

TABLE OF CONTENTS

EXECUTIVE SUMMARY	i
TABLE OF CONTENTS.....	iii
LIST OF FIGURES	v
LIST OF TABLES.....	v
LIST OF APPENDICES	v
 INTRODUCTION.....	1
The Export Metallurgical Coal Industry in Alberta	1
Future challenges.....	1
Demand side factors.....	1
Supply side factors.....	2
Meeting the Challenge	5
Hydraulic Mining.....	7
 HYDRAULIC MINING	9
Definition.....	9
Basic Concepts	9
Development.....	10
Mining	11
Transportation	13
Water Treatment.....	13
Selection Criteria for Hydraulic Mining methods	15
Requirements for Hydraulic Mining.....	15
Alternatives to Hydraulic Mining	16
Advantages of Hydraulic Mining	18
 A BRIEF HISTORY OF HYDRAULIC MINING METHODS	21
Russia	21
West Germany	22
Japan.....	23
United States	23
Other Experience.....	25
Canadian Experience.....	25
South Balmer Mine, Michel, BC.....	26
Cardinal River Coal, Alberta	30
Smoky River, Alberta	30
Discussion.....	31
 REASONS PREVENTING APPLICATION.....	33
Physical.....	33
Financial	33
Risk	34
Discussion.....	35
 SCIENCE AND TECHNOLOGY ISSUES.....	37
Rapid Development of Access Tunnels	38

Conventional Methods	38
Rapid development using full face tunnel boring machines.....	40
Support of the Roof and Sides.....	43
Transport of coal/water slurry.....	45
Transport of coal from Portal to Washplant.....	45
Water treatment/recycling.....	47
Discussion.....	49
 SITE SELECTION.....	51
Requirements For Hydraulic Mining	51
SRCL Trial Site	51
SRCL Hydraulic Mining Resource Estimates.....	52
J. T. Boyd Study, 1973.....	53
SRCL In-House Study, 1980.....	54
Canadian Mine Services Limited, 1983.....	55
 PROPOSED METHOD.....	57
Site	57
Access.....	57
Development.....	58
Mining	59
Slurry Transportation.....	60
Water Treatment.....	60
Discussion.....	60
 PARTICIPATION AND FUNDING	61
Participation.....	61
Funding.....	62
 FIELD TRIAL	63
Performance of the monitor	63
Coal Breakage.....	63
Coal Losses	64
Performance of the flumes	65
Performance of the water/coal separation system.....	66
Performance of tunnels in coal with a coal roof.....	67
Field trial Format	67
 FEASIBILITY STUDY.....	71
 COSTS	75
 CONCLUSIONS	77
 RECOMMENDATIONS.....	79
 REFERENCES AND BIBLIOGRAPHY.....	81

LIST OF FIGURES

Figure 1:	Coking coal prices, 1983 to present, with projections	2
Figure 2:	Location of the low and medium volatile reserves of Alberta.....	3
Figure 3:	Two types of development machine.....	10
Figure 4:	Typical hydraulic mining layout.....	11
Figure 5:	Artist's impression of a hydraulic monitor at work	12
Figure 6:	Diagram of the Kaiser dewatering plant	14
Figure 7:	Principle aspects of horizon mining.....	17
Figure 8:	Sub-level caving of a thick, steep coal seam by manual extraction.....	18
Figure 9:	Sub-level extraction by blasting	18
Figure 10:	Monitor at work in a Japanese coal mine	23
Figure 11:	Principle of borehole mining in a steep seam	26
Figure 12:	Generalized layout of the Kaiser South Balmer Mine	27
Figure 13:	Plan and section of a typical panel at South Balmer Mine	27
Figure 14:	Cross section through adjacent sub-levels, showing the caving of the roof.....	28
Figure 15:	Plan view of monitor in action	28
Figure 16:	Underground mines at Smoky River Coal Limited, showing the No. 3 Mine area examined as a potential site for hydraulic mining	31
Figure 17:	Shielded roadheader	39
Figure 18:	Two views of a tunnel boring machine	40
Figure 19:	Sample dewatering flowsheet for hydraulic mined product.....	46
Figure 20:	Simplified flow diagram of the Agglofloat process	48
Figure 21:	Sketch plan of potential hydraulic mining reserves on the SRCL property.....	53
Figure 22:	Principles of raise boring.....	59

LIST OF TABLES

Table 1:	Land use categories and allowable activities	3
Table 2:	Established resources and reserves of coal in the Mountain Region of Alberta at December 31, 1993.....	4
Table 3:	Summary of hydraulic mining reserves at SRCL.....	52
Table 4:	Comparison of feasibility study results	72

LIST OF APPENDICES

- 1 Market considerations for Western Canadian coking coals
- 2 Phase 2 Costs and Schedule

