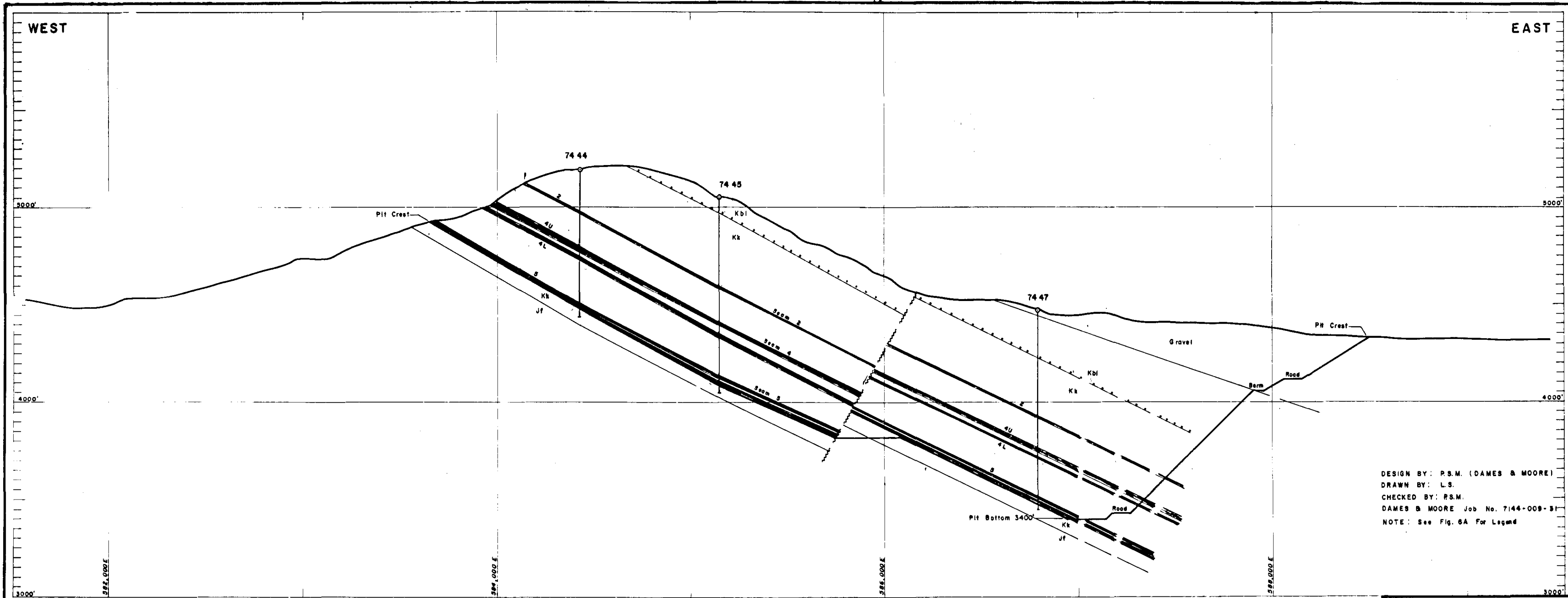
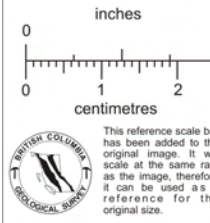
DESIGN BY: P.S.M. (DAMES & MOORE)
 DRAWN BY: L.S.
 CHECKED BY: P.S.M.
 DAMES & MOORE Job No. 7144-009-31

LEGEND

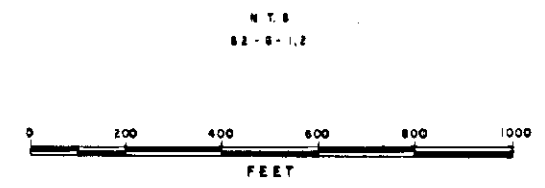
Jf	Jurassic - Ferale Fm.		Fault, Direction of movement indicated
Kk	Cretaceous - Kootenay Fm.		Contact, Defined, Inferred
Kbl	Cretaceous - Blairmore G.	•	Drill Hole
Tt	Tertiary - Kishanohk Fm.		



