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APPENDIX A

/

K-SAGE CREEK 76 (3) A (ESOK B-2)

TABLE III

DRILL HOLES OF THE 1976 DRILLING PROGRAM

HOLE NUMBER	CORDINATES	A THE A PLEVA BON T
76D01	17,853,575N	5132'
	585,210E	
76D02	17,854,660N	5060'
	585,480E	
76D03	17,851,525N	4740 '
	584,950E	
76D04	17,847,410N	4895'
	585,290E	
76D05	17,845,820N	5210'
	583,010E	
76D06	17,846,660N	5145'
	583,530E	

All cordinates are chain and compass surveyed only. All elevations are taken from the base map.

APPENDIX A

Lithological Drill Hole Reports - 1976

RIO TINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

Hole No.:	76-D-01
Location:	North Hill 17,853,575N (Approx.) 585,210E (Approx.)

Contractor: Connors Drilling

Rig No.:1

Property: Sage Creek Coal Elevation: 5132'

Hole Size: 3 25/32" (HQ)

	T-1 04 1076	
Date Commenced Drilling	JULY 24, 1976.	
Date Finished Drilling:	August 12, 1976.	
Date Hole Completed:	August 13, 1976.	
Logged By: James Mitchell	,Owen Cullingham	Date: July 24-August 12.
Probed By: Roke Oil Enter	prises	Date: August 12, - August 13.
Total Depth Drillers: 86	4	Depth of Overburden: 20'
Total Depth Logger: 86	3	Water Level: 72'

No.	Size	Make	and	Serial	No.	R.P.M.	<u>0n</u>	Off	Footage	Drilling Time
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Surf	ace Ca	sing: 54'		100 hrs		Stand	y Tim	e for	Logging:	Li hrs. Jator Truck breakdown
Tota. Tota	L Drii L Down	ling Time	3:	400 III.S.	•	Total	Stand	oy lim Qable	e:zu irş.(Standby T	ime · 31 hrs.
Tota	l Foot	ave Char	reab	le: 864		Actual	. Movi	ng Tim	e Between	Holes:
Tota:	1 Hour	ly Conta	ct:	62 hrs.		Charge	able	Moving	Time Bet	ween Holes: 6 hrs
					_	Quanti	ty of	Mud Ū	sed:	
Rema:	rks:-	Hole losi	ng ci	rculatio	on fram			Quik	Gel 232 7	Asbestos 1
		50' onward	as					Outr	1TO1 225	
									sear 3	
								UC 10	ь	

 860 -0 862 -0 860 -72	Sidewall Density Caliper Focused Beam Log Reviation Surveys		11 51 19	
	Coal Horizons	- *		

Coal Horizon	Drillers	Picks	Log Picks		
'A' Horizon 1 Horizon Seam 2 Seam 4U Seam 4L Seam 5U 5L	132.7-162.8 250.4-273.6 359.5-384.3 539-551.1 592.3-612 819.2-840 846 - 848	30.1' 23.2 24.8' 12.1 19.7 20.8 2.0	132-163 $260-273$ $359.5-384$ $539 - 551$ $593 - 610.5$ $820.5-839$ $846 - 848$	31' 13' 24.5' 12.0' 17.5' 18.5' 2'	
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Page Number 1

Interval	Unit Thickness	Description	< of Bed to Core Axis	Core Eval.	Rec.
0-20	20'	Overburden -Soil, fill and broken weathered rock. triconed to 20 feet.			
20-51	31.	Cretaceous Blainnore Group Sandstone and Conglomerate -med to coarse grained sg. grading basally & conglomerate. -33-35.2 conglomerate ss 35.2-47 conglomerate 47-50.3 shale gauge zone with slickenoids on frac. surface @ 60° to C/A.		good	95%
		50.3 - 51 conglomerate - heavily ironstained with decementation throughout.			
5171	20'	<u>Cretaceous Kootenay Formation</u> <u>Sandstone</u> -fine to med grained -Xbedded with carbonaceous lmn. -becoming coarse grained and massive by 58'-61' return to fine to med.grn. 61-71. 51-54 mod.ironstained decemented 57-57.9 mudstone 61-67 mod. to severe fract. @ 45 ⁰ 67-68 very soft, decemented.	45 ⁰ crossbedding	blocky broken	95%
71-76	5'	Interbedded Silstones and Sandstones 71-71.5 black siltstone fract. @ 40 71-76 argillacious siltstone interbedded with thin sandstone laminae.			95%
76-82 . 7	6.7'	Sandstone -med. grained becoming med. to coarse grained basally massive. -fracturing 25°-35°			
82.7-87.5	5.0'	Siltstone -argillacious fine grained sandstone and siltstone -poor sorted. -severely fractured -highly ironstained. 83.0 coal str. 83.83.9 gauge zone			
87.5-97.6	10.1	Mudstones and Siltstone and Minor Coal mudstone and siltstone with coal stringers and thin coal beds 87.5-87.7 coal clarain, soft bright 87.7-90.5 shale, fissile 90.5-90.9 coal, hard blocky durain with marcasite and mudst.stringers. 90.9-91.4 coal clarain 91.4-93.0 siltst. carbonaceous 93.0-93.8 thinly laminated mudst. and coal. 93.8-94.1 coal clarovitrain		good	958
•		94.1-96.8 mudstone thinly bedded carb. coal dusting on partings 96.8-97.1 coal and mud. 97.1-97.6 coal clarain.			

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Page Number ____2_

	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
	97.6-132.7	35.1	Siltstone -dk.grey to black - massive competent 97.6-102 carbonaceous blk. mudst. becoming siltstone. by 102 - fracturing med @ 30°-45° 127.6-127.9 argilaceous coal stringer.		good	95
•	132.7-162.8	30.1	<u>Mudstone and Coal</u> <u>'A' Horizon</u> -interbedded mudstone and coal-minor siltstone stringers. 132.7-132.9 mudst. black carbonaceous 132.9-133.1 Coal clarain soft bright 133.1-133.7 coal bright blocky claro vitrain. 133.7-134.0 mudstone 134.0-134.5 coal soft bright clarain mudstone interbedding. 134.5-137.2 - mudstone 137.2-137.8- coal durain pred. with thin bands of clarain and mudst. 137.8-140.3 siltstone massive X-bedded with tr.fine ss 140.3-144.0 mudstone blocky, severe fracturing 144.0-145.6 coal clarain thin fissile bedding tr. marcasite 145.2-145.4 mudst. 145.6-145.7 mudstone 145.7-145.8 coal soft dull 145.8-146.3 mudst.carbonaceous coally basally. 146.3-147.5 coal clarovitrain 147.5-157.1 mudstone black carb. tr. marcasite mod to severe fracturing. 157.1-157.3 coaly mudstone 157.3-157.8 mudstone, carb. 157.8-157.9 coal clarain 157.9-162 mudstone silty massive 162-162.8 coal hard marcasite durain			
	162.8-207	44.2	<pre>Sandstone -mudstone grading to siltstone by 167 and ss by 172 -gradational upper contact -ss fine to med frcoarsening basally becoming med. grained 185 -187.4-190.8 mudstone,black carbonaceous with bright coal str.@187.6 194-196 severely broken,decemented Recovery 197-202 0.5'/5.0' (Mislatch)</pre>	60 ⁰	good	197-202 0.5'/ 5.0 mis- latch
•	207-210.4	3.4'	Mudstone -thinly bedded -black -compact -abrupt lower contact			
	210.4-228.4	18.4'	Sandstone (Kurocon) -medium grained at top -well sorted -massive -severely fractured (rubble 212-224)		rubble	219-223 30% rubble

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	Interval	Unit	Description	< of Bed	Core	Est.
	·	Thickness		to Core Axis	Eval.	Kec.
	. <u> </u>		-coarsening basally is pred. coarse grained by 219' and conglomeratic by 222. 223-228.4 chert. granule. conglomerate.			
	228.4~235.8	7.4'	-abrupt lower contact e43 <u>Sandstone</u> (Breccia) - ss breccia -fine grained ss. clasts in soft fine sand matrix - lower contact 80° to C/A		good	
	235.8-250.4	14.6	Sandstone -massive -dk.grey to black -fine grained coarsening basally to med. grained 237- color becomes lighter with ironstaining. -finely laminated with carb. lenticles and thin coaly partings -Xbedding @ 45° -soft and decemented throughout		good	high
•	250.4-273.5	23.2	 <u>Mudstone and Coal</u> <u>No.1 Horizon</u> 250.4-250.9 Coal argillaceous dull with thin laminae of bright blocky coal. 250.9-260.8 siltstones and mudstones interbedded. 260.8-261.6 Coal soft bright fissile mushy 261.6-262.6 mudstone, thinly bedded carbonaceous 262.6-262.7 coal argillaceous 262.7-265 coal soft bright clarain, mushy 265-266.4 coal soft bright clarain 266.4-267.1 coal and mudstone thinly interbedded 267.1-272.0 mudstone, broken soft fissile 272.0-272.5 coal clarain 272.5-273.6 mudst. and coal 		poor	
	273.6-318	44.4	Mudstone (Breccia) -very soft -decemented -homogeneous through interval			
	318- 352	34'	Mudst. Siltst., Sandstone -fining up unit 318-322 mudst. becomes silty (with fine mudst.lenses) and cohesive. 322-342 siltstone predominally 342-352 sandstone 342-349 fine to med.grained 349-352 med.to coarse grained core broken decemented		poor (broken)	342-347 1.0'
	352-359.5	7.5'	Mudstone -abrupt contact with black carbonaceous mudstone. -thin bedded,thin coal partings and coal bands. 352-353 thin bedded mudst.with coal partings. 353.0-354.0 coal 353.0-353.3 coal mush with thin mudst. partings. 353.3-354 - coal clarovitrain 342-359.5 mudstone			

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	Interval	Unit	Description	<pre>< of Bed to Core</pre>	Core Eval.	Est. Rec.
ı		Thickness		Axis		
	359.5-387.5	28'	Coal Seam #2 359.5-359.9 clarovitrain 359.9-360.3 clarain 360.3-361 clarain with mudst.(shaly) 361-362.5 clarain 362.5-363.0 mostly durain 363-366.5 clarain and clarovitrain 366.5-368.4 clarain and clarovitrain 368.4-369.8 clarain and mudst. 369.8-371 clarain, clarovitrain 371-372 no core 372-373.1 clarain indurated with clay 373.1-373.3 coaly mudst. 373.3-376 darain and clarovitrain 376-377 no core 377-379.6 clarain 396.6-381.8 clarain 381.8-382 no core			86%
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` *		1	Interval	Unit Thickness	Des	scription	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
		•							
~		-			Core Seam # 2 382 - 384.3 384.3 - 385.6 385.6 - 386.4 386.4 - 387 387 - 387.5	Contd Clairovitrain Clarain Muds. with thin clar. bands No core Coal & Coaly mudstone			
K					Recoveries			}	
					Seam 2				
•		ι.΄			359.5 - 361 361 - 366.5 366.5 - 372 372 - 377 377 - 382 382 - 387	1.5/1.5 4.4/5.5' 4.5/5.5' 4.0/5.0' 4.8/5.0' 4.5/5.0'			
			387.5-403	13.5	Mudstone				
: •		X			- black, carb. basally	thin bed. grad. to silst.			
					387.5 - 388.7	mudst. with thin carb. & coaly bands			
					207.0 - 200	200.5 - 200.7			1
		,	403 - 539	136'	<u>Siltstone</u> - Siltstone pr	edominate grading to ss and			
~		۷.			shale but ap - moderate to - grey through - fracturing @	pears as one major unit. severe fracturing out 60 ⁰ - 45 ⁰			
•		•			420 - 425	Sandstone, fine gr.slightly more competent than surrounding rock, grad. upper, lower contact			
	-	•			444 445.5 476 - 481	thin coal parting(twig) good open froc @ 25° finely bedded shale coal parting @ 479		105 100	
•	, .			1	497	finely laminated @ 600	60~	badly brok	en 501-506
	č	• • •			526 - 533	brecclated			1'
		· .	589-551.1	12.1'	Coal Seam 4U		,		
	m				- abrupt uppe 539 - 539.2 539.2 - 542 542 - 542.05 542.05 - 543-9	r contact claren, muddy clarain, vitrain banding mudstone clarain, minor durain in thin hard bands		lost fines	
'		-			543.9 -545.1	clarain, thin minor durain mudstone		320%	
	ĸ	• • •			545.1 - 546.7 546.7 - 547 547 - 549.1 549.1 - 551.1	clarain No core clarovitrain "	•		
		•			Seam 4U				
	•	•			<u>Recoveries</u> 539 - 542 542 - 547 547 - 552	3.0/3.0' 4.7/5.0' 4.6/5.0'		-	
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t	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
	551.1-554	2.9	Siltstone dk. grey to black - massive competent laminated @ 559	550	good	
	554 - 557	3.0	<u>Mudstone</u> dk. grey, in part slightly carb. fract @ 50 [°] to C/A, mod to sev. fract. 556.3 - 557 badly broken [°]			
	557 - 566	9.0	Mudstone and Siltstone -silty mudstone with siltstone intervals -core is more competent than unit above 558 frac @ 15° to CA 560.5 " @ 20° to CA " @ 45° to CA 560.5 -561.6 carb. mudstone, sev.broken fract. surf. show coal (vitrain) partings 562.7 -565 siltstone pred. fract. @ 20° and 500 grading to sandst, 565-566			
•	566 ~ 581.6	15.6	Sandstone med.grey, f. grained, finely lamin. lamination 50° to CA fract @ 500 (BP) and 20° in part cross bedded 569 - 569.4 - breccia frags of ss inbedded in clay gauge 576-577 badly broken 577-579.9 finely laminated competent 581-581.6 broken breccia with clay gauge	50 ⁰		
•	581.6 -591	9.4'	Mudstone and Siltstone - hard mod severely fract. in part carb. 581.6 - 582 mudst. badly broken 582.2 - 582.4 badly broken 583.5 - 583.6 " " 585.2 - 585.4 badly broken, coaly 585.4 - 587 severely frac.			
	591 ~ 592.3	1.4'	<u>Mudstone</u> Carb. with thin coal partings 591.3 - 592 - broken rubbly core. carb. mudst.with minor coal.			
	592.3-614	21.7'	COAL SEAM 4L -contact @ 50° to C/A coal is friable, banded, mostly clarain and vitrain -banding @ 60° to C/A 500° to C/A	50 ⁰ -60 ⁰		52%
			593.4 - 594 crushed, broken minor coaly shale - shaly coal 594-596 - Lost Core 596-599 - Mostly clarion with thin bands of carb. core badly broken & friable. Interval of 3' represented by 50% recovery.	· · · ·		
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, ,	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
	675–686.6	13.6	Sandstone (Contd) 677.678.2 siltstone interbed black thin bedded 682.3 - 682.5 mudstone, becoming fine grained basally -finely lam. 682- 682.4 withothin carb. lenticles 688 - 688.6 irregular mudstone mp-up class abrupt ero. lower contact.	70°		
, ,	688.6-714.9	26.3	Siltstone -argillacois, dk.grey to black massive, with occasional level of white f. gr. ss very competent, frac. 45° and 70° 707-714.9-extremely competed core, essentially unbroken. 707-710.6-siltst.thin fine sand lensis soft sed.def. 710.6-711.3 fine ss pred. soft sed.def. 711.3-714.9 siltst.thin lenses of fine sand abrupt, slightly irregular lower contact Q 60°.		excellent	
•	714.9-718.4	3.5	Mudstone and Coaly Mudstone Thinly bedded mudst. and coaly mudstone 714.9-716.5 thin bedded mudst.and coaly mudst. 716.5-716.8 coal thin vitrain bands with clarain, pyrite. 716.8-717 lost core. 717-718.4 thinly bedded mudst.	75 ⁰		
•	718.4-721.9	3.5	Sandstone f-med. grained, massive, slt.and pepper, twig at top 721.6 coal parting abrupt lower contact.			
-	721.9-723.0	1.1	Coal -mostly durain and mudstone with thin clarain bands.	60 ⁰		
- • - •	723.0-725.7	2.7	Mudstone thinly bedded with coal and carb.films on bedding planes. - fossils-twigs 724.6-725.1 siltst.interbed.abrupt lower contact @ 60°.			
	725.7-812	86.3	<pre>Siltstone dk.grey to black arenacious siltstone, massive, competent well cemented, thin laminae of fine sand defining bedding with carb. lent. 741-748 siltstone with thin mudst.bands, core poor to good, mod-sev.frac. 748-760 arenaceous siltstone comptent good core. 760-767.8 silts A/A interbedded with mudst.and thin ss bds. 762.8 calat. infilling on frac. @ 30° 763-767 core soft brecciated. 767.8-769.3 ss fine grained, finely lmn. @ 60°-70° 769.3-772 mudst.siltstone, broken soft brecciated. 772-798.5 arenaceous siltst/mudstone interbeds. mod-severely fractured. brecciated 782-784 soft sed deformation 793.5 thin coal parting 797.3</pre>	60 ⁰	excellent 725.7-741	
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<i>,</i>	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
ι ι			 599-601 undifferentiated, very fine friable. 599-599.9 whole core 599.9-600.5 broken, 60% rec. 600.5 - 601 lost core 601 - 609 lost core 609 - 612 dull, interdeminated with carb. and coaly shale 609.8 -610.3 coal brighter clarain & vitrain 612 -613.5 mudstone with thin coaly bands, mudst is m-dk grey, med to high carb. in part coaly. 612-612.5 Mudst. high carb. 			
			 612.15-612.4 Mudst. med carb. 612.4 -612.6 Mudst. with partings of vitrain 612.6-612.8 broken, friable, intermixed coal & mudstone, highly carb, coal is dull. 612.9 -613.2 Finely ground dull coal, probably shaly coal, muddy 613.2 -613.5 mudst. mod carb. 613.5-614 coal, dull to bright mostly durain. 			
•		1. v	RECOVERIES 519 - 596 3.0/5.0 596 - 599 3.0/3.0 599 - 601 1.5/2.0 601 - 609 0/8.0 609 - 612 2.1/3.0 612 - 613.5 1.5/1.5 613.5 - 614.7 1.2/1.2			
	614 - 675	61'	Mudstone and Silty Mudstone - dk. grey to black silty mustone predominats grading basally to siltstone. - core fair to good in mudstone and good in silty mudstone and siltstone - some thin coal bands	2		
			 614 - 614.9 mudstone carb to coaly -thin coal laminate, thin bedded 614.9 - 615.2 mudstone and coal thinly interbedded, coal bright 615.2 begin silty mudstone frac. 615.5 20° 616.2 52° 		good	
~			616.8 -616.9 coal 626.9 -627 coal 630.4 coal 630.4 - 631.2 laminated with fine ss 642.4 - 645.3 thinly bedded carb. coaly mudstone coal bands @ 643.4 -644 bright/mudst.	650		
•			645.1 - 645.3 coal 651.6 -653 rubble 654 - 666 becomes silty mudstsiltstone, core good mod. degree of frac. thin bedded and massive 673-675 grad to sandst.	70° . 72°		
•	675-688.6	13.6	Sandstone fine grained, salt and pepper finely laminated and X bedded $@70^{\circ}$ to CA core is good.	70 ⁰		

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Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
		798.5-800.5 finely lamn with thin coal partings @ 65 ⁰ 800.5-803 brecciated angular siltst.clasts in silty clay matrix. 804-thin lense of fine sand 807-809 - brecciated,soft clay gauge zone becoming carb.	65 ⁰		
812-817	5	Mudstone highly carb. massive, with thin carb.film and cossils on frac.planes carbargillite in part.			86%
817-848	31	Coal Seam #5 817-818 coal and mudst.undiff. 40% recovery by vol. 818-819.2 mostly durain 819.2-820.5 undiff-40% 820.5-822 lost core 822-824 lost core			68%
		822-824 lost core 824-825.2 mostly durain 825.2-826.5 lost core 825.5-826.5 clarain 60% 826.5-827.4 mostly durain with thin vitrain banding 827.4-828.1 mudst. 828.1-830.3 clarain and vitrain with thin durain bands 830.3-830.8 mostly durain 830.8-832.7 clarain, soft 80% 832.7-833.8 mostly durain 83.8-834.5 - clarain, soft 60% 834.5-835.1 mostly durain 836.6-837 lost core 837-839 coal mush, undiff 60% 839-840 lost core 840-840.8 mudst.high carb. 840.8-841 lost core 841-841.5 mostly durain 841.5-841.8 clarain 841.8-842.4 mostly durain 842.4-846 lost core 846-847.3 soft bright coal clarain 847.3-848 lost core 846-847.3 soft bright coal clarain 847.3-848 lost core 842-815 2.3/3.0 815-818 3.0/3.0 815-818 3.0/3.0 818-822 2.5/4.0 822-824 0/2.0 824-825.5 1.2/1.5 825.5-826.5 1.0/1.0 826.5-830.3 3.8/4.8			
848-864	16	835.3-837 1.3/1.7 Basal sandstone 848-848.6-highly carb. ss-block with thin carb. partings lmn.@ 75-85° cohesive compact. 848.6-865 typical basal ss, very hard, massive competent, salt and perper		good	100%
•		848.6-858.5-core severely broken. 858.5-865 becoming more competent, massive.			
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RIO TINTO CANADIAN EXPLORATION DIMITED

DIAMOND DRILL RECORD

Hole No.: 76 D 02	Property: Sage Creek Coal
Location: North Hill 17,854,660N (Approx.) 585,480E (Approx.)	Elevation: 5060' (Approx.)
Contractor: Connors Drilling Ltd.	Hole Size: 3-25/32" (HQ)
Rig No.: 1	
Date Commenced Drilling: August 14, 1976	
Date Finished Drilling: August 24, 1976	
Date Hole Completed: August 25, 1976	
Logged By: J. Mitchell & O. Cullingham	Date: August 24, 1976
Probed By: Roke Oil Enterprises Ltd.	Date: August 24, 1976
Total Depth Drillers: 712	Depth of Overburden: < 20 ft.
Potal Depth Logger: 711	Water Level: 90 ft.

