

# OPEN FILE CONFIDENTIAL

MT. SPIEKER PROJECT  
PROGRESS REPORT  
1980 EXPLORATION PROGRAMME

CL # 3027, 3030-3032,  
3034-3037, 3039-3042,  
3044-3047, 3049-3060

## GEOLOGICAL BRANCH ASSESSMENT REPORT

BY

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NTS 93P3

# 00 558

Prepared For: Ranger Oil Limited,  
#2600, 330 - 5th Avenue S.W.,  
Calgary, Alberta.  
T2P 0L4

Prepared By: Robertson Research Canada Limited

Report No.: RRC/80/3014

December 19, 1980

STATEMENT REGARDING REGISTRATION

This is to certify that the descriptive logging of both stratigraphy and coal seams, all corrections thereto, and correlations with the geophysical logs, of diamond drill holes MS-34 to MS-40, drilled for Ranger Oil Limited on the Mt. Spieker Coal Property in northeast British Columbia, were carried out by Mr. L.M.Little as stated on the cover page of each log, registered Professional Geologist in the Province of Alberta, Canada.

TABLE OF CONTENTS

	<u>Page No.</u>
1. SUMMARY .....	1
2. INTRODUCTION .....	2
2.1 Location .....	3
2.2 Previous Investigations .....	3
2.3 1980 Exploration Programme .....	4
2.3.1 Programme Supervision .....	4
2.3.2 Diamond Drilling .....	4
2.3.3 Adits .....	5
2.3.4 Testing, Analysis and Data Evaluation .....	8
2.3.5 Drill Hole and Adit Locations .....	9
2.3.6 Report Preparation .....	9
3. EXPLORATION PROGRAMME PROGRESS .....	10
3.1 Field Programme .....	10
3.2 Coal Quality Testing .....	10
3.3 Drill Hole and Adit Locations .....	10
3.4 Report Preparation .....	10

LIST OF TABLES

Table 1: 1980 Drillhole Summary .....	6
Table 2: 1980 Adit Summary .....	7

LIST OF APPENDICES

- Appendix A: Location Map and Diamond Drill Hole Logs see: PR-Mt. Spieker
- Appendix B: 1980 Adits: Plans and Sections see: PR-Mt. Spieker 80(3)A 80(3)A
- Appendix C: Coal Quality Analytical Results see: PR-Mt. Spieker 80(4)A\*

Refer to: Confidential Coal Analysis File  
PR. Mt. Spieker 80(4)A

1. SUMMARY

The exploration carried out by Ranger Oil Limited on the Mt. Spieker coal project during the 1980 field season has advanced the stratigraphic and structural knowledge of the property. The field programme consisted of 1205 metres of diamond drilling in seven holes and 185.5 metres of adit drivage in four adits to obtain bulk samples. The geological evaluation and coal analysis in progress, will serve as an update to the previous report titled "Mt. Spieker Coal Project, 1978 Exploration Programme" prepared for Ranger Oil by Robertson Research (North America) Ltd.

2. INTRODUCTION

This progress report has been compiled by Robertson Research Canada Limited (RRC) as a result of an exploration programme carried out on behalf of Ranger Oil Limited during the 1980 field season. There are three principal objectives of this programme. Firstly, the geological model and reserves of the EB Pit area to be updated from the 1978 report. Secondly, to obtain coal seam quality information and bulk samples from the Gates A, B, C and D Seams in the EB Pit area. Finally, a reconnaissance hole established to investigate geological structure and stratigraphy of Syncline area of Mt. Spieker Ridge. In order to reach these objectives, drill holes and adits are required as a basis for the field programme.

## 2.1 Location

The Mt. Spieker Property is 65 kilometres by air and 115 kilometres by logging road south of Chetwynd, B.C. The property rises in elevation from 1021 metres above sea level (a.s.l.) at Bulmoose Creek to 1978 metres a.s.l. on Mt. Spieker. The terrain is mountainous with plateaus at higher elevations.

## 2.2 Previous Investigations

The 28 coal licences are currently optioned to Ranger Oil Limited by Teck Corporation of Vancouver, B.C., which carried out reconnaissance exploration work in the early 1970's.