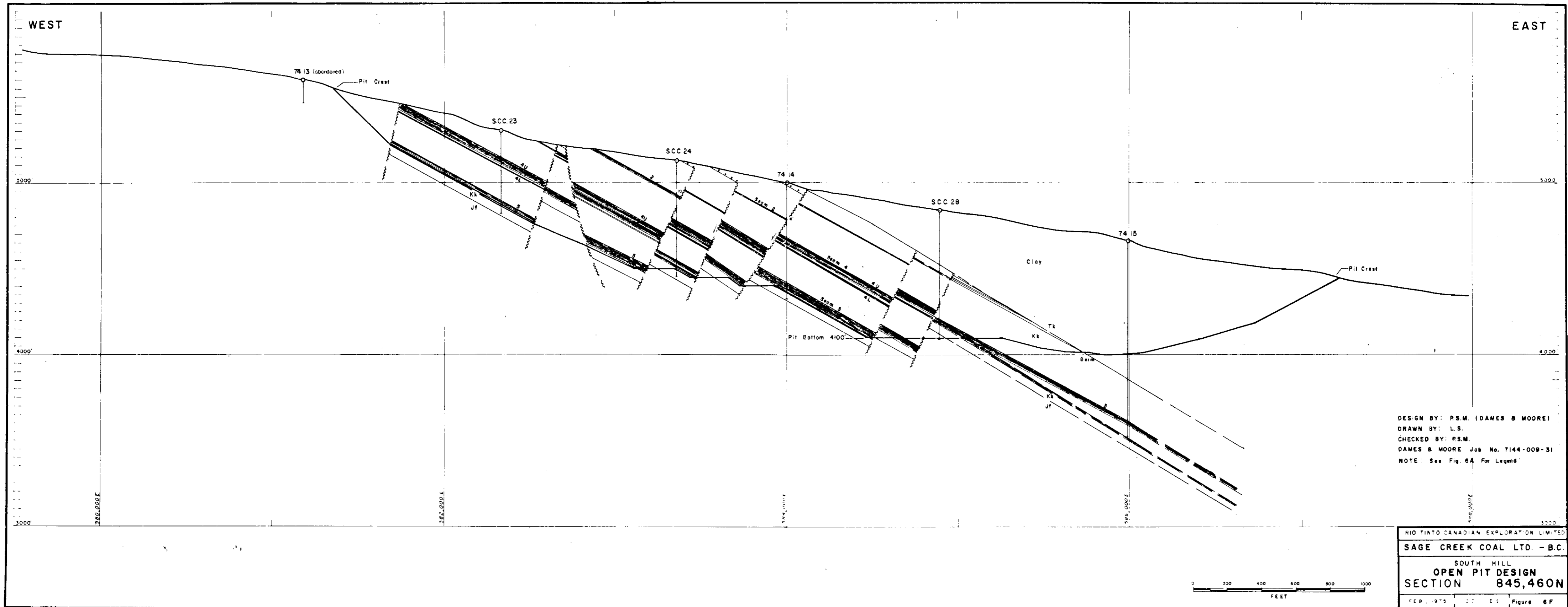
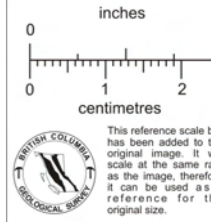
RIO TINTO CANADIAN EXPLORATION LIMITED
SAGE CREEK COAL LTD. - B.C.
 NORTH HILL
OPEN PIT DESIGN
SECTION 855,860N
 FEB. 1975 D.C. / E.S. Figure 6A