Bit Record

No.	Size	Make and Ser	ial No.	R.P.M.	On	110	Footage	Drilling Time	
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Surf	ace Cas:	ing: 24 ft.		Standl	by Tim	e for	Logging:	8 hrs.	
Tota	1 Drill:	ing Time:		Uther	Stand	lby Tim	e: Nii Standbu T	imo: O hwa	
Tota	1 Down	lime:	717	IOLAL	Unarg Mauk	eable 	Standby I.	Holes, 17 has	
Tota	1 roota	ge Chargeable:	/12	Actua.		ng lim	e between	notes: 17 nrs.	
Tota	I Hourly	y Contact:		Quant:	eadle ity of	Moving Mud U	sed: 96	ween noies: 9 hr Bags Quik Gel	:s.
Rema	rks:-			-	-		96	Bags Quik Trol	
							2	Dage 00 16	

Probe Report:	710-000 708-000 708-000	Gamma R Sidewal Caliper	ay/Neutron 1 Density	Open Hole Open Hole Open Hole	:
	708-000	Focused	Beam Log	Open Hole	
			Coal Horiz	ons _	
Coal Horizon	1	rillers	Picks	Log Pic	eks
Seam 2	269 -	287.8	18.8	269.5-286.75	17.25
Seam 4U	342.3-	376.5	34.2	343.75-374	30.25
Seam 4L	388.7-	400	11.3	389 -398.5	9.5
Seam 5U	637 -	656	19.0)	637.8-653	15.2
Seam 5L	660.1-	686	25.0 44.9	660 -686	26.0
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	Interval	Unit Thickness	Description	く of Bed to Core Axis	Core Eval.	Est. Rec.
•	. <u></u>	<u> </u>				
	0 - 20'	20 '	OVERBURDEN			
			Loose broken rock, and fill triconed			
			CRETACEOUS KOOTENAY FORMATION			
	20-57.7	37.7	SANDSTONE		Good	
			Med. to coarse grained, speckled, massive light grey weathered appearance, pitted, ironstaining on frac. surfaces. 20-30 mod. to severely frac. thin carb. laminae 30-40 excellent core 40-57.7 mod. to severely frac. fracturing pred. @ 45° and 20° to C/A Abrupt, irregular lower contact			
	57.7-68.0	10.3	SILTSTONE			
, ,			Dk. grey, argillaceous • unit 16 inconsistent, grading from mudstone to fgr SS, becoming predominately mudstone basally			
2.	68.0-78.4	10.4	MUDSTONE AND COAL	65 ⁰		100%
•			highly carbonaceous mudstone with marcasite and plant fossils very thin coaly bands			
			<pre>68.0-68.8 carb. mudst. 68.8-69.4 interbedded mudst., coal 69.4-69.9 carb. mudst. 69.9-70.2 mostly durain, thin clarain bands. 70.2-72.6 mudstone 72.6-73.3 fissile, thin bedded mudst. and coal 73.3-74.7 mudstone 74.7-74.8 clarain 74.8-75.2 mustone 75.2-75.3 clarain</pre>			
			75.3-75.5 mustone 75.5-75.6 clarain			
-			75.6-75.9 mustone 75.9-77 coal 77-78.4 carb. mudstone, sbattered core.			
			shattered tore.	· · ·		
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	Interval	Unit Thickness	Description	<pre>4 of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
•	78.4-87	5 9.1	MUDSTONE			
			<pre>lt. grey mudstone grading to silt: Core modsev. fractured brecciated in part. coal st 85.9</pre>	stone		
	87.5-90.3	2.8	COAL AND CARB. MUDSTONE		Good	100%
			87.5-89.7 Coal 89.7-90.3 mudstone, high carbonaceous			
	90.3-96.9	3.9	SILTSTONE			
		-	argillaceous siltstone, mod. to severe fracturing thin coal bands, coal 92.4-92.6 severe, sub-vertical to vertical frac. 92.6-93.5 severely broken 95.5-96			
	96.9-128.	5 31.6	SILTSTONE (BRECCIA ZONE)			
	•		Siltstone AA - soft muddy broken core. high carb. zone 108.5-109.5 slickensided, carb. films			
•	128.5-142	13.5	SANDSTONE (BRECCIA ZONE)			
I			SS fine grained, brecciated core IS decemented or rubble, iron- stained on surfaces and in decemented zones.			
	142-192.2	50.2	SANDSTONE AND CONGLOMERATE			
			fine grained, med. grey, core sound, mod. fracturing @ 20° and 70° to CA Bedding defined by poorly defined laminae @ 70° to CA coarsening basally 152 fine to med. grained 152-167 core mod to severely frac. with rubble zones 160 coarse grained, black 160.5 thin coal parting 170-171 rubble 171-176 conglomeratic with	75 ⁰		
			black rounded chert granules 177 fracturing @ 20 ⁰			
• ·						
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Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
259.4-269	9.6'	<u>MUDSTONE</u> Dk grey to black highly carbonaceous fissile in part thin coal bands inter- bedded with mudstone 259.4-260.3 coal & mudst. 260.3-263.7 mudst. 263.7-264.4 coal & mudst. 264.4-265.5 mudst.	70%		
269-287.8	18.8'	265.5-269 coal & mudst. COAL SEAM #2		-	76%
		269-270.4 clarain and durain 270.4-271.5 clarain, soft 271.5-272 lost core 272-273.0 clarain & clarovitrain 273.0-273.1 durain 273.1-273.7 clarain, fissile 273.7-273.9 mostly durain 273.9-274.1 clarain 274.1-274.2 durain 274.2-277 clarain 277-278.7 clarain 278.7-282 lost core 282-284.2 clarain 284.2-285 lost core 285-286.4 clarain 286.4-286.6 clarovitrain 286.6-287.8 clarain			
		RECOVERIES 267-272 4.5/5.0 272-277 5.0/5.0 277-282 1.7/5.0 282-285 2.2/3.0 285-287.5 2.5/2.5			
287 8-293 8	6.01	287.5-290.5 3.0/3.0			
20,00 2000		interbedded coal and highly carbonaceous mudstone - fissile			
• •		1	· .		

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,	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
	293,8-328	34.2'	SILTSTONE			
i		1	<pre>massive, slightly arenaceous siltstone, with thin lenses of fine sand - vertical fracturing throughout. severely fractured, broken and partially brecciated 315-328 breccia zone angular siltstone in mud matrix. lower contact is obscured by brecciation.</pre>			
	328-342.3	14.3'	MUDSTONE			
`	• •		<pre>black, highly carbonaceous core severely broken with fracturing @ 65° and 20° gradational lower contact with seam 4L. 341.5-342.3 interbedded coal & mudst.</pre>			
	. <u>342.3-376</u> .	<u>5 _34.2'_</u>	COAL SEAM 4U	:		91%
•			 342.3-343.8 clarain with thin durain bands 343.8-346.5 lost core 346.5-351.5 clarain mudst. stringer @ 349-349.2 351.5-356.5 soft fissile clarain pred. with thin hard bands of durain. 356.5-357 lost core. 357-362 clarain and clarovitrain. 362-362.1 durain 363.4-364.0 durain 364.0-367 soft flaky clarain 367-370 soft clarain 370-374.6 clarain and claro- vitrain, hard, fissile, bright 374.6-375.3 carbargillite and carb. mudst. 			
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Interva	al Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
342.8-3	76.5 34.2'	COAL SEAM 4U (Cont'd) 375.3-376.5 coal undiff.		-	
		RECOVERIES			
		$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$			
376.5-3	86.5 10.0'	MUDSTONE AND COAL		Poor	70%
		"shale" bench between 4U and 4L highly carb. mudstone with thin coal bands. 376.5-377.6 carb mudstone 377.6-377.7 coal 377.7-378.8 mudst. 378.8-380 lst core 380 -386.5 carb. mudst. core severely broken core is poor			
<u>386.5-4</u>	0013.5 _	COAL SEAM_4L			73%
•		386.5-388.7 Coal - dull, clayey texture - quite shaly. 388.7-391.7 vitreous, mostly clarain 391.7-342 lost core 392-395.1 Coal - mostly clarain 395.1-397 lost core 397-398 coal - mostly clarain 398-399 lost core 399-399.5 coal - soft muddy - mostly clarain 399.5-400 lost core			
	Ì	RECOVERIES			
		386.5-392 5.2/5.5 392-397 3.1/5.0 397-399 1.0/2.0 399-400 0.5/1.0 400-402 2.0/2.0		- -	
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	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Est. Eval. Rec.
	400-440.5	40.5	SILTSTONE AND MUDSTONE		
t			Med. gy, siltstone is thinly bedded and laminated with fine sands. Mudstone - in part carb, massive, 400-405 - mudstone, carb,broken 405-409 - sltst. 409-415 - mudstone 415-433.9 - mudstone - slty & carb., carb. & coaly pl. frags, some twigs preserved.	65 ⁰	Good
			<pre>massive but soft. 433.9-434.2 coal - thinly inter- bedded durain and vitrain dense 434.2-436 thinly bedded in the coal stringers & partings. breaks along carb. ptgs @ 60° to C/A 435.9-436 coal soft, fissile probably clarain 438.5-439.1 thinly bedded, interbeds of coal & mudstone. Gradational contact with SS below</pre>	60 ⁰	
•	. 440.5-451.	5 11	<pre>SANDSTONE light gray, thinly laminated & cross bedded, fine grained, qty & chert grains, becomes silty basally & interlaminated with siltstone. Fractures @ 45° are approx. at c's yto bdg. @ 450.5' micro fault with displacement along fract. @ 45° to C/A l/2" displacement. gradational to argillaceous & silty SS to siltstone & silty mudstone.</pre>	60 ⁰	Mod. to severely fractured. Fractures @ 20 ⁰ & 45 ⁰ to C/A. Pred. 45 ⁰ to C/A
	451.5-489	37.5	SILTY MUDSTONE & MUDSTONE m. gy to m. dk. gy, in part carb., in part slty & hd. blocky to platy - fairly massive thin parted carb. mudstone intvls.		Crumbly to moderately fractured
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			-	-	· ·

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х х	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
			Fractures @ 20° to C/A and few @ 70° to C/A 459.7-460.5 - severely fractured core is hd. but badly broken. 464.2-465 - Core is soft, crushy crumbles readily. 466-468 - Core is soft-muddy, crusty - crumbles readily. 471.5-472 - Prom.vert. fracture. Waxy coating - white talc like subst. (not calcite). 475-475.5 - Crumbly friable crusty. 476-476.7 - Crumbly, wthrd. appearance. After 477' fracturing predom. @ 60 to C/A. Probably along bdg. plane. 477-477.5 - Soft, friable crumbly. 477.5-479.3 - Hd. blocky, near vertical fracturing. Calcite film on fractures surface. 483.2-483.7 - Soft, crusty and crumbly - wthrd. appearance 487.2-487.6 - Breccia zone/ some clay material.	60 ⁰		
	489-506.5	17.5	<pre>Some ereq material: SILTSTONE Hd., arg., m. to m.dk.gy thin silty mudstone intvls. 2 sets fractures 60 to C/A - probably bdg. plane 20 to C/A - approx. rt. angles to bldg. 492-493 - Severely broken ore. Poss. mechanical. 496.4-497 - Severely fractured; blocky; wthrd. appearance on fract. surfaces. 497.5-498.5 - Very friable fractured; weathered appearance on fracture surfaces. 500.5-501 - Badly broken, blocky; slty. mudstone. 503.3-503.7 - Crushed to broken zone - clay material deposited along fractures.</pre>	600		

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	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
•	506 5-515	5 9 0	SILTY MUDSTONE			
	200.2-213.	5 5.0	M.gy. to dk.gy. Much softer and more friable than above;crusty. 511-511.5 Severely fractured. 511.5-513 Intbd. sltst., mudstone and v.f.gr.ss. Laminated appearance - Gradational contact into sandstone below. 513-515.5 Laminations as above are brecciated & disturbed; clay gouge material around frags. (Possible fault zone - No apparent displacement).			
	515.5-536.	5 20.0	SANDSTONE			
	•		Massive, m.lt.gy., f.gr.,hd.; well sorted, sil cont., gr. to gr. contact; qtz. & chert with qtz. > chert by 2:1 Fractures @ 50° to 60° to C/A. Wthrd. appear. on fracture faces. Frequency of fractures @ approx. 1 fracture/linear foot. 515.5-516.5 Severely broken; blocky. 520.6-520.7 Broken and partially decemented. 526.2-527 Core is badly broken and appears wthrd. 533.5-534 Wthrd. appearance. In part decemented broken core.			
	536.5-541.	5 5.0	SANDSTONE			
			M.gy., massive, sl. arg. contains coal stringers and splints up to 0.2'. 536.5-536.7 <u>Coal</u> bright clean, very friable. claro-vitrain. 537.8-538 Broken core. arg.; abundant coal splints; in part decemented. 540.4-541.3 broken, arg. highly wthrd. appearance. Decemented in part. 541.3-541.5 <u>Coal</u> bright,friable; claro-vitr. <u>Relov.</u> 537-541.5 3.7/4.5			
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,	Interval	Unit Thickness	Description	く of Bed to Core Axis	Core Eval.	Est. Rec.
•	541.5-637	95.5	MUDSTONE			
			m. to dk. gy., for the most		Moderat Sound	ely
		{	carbonaceous partings.			1
			In part silty and in part			
			carb. to coaly.			
			downwards.			ļ
			Occasionally very carb. to			
			coaly with coal stringers &			
			Core is generally homogenous			
			& moderately sound.			1
			2 prominent fracture directions (i) at 60° to C/A (prhly bdg.))		
			- (ii) 20° to C/A			
			Average of 3 fractures to a			
`			2' section. 541 9-542 3 broken blocky			
			rubbly	1		
			545.8-546.8 broken, blocky,	i		
			rubbly. 550.2-550.7 broken, blocky.			
			core crumbles readily.			
	•		550.7-550.9 Coal stringer			
			dull to bright; friable. 550.9-551.7 broken, crusty			
			551.7-552 <u>Coal</u> stringer			
· ·			bright, clean; claro-vit.			-
· * .			552-557 broken, blocky, fracture density 3 per foot.			ļ
• •			552.3-553 crusty, crumbly			
			555-555.3 highly carb. to			
			556.8-557 highly carb.			
			wthrd. appear. crusty.			
			563.5-564 broken; high degree			}
•			575-577 high degree of			
•			mechanical breaking; blocky			
•			581-583 High dens. fract.			
			blocky; in part decemented.			
•			583-585.5 greater than average			
- - -			Fract. density @ 3 fract./foot. Fract.irregular: crusty.			
3			599.9-600.9 Highly fractured			
			& brecciated.		· ·	
			high dens. fracturing.			
-			606.4-607.4 High dens.		ł	
			fracturing; Brecclated. 608.4-608.6 Brecclated.		1	
	•		610.5-611 Broken core.	•	.	
	•		High dens. fracturing.		1	
			fract; crumbly.]	
			626-626.5 Broken; high dens.		· · ·	
			fract.		ļ	
			Prom. open fract. @ 20 ⁰ to C/A			
•	,		@ 627 core is becoming softer &			
·	-		more muddy although remaining fa	irly	ļ	
			competent.	ł.	ł.	ļ