During the 1975 to 1977 field seasons, Nichimen Resources Ltd., in conjunction with Ranger Oil, upgraded the geological knowledge of the property by performing geological exploration, including 15 drill holes. This work demonstrated the presence of mineable thicknesses of coal seams belonging to the Commotion and Gething Formations.

In 1978 a field programme, consisting of geological mapping, 18 drill holes, 24 trenches and three adits, was conducted by Robertson Research on behalf of Ranger Oil Limited. As a result of this programme a prefeasibility mining study was undertaken by Intermin Consultants Ltd.

As a result of previous work conducted, four potential mining areas have been identified on the Mt. Spieker property. The four areas are:

- (1) Mt. Spieker Ridge
- (2) EB1 Open Pit
- (3) Main Syncline Underground Area
- (4) Bird Seam Underground Area

The total resource base of all four above areas is approximately 120 million tonnes of coal in situ, of which 19.32 million tonnes exists to a highwall unit of 12 cubic metres overburden to one tonne coal.

### 2.3 1980 Exploration Programme

In order to achieve the objectives of the exploration programme as previously stated, a programme consisting of diamond drilling and adit work was carried out. Each phase is described below.

#### 2.3.1 Programme Supervision

The overall supervision of the field programme was under the control of Mr. M. A. Mitchell, Ranger Oil. The geological data was collected and collated by L. M. Little, Robertson Research. A field camp was established on the Mt. Spieker Property to accommodate field crews and contractor's personnel.

Support, communications to the field camp, routine facilities for data and coal samples were supplies from the offices of Robertson Research, under the supervision of Mr. G. R. Wallis.

#### 2.3.2 Diamond Drilling

The diamond drilling phase of the programme, totalling 1205 metres, was designed to satisfy two objectives. The first

objective involved five holes in the EB1 Pit Area, two of which were designed to sample the coal seams prior to establishing adits, while the remaining three were designed to further delineate the geological structure and stratigraphy. The second objective involved one hole in the Syncline area of Mt. Spieker Ridge which was designed to intersect the coal seams of the Gates Member while at the same time identifying the general structural setting for the area. Table 1 summarizes the location of the drill holes while Appendix A contains a map showing the spatial distribution of drill holes in the EB1 Pit Area.

The drilling was contracted to D. W. Coates Ltd. of Vancouver. Drill hole logs and sections, both stratigraphic and seam, for each hole are included in Appendix A. The coal seam intersections with core recoveries and quality analysis are included in Appendix C.

### 2.3.3 Adits

To allow bulk sampling for washability and coking tests, four adits involving some 185.5 metres of total drivage, were constructed during 1980. The work was carried out under contract by Target Tunnelling Ltd.

All the adits were established in the EB1 Pit Area. These adits are referred to as "A Seam - Adit A1", "B Seam - Adit B3", "C Seam - Adit C2" and "D Seam - Adit D1". Table 2 summarizes the adit locations and elevations while Appendix A contains a map showing the spatial distribution of the adits.



TABLE 1

1980 DRILLHOLE SUMMARY\*

<u>DDH</u>	<u>TOTAL DEPTH</u>	<u>NORTHING</u>	<u>EASTING</u>	<u>ELEVATION</u>
MS-34	103.09	6107633.1	602174.9	1701.6
MS-35	120.49	6107016.5	601663.3	1560.6
MS-36	160.26	6107052.3	601737.4	1560.3
MS-37	158.8	6108034.0	602156.5	1716.1
MS-38	137.92	6106813.5	601573.5	1558.5
MS-39	449.8	6108686.2	605184.4	1831.2
MS-40	74.8	6107446.8	601901.3	1679.3

\*Values are metric on UTM Zone 10 grid and Geodetic Vertical Datum. Accuracy  $\pm 1$  metre.