DESIGN BY: R.S.M. (DAMES & MOORE)
 DRAWN BY: L.S.
 CHECKED BY: R.S.M.
 DAMES & MOORE Job No. 7144-008-B1
 NOTE: See Fig. 6A For Legend



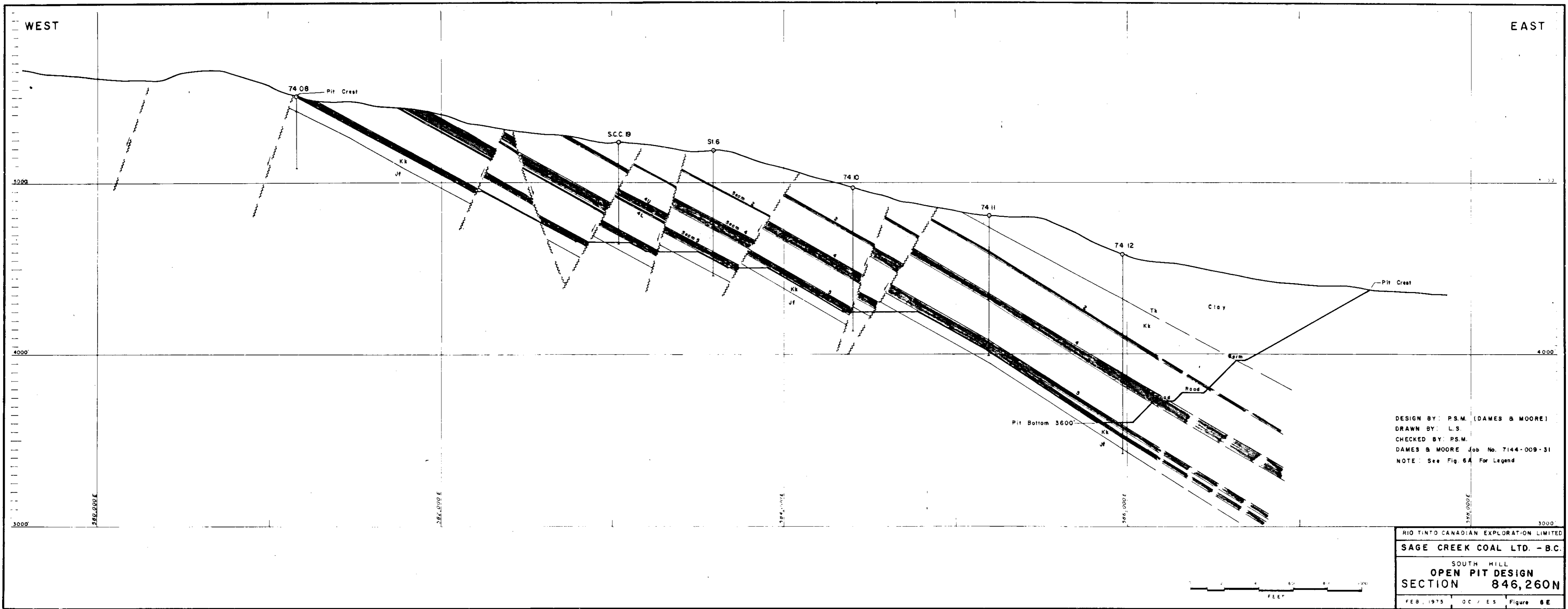
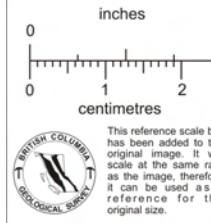
RIO TINTO CANADIAN EXPLORATION LIMITED
 SAGE CREEK COAL LTD. - B.C.
 NORTH HILL
 OPEN PIT DESIGN
 SECTION 852,660N
 FEB. 1975 DC / J.E.S. Figure 6C



DESIGN BY: P.S.M. (DAMES & MOORE)
 DRAWN BY: L.S.
 CHECKED BY: P.S.M.
 DAMES & MOORE Job No. 7144-009-31
 NOTE: See Fig. 6A For Legend