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	Interval	Unit Thickness	Description	<pre>4 of Bed to Core Axis</pre>	Core • Eval.	Est. Rec.
			631.5-632 crushed; crumbly; may be mechanical 635-635.5 soft; crumbly; v. carb to coaly; crushed; contains coal ptgs. 636.1-636.5 broken core. Possiblly mechanical <u>Recov.</u> 632-636.5 4.5/4.5			
	<u>637-687.1</u>	50.1 _	COAL_SEAM 5			
	<u>. <u>v</u>o<u>r</u> <u>v</u>o<u>r</u>.<u>z</u></u>		Contact © 50° to C/A bnd. © 60 to C/A within coal seam. 637-637.2 <u>Coal</u> dull to vitreous; hd.; pyr. on parting surfaces. Sl. shaly. Mostly clarain. 637.2-637.7 <u>Coal</u> vitreous mostly clarain - minor pyr. on ptg. surfaces. 637.7-637.9 <u>Coal</u> dull, dense <u>Shaly</u> - bands of bright vitrain. 637.9-638 No Core 638-638.4 <u>Coal</u> dull to bright brittle to friable. banded/dull coal possibly durain bands; mostly clarain/ some vitrain; minor pyr. on fracture surfaces. 638.4-638.9 <u>Shaly coal</u> dull, muddy fracture. Dirty. 638.9-639.5 <u>Coal</u> dull to vitreous; banded; bnds of dull coaly shale; mostly clarain; friable; abundant pyr. on ptg. surfaces & fracture surfaces. 639.5-640.8 <u>Coal</u> hd.; vitreo	60 ⁰		79%
			<pre>lustre, concoidal fracture, clean to touch, abundant pyr. on ptg. surfaces & fracture surfaces. banded with thin br bands of vitrain - minor durai 640.8-641.2 Coal friable vitreous with bands of bright vitrain; abundant pyr. on ptg. fracture surfaces. 641.2-641.5 Coal dull to vitreous, hd;dense, mostly clarain with bands of durain.</pre>	ight n		
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			Decomintion	< of Bed	Core	Est.
	Interval	Thickness	Description	to Core	Eval.	Rec.
				Axis		
			641.5-642 No Core			
			642-642.3 <u>Coal</u> friable,			
			crumbly, soft, dull to			1
		Ì	vitreous. Mostly clarain.			
			642.3-642.6 <u>Coal</u> hd.; brittle	;		
			vitreous to bright; claro-		1	
			vitrain; abundant pyr.		1	
			642.6-643 Shaly Coal to		1	
			carbaigillite; dull, hd.;			
			dense.			
			643-643.5 <u>Coal</u> vitreous to			
			bright, hard, light wt.			
			mostly clarain, abund. pyr. on			
			fracture surfaces.			
			643.5-643.7 <u>Carbaigillite</u> to			
		1	Shaly coal duil, hd., dense.			
			b43./-b44.2 <u>COal</u> dull to		1	1
		1	pright, banded with pright			
			Vitrain; mostiy clarain.			
			Minor bands of ddil, PD gy,			1
		ł	aense aurain 644 2-644 4 chalve Coal	Į	ļ	
			dull dongo	[
			644 4 - 644 8 Coal dull to			
			bright mostly clarain/ptgs.	-		
•			of vitrain: abund. pvr. on			
			fracture surfaces & pyr.			
•			surfaces.	1		
			644.8-645 Coal soft, mushy,			
÷			dull to vitreous, crumbly.			
· ·			645-645.2 Coaly Shale dull,			[
· •			blocky.		ļ	
			645.2-645.9 Coaly shale dull	•]	
			dense, hd., contains stringers			
			& splints of vitrain.			
			645.9-646.1 Shale laminatiou:	\$		
			of carb. & coaly shale/thin			1
	· ·		dull, shaly coal ptgs.	· · ·		
			laminatious @ 70° to C/A		1	
			646.1-646.3 <u>Coaly shale</u> ,			
•		•	hd., dense, dull, banded @			
			70° to C/A			
		ţ	646.3-647 <u>Coal</u> dull to			
		1	vitreous, dense, hd. but	1		
•			brittle, abundant pyr., bnd./			· ·
			bands of duli shaly coal.			
			647-647.9 <u>Coal</u> hd., dense,	1	1	
		ļ	duil to vitreous; shaly;			
	·		abundant pyr.	le.		1
			banded hands of bright witherin	43, 		
		· ·	banded/bands of bright vitrain	1		
			brittle; mostly clarain	1		
			648 6-649 Cosl frishle			
			arushed core dull to bright.	1 · .		[
		ľ	mostly clarain			
			649-649 A Coal bd arg	1]
•			dull to witroous, shundant			1
•			wir flakes on ptg & fragt		1	1
		}	surfaces mostly clarain			
1			649.4-649 6 Coaly Shale	1	ļ	
			Juli Janes man Jinter to ton	dn.	1	
		1	auii, dense, very dirty to tou	1	1	
						J
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Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
····	· · · · · · · · · · · · · · · · · · ·				
		649.6-650.3 Coal friable, dull		1	ļ
		to bright, soft, mostly clarain.	L.		
		650.3-650.4 <u>Coal</u> sort, crushed	10		
		vitreous, mostly claiain		-	}
		thin hands witreous coal			
		650 9-651.2 Coal soft, crushe	4.		
		dull to bright, clarain,			
		thin vitrain bands. Minor			
		shaly coal.		1	
	l l	651.2-651.7 Coal hd., dull		1	
		to vitreous, shaly; blocky			
		651.7-652 No Core			
		652-652.8 <u>Coal</u> soft, friable;			
		dull to vitreous, mostly			
	l l	clarain/some shaly coal.			
		652.8-652.9 <u>Shale</u> dull, carb			
		652.9-653.6 <u>Coai</u> Solt, Illab			
		mostly clarain.			
	}	oprthu	1		
		653 7-654 5 Coal soft. dull.			
		mushy, crushed.			
		654.5-656 No Core			
		656-656.3 Coal soft, dull,		1	
		mushy, crushed.			
•		656.3-656.5 Coal with clay			
		tacky.			
		656.5-657 <u>Coal/Coaly Shale</u>		ļ	
		bands, dull, blocky,			
		fragmented.		ſ	
		657-657.2 Carb. to Coal Shale			
		hd., dull, blocky.			
		657.2-658 NO COLE			
•		$\begin{array}{c} 0.00-0.000, 2 \\ \underline{0.000}, 0$			
		658 2 - 658 4 dull, soft.			
		Shalv coal to coalv shale		1	
		658.4-658.6 Coal soft,	1		
		friable, dull to vitreous,		1	
		mostly clarain.			
		658.6-658.8 Carb. Shale,			
]	dull, blocky, fragmented.		1	}
		658.8-658.9 <u>Coal</u> dull to			1
		vitreous.			
		658.9-659 <u>Shale</u> sl. carb.			
		659-659.7 <u>Coal</u> friable,			
		dull to vitreous, /some bright			
		vitrain bands, soft coal in			
		part. Mostly clarain.			
		donse			
		$a_{\rm K}$, $g_{\rm Y}$, $c_{\rm arb.}$, $a_{\rm u}$, $a_{\rm ense}$.			
	1	vitreous friable shalv.			
•		soft, mushv.			
		660.5-660.6 Shale sl. carb.			
	1		1	ł	1
				· ·	1
				1	1
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			4		1
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•	Interval	Unit Thickness	Description	to Core	Eval.	Rec.
•				Axis		
۰ ۲		1				
-		1 1	660.6-661 <u>Coal</u> friable, blocky	n.		
\sim	-		dull to vitreous, mostly clarain			
			661-661.1 Coal shale dull,			
			dense, fragmented blocky.			1
			661.1-661.5 <u>Coal</u> dull to			
· · · · · · · · · · · · · · · · · · ·			vitreous, friable, crushed, mos	tly		Ì
K.			661.5-661.7 Coalv shale dull.			1
			hd., blocky.			
			661.7-662 Coal dull to		1	
			vitreous; soft, mushy, crushed			
ι.			662-665 Coal crushed. friable			
			soft, mushy in part; dull to			1
			vitreous/occasional bright band	s		1 .
,			of vitrain. Mostly clarain/			
		1 · 1	minor snaly Coal. 665-666.4 Coal dull. soft			
		1	muddy, crushed, some bright			
· · · · · ·			ptgs., undifferent.	Ì		
			666.4-667.2 <u>Coal</u> soft, shaly,			
			musny, neavily contaminated			
			667.2-669 No Core			
			669-671.2 <u>Coal</u> dull, soft,			
			crushed, mussy, undiff.			
	•		672-672.9 Coal muddy, soft.			
			dull to vitreous, crushed,			
			mostly clarain.			
•			672.9-676 No Core			
			muddy. undifferentiated.			
			676.7-676.9 <u>Shale</u> hd., carb.,			
· ·			676.9-677.8 <u>Coal</u> dull to			
			vitreous, occasional bright			
			677.8-678 No Core			
			678-678.9 Coal dull to			
		1	vitreous, crushed, remnant			
		}	banding, mstly clarain. 678 9-679 9 Coal soft mushu		1	
		}	dull, probably shalv.			l
			679.9-680 No Core.			
		1	680-681 <u>Coal</u> dull to vitreous	•		
W 2		• I	crusned, contains dull, dense,		1]
· · ·		1 I	681-682 Coal dull to vitreous			
			banded, thin ptgs. of shaly			
· · · · · · ·		· ·	coal & carb. sh.		ŀ	
			b82-b83.3 <u>Coai</u> duil, crushed, mushy, prhly, very shaly		1	
•			undiff.			1
. .			683.3-684 No Core	•	ļ	1
•	•		684-684.9 <u>Coal</u> dull, crushed,			
· · · · · · · · · · · · · · · · · · ·		1	mushy, undiff.			
· · ·						
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Page Number <u>15</u>

Interval U	Jnit Nickness	Description	< of Bed to Core Axis	Core Eval.	Est. Rec.
		<pre>684.9-685 No Core 685-686 Coal solid core; hd., vitreous to bright, pyr. flakes on fracture surfaces, light weight, mostly clarain. 686-686.6 Coal hd., dull, sdy., becomes increasingly sandy towards base. H₂S smell when coal broken. 686.6-687 No Core 687-687.1 Coal dull, hd., dense, dirty, sdy., smell of H₂S when broken.</pre>			
		Recov. $636.5-638$ $1.4/1.5$ $638-642$ $3.5/4.0$ $642-647$ $5.0/5.0$ $647-652$ $4.7/5.0$ $652-656$ $2.5/4.0$ $656-658$ $1.2/2.0$ $658-662$ $4.0/4.0$ $662-665$ $3.0/3.0$ $665-669$ $2.2/4.0$ $669-672$ $2.2/3.0$ $672-676$ $0.9/4.0$ $676-678$ $1.8/2.0$ $678-680$ $1.9/2.0$ $680-681$ $1.0/1.0$ $681-682$ $1.0/1.0$ $682-684$ $1.3/2.0$ $684-685$ $0.9/1.0$ $685-687$ $1.6/2.0$ $687-692$ $5.0/5.0$			
587.1-712	24.9	SANDSTONE Basal m. gy., massive, f. gr., well sorted, qtz & chert gr. in 4:1. sil. cmt., gr. to gr. contact, very little variation throughout unit. Irregular fracturing throughou 689.5 thin carb. bands of 0.05' thick. 689.5-689.7 sdy. sh., m. dk. gy., bdg. @ 65° to C/A 690.3-690.4 ptgs. of carb. ss. @ 65° to C/A 692.5-693 broken core, blocky, wthrd. appear. 693.7-693.9 sdy., coaly mudstone band @ 65° to C/A 695-695.1 Sdy carb., mudstone ptg. 695.7-697 core is badly broken. Wthrd. appear. 697-699 ss. is arg., dirty appearance. 699-700 badly broken, wthrd. appear.	5.		

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	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
			<pre>701.8-702 badly broken. wthrd. appear. 702-702.7 core is competent but irreg. fractures from vertical to 20° to C/A 702.7-707 badly broken into 1" pieces; shaly dirty ss.; v. thin carb. ptgs. local & dis cmt. 707-712 Core is fairly sound but with near vertical fractur- ing throughout, some carb. traces on fracture surfaces.</pre>			
	712		Total Depth			
x						-
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RIO TINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

Hole No.: 76 _D 03	Property: Sage Creek Coal
Location: North Hill 17,851,525N (Approx.) 584,950E (Approx.)	Elevation: 4,740' (approx.)
Contractor: Connor Drilling Ltd.	Hole Size: 3-25/32" (H.Q.)
Rig No.: 1	
Date Commenced Drilling: August 26, 1976	
Date Finished Drilling: September 4, 1976	
Date Hole Completed: September 4, 1976	
Logged By: O. Cullingham	Date: September 4, 1976
Probed By: Roke Oil Enterprises	Date: September 4, 1976
Total Depth Drillers: 671'	Depth of Overburden: < 5'
Total Depth Logger: 671'	Water Level: 29'

Bit Record

No.	Size	Make and Serial No.	R.P.M.	0n	Off	Footage	Drilling	Time
-		,	ĺ	Í	1			
	1							
		<i>.</i>						:
Sur: Tota Tota Tota Tota	face Cas al Drill al Down al Foota al Hourl	ing: 14 ing Time: 10 days Time: ge Chargeable: 671 y Contact:	Standi Other Total Actual Charge Quanti	y Tim Stand Charg L Movi eable	e for by Tim eable ng Tim Moving Mud U	Logging: e: Standby T: e Between Time Betw sed: 92 b:	8 hrs. ime: 8 hrs. Holes: 14 Ween Holes: ags Ouick 6	hrs. 6 hrs.
Rema	arks:-		Quality	LUY OI	nua o	92 ba 92 ba 2 ba 1 ba 1 ba	ags Quick G ags Quick T ags CCl6 ag Quick S ag Asbesto	rol Seal

	670 - 000 668 - 000 668 - 000 668 - 20	Gamma/Neu Sidewall Caliper . Focused B Coal Hori:	tron Open Hol Density Open Hol Open Hol eam Open Hol zons	e e e
Coal Horizon	Drillers P	icks	Log Picks	
Seam 2	127 - 135.8	8.8	127 - 135.5	8.5
Seam 4U	359.2-394.1	34.9	359.5 - 394	34.5
Seam 4L	407.5-428.65	21.15	407.5 - 428.5	21.0
Seam 5U	610.8-635	24.2	614.0 - 635	21.0
Seam 5L	644.15-658.5	14.35	645.0 - 660	15.0
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	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
0 - 14	14	OVERBURDEN & WTHRD, SHATTERED RO)CK		
		Sdy. mudstone to carb. mudsto True overburden 5 ft. First 14 feet triconed.	one.		
14 - 28	14	MUSTONE			
		Dk, gy., carb., highly wthrd. Fe stn.; soft, crumbles easil some coaly shale intvls In slky & blocky.	y; pt		
		Recovery:			
		14 - 18 2.8/4.0 18 - 23 No core; Hole tricon mudstone & coaly mud 23 - 23.9 Coal, dull, prbly.	ned; Istone.		
		oxidized, prbly. hig ash.	Jh		
		24 - 28 <u>Mudstone</u> , As above ; becoming sdy. downwa into arg. ss. Carb & coal stringer splints. Bdg @ 70° to CA.	ards cs &	· .	
		Fractures @ 60 to C to bdg. 24.6-24.8 crushed c to coaly	CAL carb mud-		
		27.0-27.4 highly fr tured. So & friable	rac- oft		
	1 1	SANDSTONE			
28 - 89	61				
28 - 89	61	<pre>m.gy. fresh; m.yel.brn. wthrg f. Hro m.gr., grades locally downwards to c.gr., l:l qtz:c lmn. & sil. cmt., p-m. sort., good solid core for most part with highly fractured & broke zones. fractures @ 30° to CA at appr l' to l.5' intvls.</pre>	J., chut: t but en cox.		
28 - 89	61	<pre>m.gy. fresh; m.yel.brn. wthrq f. Hro m.gr., grades locally downwards to c.gr., l:l qtz:c lmn. & sil. cmt., p-m. sort., good solid core for most part with highly fractured & broke zones. fractures @ 30° to CA at appr l' to l.5' intvls. 30.2-30.7 crushed, brecciate frags. of ss. in c matrix; carb. muds</pre>	d., chut; c but en cox. ed, clay st.		
28 - 89	61	<pre>m.gy. fresh; m.yel.brn. wthrq f. Hro m.gr., grades locally downwards to c.gr., l:l qtz:c lmn. & sil. cmt., p-m. sort., good solid core for most part with highly fractured & broke zones. fractures @ 30° to CA at appr l' to 1.5' intvls. 30.2-30.7 crushed, brecciate frags. of ss. in c matrix; carb. muds & coal intermixed clay. 28.0-32.0 fractured 3/foot. Fe stn. on fracture</pre>	d., chut; t but en cox. ed, clay st. in		
28 - 89	61	<pre>m.gy. fresh; m.yel.brn. wthry f. Hro m.gr., grades locally downwards to c.gr., l:l qtz:c lmn. & sil. cmt., p-m. sort., good solid core for most part with highly fractured & broke zones. fractures @ 30° to CA at appr l' to 1.5' intvls. 30.2-30.7 crushed, brecciate frags. of ss. in c matrix; carb. muds & coal intermixed clay. 28.0-32.0 fractured 3/foot. Fe stn. on fractur surface. 35.8-37.0 broken wthrd. zone abund. Fe stn. (lm prbl. H₂O zibe, in</pre>	<pre>d., chut; t but en cox. ed, clay st. in re e; m), n pt</pre>		
28 - 89	61	<pre>m.gy. fresh; m.yel.brn. wthrq f. Hro m.gr., grades locally downwards to c.gr., l:l qtz:c lmn. & sil. cmt., p-m. sort., good solid core for most part with highly fractured & broke zones. fractures @ 30° to CA at appr l' to 1.5' intvls. 30.2-30.7 crushed, brecciate frags. of ss. in c matrix; carb. muds & coal intermixed clay. 28.0-32.0 fractured 3/foot. Fe stn. on fractur surface. 35.8-37.0 broken wthrd. zone abund. Fe stn. (lm prbl. H₂O zibe, in decemented. 39.9-41.1 broken zone, highl wthrd., lmn. stn., part decemented, c</pre>	d., chut; but en cox. ed, clay st. in re e; mn), h pt ly , in con-		
28 - 89	61	<pre>m.gy. fresh; m.yel.brn. wthrq f. Hro m.gr., grades locally downwards to c.gr., l:l qtz:c lmn. & sil. cmt., p-m. sort., good solid core for most part with highly fractured & broke zones. fractures @ 30° to CA at appr l' to 1.5' intvls. 30.2-30.7 crushed, brecciate frags. of ss. in c matrix; carb. muds & coal intermixed clay. 28.0-32.0 fractured 3/foot. Fe stn. on fractur surface. 35.8-37.0 broken wthrd. zone abund. Fe stn. (lm prbl. H₂O zibe, in decemented. 39.9-41.1 broken zone, highl wthrd., lmn. stn., part decemented, c tains carb. ptgs. 42.0-43.4 becomes carb & sha downwards, poorly, copt., carb. ptggs 60° to CA. ss bands are very</pre>	d., chut; but cox. ed, clay st. in re e; mn), n pt ly , in con- aly s at Fe		
28 - 89	61	<pre>m.gy. fresh; m.yel.brn. wthry f. Hro m.gr., grades locally downwards to c.gr., 1:1 qtz:c lmn. & sil. cmt., p-m. sort., good solid core for most part with highly fractured & broke zones. fractures @ 30° to CA at appr 1' to 1.5' intvls. 30.2-30.7 crushed, brecciate frags. of ss. in c matrix; carb. muds & coal intermixed clay. 28.0-32.0 fractured 3/foot. Fe stn. on fractur surface. 35.8-37.0 broken wthrd. zone abund. Fe stn. (Im prbl. H₂O zibe, in decemented. 39.9-41.1 broken zone, highl wthrd., lmn. stn., part decemented, c tains carb. ptgs. 42.0-43.4 becomes carb & sha downwards, poorly, cont., carb. ptygs 60° to CA. ss bands are very stn.</pre>	Fe How How How How How How How How		

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Page Number <u>3</u>

interval	Unit Thickness	Description		to Core Axis	Core Eval.	Est. Rec.
			a			<u> </u>
		45.5-46.0	broken, highly fractur abundant Fe stn.	ed,		
		48.0-48.5	Mc. gr. ss., de- cemented, soft, some	ĺ		
		52.8-53.0	clay. m.dk.gy.; Fe stn., crumbly, in part de-			
		cem	cemented, shin. carb. mudstone ptgs to lense	es.		
		54.1	e 60 to CA.	Ĩ		
		54.9-55.1	carb. to coaly shale			1
		55.1-57.0	Sdy. mudstone/carb. & coaly ptgs.; dk.gy.,			
			Fe stn. on fracture surfaces, dissem. throughout core.			
		67.0-68.1	arg. ss. intbeds. severely fract.,broke	n		
		75.7-76.0	nviy. Fe.stn., in par decemented. broken, Fe stn. carb.			
		78.5-80.1	ptgs @ 60° to CA. carb. & coaly ptgs.			
			79.1 0.01 coaly sh. ptg.			
			79.3-79.6 carb.to coa mudstone pt	1y 9.		
		81.0	sdy. prominent open fractu	re		
		82.5-83.0	<pre>@ 20⁰ to CA. Fe stn. fract., wthrd. appear ance. broken. boly.</pre>			
		84.5-87.0	Fe stn.; co gr.ss. Hvly. Fe stn., esp.			
			<pre>on fracture surfaces. Frequency of fracture @ 3/foot. Intersecting</pre>	s q		
			20° & 30° fractures t CA with near vertical	ō		
		87 3	fract. 0 5° to 10° to CA, c.gr.ss. contains thin bed of			
		07.5	pbls. up to 1" long & 3/8" wide in c.gr.ss.			
			matrix. Below ints. bdd. m-c gr.ss. bdd (60° to CA.			
		88.0	fracture @ 60 ⁰ to CA			
		87.8-89.0	wthrd. appearance. Fe stn.; abruptly int	0		
			mudstone @ 89. contac is irregular because of differential com-	τ .		
			paction. forms a plan @ 60° to CA.	e		
89-97	8	MUDSTONE		· •		
- ·		m. to m. c carb. pl. siltiness 9" intvls	<pre>dk. gy., slty., some remn., increases in basally; fractured @ . @ 65 to CA, possibly weaknesses Grada-</pre>			
		tional con @ 97'.	ntact into f.gr. ss.	, .		
	1			1		1