TABLE 2

1980 ADIT SUMMARY\*

<u>ADIT</u>	<u>NORTHING</u>	<u>EASTING</u>	<u>ELEVATION</u>	<u>DRIVAGE DISTANCE</u>
D1	6107472.6	601873.0	1689.8	34
C2	6107391.1	601916.9	1647.8	32
B3	6107332.1	601913.5	1624.7	56.5
A1	6107309.1	601968.4	1608.0	63

\*Values are metric on UTM Zone 10 grid and Geodetic Vertical Datum. Accuracy  $\pm 1$  metre.

Throughout the construction of the adits, channel samples of the total various seam plies, including rock bands, were taken at 1.5 metre intervals along the drivage for field testing of the free swelling index (F.S.I.). By this method the degree and depth of oxidation were continuously monitored. Appendix B contains plans, section and F.S.I. results for each adit.

Bulk sampling was carried out once the seam was unoxidized for each adit. Approximately 60 tonnes of bulk sample was sent to Birtley Coal and Mineral Testing for analysis.

#### 2.3.4 Testing, Analysis and Data Evaluation

A programme of geophysical borehole logging, visual logging of both stratigraphy and coal seams, and coal seam analysis was carried out in 1980.

Geophysical logging using caliper, gamma ray, neutron, and focussed resistance sondes was carried out on all drill holes. The geophysical logging was carried out by Roke Oil Enterprises Ltd. of Calgary.

The geophysical logs have been incorporated with the geologist's detailed core logs to prepare the coal seam sections, included in Appendix A, as well as to determine seam thicknesses for reserve calculations.

Drill core representing the coal seams, after detailed logging, was sampled and forwarded to Birtley Coal and Mineral Testing for quality analysis. Similarly the adit channel and bulk samples were sent to Birtley for quality analysis. The results of these analytical tests are listed in Appendix C.

### 2.3.5 Drill Hole and Adit Locations

Following the completion of drilling and the establishing of portals on the four adits the property was flown by Burnett Resource Surveys Ltd. of Vancouver. As a result, location and elevation coordinates were calculated for all drill holes and adits, and are summarized in Tables 1 and 2.

### 2.3.6 Report Preparation

Following the completion of the field activities, the data evaluation phase of the programme will concentrate on producing the necessary updated maps and sections of the EB1 Pit Area and Syncline Area of Mt. Spieker Ridge. The data base consisting of drill hole logs, coal seam sections, adit plans and sections, and coal seam quality analysis will be contained in separate appendices. A computer programme will be used to assist in data reduction and evaluation. The final report will summarize the findings of this exploration programme and will provide an update of the 1978 Robertson Research report for the EB1 Pit Area and Syncline Area of Mt. Spieker Ridge.

### 3. EXPLORATION PROGRAMME PROGRESS

The following is a summary of the work done to date on the 1980 exploration programme.

#### 3.1 Field Programme (Diamond Drilling and Adits)

All proposed drill holes and adits were completed. Geological and geophysical data has been collected from the drill holes and adits. This data has been evaluated and summarized as drill logs, coal seam sections, and adit plans and sections, and included as Appendix A and B.