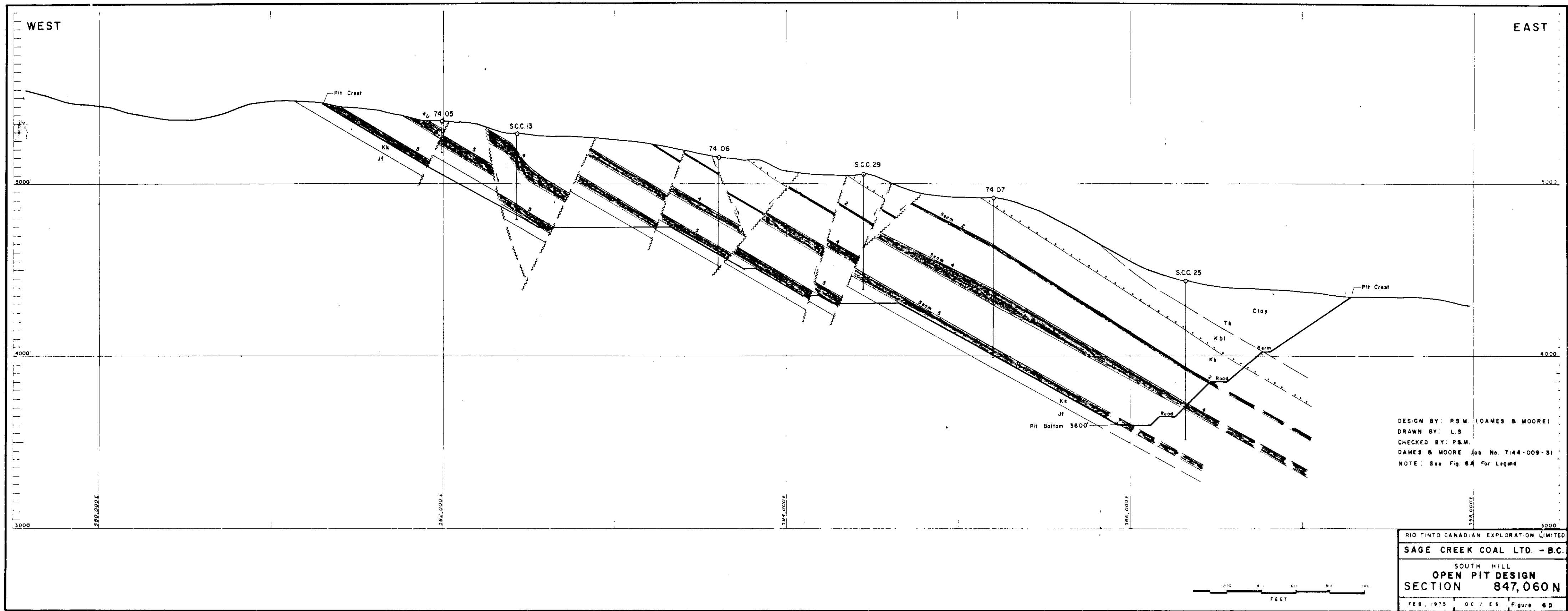
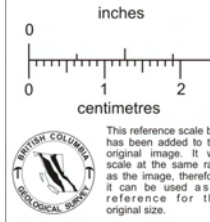
RIO TINTO CANADIAN EXPLORATION LIMITED
 SAGE CREEK COAL LTD. - B.C.
 SOUTH HILL
OPEN PIT DESIGN
SECTION 845,460N
 FEB. 1975 20 ES Figure 6F



DESIGN BY: P.S.M. (DAMES & MOORE)
 DRAWN BY: L.S.
 CHECKED BY: P.S.M.
 DAMES & MOORE Job No. 7144-009-31
 NOTE: See Fig. 6A For Legend