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Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
97.0-123.	4 26.4	<u>SANDSTONE</u> m.gy., slt. to f.gr., x bdd., mod. to poor sort., chert & qtz. grs., hd., sil.cmt., bdg. lamin. @ 55 to 75 to CA. fractured @ 20 to CA at frequence of 2/3 ftt.	У		
, t		<pre>102.5 fract. @ 80⁰ to CA., fract. surface coated with 1/16" white cal- cite. 101-107 vertical & sub vert. fracturing (to 10° to CA). 105.5-107 core is broken because of severe fracturing. 107 -109 downwall is less Fe st 111 -115.5 core is badly broken 114.8-115.5 3 fractures @ 3" into @ 20° to CA</pre>	n. 1.		
		123.4 abrupt contact but irr gular; plane thru con- tact @ 40 to CA.	e-		
123.4-127	3.6	CARBONACEOUS TO COALY MUDSTONE Contains ptgs & bnds of coal & shaly coal. 123.4-123.6 shaly coal bnd. 123.6-125.2 brecciated carb. mud- stone. 125.2 1/8" white calcite film on fracture surface. 125.2-125.7 carb. to coaly mud- stone, soft, crushed abruptly into sltst. 125.7-126.2 <u>sltst.</u> , hd., abruptly into carb. to coaly mudstone. 126.2-126.4 coaly mudstone. 126.4-126.5 hd., silty mudstone. 126.6-127.0 hd., carb. mudstone.			71 %
<u>127-135.8</u>	8.8	COAL_SEAM 2 127.0-129.4 Coal fairly hd.,dull to vitreous, highly fract. & sks., pyr. flakes on fracture & ptg. surfaces. 129.4-132.0 No Core 132.0-132.6 Coal soft, friable, dull to vitreous, minor pyr. 132.6-132.7 Coal hd., dull, shaly. 132.7-132.9 coal, hd., brittle, dull to vitreous, mostly clarain. 132.4-133.0 coaly shale, hd.,dul 133.0-133.5 coal soft, vitreous, probably mostly clar crushed. 133.5-133.7 coal, dull, soft, crushed, muddy textur shaly.	l. ain, are		

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Interval Unit Thickness		Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
		<pre>133.7-134.7 coal dull to vitreou soft, crushed. 134.7-135.8 coal hd, dull to vitreous, dense, son shale contents. Recoveries:</pre>	16		
		126.5-132.02.9/5.5132.0-137.04.8/5.0			
135.8-146.	7 10.9	MUDSTONE m.gy., to dk. gy., where carb., sl. slty., becomes more silty downwards. Intvls. of badly brok core with clay infilling. core breaks readily @ 60° to CA. Prbly along bdg. plane. 135.8-136.6 carb. to coaly mud- stone; crushed, fria ble. 136.6-136.8 <u>shale</u> , sl. carb., hd blocky, brecciated. 136.8-137.7 no core. 137.7-138.0 wthrd. appearance, broken. 139.2-141.5 Repces. by 1.1' of badly broken core because of fracturin 141.9-142.4 core is soft & wthrd easily cut by knife; broken. 142.4-144.6 core is highly frac- tured & broken. 143.7-143.9 soft, sdy mudstone, claye texture. Bdg. @ 60° to CA. 145.5-145.6 Fract. @ 30° to CA. Brecciated rock in clay matrix. Possibl fault. Contains mind amount pyr. balls. 145.8-146.5 Severely broken because of high dens fracture.	en 60 [°]		
		146.5-146.7 Breccia zone. Frags. of mudstone imbedded in clay. No displace ment. Recovery:	1		
		137.0-141.5 3.3/4.5			
146.7-164.3	17.6	<pre>SANDSTONE with silty & sandy mudsto interbeds. m.gy., thinly bdd., X bdd., slt. to f.gr.ss. bdd. @ 40° to 60° to CA. 147.7-148.5 core is shattered & brecciated; wthrd. appearance; slty. mudstone.</pre>	9 40 ⁰ - 60	Þ	
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Interval	Unit Thickness	Descr	ription	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
		148.5-152.0	Moderately sount & competent; fractures @ 149.4 & 150.3 at 20° to CA.			
			<pre>150.6-151.7 vertical fract.,terminate at both ends at open fract. @ 60° to CA (poss. bdg. plane fract brecciated along one side of frac & sound the othe side. 151.7-152.0 Brecciate crumbly, crusty.</pre>	s) t. r d,		
		152.8~153.2 153.2~155.4	mudstone. Broken, blocky, to ½ pieces. core is griable but whole; easily cut by			
		155.4~155.5 155.9~156.2 156.2~157.0 157.0~159.0	<pre>knife. Carb. to coaly shale ptg. soft. Carb. to coaly sh.ptg Coal & coaly shale ptgs.; crushed. Broken core-mudstone.</pre>	•		
•		Recovery: 159.0~162.0	157-159 0.8/2.0 No recovery. Mislatch.			
•		162.2-162.8 163.2-163.29 163.25-164.5	Very friable, crushed no apparent displace ment, brecciated, thi coal ptgs., easily cu with knife. 5 Coal splint, bright 5 Friable, highly frac contains thin ptg. of carb. sh. & coal; Brecciated with no apparent displacement	, n t		
164.3-203	38.7	SANDSTONE				
		M.gy. to m.	t.gy., m.gr., qtz & chert grs in 1:1; m.gr.; mod.sort., sil. cmt./minor 1mn. cmt., hd.; gradationa to c. gr. Abrupt con- tact with above @ 600	1		
•		· ·	Joints approx. 1' to 1.5' apart @ 30° to CA, Fe stn on fract. surfaces. ss. is generally massive & is in part x.bdd.			
		170.0-171.0 172.0-172.8	Fract., broken, wthra appearance, hvl. Fe stn. Broken, fract. @ 60 ⁰ to CA (prbly. bdg. plane).	•		

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Page Number <u>7</u>

Interval	Unit Thickness	Description	1	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
		172.0-173.4 f.gr. to m.	ss.; hd. grading gr. @ 173.4 to			
		C.gr. 173.6-174.6 Broke densi Fe st surfa	n, wthrd., high ty of fractures; n. on fracture ces.			
		Coal 175.3-176.3 <u>ss</u> , b sity appea on fr	Taminations. roken, high den- of fract., wthro rance; Fe.stn. act. surfaces.			
		Coal 177.0-179.0 Fract	ured @ 30° to CA	,		
		100 t 182.0-183.3 Broke to v.	o CA & 60° to CA n, 2" pieces, c. c.gr., wthrd.	•		
		185.2-185.7 Core wthrd to co core of co	appearance, car al laminations, contains splints al which forms	en b		
		weakn cause of fr 188.3-190.0 Broke	ess planes & s greater densit acturing. n, highly wthrd	У &		
		· fe st & coa gers.	n., contains cai 1 splints & stri	.n-		
		190.0-191.0 High @ 30 ^C on fr	density of fract to CA; Fe stn. act. surfaces.	•		
		191.3-192.0 Broke	n, nd., rubbly.			
		192.0-192.2 v.c.c @ 192 into tact gular but i	r. <u>ss</u> . .2 abrupt contac arg.sltst.; con obscured by irr breaking in co s approx. 80 ⁰ to	ct 		
		192.2-203.0 <u>sltst</u> lamin to mu hd., 30 ⁰ t	. to v.f.gr. <u>ss</u> . ated & gradation dstone below., m.gy., fract. @ to CA.	nal		ŕ
		195.5	-196 badly brok blocky, up to 1 blocks.	en " ah		•
		199.8	dens. of fract. -200 broken, hi dens. of fract.	gh		
203 - 246.	5 43.5	MUDSTONE				
·		M. to dk.gy., th: tains carb. & coa throughout. Ptgs. generally (throughout 1' to	nly parted, con al splints & ptg 0 60 ⁰ to CA, fra 1½' intvls @ 30	- s. ct. o		
		203.2-203.6 Carb crusi 204.4-205.5 crusi	to coal band, ned & soft. ned coal & carb.			
		sh. 204. 204.	soft. 5-205.5 dominant coal. 5-206.0 No core.	ly		
	1					

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Interval	Unít Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
	·	207.0-207.2 broken friable carb.			
		& coal ptg.			
		207.4-207.5 coal ptg.bright. 207.5-207.9 carb.sh./thin coal	ļ		
		splints, friable. 208.3-208.35 Coal ptg.,bright.			
		208.5-208.7 broken, carb. & coal			
		209.2-210.0 Brecciated & soft,			
		easily cut by knife. 210.4-210.8 coal thinly parted,			
		vitreous to bright.			· ·
		212.6-213.4 broken, blocky to 1"			
		blocks. 213.4-214.5 broken,blocky, 2" to			
		3" pieces; in part			
		215.1-215.7 broken, crumbly, soft.	ł		
		216.6-217.5 brecclated, soft, easily cut by knife,			
		frags. of carb. sh. Possible fault: zone			
		begins @ fract. at			
		217.5-218.0 broken, blocky, 2"			
		to 2½" blocks. 222.4-222.8 broken, blocky, ۶"			
•		to $1\frac{1}{2}$ " pieces. 223.3-223.4 solitary chert pbl.	}		1
•		225.7-227.0 banded @ 60° to CA.			
		227.3-228.0 broken, irregular			
	-	blocks of 2" to 3". 231.9-233.6 Dessication cracks			
		throughout core,			
		235.3-235.4 broken, fract. appea	rs		
		236.8-237.0 broken, wthrd.appear.			
		238.3-238.4 Brecciated muds & frags. inbedded in			
		clay occupying fract	•		
		238.7-240.0 broken, blocky, silty,			
		2" pieces.			Í
		241.8-242.0 Badly broken, prbly. mechanical.			
		242.0-242.7 slty. to v.f.gr.ss.; x-bdd.			
		242.7-243.1 broken, wthrd.			
		to CA.	}	}	ļ
		gr. sdy. mudstone,			
		fractures vertical t 30 ⁰ to CA.	D		
		246.3-246.5 brecciat	ed.		
246.5-264	18.5	SANDSTONE	· .		
		Thin to m.bdd., m.gy to m.dk.gy.	,		
		v.f.gr. to f.gr. <u>ss</u> ., hd. x-bdd. thin bds. & lamin. of slty. &			
		sdy. mudstone. X-bdd. 0 30 ⁰ to CA.			
		Fract. throughout @ 30° to 40°		1	
		TO CA.	·	1	
· · · ·					}

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Interval	Unit Thickness	Description	<pre>4 of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
		<pre>247.2 Fracture @ 30[°] to CA,</pre>	r r r r r r r r		
	22.1	263.0-264.0 Broken, blocky, to 2 pieces. ss becoming core mas & coarser grained.	" sive		
264.0-287.	L 23.1	SANDSTONE M.gy., thin bdd. to massive,f-m gr. grading to c.gr. basally. Chert & qtz. gr. with chert>qt mod. sort. some x-bdg. Fract. at 10 to 30 to CA & 1 to bdg. 30° fractures most prominent in massive m. & m-c.gr. ss.	60 ⁰		
		266.5-266.8 Badl- broken, wthrd fract. surfaces. 270.0-273.6 Thin bedded with lamin. of carb.mudst @ 272' small irreg. fract.with di curved fract. @274.5 Fract.@ 30° t CA, 1 to bdg. small displ. 0.07'. Fract. infilled/calc & minor pyr. 275.5-276.3 Lamin. of carb.muds & v.f.gr.ss. @ 278 abrupt contact	one. spl. of te t.		

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	Interval	Unit Thickness	Desc	ription	<pre>< of Bed to Core</pre>	Core Eval.	Est. Rec.
r				<u></u>	Axis	ļ	
				0279.2 abrupt contact into massive c	2 2 8		
			279.2-280.4	gr.ss. Contains frags. of m. dk.gy. mudstone from above unbedded in ss.			
				increasing in content basally. Elongate & to bdg. @ 60 ⁰ to CA.			
			282.0-283.0 284.0-285.0) Broken into pieces ½" to 2½".) Broken, large chunks			
			285.0-287.]	to 3". ss. become c.to v.c. gr.			
	287.1-347.	1 60	SILTY MUDSTONE	2			
	X		Generally maintbds. of m.to m.dk.gy above. Soft of dessicat Fractures fo to CA, 1 to 1 0 60° to CA	assive with some thin siltstone to f.gr.ss. y., abrupt contact with sediment deformation ion fractures throughou or most part @ 20° to 3 odg. Bdg. plane fractur	t. 00 es		
,			288.0-288.5	Broken, blocky, wthrd., coated/calcite on fracture surfaces.			
٠			@290.0	Prominent fracture @ 25° to CA., coated with calcite.			
		j	291.3-291.5	Soft, silty, mudstone; crusty, broken.			
. •			293.8-294.2	Brecciated, crusty & wthrd.			
			295.7-296.3	Broken, rubbly, ½"-1"			
			296.5-296.7 296.7-297.4 297.4-298.3	Soft, wthrd, mudstone. Brecciated. Broken core; v.f.gr.			
			298.3-298.5	mudstone & clay. Thinly bedded to lamin f.gr.ss.			-
1.			@298.9	Prominent fracture @			
· ·			298.9-301.0	Broken, rubbly, pieces to 1".			
				Fe.stn.on fracture surfaces, minor calcit minor coal splints.	e,		
	7	· ·	@302.5 305.0-306.0	coal ptg. @ 60° to CA. Brecciated appearance dessication fractures	60 ⁰		
-			306.0-314.3	Sound core, commonly fract.along bdg.planes @ 60° to CA. Fractures @ 3"-4" intvls.			
			314.3-315.0	Broken, blocky, arg.slts frags to 2". Fract. @ 10° to 20° to CA.	t. ′.		
, ,	-		315.0-316.0	Mudst., fractures, irre but tending to 10 to 30 to CA.	d.		
-			316.0-316.7 317.1-317.2 316.0-320.0	Carb.,crumbly. Carb. to coaly,crumbly Intbdd. arg.sltst. to v.f.gr.ss. with slty. mudst. Fract. @ 30° to	•		
•				CA. Prbly bdg. plane fract.			

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Interval	Unit	Desc	ription	< of Bed	Core	Est.
	Thickness			to Core Axis	LVal.	Kec.
	· · · · · · · · · · · · · · · · · · ·	322.7-323.1	Fract. $\theta 20^{\circ}$ to 40°			
		522.7 525.1	to CA; core is broken			
			because of high densi-	с с		
	1		minor calcite on fract	μ. Ε.		
		224 5.225 4	surfaces.			1
		324.5~325.4	core, fract. $(0.100-30^{\circ})$			
		205 4 206 8	to CA.			
	}	326.0-326.1	Brecciated mudstone			
		216 1-226 0	frags.imbedded in clay	y .		
		326.9-327.2	Sandstone, f.gr.x-bedd	ed,		1
		207 2 220 1	possibly a boulder.	_		
		327.2-329.1	frags. in mudstone			
		Nome	matrix.			
		NOTE -	is probably sedimenta	ry		
	ļ j		breccia.	-]
N.		330.0-330.8	fragmented.			
		331.0-335.0	Sltst., hd.fract. @ 6	0		
			1 to lst set.	A.		
		335.0-335.2	Soft, mudstone ptg.		1	
		335.2-336.0	& mudstone. Fract. @			
•) ·	20 ⁰ to CA. Core is pu	2-		
•			side of fracture.			
		336.0-336.3	Fract. @ 20° to CA,			
			hanging wall side of			
		337 5	fracture.	0 600		
		337.3	to CA, bright & britt	le Ie		
		337.55-338	Mudstone, carb. & coal			
-		338.3-339.1	Arg.sltst., hd.	1		
		339.1-339.5	Slty.mudstone with pt	gs	l	
			@ 60° to CA.	60 ⁰		
		339.5-345.0	Arg.sltst., to slty.	omes		
	}	}	less slty. basally, g	rada-		ļ
			tional to m.dk.gy.car	þ.		
			Fract. @ 3"-4" intvls			
			@ 40° to CA. Bdg.plane fract.@ 60°			
			to CA @ L to fract.			
· /	ļ]	above. Carb. ptgs, ne base of unit @ 60° to	ar CA.		ļ
247 1 250			A CALLY NURCHAND NITHI			
34/.1-359.		COAL STRINGERS	& BANDS			
		Dark grey, (carb. to coaly.			
		347.1-347.5	carb. to coaly mudsto	ne		
•	ł	347.5-348.0	with thin coal splint. coal, dull to bright.	5.		}
			becomes brighter basa	lly.		
•			rew shaly coal bands ptgs. & thin vitrain	δ κ		
• •]		bands.			
j		348.0-348.9	<u>mudstone</u> , m.dk.gy. wi carb. & coal splints.	rn.	1	ļ
:		@348.9	Promin. fract. @ 30 [°]		1	
		348.9-349.2	to CA & rt. Δ to bdg. coaly shale/carb.sh.p	cgs.		1
	1.	· · · · · · · · · · · ·				
1	1	1				1

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Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
<u> </u>	<u> </u>	349.2-349.4 coal ptg.,soft,friabl	e,		
		vitreous; mostly clar	ain.		
	1	$349.4-349.6 \frac{\text{carb.sh}}{\text{carb.sh}}$ 349.6-349.65 coal ptg. 0 65° to C	A.		
		349.65-350.4 carb. to coaly shale	-		1
		coal splints & ptgs @		1	
,	j	350.4-350.9 coal laminations vitr	eous 60	ļ	ļ
		to bright/lamin. Of d arg coal: banded @ 60	μ11 φ		
		to CA.	-		
		350.9-354.1 carb.to coaly shale			
		splints.			
		354.1-354.6 coal, hd., vitreous t	:D		
		dull & dense bands of			
		durain. $254 - 254 - 9$ are to coaly shale			
		354.8-358.2 Mudstone carb. with			
		few splints of carb.	,		ļ
		& harder basally.		1	[
		358.2-358.65 carb. to coaly shale			
		carb. ptgs.			
		358.65-358.75 coal, bright, clean,			
		358.75-358.95 coal dull, shaly.		}	1
		358.95-359.2 <u>carb.sh.</u> dk.gy. with coal splints.			
	34.9	SEAM 4U			100%
<u></u>		359.2-359.35 coal, dull to vitree	us,	ļ	
		clarain,sl.shaly. 359.35-359.4 shaly coal, dull,			
		359.4-359.6 coal, soft, friable,			
		mostly clarain. 359.6-359.7 coal, hd.,dense,clara	in		
		with some durain, mind	r	1	1
		359.7-359.8 coal,soft,bright,fria	ble		
		mostly clarain.			
		dense, durain band.			1
		359.9-360.0 coal, soft, vitreous for ight, clean, mostly	to l		
		durain. 360 0-360 1 coal bd .dense.dull 1			
		vitreous, shaly.			
,	,	360.1-360.3 coal,soft,friable, vitreous to bright.			
	ł	mostly clarain			
		$\frac{1}{2}$ shalf, $\frac{1}{2}$ shalf, $\frac{1}{2}$ shalf, $\frac{1}{2}$			
		coaly, mod.hd.			
		360.5-361.2 <u>coal</u> , dull to vitreou sl.shaly,mod.hd., hid	us, gh		
		in fusain. 361.2-362.0 coaly shale to shaly	coal		
		contains coal splint:	\$,		
		touch.			
, .		362.0-362.1 shale carb.hd.			
:		362.1-362.3 coal, dull,earthy, shaly,soft.		ļ	ļ
		362.3-362.5 coaly shale with coa	1		
		splints.			
	1		1		1