#### 3.2 Coal Quality Testing

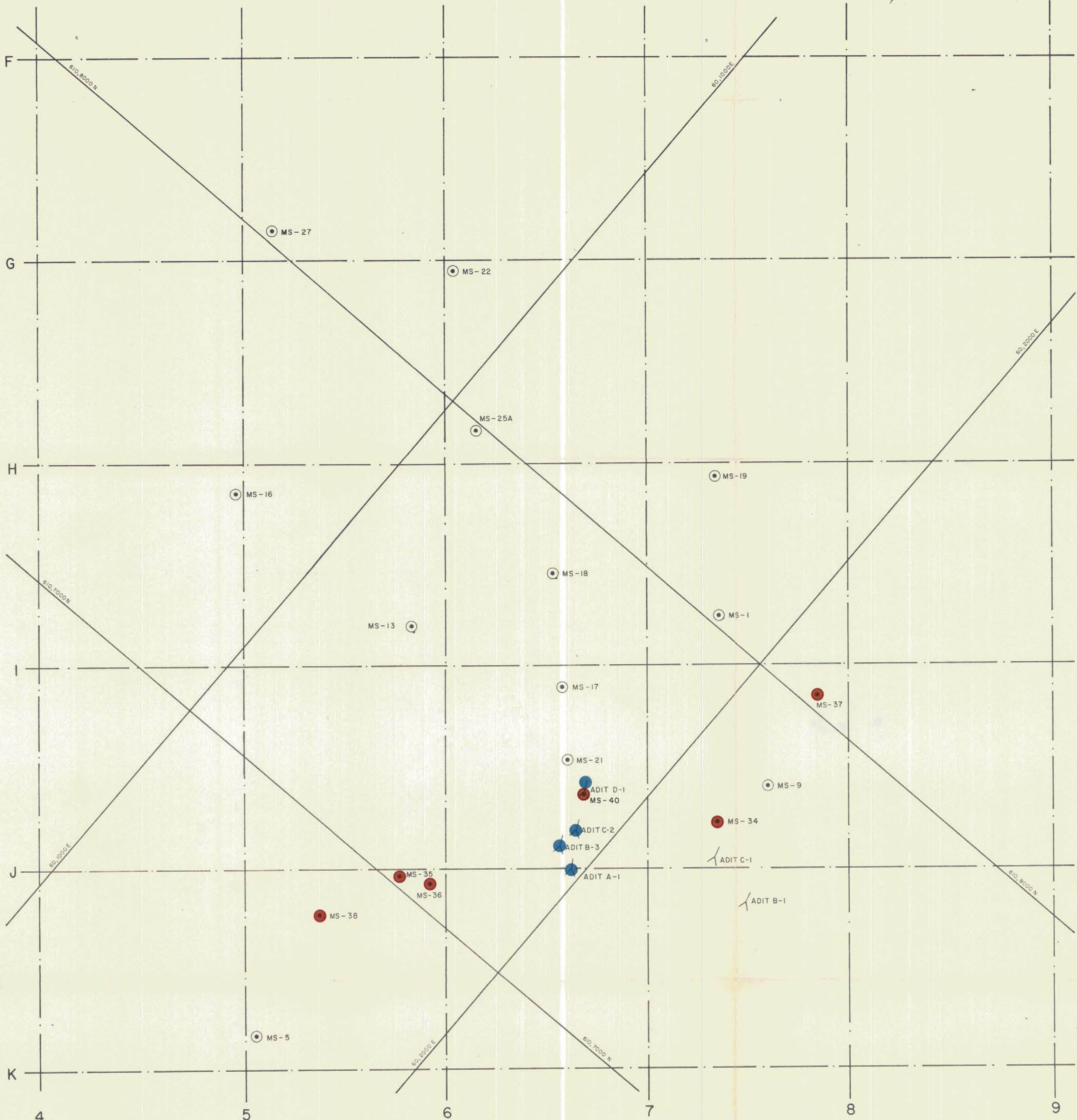
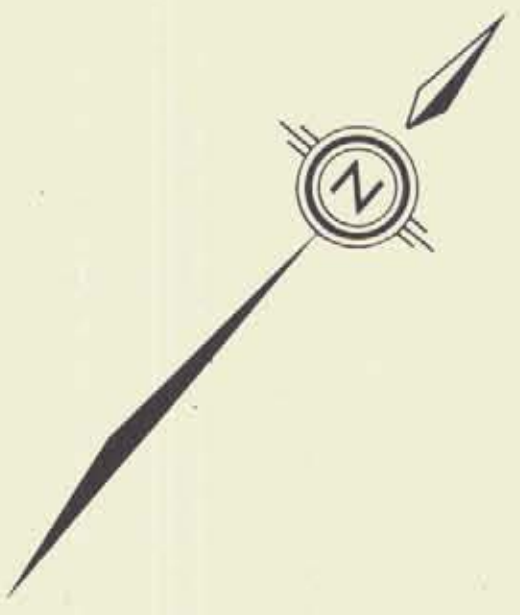
Coal samples have been sent to Birtley Coal and Mineral Testing for analysis. Majority of analysis complete and summarized in Appendix C. Remaining analysis to be done includes petrographic analysis of clean coal seam composites and Wet Drum Attrition test for each adit bulk sample.