RIO TINTO CANADIAN EXPLORATION LIMITED
 SAGE CREEK COAL LTD. - B.C.
 SOUTH HILL
OPEN PIT DESIGN
SECTION 846,260N
 FEB. 1975 OC / ES Figure 6E

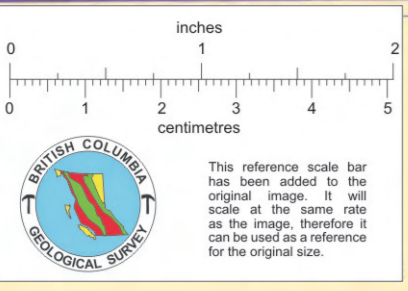




DESIGN BY: P.S.M. (DAMES & MOORE)
 DRAWN BY: L.S.
 CHECKED BY: P.S.M.
 DAMES & MOORE Job No. 7144-009-31
 NOTE: See Fig. 6A For Legend

RIO TINTO CANADIAN EXPLORATION LIMITED
 SAGE CREEK COAL LTD. - B.C.
 SOUTH HILL
OPEN PIT DESIGN
SECTION 847,060N
 FEB. 1975 OC / ES Figure 6D



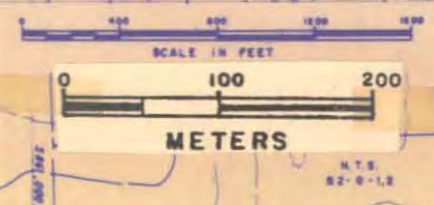
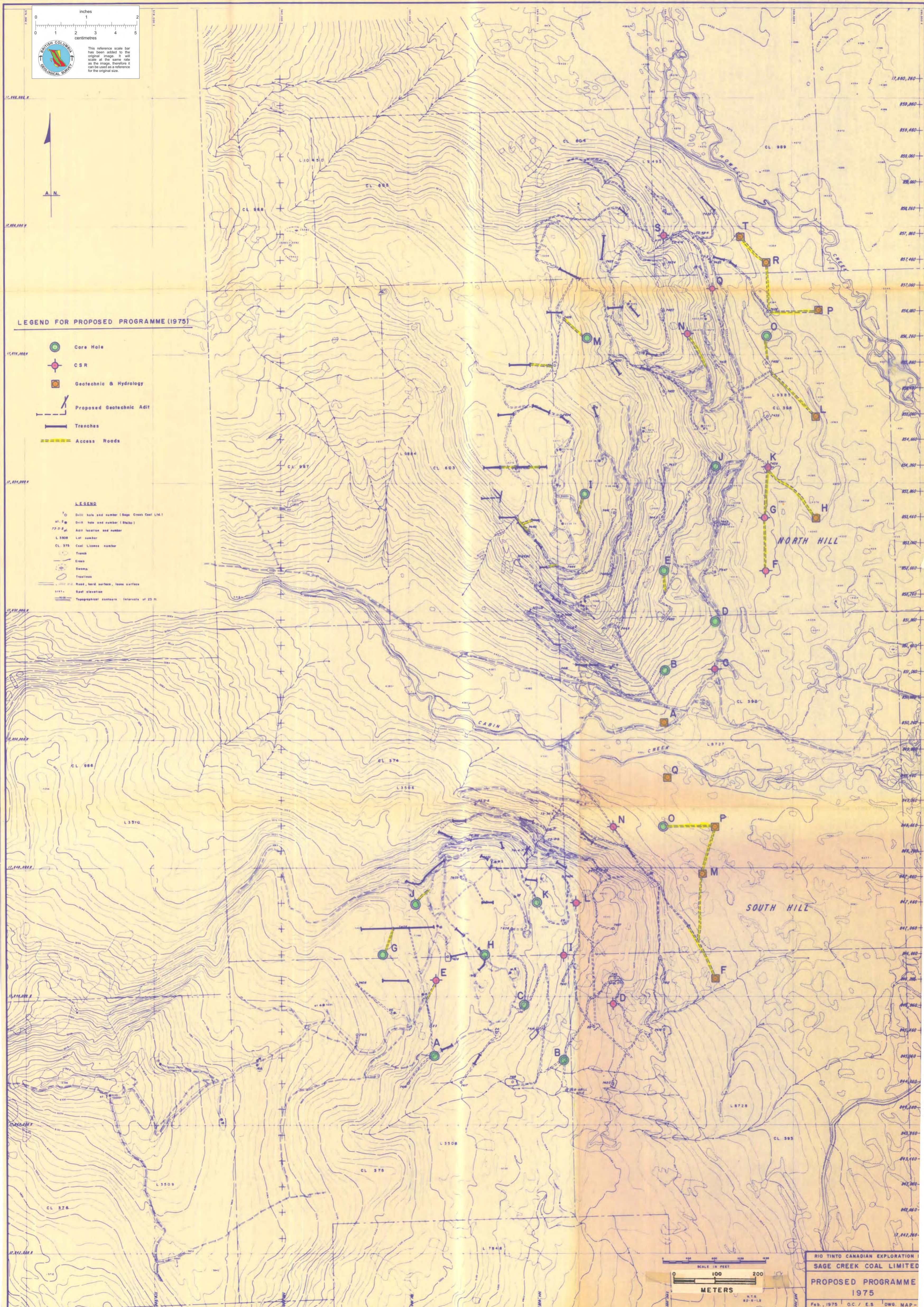