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ntervar.	Unit Thickness	Description	to Core Axis	Eval.	Rec.
		3625-3627 coal dull to vitreous.			
		soft, friable, mostly	hp.		
		362.7-363.0 coal,dull,Pb. gy.,dens	e		
		but light wt., sl.shal mostly durain.	у.		
		363.0-363.2 coal, soft, friable, most	ly		
		clarain. 363.2-363.3 coal,dull,friable,shal	y.		
		363.3-363.45 shale carb.to soaly			
		363.45-363.9 coal, hd.dull to vitre	ous,		
		minor pyr., lt.wt.,cla & durain.	rain		
		363.9-364.0 coal dull, Pb. gy., dens	e,		
		364.0-364.5 coal hd.dull to vitred	us,		
		some pyr. flakes, lt.v	t.		
		364.5-365.1 coal friable, vitreous,			
	· ·	mostly clarain. 365.1-365.2 coal, Pb. gy.,dull,der	se,		}
	ł	shaly.			
		mostly clarain, some	1		
		shaly coal, friable.	iv.		
		dense, poaaibly high			
		durain contact. 365.6-366.5 coal,dull to vitreous.			
		minor coaly shale ptgs	.		
		366.5-366.7 shaly coal, banded,du	ļi,		
		dirty. 366.7-366.85 coal.dull to vitreous	,		
		hd.mostly clarain.			
		duil, PD.997 hd., dense, contains ca	e b.		
		plant remnants.			
		367.1-367.8 coal, hd.dense, dull to			
		vitreous,high durain contact,blocky,minor			
		pyr.flakes.			
		dull,dense, Pb.gy.,		}	
		light in wt., pbly. durain &/or coaly shl			
		367.95-368.3 coal, friable, vitreou	9 ,		
	í i	368.3-368.5 coal hd.dense,dull to			
	4	vitreous, lt.wt., claro			
		tact of fusain.			
		368.5-368.7 coal, duil, Pb.gy,, shaly.			
		368.7-369.0 coal dull to vitreous	*		
		some durain, shaly.			
		369.0-370.2 <u>coal</u> ,hd.dull to bright bands of shalv coal	,		
		with vitrain & clarain	i, .		1
		flakes.	×1⊥ •		
		370.2-370.23 <u>shale</u> ,hd.dull,hvy.,			
		370.25-370.35 coal, dull to vitreo	s,		
		friable,mostly clarais 370.35-370.45 coalv shale.dull.hd	1.		
		370.45-379.7 coal, friable, dull to	-h +		
		vitreous with few brid bands, mostly clarain	nt		
		Dunied, model, efatali			

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Interval	Unit	Description	< of Bed	Core	Est.
	Thickness		Axis	Lvar.	
		370.7-370.9 coaly shale to shaly thin lam. of pyr.,der	<u>coal</u> nse,		
		possibly durain. 370.9-371.0 <u>shale</u> , carb. to coaly,	,		
		371.0-371.7 coal dull to vitreous	3 ,		
		hd.dense, mostly clar with some durain.	rain		
		371.7-372.0 shale, carb.with coal flecks to splints.			
		372.0-373.0 coal,hd.friable,in pa brittle,vitreous to bright,mostly clarain	art n		
		with some vitrain,min pyr.ptgs.	nor		
		373.0-373.7 <u>coal</u> ,hd.dense,dull to vitreous,some bright	D		
		373.7-374.35 coal,hd.vitreous to bright,some pyr.flake	es,		
		374.35-374.5 shale, carb.with co	al		
		streak. 374.5-374.8 shale.m.lt.gv.,clave	v :		
		crusty,thin carb.ptg soft.	S,		
		374.8-374.9 <u>coal</u> ,dull,dirty,conte inated with clay from	em- m		
		374.9-375.5 <u>coal</u> , friable, soft, du to vitreous, mostly c	11 1a-		
		coal. 375.5-375.6 <u>coal</u> , dull, dirty, soft	Y .		
		shaly,possibly high fusain.	in	_	
		harder than above, friable,minor bands			
		378.4-378.5 shaly coal, dull, dirt	у.		
		soft, friable, mostly	nds,		
		vitrain. 382.0-383.0 coal.dull to bright,			
		dense,hd.,contains splints & bands of			
		vitrain,mostly clara minor dense,hd. Pb.g	in, Y,		
		383.0-383.7 <u>shale</u> , hd.dense, carb	•		
		bright vitrain, Pb.gy possibly high durain	• •		
		thin pyr.flakes. 383.7-384.5 <u>coal</u> ,hd.fairly dense	,1t.		-
		wt.,vitreous to brig with thin dull bands (prbly durain) most)	ht ,		
		clarain with minor vitrain, minor pyr.			
		384.5-385.1 <u>coal</u> friable, dull to vitreous, dirty, mostl	y		
		385.1-385.2 coaly shale, dull, ear 385.2-386.8 coalfriable to soft,	thy. dull		
		to vitreous, mostly c with minor ptgs of c	larain oaly		
		sh.& shaly coal.	-	1	ļ

· .	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
-			386.8-387.0 <u>coal</u> , hd.dense,splints of bright coal,mostly			
	•		clarain with some dura 387.0-388.0 coal, soft,friable,dul to vitreous with splin to thin ptgs. of bright coal,mostly clarain with thin ptgs. of shalv co	in. L ts th al.		
			388.0-388.05 <u>shale</u> band. 388.05-388.8 <u>coal</u> , soft, friable, dul to vitreous with minor bright coal, thin ptgs. of shaly coal.	1		
			388.8-389.0 <u>coaly shale</u> , dull, earth with splints & ptgs.of coal & shaly coal. 389.0-389.9 <u>coal</u> , soft, friable, dull to vitreous with occa- sional bright splints	2 &		
			ptgs.of vitrain,minor shaly coal ptgs.,minor pyr. 389.9-390.0 <u>coaly shale</u> ,dull,dense Pb.gy., possibly high in durain.			
•			390.0-391.4 <u>coal</u> as for 389-389.9. 391.4-391.45 <u>shale</u> with carb. to coal bands,dull,dense. 391.45-391.6 <u>coal</u> ,dull to vitreous hd.sks.,shaly,calcite coating on fracture	,		
•			surfaces. 391.6-392.0 <u>coal</u> , vitreous to brig soft, friable, mostly clarain with minor vitrain splints. 392.0-392.6 shale, hd.dk.gy., carb.	ht,		
			to coal flecks,dense, splints of shaly coal thin bands of siderite 392.6-392.9 coal,fraible,dull to vitreous,thin ptgs. of dull shaly coal,mostly			
			392.9-393.4 <u>coal</u> ,soft,friable to clayey,dirty,dull to vitreous,high in fusa: 393.4-394.1 <u>coal</u> ,soft,clayey textu	in. ire,		
			dirty,quite shaly. @394.1 Footwall contact @ 60 ^o to CA. <u>Recoveries</u> :			
			$\begin{array}{cccccccccccccccccccccccccccccccccccc$			
	394.1-407.	13.4	392.0-397.0 4.2/5.0 <u>MUDSTONE</u> <u>m.dk.gy.</u> to m.lt.gy.,carb.flecks,	60 ⁰		
			parts along carb.ptgs. Calcite lamin.& flakes on fracture surfaces & invading mudstone to depth of 0.3'. Fract.@ 60° to CA along bdg.plane In part silty,hd.to crusty.			

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Interval	Unit	Description	< of Bed	Core Eval.	Est. Rec.
	Thickness		Axis		
407 5-428	65 21.15	SEAM 4L			96%
407.5.420.	¥3_ <u>=</u> - <u>-</u> - <u>-</u> .	the state of the s			
		407.5-307.7 Coal, solt, filable, vitreous, dirty to to	uch,		
		mostly clarain with			
	ł	some fusain.			
		highly crarb. to coa	1¥,		
		contains ptgs.& spli:	nts		}
		shale.	1		}
		Calcite on fracture			
		surfaces. 408.4-408.55 coal.soft,friable,			
		vitreous, mostly clar	ain.		
		408.55-408.8 coal, soft, dull to	uch,		
		mostly clarain with			
		minor fusain.			
		dull,earthy,Pb.gy.			
		409.3-409.4 coaly shale, hd.dull	ant		
		coal, lt.wt., possibly	9110		
		some durain.	e		
		409.4-411.7 <u>coal</u> , duil to vitreou hd.to friable, mostly	.5,	1	
		clarain with ptgs. o	f		
	1	shaly coal & coaly shale			
		411.7-412.0 No core.			
		412.0-412.4 Coal,dull to vitreou	us, v		
		clarain with some sh	ialy		
	1	coal.			
		412.4-412.5 Shale, Carb. ptg., ptg. surfaces coated with	L L		
		calcite.	-i b_		
		412.5-412.9 Coal, Md. Blocky to II ble, dull to vitreous	· · · ·		
		mostly clarain with	pegs.		1
		412.9-413.35 shale, Pb.qy., high]	y		
		carb.to coaly, coal	-		·
		flecks & splints thr	ru-	1	
		413.35-413.85 coal, dull to brigh	nt,		
		friable, mostly clara with ptgs & splints	of		
		vitrain, minor thin p	otgs.		
		of dull shaly coal.			
		brittle, fract.surfac	es		
		coated with calcite;	; coal		
	ļ	414.05-415.8 coal, dull to brigh	nt,		-
		hd.to friable, mostly			
		bright vitrain, thin	ptqs.		
		of shaly coal.			
		415.8-415.9 shale, dull, Pb.gy. bright coal flecks.	,na.		
		possibly some durain	1. j		
		415.9-416.3 coal, friable, vitreo	us arain	1	
		with thin vitrain ba	ands.		1
		416.3-416.4 shale, hd., v. carb.to			
		coaly,dull. 416.4-417 coal vitreous to brid	aht,		ł
		friable, mostly clara	áin &		}
:		some thin vitrain b	ands.		1
	1			-	ļ
	1		i		1

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Interval	Unit	Descri	ption	< of Bed	Core	Est.
	Thickness			to Core Axis	EVal.	Kec.
·	1					
		417.0-418.1 0	Coal, dull to vitreou	5 ,		}
•		1 %	with thin ptgs and	11		
		L L	oands of dull shaly			ļ
		410 1 410 2 4	coal.	· · · ·		
		418.1-418.3 C	d. mostly vitrain.	uc		
		418.3-418.7	coal, vitreous with mi	nor		
		t.	bright bands, friable,	i nord		
		n v	vitrain & minor ptgs.	·		
		ć	ull shaly coal.		Ì	
		418.7-418.9	coaly shale, hd.dirty	,		
		C ç	shalv coal to coalv	· .		ļ
		-	shale (possibly same			
		(1) 0 (1) 0 ()	lurain).	~		
		418.9-419.0	umerous thin beds of	5,		
		ċ	full shaly coal & coa	ly		1
	· ·	9	shale. Some calcite			
	j	419.6-421.4 c	coal. vitreous to bri	ght,		
		Ī	d. & friable, mostly	J /		
	1	402 A 401 E 6	clarain & minor vitra	in.		
		421.4-421.5	otqs. shaly coal, coal			
		5	splints.			
•		421.5-422.0 N	No core.			
	1		lull.	Í		
•		422.1-422.6	coal flaky, friable, du	11		
		t	ouch.mostly clarain			
		v	with minor fusain.			
		422.6-423.1	coaly shale + shaly de	oal		
<i>,</i>		S	soft,dirty,hd. bands	of		
		400 1 400 6 4	coaly shale.	h -		
		423.1-423.6	birhgt.mostly clarain	10	j	
		. v	with some vitrain.			
		423.6-423.8	baly thin pros			
		2	splints of clean coal			
	}	423.8-425.9	coal, vitreous to bright	ht		
		n	Nostly clarain with	r		
		Ĩ	otgs. dull shaly coal			
		425.9-426.0	shale, brn, soft, carb.			
		420.0-420.0 <u>(</u> V	vith some bright coal		ĺ	
		i	friable to hd., conta	ins		
		t	thin ptgs.& bands of	1		
]]	2	shale.	-x	ļ	
		426.8-427.0 <u>s</u>	<pre>shale,dull,hd.,dense</pre>			
		(+	coaly,coal flecks &			
		427.0-428.1	coal hd.vitreous to			
`		Ē	pright, minor ptgs. of	.		
		((clarain & vitrain	· · .		
		428.1-428/35	coaly shale to shaly			
		í ç	coal, hd., dense, dull,	_		
		С А	airty with coal fleck Solints.	S	·	
		428.35-428/65	5 <u>coal</u> vitreous to	ļ		
		h	pright, soft, friable,			
		I	uostry crarain.			
					ļ	
:						
	T T		1			

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Inter	val Unit Thickr	Desc	eription	<pre>4 of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
4 - <u></u>		Recoveries				
		407.5-412.0 412.0-417.0 412.0-422.0 422.0-427.0 427.0-432.0	4.2/4.5 5.0/5.0 4.5/5.0 5.0/5.0 4.5/5.0 4.5/5.0 4.8/5.0			
428.65-	514.4 85.	35 MUDSTONE				
		m.gy.to m. carb. to co coal ptgs. bands. Fractures generally Fractures & L to bdg	dk.gy.,silty in part, baly in part, contains & splints & few coal readily along ptgs., at 60° to CA. also @ 20° to 30° to Ca s.			
• •		429.3-429. 436.8-437. 442.9-443. 443.5-449.	7 coaly shale to shaly coal,dull,with abund. bright coal flecks & splints. 0 core is broken,blocky ½" to 1½" pieces. 0 coal,bright band of claro-vitrain. 2 sandstone, m.gy.,sili to f.gr., in part X- bedded,laminations of mudstone & carb. mud- stone. Gradational	ant 7,		
4			from above. 444.5-445.0 core is broken, fract. @ 30° to CA. Gradational back inte			
· .		450.2-452.0 456.0-456.3 457.4-457.8	<pre>mudstone basally. siltstone, m.gy.,hd. arg.band @ 60° to CA coal & shaly coal & carb. to coaly shale ptgs. coal & carb.shale,dul</pre>			
		457.8-457.9	earthy, clayey, soft. coal, dull/bright lust Pb.gy., dense, hd., poss bly durain.	re, i-		
		457.9-458.9	coal,dull to bright, mostly clarain with thin bands of vitrain becomes shalin basall	, V.		
4.		460.0-461.0	Brecciated mudstone, crusty & crumbly.	「		
-		461.0-461.8	soft,friable. soft,friable. soft,friable,dul	1		
		462.8-467.0	to vitreous, in part shaly.) carbonaceous,coaly throughout,desication	1		
· ·		467.5-468.0	breccia.) coaly shale to shaly coal,soft,earthy,dirt	y		
•		@480.2	to touch coal ptg.,shaly,wedge shaped,upper contact @ 60° to CA, lower contact @ 90° to CA.			
•						

Page Number _____19

Interval	Unit Thickness	Description	< of Bed to Core Axis	Core Eval.	Est. Rec.
				<u> </u>	
		480.5-482.0 vertical fracture	4		
		@ open bdg. fractures	•	2	
		482.2-482.4 coal ptg.			
		througout soft mudston	ne.		
		483.6-484.3 core is broken, coal &		I	
		throughout.	5		
		484.4-495.3 core is broken, soft &			
		crusty, carb. & coal			I .
		495.5-497.0 curved vertical fract			
		497.55-498.25 coal, hd.vitreous to		-	
		498.25-498.55 broken, carb. & coal			
		splints.	1		
		blocky, ptgs. of coaly			
		shale throughout.	ah +	1	
		hd., friable, mostly	911 L ,		
		clarain/vitrain bands			
		contains thin ptgs. o coaly shale.	T.		
		504.45-504.75 broken core/coaly &	}		
		carb. frags. & ptgs. 504.75-514.5 mudstone becomes	ſ		
		harder & more silty			
		basally.	ł		
514.5-567	52.5				
		SILISIONE	600		
		m.gy., hd., for the most part mass	ive		
		mudstone & minor carb. ptqs. @			
		60° to CA.			
		x-bedded.	1		1
		Fractures @ 20 [°] to CA @ irregular			
		apart. Some calcite crystals on			
		fracture surfaces. 2nd set of			
		fractures @ 40° to CA.			
		517.0-517.5 fract. @ 20 ⁰ to CA wi	th	1	
		abundant calcite or			· ·
		536.2-537.0 core is fract.& broke	n		
		into pieces 3"-4" by			
		541.7-542.0 broken.			1
		542.7-543.3 broken core,blocky,up			
		543.3-543.5 mudstone band, parted			
			ī	1	1
		e 60° to CA.	ŧ.		
		<pre>@ 60° to CA. 544.5-545.4 broken core because o high density fracturi</pre>	f ¶g.		
		<pre>@ 60° to CA. 544.5-545.4 broken core because o high density fracturi 545.8-546.3 broken,vertical fract</pre>	f mg.		
		<pre></pre>	ng. oo.		
		<pre>@ 60° to CA. 544.5-545.4 broken core because o high density fracturi 545.8-546.3 broken,vertical fract and fract. from 20°-4 555.0-566.5 interlaminated mudsto siltstone & v.f.gr.ss</pre>	ng. oo. ne,		
		<pre></pre>	ng. oo. ne, i, s.		
		<pre>@ 60° to CA. 544.5-545.4 broken core because o high density fracturi 545.8-546.3 broken,vertical fract and fract. from 20°-4 555.0-566.5 interlaminated mudsto siltstone & v.f.gr.ss x-bdd. Increases in s content downwards. Pt @ 60° to CA.</pre>	ng. oo ne, s. gs.		
		<pre>@ 60° to CA. 544.5-545.4 broken core because o high density fracturi 545.8-546.3 broken,vertical fract and fract. from 20°-4 555.0-566.5 interlaminated mudsto siltstone & v.f.gr.ss x-bdd. Increases in s content downwards. Pt @ 60° to CA. 565.8-566.5 core badl broken because</pre>	ng. oo. ne, s. gs.		
		<pre></pre>	ng. oo. ne, s. gs. y of g.		
		<pre>@ 60° to CA. 544.5-545.4 broken core because o high density fracturi 545.8-546.3 broken,vertical fract and fract. from 20°-4 555.0-566.5 interlaminated mudsto siltstone & v.f.gr.ss x-bdd. Increases in s content downwards. Pt @ 60° to CA. 565.8-566.5 core badl broken because dense fracturin</pre>	ng. oo. ne, s. gs. y of g.		
		<pre>@ 60° to CA. 544.5-545.4 broken core because o high density fracturi 545.8-546.3 broken,vertical fract and fract. from 20°-4 555.0-566.5 interlaminated mudsto siltstone & v.f.gr.ss x-bdd. Increases in s content downwards. Pt @ 60° to CA. 565.8-566.5 core badl broken because dense fracturin</pre>	ng. o. ne, s. gs. y g.		