#### 3.3 Drill Hole and Adit Locations

Calculations establishing the drill holes and adits location and elevation, and grid plot of the above have been completed.

#### 3.4 Report Preparation

The data base has been created. The next phase involving map and final report preparation is in the initial stage. A computer programme is being used to assist data evaluation. The completion date for the final report of the 1980 exploration programme is expected to be the end of January 1981.



558

PP-Mt Spitzer RD(2)A

RANGER OIL (CANADA) LTD.

1980 EXPLORATION PROGRAMME  
DRILL HOLE & ADIT LOCATIONS

COMPILED BY L LITTLE	DATE DEC 1980
DRAWN BY J COONEY	REV DATE

PREPARED BY ROBERTSON RESEARCH CANADA LIMITED



- 1980 Adit locations
- 1980 Drill holes.

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MT. SPIEKER PROJECT

APPENDIX A and B

# CONFIDENTIAL

GEOLOGICAL BRANCH  
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MT. SPIEKER PROJECT

APPENDIX A

LOCATION MAP AND

DIAMOND DRILL HOLE LOGS

MS-34 to MS-40

See Over For: Notes to Accompany Appendix A and Legend  
for Drill Logs.

Prepared For: Ranger Oil Limited,  
#2600, 330 - 5th Avenue S.W.,  
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NOTES TO ACCOMPANY APPENDIX A

Appendix A, contains the raw data relating to each diamond drill hole drilled in 1980 on the Mt. Spieker Property.

The 1980 series drill holes, D.D.H.'s MS-34 to MS-40 a full record is reproduced in Appendix A. This record comprises, in the listed order, the following elements:

Cover Page - summary facts and drilling record.

Stratigraphic Section - columnar section of the stratigraphy at a scale of 1:500.

Seam Section - detailed columnar seam section at a scale of 1:20, showing sample intervals and raw coal analytical data.\*

Written Log - descriptive written log of strata penetrated.


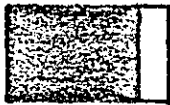




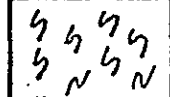
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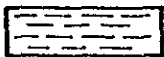

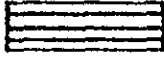
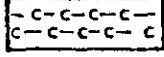

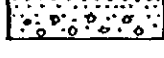
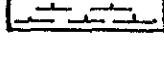
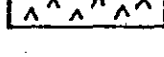
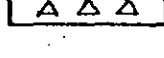
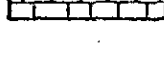


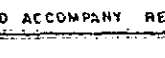
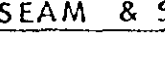
\*Shown on the seam sections are those coal plies which were composited for washability tests. The results of those tests are included in Appendix C.

SEAM SECTION

LITHOLOGICAL SYMBOLS

COAL VARIATION SYMBOLS

% OF BRIGHT BANDS	VISUAL APPEARANCE
>80%	 <b>BRIGHT</b>
60-80%	 <b>BRIGHT W. DULL BANDS</b>
40-60%	 <b>INTERBANDED DULL &amp; BRIGHT</b>
20-40%	 <b>MAINLY DULL W. BRIGHT BANDS</b>
<20%	 <b>DULL</b>
	 <b>BONEY</b>
	 <b>SHEARED</b>

	Shale
	Sandy shale
	Mudstone, claystone
	Siltstone
	Carbonaceous mudstone, clayst.
	Carbonaceous shale
	Coal
	Sandstone
	Conglomerate
	Marl
	Tuff
	Breccia
	Limestone
	Fault
	Possible Fault

**RANGER OIL LTD.**

PREPARED BY ROBERTSON RESEARCH ( CANADA ) LIMITED -  
TO ACCOMPANY REPORT NO RRC/80/3014

DIAMOND DRILL CORE SYMBOLS FOR  
SEAM & STRATIGRAPHIC SECTIONS

DRAWN BY: LML DEC.80

REF. No. RRC./80/3014