LEGEND FOR PROPOSED PROGRAMME (1975)

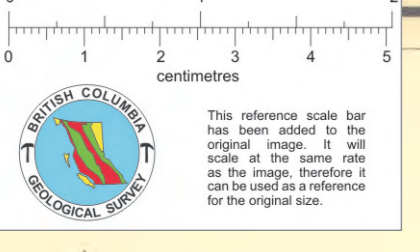
- Core Hole
- CSR
- Geotechnic & Hydrology
- Proposed Geotechnic Adit
- Trenches
- Access Roads

LEGEND

- Drill hole and number (Sage Creek Coal Ltd.)
- Drill hole and number (Bulke)
- Drill location and number
- Lot number
- Coal Licence number
- Fence
- Cross
- Swamp
- Trailline
- Road, hard surface, loose surface
- Spot elevation
- Topographical contours Intervals of 25 ft.



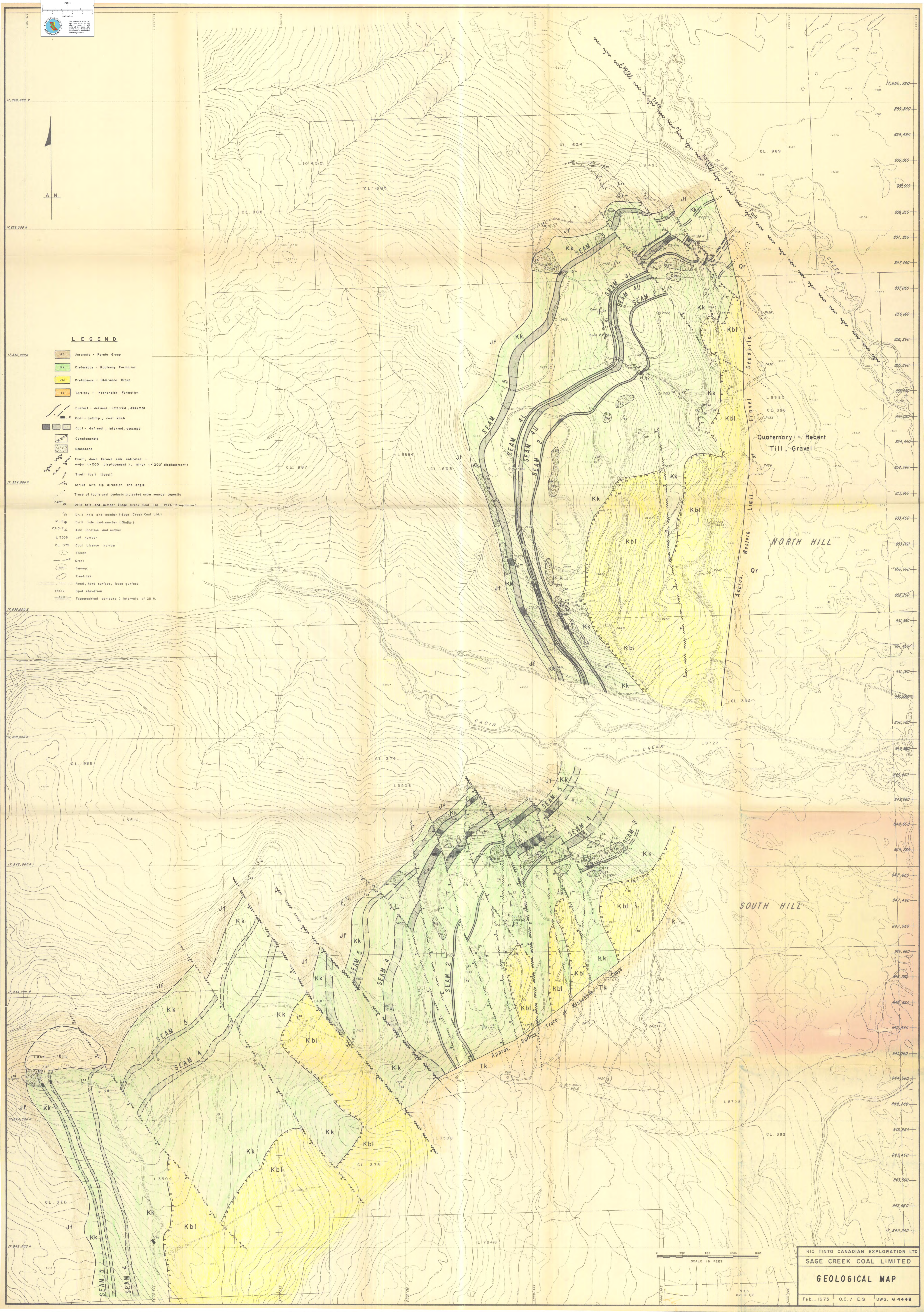
RIO TINTO CANADIAN EXPLORATION
 SAGE CREEK COAL LIMITED
 PROPOSED PROGRAMME
 1975
 Feb. 1975 O.C./E.S. DWG. MAP-



A N

LEGEND

- Jf Jurassic - Fannie Group
- Kk Cretaceous - Kootenay Formation
- Kbl Cretaceous - Blairmore Group
- Tk Tertiary - Kishenehn Formation
- Contact - defined - inferred, assumed
- Coal - outcrop, coal wash
- Coal - defined, inferred, assumed
- Conglomerate
- Sandstone
- Fault, down thrown side indicated - major (>200' displacement), minor (<200' displacement)
- Small fault (local)
- Strike with dip direction and angle
- Trace of faults and contacts projected under younger deposits
- Drill hole and number (Sage Creek Coal Ltd. - 1974 Programme)
- Drill hole and number (Sage Creek Coal Ltd.)
- Drill hole and number (Sulko)
- Adit location and number
- Lot number
- Coal Licence number
- Trench
- Creek
- Swamp
- Trestlines
- Road, hard surface, loose surface
- Spot elevation
- Topographical contours: intervals of 25 ft.



RIO TINTO CANADIAN EXPLORATION LTD.
SAGE CREEK COAL LIMITED

GEOLOGICAL MAP

Feb., 1975 O.C. / E.S. DWG. G 4449