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	[nterval	Unit Thickness	Description	< of Bed to Cora Axis	Core Eval.	Est. Rec.
·	567-577	10	SANDSTONE	60 ⁰		
			m.gy.,f.gr.,laminated becoming massive downwards, x-bdd. lamina- tions @ 60° to CA. Fract. @ 1'-1.5' intvls. @ 20° to CA. Fract. surfaces coated with thin flakes of calcite.			
*			570.5-571.2 broken core because of high density intersecting fractures @ 20 to CA with bdg. plane fractures @ 60 to CA 572.0-577.0 Loss of core because of mislatch. 0.9'/5.0'.	-		
•	577-583.3	6.3	SANDSTONE	60 ⁰		
			Thinly bdd. to lamin., lam. @ 60° to CA. Laminated with thin ptgs. of shale & siltstone. v.f.to f.fr.,hd.,qtz. & chert. in l:l. minor arg. matrix. Fract. @ 20° to CA.			
			 579.0-580.9 fm.gr.ss.lenses in a predominately lamin. v.f.gr.ss. & sltst. sequence, lenses vary in dimensions. Banding is irregular but approx. @ 60 to Cl 580.9-581.3 badly broken,blocky, to 2" blocks. 581.3-381.5 broken to blocky with coaly shale & coal pter & splints. 581.5-582.2 ss.,m.gy., m.gr.,massingtz & chert gr. qtz chert, hd.sil.crut. mod. sort. Fractures in 2 direction 20 to CA & 30 to CA & 50 one to the other. 582.2-583.3 broken,crushed,mudstom carb. & coal splints & ptgs., minor thin ss lenses. 	A. S. Ve, Dns vith S,		
m	583.3-604.5	21.2	INTEDD.SILTSTONE WITH SANDSTONE & SILTY MUDSTONE Siltstone - m.gy.,hd.thin to m.bdd.			
			<pre>in part argill. interlaminated with SS - m.gy.hd.,v.f.gr.,interminated with:</pre>	1:		
			Mudstone - m.gy., in part silty, mod. hd.			
			Greater frequency of mudstone laminations and beds towards base of unit. Fracturing 020° to CA & 060° to CA - 2nd set prbly. bdg.plane.			
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<u> </u>		Dependention	C of Rod	Core	Fet
Interval	Unit Thickness	Description	to Core Axis	Eval.	Rec
		586.7-587.5 broken core,wedge shap pieces up to 3",broken because of fracturing. 592.8-596.5 broken,coal & carb.sh. ptgs.,core is blocky, slty.to sdy.mudstone/ thin beds of arg. slts 596.5-604.5 mostly slty-mudstone/ arg.sltst.,+v.f.gr.ss. beds., numerous coal splints + ptgs. @ 60 to CA.	ed		
		597.7-598 coal splints following fract. @ 20 to CA. 601.0-601.5 broken,fra because of fracti ing, subparallel fract. @ 20 to CA, prbly.bdg.pl fractures.	ag. 1r-		
04.5-610.8	6.3	MUDSTONE			
		<pre>mdk.gy., carb.to coaly in part/ ptgs. of coaly sh.+ shaly coal. Ptgs. are @ 50° to 60° to CA. Becomes softer & more friable downwards. 605 3-605 6 friable bigh density</pre>			
		of fract., carb.& coal crusted. 605.6-605.9 brecciated but intact	У, •		
10.8-658.5	_ 47.7_	SEAM 5			938
		<pre>610.8-611.3 coal,dull to bieteous soft,friable. 611.3-611.5 shale,hd.blocky,carb. & coaly. 611.3-611.35 soft,cla texture,quite co 611.5-611.8 shale, hd.sl.carb. 611.8-612.6 shale,softer than abo carb. to coaly,ptgs & splints of dull shaly</pre>	, yey aly. ve,		
		coal. 612.6-613.1 <u>coal</u> , hd.dull to vit	eous		
		snaly. 613.1-613.5 <u>coal</u> ,soft,friable,mos vitreous, mostly clar 613.5-614.35 <u>coal</u> ,hd.blocky to fr vitreous with some br	tly ain. iable, ight rain.		
		614.35-614.85 shaly coal & coaly dull.crushed.contains	<u>shale</u> minor		
		vitreous coal ptgs. 614.85-615.3 <u>coal</u> dull to vitreou numerous thin carb. coaly sh.ptgs., friab 615.3-616.4 <u>coal</u> ,soft,crushed,dul vitreous,mostly clara dirty to touch, may b	s, le. l to in, e		·
		616.4-616.5 No core 616.5-616.9 <u>coal</u> ,dull to vitreous ptgs. of carb. & coal shale.	, Y		
				1	

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Interval	Unit	Description	<pre>< of Bed</pre>	Core	Est.
Lifeer far	Thickness	•	to Core Axis	Eval.	Rec.
		and a cur f and dull to witreous			
		dirty to touch, mostly	1		
	(clarain, soft & friabl	e,		
		possibly some fusain.	j		
		617.5-618.8 coal, dull to bright,	.]		
		flakes on fract.surfa	ces,	1	
		in part friable, clear	l j		
		to touch, mostly clara	iin/		
		618.8-619.0 shale.sdy.,m.lt.gy.,			
		carb. ptgs.			
		619.0-620.3 coal, hd. vitreous to		}	
		minor pyr, on fractu	ску,		
		surfaces, mostly clara	hin	}	
		with some vitrain bar	ds.		
		620.3-621.0 coal, soft, dull to br	ght,		
		hands of vitrain, band	ls &		
	N .	thin ptgs. of carb.	x		-
		coaly shale.	rtad	ł	
		621.0-621.1 coaly shale, thinly particular for the former of the former	irteu,		ŀ
		621.1-621.2 coal, vitreous, hd.dens	se,		ľ
		mostly clarain.			
		621.2-622.0 No core.	- D-		
		622.0-622.1 <u>carb. shale</u> , hu.bahu. dull.			
		622.1-622.4 coal,hd.dense,dull to	2		
		vitreous, shaly coal,			
		622 4-622.6 coaly shale to shaly			
		coal, hd.dull,dense,			
		Pb.gy.	+ b +		
		622.6-627.0 coal, vitreous to Dri bd friable to brittl	gnt.		
		minor pyr.on fractur	e e		
		surfaces, clarain wit	h		
· · ·		vitrain bands, Iew	,		
		shale bands.	f		
		627.0-627.4 coal, hd.dull to vit	reous,		
		some bright coal ban	as,		
		clarain.	r I		
		627.4-627.5 coal, hd.dense, shaly.			
	ļ	627.5-627.6 shale,m.dk.gy.,carb.			
		627.6-627.8 Coal, solt, clumbly, dull to vitreous, dir	ty		
		to touch, clarain/som	e		
		fusain.	10		
		627.8-628.1 coal, hd., platy, irian	re,		
		clarain/minor vitrai	n.		
		628.1-628.3 shaly coal, dull,der	se,		
	.	Pb.gy., lt.wt., prbly]•		
		628.3-628.55 coal,friable,soft,d	ull		
	(to bright, mostly cla	rain		
	Í	with minor shaly coa	1.		
		628.55-628.65 Coary share, band, dull, Pb.gv., possik	lv		
		durain.	-	1	
		628.65-628.85 <u>coal</u> ,dull,shaly,di	rty		
	•	to touch, clarain with	n		
		ptas.	•		
		628.85-629.25 coal, hd.vitreous	o ,		
		bright, clarain/vitra	in		
	1	bands.	a		
	·	029.25-029.35 coary snate, dull,	in.		
	I	PD.GX, POSSIDIA dur			

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	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
•	. <u></u>					
			629.35-630.85 <u>coal</u> ,hd./soft intvl friable,minor pyr., vitreous to bright,		1	
			clarain with some vitrain bands.			
			630.30-631 <u>coaly shale</u> ,dull,hd., 631.0-631.2 <u>coal</u> ,soft,mushy,dull to vitreous,some coal	Y		
			shale ptgs. 631.2-631.5 No core.			
	•		631.5-631.6 coal,dull,hd.dense, Pb.gy.,lt.wt.,shaly, (possibly high in dur	ain)		
1			631.6-632.0 shale,dull,dense,carb to sl.coaly.	• •		
			632.0-632.3 <u>coal</u> ,vitreous with bright bands,mostly clarain			
			632.3-632.7 shale,dull,hd.,dense, carb.& coal ptgs.			
	Λ.		632.7-635.0 coal, soft, dull to vitreous.			
			635.0-636.0 <u>shale</u> , thinly parted, carb. to coaly shale ptgs., some calcite on	L		
			ptg. surfaces. 636.0-636.5 coal & carb.shale,dul	1		
•			636.5-638.15 shale,dull,earthy texture,carb.,thin	artny.	i	
			coal splints. minor calcite on frac	t.		
÷			638.15-638.3 coal,dull,dirty,soft clayey texture.	,		
•			638.3-639.0 No core. 639.0-640.0 coal,dull to vitreous	,		
			640.0-640.4 carb.to coaly shale, hd.,dull.			
· •	· .		640.4-640.6 coal,dull to vitreous earthy	,		
			640.6-641.3 shale,dull,dense,earth carb.	hy,		
			641.6-642.5 No core. 642.5-642.8 coaly shale δ shalv of	y. Dal		
			hd.,dull,blocky. 642.8~643.0 coal,soft,dirty,dull,			
- -			thin coaly shale bands 643.0-643.8 shale,dull,Pb.gy., v.	5.		
· .	-		643.8-644.15 <u>coal</u> , dull, dirty, shaly soft clayey texture.	ξ,		
*			644.15-645.9 coal, soft, dull to vitreous.			
			vitreous,occasional bright bands.mostly			
			clarain/minor vitrain. 647.2-648.0 <u>coal</u> ,soft,muddy,dull			
	Ì		to vitreous, mostly clarain.			
•			mostly clarain. 648.35-649.05 shale carb to conju	5,		
•			soft,dirty,earthy. 649.05-649.95 coal,friable,dull to	, ,		
,			vitreous, mostly clarai 649.95-650.3 coal, blocky, shaly/ bands of coaly shale	-n .	ļ	
•			Sands of Codiy Shale.			

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Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
		<pre>650.3-652.35 coal,hd.to friable,</pre>	ht, ht, ll ht, e, w Y		
		$\begin{array}{cccccccccccccccccccccccccccccccccccc$			
658.5-671	12.5	<pre>SANDSTONE massive,highly fractured & broker occasional minor splints & irreg flecks of coal, hard, f.gr.,sil. with minor chert gr., mod. to we sort. a-R, p.poros., minor Fe(lm stn. Few short intvls. of partis decemented ss. Much of broken core probably mechanical. Broken from ½" to 1.5' long piece usually broken along & subparalle to CA. Regular fracture pattern apparent. Breaking less severe do in section. Most prominent fractures @ 30° to CA.</pre>	a, ilar cemt. ll a) ally es, el not own o		
676.0		END OF HOLE.			

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KLO FINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

Hole No.:	76 _D ~04	Property: Sage Creek Coal
Location:	South Hill 17,847,410 N (Approx.) 585,200 E (Approx.)	Elevation: 4895' (Approx.)
Contractor:	Connors Drilling Ltd.	Hole Size: 3-25/32" (H.Q.)
Rig No	.: 1	
Date Commen	ced Drilling: September 7, 1976	
Date Finish	ed Drilling: September 14, 1976	
Date Hole C	completed: September 15, 1976	
Logged By:	O. Cullingham	Date: September 15, 1976
Probed By:	Roke Oil Enterprises Limited	Date: September 15, 1976
Total Depth	Drillers: 355	Depth of Overburden: < 10 ft.
Total Depth	Logger: 350	Water Level: Full

Bit Record

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No	5. Size	. Make and Ser	íal No.	R.P.M.	0n	0ff	Footage	Drilling Time
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	}	j]]	
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. Sı	urface Ca	sing: 12 feet		Standb	y Time	e for l	Logging: 2	2 hrs.
γ.Γς Τς	otal Dril	ling Time:		Other Total	Stand	by Time eable :	e: Standby Ti	 me: 2 hrs.
To	otal Foot	age Chargeable:	355'	Actual	Movi	ng Time	e Between	Holes: 18 hrs.
To	otal Hour	ly Contact:	59 hrs.	Charge Ouanti	able ty of	Moving Mod D	Time Betw sed: 168 ba	veen Holes:10 hrs. aas Ouik Gel
Re	emarks:-	Down hole cavir prevented compl	ng and los etion of	ss of circ	ulati and	on on	168 ba 5 ba	ags Quik Trol ags CC 16
		prevented open	hole log	ging.			3 ba	ags Quik Seal
							23 ba 	ags Asbestos A gs Cement
Pr	robe Repo	rt:					-	-

-	350 -	_	000	•		•	•		۰.	.Gamma Ray/Neutron Thru H.Q. drill	rods.
	347 -	-	000		•	•		•		.Sidewall Densilog Thru H.Q. drill	rods.

Coal Horizons								
Coal Horizon	Drillers	Picks	Log Picks					
"A" Horizon	115.5-153.5	38.0	118 - 153	35.0				
Seam 2	327 -346.3	19.3	327.5-347	19.5				
 •								

Page Number <u>1</u>

Interval	Unit Thickness	Description	< of Bed to Core Axis	Core Eval.	Est. Rec.
0 - 10	10	OVERBURDEN, FILL & SHATTERED ROCK Triconed, Cased. Mostly weathered congl.			
10 - 62	52	CRETACEOUS- BLAIRMORE GROUP CONGLOMERATE & CONGLOMERATIC SANDST(NE		83%
		Mostly conglomerate; granule to			
		generally ½" to 3/4" long, roller			
		Mainly chert pbls., mc.gr.ss.			
		matrix, sil. cmt./minor lmn.			
		appearance throughout, abundant			
		lmn. stn., 10-12 Congl.ss. increases in			
	· ·	pbl. content basally, core is	i I		
		broken in 3" - 4" pieces. 12-24 Congl.,broken into 3"-4"			
		pieces,			
		abundant Fe.stn., in part			
		decemented. 22-24 highly wthrd., broken,			
		in part decemented.			
		mostly chert., 1 mn. stn. around			
		chert gr., hd., massive, contain isolated chert pbls., core is	\$		
		sound in lengths to 2 ft.,			
		$\frac{1}{40^{\circ}} \text{ to } C/A = \frac{1}{40^{\circ}} \text{ to } C/A.$		1	1
		29.5-62 <u>Congl.</u> 30-31 5 Bubbly: wthrd., in			
		part decemented.	_	1	
		Core typically in 4"-6" lengt 35.5-36.5 Broken, rubbly.	ns		
		41.5-42 Rubbly, Rnd., weather	eđ		
		@ 48.3 Prominent fracture @			
		20° to C/A. 49-49.5 Rubbly, decemented,			
		abundant Fe.stn., wthrd.			
		@51.5 Prom. fracture @			
-		30° to C/A abundant hem.stn.			
		hem.stn.			
		56-56.5 Rubbly, abundant hem.stn.			
		59-62 broken, in part			
		decemented.			
			• .		
		· · ·			
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Page Number ____

Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
		RECOVERIES 13-16 1.8/3.0 16-19 1.0/3.0 19-22 1.5/3.0 22-24 1.8/2.0 52-58 4.5/6.0 58-62 2.0/4.0 Cretaceous-Kootenay Formation			
62-110	48	SANDSTONE			
	40	 M.gy.,hd., few isolated chert pbls., Fe.stn. on fracture surfaces, (hem. & 1 mn.) p. scrt., fc.gr., massive, in part partially decemented, sil. & minor 1 mn. cmt., wthrd. appearance. Fractured @ 20⁹ to C/A, fracture surfaces coated abundant 1 mn. stn. 2nd set fractures @ 30⁰ to C/A Bdg. plane fractures @ 60⁹ to C/A, 66-68.5 High dius. fractures, to brecciated, abundant Fe.stn. along fractures, in part decemented. 68.5-71.3 clay & caly indurated sand / short intvls. of ss., soft, easily dug with pocket knife, I mn. stn. abrupt contact back into <u>ss</u> below. 73.6-74.5 <u>Sand</u> decemented, abundant Fe.stn. (1 mn.) 74-74.5 partially cmt. 81-81.4 <u>Sand</u>, decemented Fe.stn. (1 mn.) 81.4-81.6 <u>ss</u> broken, rubbly, 90.5 near vertical fracture/ 3/8" Fe.stn. clay gouge. 92.3 local zone of pbls. in ss. matrix. 92-99.5 Generally coarser gr., increasing pbl. content, 94-95 Fract. @ 20⁰ to C/A, abundant Fe.stn. sdy. mud filling fract. up to 3/8" thick. 95.7-96.3 In part decemented, abundant Fe.stn., clay gouge around brecciated ss. frags. 99.5 contact with congl. 99.5-101.4 <u>Congl.</u> pbls. to 3/8" hardened with clay @ contact & grades to ss. matrix, high chert content, pbls. much smaller than Blaumore. 	60 ⁰		98%

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Page Number _3___

Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
				<u> </u>	
		101.4-110 <u>ss</u> in part congl., p. scrt., v.f.gr. to pbl.congl.,			
		fract., Fe.stn. (1 mn) along			
j		fractures & around brecclated]	
		102.4-102.8 Fracture @ 20° to		3	
		C/A infilled with abundant Fe.			
		brecciated frags, of ss imbedded			
		in clay.		}	ļ
		102.4-106 Brecciated & high			
		density fractures, rubbly with abundant Fe stn_throughout			
		107-109 fractured & brecciated,			
		becomes increasingly brecciated			
		& Fe.stn. downwards.			
		hd, solid ss, on one ride of			
		fracture & ss frags. imbedded			
		in clay on other side of fract.		1	
		109.5-110 <u>SS</u> abundant Fe.stn.,			
		with clay.			
		RECOVERIES			
		<u>69-72</u> 2.4/3.0			ĺ
110-115.5	5.5	MUDSTONE 4.6/5.0			
		Soft, buff, corky to whitish			100
		gy., easily dug with pocket			
-		mottled/Fe.stn., fractures			
		@ 20 ⁰ to C/A, bdg. plane			
		fractures @ 60 ⁰ to C/A.			
115.5-153.	5 38.0	MUDSTONE AND MINER COAL BANDS			919
		M.lt. to m.dk.gy., in part sl.			
1		sity., in part si. carb. Abrupt			
		Contains thin beds & bands of			
		carb. & coaly shale & shaly coal.		1	
ļ		splints of bright coal.			
1		118-119 Carb. sh./thin coal			
		ptgs. & splints.			
		of mudstone in carb mudstone			
	ļ	matrix.			
(M.dk.brn. to buff, incg. ptgs.			
		differential drilling of core,			
		Coal ptgs. $@ 60^{\circ}$ to C/A.			
]		122-122.6 Carb. & coaly shale,			
		broken throughout/thin coal	´ •		
		122.9-123.5 Coal band. dull to			
		vitreous, high %age clarain/			
.		lesser shaly coal.	ļ		
		friable; mushy. dull to vitreous			
		,,,,,,			
		1			

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<pre>125-125.6 Coal vitreous to bright, clarain with some vitrain, friable. 125.6-125.9 Coal dull, soft, earthy, very shally to coaly shale. 123.2-129.5 Broken, breeciated, shale & carb. to coaly sh., frag 123.8-130.2 Coal vitreous to bright, hd. to friable, mostly clarain with some vitrain, shhor pyr. flakes. ukrd. 137-137.7 Coal dull through vitreous to bright, mostly clarain. 137-137.7 Coal dull through vitreous to bright, mostly clarain. 137-138.3 Coal dull to bright, mostly clarain/miner vitrain, thin ptys. carb. to coaly sh. 138.3-139.6 Shale/coal splints & ptys. to ptys. of carb. a coaly sh. 142.142.4 Slest. m.lt.gy., hd. 142.8-144 Shale v.l.easily dug with a pocket knife, sdy., in part decemented. Contains few carb. to coaly sh. 144.5-146.4 Signer, m.lt.gy., hd. 144.5-146.4.6 Jest. m.lt.gy., hd., set if a coaly sh. 144.5-146.5 Coal to acoly sh. 144.5-146.5 Coal to coaly sh. 144.5-146.7 Coal vitreous to 144.7-148.65 Coal vitreous to 145.7.163.5 Coal vitreous to 144.7.7.163.5 Coal vitreous to 145.7.163.5 Coal vitreous to 145.7.163.5 Coal vitreous to 146.7.5.163.5 Coal vitreous to 147.7.163.5 Coal vitreous to 147.7.163.5 Coal vitreous to 147.7.163.5 Coal vitreous to 145.7.163.5 Coal vit</pre>	,	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est Rec
<pre>breeclated, sort, easily dug with a pocket knife, sdy., in part decemented. Contains few carb. to coaly sh. ptgs. & splints. 144.5-146.4 <u>Sltst</u>. m.lt.gy., hd., arg. 148.3-148.4 Coaly sh., soft, earthy, dull. 148.4-148.55 Carb. to coaly sh., thin coal splints. 148.55-148.7 <u>Coal</u> vitreous to bright, miner pyr., clarain/ some vitrain. 148.7-148.45 <u>Shale</u> thin ptd., carb. & coaly sh. ptgs., dull. 148.85-149.3 <u>Coal & coaly shale</u> ptgs., dull, soft, friable. 149.3-149.45 <u>Shale</u> dull, carb. 149.45-149.65 <u>Coal</u>, soft, dirty to touch, dull shaly, possibly high in fusain. 149.65-149.9 <u>Coal</u> dull. hd., pb.gy., high in durain, shaly duise, lt.w., minor pyr. flakes. 149.9-150.35 <u>Coal</u> vitreous to bright, mostly clarain/minor vitrain, minor pyr. 150.35-150.8 Mudstone, broken, appears wthrd., irregular breaking. 150.8-151 No core. 152-152.3 Coal drill to vitreous.</pre>	· · · · · · · · · · · · · · · · · · ·			<pre>125-125.6 <u>Coal</u> vitreous to bright, clarain with some vitrain, friable. 125.6-125.9 <u>Coal</u> dull, soft, earthy, very shaly to coaly shale. 129.2-129.5 Broken, brecciated, shale & carb. to coaly sh., frag. 129.8-130.2 <u>Coal</u> vitreous to bright, hd. to friable, mostly clarain with some vitrain, minor pyr. flakes. 134.8-135.5 Broken, appears highly wthrd., crusty to crumbly 136-137 Broken, crusty, appears wthrd. 137-137.7 <u>Coal</u> dull through vitreous to bright, mostly clarain. 137.7-138.3 <u>Coal</u> dull to bright, mostly clarain/miner vitrain, thin ptgs. carb. to coaly sh. 138.3-139.6 <u>Shale</u>/coal splints & ptgs. to ptgs. of carb. & coaly sh. 142-142.4 <u>State</u> v.sl.carb., hearinted wath and</pre>	· · ·		
148.55-148.7 <u>Coal</u> vitreous to bright, miner pyr., clarain/ some vitrain. 148.7-148.85 <u>Shale</u> thin ptd., carb. & coaly sh. ptgs., dull. 148.85-149.3 <u>Coal & coaly shale</u> ptgs., dull, soft, friable. 149.3-149.45 <u>Shale</u> dull, carb. 149.45-149.65 <u>Coal</u> , soft, dirty to touch, dull, shaly, possibly high in fusain. 149.65-149.9 <u>Coal</u> dull, hd., Pb.gy., high in durain, shaly duise, lt.wt., minor pyr. flakes. 149.9-150.35 <u>Coal</u> vitreous to bright, mostly clarain/minor vitrain, minor pyr. 150.35-150.8 Mudstone, broken, appears wthrd., irregular breaking. 150.8-151 No core. 152-152.3 Coal drill to vitreous.	•	•		brecciated, soft, easily dug with a pocket knife, sdy., in part decemented. Contains few carb. to coaly sh. ptgs. & splints. 144.5-146.4 <u>Sltst</u> . m.lt.gy., hd., arg. 148.3-148.4 Coaly sh., soft, earthy, dull. 148.4-148.55 Carb. to coaly sh., thin coal splints.			
Pb.gy., high in durain, shaly duise, lt.wt., minor pyr. flakes. 149.9-150.35 <u>Coal</u> vitreous to bright, mostly clarain/minor vitrain, minor pyr. 150.35-150.8 Mudstone, broken, appears wthrd., irregular breaking. 150.8-151 No core. 152-152.3 Coal drill to vitreous.	***			148.55-148.7 <u>Coal</u> vitreous to bright, miner pyr., clarain/ some vitrain. 148.7-148.85 <u>Shale</u> thin ptd., carb. & coaly sh. ptgs., dull. 148.85-149.3 <u>Coal & coaly shale</u> ptgs., dull, soft, friable. 149.3-149.45 <u>Shale</u> dull, carb. 149.45-149.65 <u>Coal</u> , soft, dirty to touch, dull, shaly, possibly high in fusain. 149.65-149.9 Coal dull, bd.			
				<pre>Pb.gy., high in durain, shaly duise, lt.wt., minor pyr. flakes. 149.9-150.35 Coal vitreous to bright, mostly clarain/minor vitrain, minor pyr. 150.35-150.8 Mudstone, broken, appears wthrd., irregular breaking. 150.8-151 No core. 152-152.3 Coal drill to vitreous, soft shaly</pre>	· · ·		

Interval Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Eval.	Rec.
	RECOVERIES			
			1	ļ
	132 - 137.7 $5 - 77.5 - 7$			
	137.7-142 $3.074.0$			1
	142 - 140 $4.8/5.0$			
	151-153 5 $2.0/2.5$			
	THE FOUL AND AND AND THE THEFT			95%
153.5-237.8 83.8	SANDSTONE/SANDY MUDSTONE INTERBEDS			
	M. to m.dk.gy., moderately			
	sound core, massive, in part,			
	x-peid., mod.hu. to hu., vii			1
	downward in part to M. Gr.			
	chert & gtz. in approx. 2:1,			
	sil cmt., minor Fe.stn. (lmn.)			}
	Trregular fracturing-more			
	pronounced basally in harder			1
	f-m gr.ss.			1
	3 directions of fract.			
	200 to C/A to 3rd set.			1
·	30° to C/A <u>I</u> to 3rd set.			
	60° to C/A - prbiy. bdg. plane			
	Fracture surfaces tend to be			
	Fe.stn. Westly $y = f = f \ ar = to \ 172'$			
	$5 \oplus 172$ grades to m.gr. &			
	coarsens basally to c.gr.			
	172-173.7 Abundant Fe.stn.,			1
	in part decemented, mod.hd.			
	173.7-174.4 Banded, m.dk.gy.,			
	ss./arg.ss., Fe.stn. in bands.		1	ļ
	174.4-175.3 Abundant Fe.stn.			
	176.8-177.2 Broken, rubbly.		1	
	189.45-189.7 <u>Mudstone</u> , sdy.,			
	sl. carb., banded, irregular			
	but sharp contact with above,			
	plane through contact at 55]		}
	bogause of differential			1
	compaction.			
	189.7-190 No Core.			
	190-190.45 Mudstone As above,	ļ		
	sharp contact with ss below.			
	193.95-194.2 Shaly <u>ss</u> , soft,	1		1
	decemented, sl.Fe.stn.			
	194.2-194.7 <u>SS</u> broken, blockly		ł	
	poorly cmt.			
	197.5-197.9 Laminated mudstone			
	& ss., dk.gy., sl. carb.			
	197.9-198.15 Say. Muastone,			
	soil, carb. to coary, crushea,		1	
	knife			
	198,15-199 SS broken, high dens]		1
	fractures, m.dk.gv., carb. to	1	l	
	coal flecks & splints. Core in	-		
	2" pieces.		ł	
1	199-199.6 No Core.		1	
	• • • • • • • • • • • • • • • • • • •		1	

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Page Number <u>6</u>

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, ,	Interval	Unit Thickness	Description	4 of Bed to Core Axis	Core Eval.	Est. Rec.
			199.6-201.6 Core is broken, pieces to 3", numerous carb. & coal ptgs. & splints. 202.3-202.8 Broken, wthrd.			
N			appearance, pieces to 1". 203.2-203.6 Broken, wthrd., Fe.stn., pieces to 1½". 205.6-206.6 <u>S1.sdy. mudstone</u> contact with above @ 60° to C/A in part 1 carb. splints			
			& ptgs. 206.6-209 Banded & Irreg. bdg. of sdy. mudstone & m.gr.ss., carb. & coal splints & ptgs. throughout, soft sed. deformatio caused by differential	2		
			compaction. @ 209.8 into m-c gr.ss. with local thin bds. of granule congl., contains thin irregular ptgs. & splints of carb. mudston Core is sound & fractures along bdg. plane & @ 20° & 30° to	e.		
			<pre>2/3' of core. 218-218.3 Congl.ss. To granule size in ss matrix. 218.3-220.3 P. scrt., c. to v.c. gr./few gr. to granule. 220.3 Back into m-c.gr.ss. 227.227.2 Gengel est to granule</pre>			
· · · ·			pbls. in ss. matrix. 228.1-228.5 Granule to pbl. congl.ss., pbls. to 1½" x ½", long axis approximates 60° to C/A.			
			sdy.dk.gy. mudstone. Irregular contacts because of differential compaction. Plane through contacts @ approx. 60° to C/A. 230.3-237.3 Prominant fracture @ 30 to C/A & <u>1</u> to bdg.			
n,	• •		RECOVERIES			
			$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$			
			199.6-204.5 4.0/4.9 204.5-209 3.8/4.5 209-212 2.5/3.0			

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I t	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
	237.3-255.5	18.2	INTERBEDDED & BANDED MUDSTONE SILTSTONE & FINE GRAINED SANDSTONE			> 98%
•			Abrupt contact with above but irregular @ approx. 80° to C/A Moderately hd., sound core, minor carb. ptgs. Breaks readily along lamin. & bands @ 50° to 60° to C/A. Lamin. & banding is irregular because of different compaction. Fractured @ 20° to 30° to C/A & 1 to lamin. 1 fract./2' of cor After 242 less pronounced banding, more massive although banding is discernable. 246.3-247 Broken into 2" pieces broken core caused by severe fracturing. 247.7-248.1 Broken, pieces of 2" wthrd. appearance along fractures. 249.7-250 Broken, crushed, in part with carb. & coal splints. 251.7-252.3 Crushed to blocky, slty. to sdy. mudstone. 252.3-252.7 Broken to 2½" pieces. Intv1. becomes sandier down- wards with increasing frequency & thickness of <u>ss</u> beds & lenses. Gradational into ss below.	e.		
	255.5-291	35.5	SANDSTONE			>98%
			M. to m.dk.gy., p.scrt.,m.gr. ss., chert & qtz. gr., in part/ minor arg. matrix, sil. cmt., contains carb. & coal ptgs., stringers & splints throughout. Moderately sound with zones of broken core & zones of abundant Fe.stn. & partial decement. Thin bands of carb. mudstone. 257.2-257.4 Carb. mudstone bnd. 258-259 Broken, wthrd. appear. Fe.stn., in part decemented. 259-259.5 Carb. & coal ptgs. within sdy. mudstone. 260-260.2 Abundant Fe.stn., wthrd. appear., partially decemented. 261-262.1 Broken, Fe. stn., appears wthrd., mostly <u>ss</u> . minor carb. & coal splints & ptgs. 263.7-264 Broken, wthrd., Fe. stn.			

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Interval	Unit Thickness	Description	く of Bed to Core Axis	Core Eval.	Est. Rec.
		264-265.6 Soft, sl.carb. to coaly sd., Fe.stn., almost entirely decemented. 266.4-267 Soft, partially decmt., Fe.stn., wthrd., abruptly into hd.ss. following fracture			
		to bdg. Bdg. @ 55° to C/A. 267.291 <u>SS</u> more homogeneous/ fewer carb. & coal splints & ptgs., minor Fe. stn. (1mn.) throughout with zones of abund.			
		<pre>Fe.stn., mc. gry, generally coarsens downwards. @ 269.9 Abundant Fe.stn. along fracture, Fe.stn. invades rock for 0.11 without of fracture</pre>			
Y.		at 30° to C/A. Some open fractures @ 60° to C/A bdg. plane. 271.5-272.6 Broken pieces to			
		<pre>2½" x 1". Severe fracturing causes broken core. 273.9-274.5 Fractured, abundant Fe.stn. along fractures & invading rock for 0.1' at upper side & 0.3' at lower side. 274.5-275.1 Banded, ptgs. of</pre>			
		<pre>sh. & sl. carb. sh., banding @ 70^o to C/A. 275.1-275.6 Abruptly back into m.gr.ss., broken for 0.5'.</pre>			
		275.6-276.4 Vert. fract. bound by bdg. plane fractures @ 60 ⁰ to C/A. 277-277.3 Broken, irregular, caused by intersecting fractures			
		@ 277.3 Core becomes more sound & massive. Fracturing @ 20° to 30° to C/A. Frequency @ 2/ft. but irreg./ solid core up to 1½' lengths.			1
х.•		<u>RECOVERIES</u>			
291-293.2	2.2	MUDSTONE			100%
		M. to m.dk.gy., contains thin carb. to coaly sh. ptgs. Abrupt contacts with carb. & coaly sh. ptgs. @ 45 ⁰ to C/A. Slty. to sdy. bands.			
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Interval	Unit Thickness	Description	to Core Axis	Eval.	Rec
293.2-299.2	6.0	SANDSTONE/MINOR BANDS & PARTINGS OF CARB. TO COALY MUDSTONE & COAL			
1 · ·		Abrupt contact with above, irreg.			
		contact caused by soft sediment			
		deformation.	•		
		down to granule congl., gradation	al		
		bdg., interrupted by minor carb.			1
ļ		mudstone bands, few minor coal			
		ptgs. 294.1-294.2 Coal band, clean,			
		bright, clarain & vitrain.			
		295.8-296.1 Coal band, clean,			
		clarain & vitrain.			
200 2.227	27.9	MUDSTONE CARB & COAL BANDS &			
299.2-321	27.0	PARTINGS			
		Abrupt contact with sandstone			
		above, dk.gy., in part slty. &			
		in part/carb. & coal bands &			
		ptgs. 299.2-301 Coal contacts @	ļ		
•		50° to C/A, vitreous to bright,			
	ľ	minor dull shaly coal, minor			
		vitrain.			
		301.4-301.5 Dull, mushy coaly			
		sh. band. 302.5-303.2 Mudstone/ptgs. of			
	}	carb. sh. & coal throughout.			
		305-306 Fragmented & blocky,			
		306.25-306.5 Crushed, partially			
		carb.			
		306.5-306.7 Brecciated.			
		coaly sh.			
		309-312.6 Gd. core, hd.			
		frequency of 1/ft. minor			
		pyr. on fract. surfaces.			
ľ		312.6-313 Broken core, pieces			
		313-313.2 Crushed, some carb.			
		Sh. frags. blocky.			
		$313.2-316.8$ Fractured throughout 330° to C/A to banding.			
		breaks in thomb shaped pieces.			
		Minor carb. & coaly sh. frags.			
		318.2-319 Brecciated, blocky.			
ł		318.2-318.4 Carb.sh. & coal ptgs	*		
	ļ	320.6-320.7 Broken, friable.			
		friable.	1		
		323.1-323.5 Mushy, fragmented			
		coaly shale & shaly coal band.	ł		
		325-324.2 Coaly shale & shaly	ł		
ſ		coal contains coal ptgs.	1		
		324.9-325.1 Coaly shale & shaly			

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[nterval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
		RECOVERIES			
		317-321 3.7/4.0 321-326 4.6/5.0			
<u>327-346.3</u>	_19.3	SEAM_Z			
		327-327.15 Shaly coal band, dull			91.7%
		327.15-327.7 <u>Coal</u> dull to bright, friable & soft, minor pyr.		:	
		mostly clarain/thin ptgs. of			
		shaly coal. 327.7-327.95 Shaly coal dull,			
		dense, hd., abundant pyr. on			
		327.95-328.1 <u>Coal</u> vitreous to			ł
		bright, hd., claro-vitrain.			ŗ
		soft & mushy, mostly clarain/			
		minor shaly coal ptgs.			
		coal splints, dull, abundant			
		pyr.			
		friable, minor pyr.			Í
•		329.1-329.5 Carb. to coaly shale			
•		dull dense. 329.5-330.2 <u>Coal</u> soft, friable,		,	
		dull to vitreous, clarain/thin			
		330.2-331 No Core.			
		331-331.5 <u>Shale</u> dull, coaly/		i	
		331.5-331.65 Coal vitreous,	3		
		friable, mostly clarain.			
		coaly,dull/splints & ptgs. of			u .
		coal, hd., blocky.			
		vitreous, clarain mostly 1			
		ptgs. of shaly coal, minor			
		332.1-332.5 Shale hd., blocky,		ĺ	
		minor carb. & coal ptgs. &			
		splints. 332.5-333.6 Coal dull to			
		vitreous, clarain/bnds. & ptgs.			
		333.6-334.15 Shale dull, hd.,	1		
		minor splints & ptgs. of carb.			
		& coaly sh. 334.15-334.4 Coal dull, soft &			
		mushy, shaly.	J	ļ	
		sh. crushed, mushy, dull.	:.		
		334.6-335 No core.	•		
		335-335.15 <u>Shale</u> hd., blocky. 335.15-335.55 Coal hd., dull			
•		to vitreous, minor pyr.,			
3		mostly clarain/minor shaly coal ptgs.			
		335.55-335.8 <u>Coal</u> vitreous,			
		soft, mushy, mostly clarain. 335.8-337.2 coal vitreous.			
		friable, mostly hd., short			
 	ſ	intvls. of soft coal, mostly	[1	
• • • • • •	,	crarain, minor shary coar prys.		• • • • • •	

[nterval	Unit Thickness	Description	to Core Axis	Eval.	Rec
		337.2-337.5 <u>Shale</u> hd., ptgs. of			
		carb. & coaly shale, blocky.			1
		337.5-339.4 Coal dull to vitreous			
		some bright bands, mostly clarain,			
		some vitrain, minor duit shary			
		339.4-340 Coal soft, mushy, dull			
		to vitreous, mostly clarain.			
		340-344.6 <u>Coal</u> dull to vitreous/			
		occasional bright stringers &			
		ptgs., mostly clarain, friable			
		& soft throughout/minor ha. dull	•.		
		341.6-341.7 Hd., dull, Pb.gv.			
		high in durain.			
		342.3-342.4 Hd., dull, lt.wt.,			
		high in fusain.			
		344.6-345 No Core.			
		345-345.6 Coal vitreous, soit			
		345 6-346 3 Coal dull to vitreous			
		soft, mushy, clarain &shaly coal.	·		
		RECOVERIES			
	ł	326-331 4.2/5.0			
		331-335 3.6/4.0			
		335-340 5.0/5.0	1	Í	
		340-345 4.6/5.0			
		345-350.5 4.073.5		j	
346.3-355	8.7	MUDSTONE/COAL & COALY SHALE BANDS & PARTINGS			
		M. to dk. gy., in part carb. to			
		coaly, blocky to friable.			
		Contains thin ptgs. & bnds. of			
		coal & coaly shale.			
		dull friable to blocky, in			
	1	part crushed & mushy.			
		346.8-347.2 Coal dull to			
]	vitreous, mostly clarain,			
1		friable.			
		347.2-347.35 Shaly coal to	1		
		347.35-347.9 Coal dull to			
		vitreous, soft & friable.			
	-	347.9-348.15 Coaly clay		· •	
		clayey texture, dull, charcoal			
		grey.			
		348.15-348.2 Snaly coal, hd.,	1		
		$a_{348,2} = 55^{\circ} + c_{\Lambda}$ Trregular	1		
.		contact.			
•		348.2-349.1 Mudstone with splints	-	Í	
		"of coaly material, hd.			
		349.1-349.8 Broken, blocky, in			
		part with carb. & coaly sh.			
	ļ	ptgs.			
		343.0-330.3 NU CUIE.			
	· · ·				
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 350.5-351 Broken, blocky, wthrd. appearance, pieces less than 1° square, rounded. 351-351.9 Blocky, fractured, contains minor carb. s coaly ptgs. 351.9-352.3 Coal soft, friable, vitreous/some bright coal, mostly clarain. 352.3-34.5 Mudstone, solid core, fractures @ 60° to C/A, prbly. bdg. plane fractures. 355 End of Hole 	
355 End of Hole	

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RIG FINTO CANADIAN EXPLORATION LIMITED

A.,

5 ft.

DIAMOND DRILL RECORD

Hole No.: 76 _D -05	Property: Sage Creek Coal
Location: South Hill 17,845,820 N (Approx.) 583,010 E	Elevation:5210' (Approx.)
Contractor: Connors Drilling Limited	Hole Size: 3 25/32" (H.Q.)
Rig No.: #1	

Date Commenced Drilling: September 17, 1976Date Finished Drilling: September 19, 1976Date Hole Completed: September 19, 1976Logged By: O. CullinghamDate: September 19, 1976.Probed By: Roke Oil Enterprises Ltd.Date: September 19, 1976.Total Depth Drillers: 222 ft.Depth of Overburden:Total Depth Logger:221 ft.Water Level:Full

Bit Record

	No.	Size	Make	and	Serial	No.	R.P.M.	0n	110	Footage	Drilling Time	
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									l)		
								ـــــــــــــــــــــــــــــــــــــ	<u>ا</u>	L	· ·	
	Surf	ace Casi	ing: 1	20 ft	•		Stand:	y Tim Stand	e for : by Tim	Logging:	4 hrs.	
	Tota	L DELILI L DELILI	lig ili Cime:	ue	-		Total Chargeable Standby Time: 4 hrs. Actual Moving Time Between Holes: 15 hrs.					
	Tota	l Footag	ge Chai	rgeat	le: 222	2 ft.						
Total Hourly Contact: 2 hrs.							Chargeable Moving Time Between Holes: 7 hr					
							Quanti	ty of	Mud Us	sed: 32 Bag	gs Quik Gel	
Remarks:-										32 Ba(JS QUIK TTOL	
										I Day		

Probe Report:		
220 - 000	Gamma Ray/Neutron	Open Hole
218 - 000	Sidewall Densilog	Open Hole
218 - 000	Caliper	Open Hole

Coal Horizons

Coal Horizon	Drillers	Picks	Log Picks		
Seam 2	172 - 185.1	13.1	171 - 184	13.0	

	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
•	0 - 12'	12'	Overburden & Weathered Rock			
			less than 5 feet true overburden.			
			Tricored to 12 ft. through weathered mudstone and carb. sh.			
	12 - 25	13'	Mudstone m. to dt. gy., occasional silty interbeds and carbonaceous and coaly bands, remnant banding @ 70° to C/A blocky, in part soft . highly wthrd. & Fe. stn. in upper part of unit. 13.75-15 Coal dull within interbeds of coaly shale, in part vitreous, lower			95%
	•		contact with mudstone $@ 80^{\circ}$ to C/A.			
	x		16.5 - 16.6 friable and sl.carb. 16.6 - 18.1 near vertical fracture termi- nates at 18.1' at a fracture @ 70° to C/A.			
			 19.5 - 19.9 broken, rubbly. 21.45 - 21.6 Shaly coal band. @ 22.9 coal ptg. 22.9 - 23.1 soft, carb. mudstone. 23.1 - 23.15 band of sdy, clay abundant Fe. stn. (lmn.) 23.5 - 25 clay texture, sdy, wthrd. appear 	•		
	25-122	97	Sandstone			
•			<pre>lt. to m. gy., mostly massive with zones of laminated to thinly banded sandstone, varies between fine to coarse grained usually coarsening downwards and with higher percentage c. grs. in lower part of unit. In part X-bdd. gradational contact with above, weathered appearance and highly Fe. stn. to 70 ft. few thin intbds. of sdy. mudstone in upper part of unit - core is moderately sound with minor intervals of highly fractured and broken core.</pre>			
			Fractures dominantly in two directions: 1) 60 [°] to 70 [°] to C/A (varies) 2) 20 [°] to C/A fracture surfaces moderate to heavily Fe. stn.			
4 - -			 35.6 - 35.8 soft, abundant Fe. stn., partially decemented. 39.3 - 40 highly fractured & brecciated, in part decemented. 			
•	•		40-41 broken, blocky, pieces up to 2 1/2", abundant Fe. stn. on fracture surfaces (lmn.& hem.)			t .
	•		41.5 - 42.3 brecciated, abundant Fe.stn., fractures $(0, 0, 0, 0)$ to C/A and $(0, 40, 0, 0, 0)$ ro C/A. 2nd set is 1 to 1st set, In part decemented, contains minor clay.	-		
	:		43.2 - 43.9 fractures $@ 10^{\circ}$ to C/A and 1 to bdg. Imn., fracture are infilled with white calcite.			
	: :		44.8 - 46.2 blocky and brecciated in part decemented.			
		, I				1

		Interval	Unit	Description	< of Bed	Core	Est.
•			Thickness		to Core Axis	LVal.	Rec.
	ι .			 46.2 - 46.3 sdy. clay band. 46.8 - 47.6 abundant Fe. stn. (lmn.) 48.3 - 48.6 crushed core, in part decemented. 49-51 broken, high density fracturing in part decemented. 			
-				51-70 core is badly broken, typically into pieces ranging up to 3", few intervals of sound competent core, broken core is caused by high density intersecting fracturing, two sets predominate: One at 20 to 30 to C/A One at 60 to 70 to C/A and 1 are to the other. core becomes less wthrd. downwards.			
•.				60.6- 60.8 in part decemented. 64.5 - 64.7 in part decemented. 65.5 - 70 represented by 1.5' of broken, nibbly fragments, possibly caused by bit action, mislatch at 70'.			
••				70-87 <u>Sandstone</u> is m. to c. gr., generally coarsens downward, core is much less wthrd. to more sound and competent with minor cross-bedding.			
	,			72.3-73 broken, friable, core faint laminations @ 60° to C/A.			
	•			75-83.5 core is broken by fracture at 10° to C/A to vertical.			
				80-80.5 blocky, 2" pieces, abundant Fe. stn. on fracture surfaces.			
•				81.6 - 83 Conglomeratic sandstone. sandstone is p. sort. to c. gr., pbls. are from granule to pbl. size.			
	•			83-83.5 Prominent fractures @ 20 ⁰ to C/A, fracture surfaces are coated with lmn.stn. clay, clay bands up to 1/2" thick.			
		·		87-87.7 Sandy mudstone with laminations of very fine gained sandstone, abrupt contact with above coarse gr. sandstone.			
:				87.5-87.55 clay band.			4
	4. ¹			92~93.5 Banded with sdy. mudstone to m. gr.ss, banded @ 70° to C/A.			
11.				94.6-95.6 Fe. stn (hem.) rear vertical curved fracture, lmn. stn. on fracture surface.			
	•			96.6-97.9 broken, rubbly, fractures with abundant Fe. stn. (lmn.) Following rubble zone core becomes more wthrd. and more lmn. stn., intvls. of p. omt. to partially decemented ss.			
i. N	•••			Recovery 97-102 2.3/5.0 102.4-102.5 abundant Fe. stn., decemented sand. 103-105.1 Soft, lmn. stn. sdy., mudstone to arg. ss., partially decemented, easily cut with knife.	· -		
•				106.8-107 borken, friable, same day, 107-108 soft, poorly omt. or partially decemented, abundant Fe. stn. (hem.).			
	•			108-112 Brecciated, in part decemented,			
				some sdy, clay, minor or hem. and lmn. throughout.			

Page Number <u>3</u>

1	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
•			 113.5-114 Fracture @ 20⁰ to C/A. Brecciated m. to c. gr. ss. on hanging wall side of fracture, competent m. to c. gr.ss. other side. 117.8-122 Brecciated sandstone, less Fe. stn. than above. Dessication breccia, in 			
			part poorly cmt., becomes arg. basally.			
,	122-126	4.0	Mudstone m. to m. dk. gy. in part sl. shy. dessication breccia throughout,crusty and crumbly,			95%
	126-137	11.0	Sandstone and Siltstone & Minor Silty Mudstone			05%
x			Soft to hard, zones of soft, poorly cmt. ss., soem Fe. stn. (Mostly lmn.) 130.5-132 abundant Fe. stn. (lmn.) poorly cmt, sd. & sdy. mudstone.			928
			132.5 - 135.5 clayey mudstone intbdd.with sdy.mudstone easily cut with knife, irregular fracturing throughout.			
,	137-142	5.0	Mudstone m.dk.gy.,abundant Fe. stn. (lmn.), easily cut with knife, contains irregular (boulden like) inclusions of moderately hd. arg. sltst.			95%
÷	142-159	17	Sandy Mudstone m. bm.gy. to gy. bm. core is moderately sound, but easily cut with knife,			94%
•			147.6-147.8 Brecciated and fractured, fractures infilled with Fe. stn.clay.			
•			151.7-152.2 clay band, bm., lmn.stn.,sdy, very soft.			
			155-157.3 broken, in part decemented,arg. ss., minor carb. splints.			
			158-159 Mudstone, bm, colour, less sand grains than in above, grades downwards into m. dk. to dk. gy.mudstone.		i	
1 <u>.</u> 1		-	Recoveries 147 - 152.5 5.2/5.5 152.5 - 158.0 4.8/5.5			
	159-172	13	Interbedded Mudstone with Coal mod. hd., banded, bands 065 to C/A, generally carb. and contains minor coal splints, coal bands are generally dull to vitreous and are in part shaly coal to coaly shale.			48%
			Poor recovery throughout this zone. 160.2-160.5 Coal band, soft to blocky, mostly shaly coal, banded @ 65° to C/A.			
•			<pre>160.7-161.1 Coal soft to blocky,mostly dull, shaly. 161.1-161.2 Shale 161.2-162 No Core 162-162.3 Mudstone, hd. 162.3-162.7 soft, crushed, earthy texture, carbonaceous mudstone, contains</pre>			
•			minor coal splints. 162.7-162.9 hard <u>coaly shale</u> , dull with abundant bright coal splints.			

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Page Number <u>4</u>

	Interval	Unit Thickness	Description	<pre>4 of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
			162.9-163.1 Coal hd, bnd, vitreous to bright, duro - vitrain, 163.1-163.3 Coal friable to blocky, mostly dull, high % age shaly coal. 163.3-163.7 broken, blocky, carbonaceous to coaly shale 163.7-167 No Core 167-167.4 Mudstone moderately hd. 167.4-168 Coal dull to bright, mostly clarain with minor coaly shale partings, trace of pyr. 168-168.4 Mudstone carb. with minor coal splints. 168.4-171 No Core. 171-172 Mudstone, carb. with coal splints and ptgs.			
	х.		<u>Recoveries</u> 158-162 3.2/4.0 162-167 1.7/5.0 167-168 1.0/1.0 168-171 0.4/3.0 171-173 1.5/2.0			
	172-185.1	13.1	Coal Seam 2 172-172.5 coal dull to vitreous, soft, dirty, probably high ash.			96%
•			172.5-173 No Core 173-174.8 Coal mostly dull to vitreous, mostly clarain with minor shaly coal partings, soft and friable. 174.8-177.2 Coal vitreous with minor bright coal frags. Mostly clarain with minor vitrain, soft, friable. 177.2-177.3 Shaly coal soft, dull 177.3-177.8 Coaly Shale to Shaly Coal dull, moderately hd. 177.8-178.2 Coal mod. hd. dull to			•
			vitreous, minor shaly coal ptgs. 178.2-178.4 <u>Coaly shale</u> , friable but blocky. 178.4-182.0 Coal dull to vitreous, friable and soft, mostly clarain with minor shaly coal ptgs. 181.65-181.7 Coal band-Rich in pyr.			
• • •			182.0-182.2 Carb.Mudstone coal splints. 182.2-182.5 Coal dull, soft, shaly. 182.5-182.65 Coal soft, dull to vitreous, mostly clarain. 182.65-182.75 Shale dull, hard, blocky. 182.75-182.85 Thinly parted coal and			
			182.85-182.95 Carbonaceous shale hard, dull, contains coal flecks, 182.95-184 Coal dull to vitreous, minor bright coal flecks, contains thin partings and bands of shaly coal to coaly shale. 184-184.15 Coaly shale dull, hd. blocky.			
•			friable mostly clarain with minor shaly coal and coaly shale partings.			
			185-185.1 Shaly Coal dull, soft, earthy. Recoveries 171-173 1.5/2.0 173-177.3 4.3/4.3 177.3-182.5 5.2/5.2 182.5-187.5 5.0/5.0			
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Page Number ____5

Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
185.1-192.5	7.4	Mudstone m.gy, in part silty, becomes increasingly silty basally, short sections of m.gr. ss., X-bdd. and containing fragments of mudstone. Core is moderately sound and in part/dessication breccia. Parted @ 60 to C/A. Irregular fracturing. 188-188.3 Sandstone lt.gy, m.gr., contains fragments of mudstone X-bdd. Sharp but irregular contacts. 191.8-192.5 Broken, blocky, irregular breaks, frags. to 2 1/2".			988
192.5-209.7	17.2	Siltstone to Fine Grained Sandstone Thin interbeds of silty Mudstone. Becomes coarser and increasingly sandy basally. Gradational from above. m.gy.,massive, in part laminated to thinly bedded, sandstone is generally X-bdd. 195.3-197 <u>ss</u> m.gr.,fragments of ss. imbedded in mudstone.			98\$
۰ ۲		Sedimentary Breccia. 197-197.5 Broken to crushed, Probably mechanical. 198.8-199.3 Brecciated ss. and mudstone. 200.4-200.8 Broken core, wthrd. appear, may in part be mechanical, irregular. 202-202.5 Broken, irregular may in part be mechanical. 206.75-206.8 sdy.mudstone parting, m.bm. crusty and crumbly, irregular contact, plane through contact @ 65° to C/A. 207-208.7 <u>Sandstone</u> m.gr., m. lt.gy.			
209.7-222	12.3	Sandstone m. to m. lt. gy, m. to c. gr., mod. to well sort, ar, chert and qtz in 2:1, lostly massive, hard, mod. sound, competent Gradational from above, Gr. size generally coarsens downward. Fracturing generally @ 20° to 30° to C/A. 211 - 211.7 mudstone pbls. imbedded in f. to c. gr. ss. matrix, poorly sort, mudstone pbls. are irregular and non-aligned. 213.4-213.6 Broken and blocky.	•		98%
	222	217-217.5 Broken and blocky, may in part be mechanical. Total Depth.			
		· · · · · · · · · · · · · · · · · · ·			

RIO FINTO CANADIAN EXPLORATION LIMITED

DIAMOND DRILL RECORD

Hole No.: 76 _D -06	Property: Sage Creek Coal
Location: South Hill 17,846,660N (Approx) 583,530E (Approx)	Elevation: 5145' (Approx)
Contractor: Connors Drilling Limited	Hole Size: 3 25/32" (H.Q.)
Rig No.: #1	
Date Commenced Drilling: September 21, 1976	
Date Finished Drilling: September 22, 1976	
Date Hole Completed: September 22, 1976	
Logged By: O. Cullingham	Date: September 22, 1976
Probed By: Roke Oil Enterprises Limited	Date: September 22, 1976
Total Depth Drillers: 152 ft.	Depth of Overburden: 12'
Total Depth Logger: 152 ft.	Water Level: Full



No.	Size	Make	and	Serial	No.	R.P.M.	0n	Off	l'ootage	Drilling Time		
								1				
								1				
								-	}			
					,							
			·			L	L					
Surfa	ace Cas	ing:		12		Standby Time for Logging: 6 hrs.						
Total	L Driii Down	Ing II Time	ne:			Other Standby lime: Total Changeable Standby Time: 6 bre						
Total	l Foota	ge Char	rgeat	ole: 152	2	Actual Moving Time Between Holes: 10 hrs.						
Total	Total Hourly Contact: NIL					Chargeable Moving Time Between Holes: 2 hrs.						
	-					Quantity of Mud Used: 24 bags Quik Gel						
Remar	Remarks:-					24 bags Quik Trol						

Probe Report:		
149 - 0	Caliper	Open Hole
151 - 0	Gamma Ray/Neutron .	Open Hole
149 - 0	Sidewall Densilog .	Open Hole

COAL NOTIZONS											
Coal Horizon	Driller	s Picks	Log Picks								
Seam 2	108 - 120.3	12.3	108.5 - 119	10.5							
	. ,										

ı		Interval	Unit Thickness	Description	く of Bed to Core Axis、	Core Eval.	Est. Rec.
	L	·					
-		0-12	12.0	Overburden and Shattered Sandstone			
		12-57	45	Sandstone			98%
				<pre>m.lt. to m.gy., massive, m.to c.gr., locally to v.c. gr. & conglomeratic; mod. sort, chert & qtz. in 2:1, silica cmt., mod. hd. to hd., ar. gr., to gr., localized zones of devise fracturing, wthrd., abundant Fe. stn. (lmn.) & in part decemented. In part X-bdd., core is mod.</pre>			
١				sound & compentent. Fractures @ 60° to C/A bdg. plane pre- dominates. 2nd set @ 20° to 30° to C/A to $\underline{1}$ to 1st set.			
				Core ranges in lengths to 1 ft.			
				12.8 - 13 Partially decemented			
				18.5 - 22 Abundant Fe.stn (lmn.) greater density of fractures.			
.•				18.6 - 18.8 Partially decemented			
		÷		19.4 - 20.0 In part a crushed appearance and partially decemented			
				21.5 - 21.7 Broken & partially decemented			
				22.0 - 22.5 high density fractures, sub parallel @ 20° to 30° to C/A. In part decemented, Fe. stn., some clay lenses in open fractures			
i.	•			23.6 - 34.1 In part decemented, densely fractured, not as Fe.stn. as above, same day in fractures.			
'. '.	•			31 - 32 In part brecciated highly fract- ured, in part decemented, broken, abundant Fe.stn. @ 31.4-32.0			
				32 - 32.6 v.c.gr.sd. to granule conglom- eratic <u>ss</u> , broken, poorly sort, p. cmt.			
•				32.6 - 33.1 broken, brecciated in part decemented, Fe.stn., clay intruding fractures.			
· ·	. '.			37-37.8 c.to v.c. gr. to granule congl., p.sort, broken, p.cmt., chert to qtz. grs. in 3:1, a-r.			
•	•			39.5-40 c.to v.c.gr.			÷
	· ·			40.6 - 41 Abruptly into mudstone, v.sl. slty.			
*				41 -44 Abruptly back into c.gr.ss., contact @ 70 ^o to C/A, coarsens downwards to v.c. to granule congl. ss., p.cmt., in part sed. breccia.			
,	•			<pre>@ 44 fracture @ 30^o to C/A mirco fault of 0.2' displacement, hanging wall side down, fracture occurs at contact with arg.ss., m.gr., grades quickly into competent in gr.ss. parted @ 60^o to C/A</pre>			
	•			48.5 - 49.5 broken, p.cmt. m. gr., clay texture.			
				49.5 - 50 broken, blocky, m.gr. ss., intruded/clay, wthrd. appearance, abrupt. into c.gr.ss.			
•	:					e .	N

Page Number 2

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· · · ·	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
· ·			50.8 - 54 high density of fracturing, broken, rubbly, 1"-2" pieces up to 6" X 1" pieces, c.to v.c. gr.			
	•		Recovery 2'/3.2'			}
× •			54-57 c.gr., locally to granule congl. broken, blocky, in part rubbly, abruptly into soft clayey mudstone below.			
N.	579 23	35.3	Interbedded Mudstone, Sandstone and Silt- stone			95%
			<u>Mudstone</u> m.gy. to m.gy. bm., soft to mod. hd., massive in part slty, in part crusty.			
·			Siltstone m.gy.hd., massive & in part arg			
•			Sandstone v.f. to m.gr. thin bdd, & in part X-bdd., mod hd. to hd., chert & gtz. grs., sil.cmt. in part arg.			
			57-60.3 <u>Mudstone</u> becomes sdy. basally))
· · · · ·			58.8-59 broken, crumbly.			
. x	•		59 - 59.3 broken, crumbly on hanging wall side of fracture $@$ 30° to C/A more compt. on f.w. side of fracture			
			59.9-60.2 broken, crumbly, in part decemented.			
			60.3-72 Arg. Siltstone to F.gr. Sand-			1
•			competent sound core, to sandstone basally, X-bdd. basally,			
			62.5-63.5 wthrd. appear. Fe.stn. arg.ss, poorly cmt.			
•			70-72 <u>Sandstone</u> arg. m. gy. bm., wthrd f-m.gr. in part partially cecemented			
		-	72-72.6 Arg. Sandstone highly wthrd. appear., for the most part decemented.			
			hd.			
			75-79.5 <u>Sandstone</u> for the most part m. gr., wthrd. appear, Fe. stn., partially decemented.	r		
			76-76.4 Abundant Fe.stn., partially decemented.	I		
			77.2-78 decemented, abundant Fe.stn.			
	•		78.5-79.5 Broken, partiall decemented some clay content around ss. fragments			
			79.5 81 <u>Brecciated Mudstone</u> - Some frags siltstone to v. fine. gr. sandstone, frags imbedded in mudstone.			}
* - *** -			81-87.5 Arg. Sandstone to very sdy.mud- stone			
· · · ·			87.5-92.3 Abrupt contact @ 50 ⁰ to C/A in- to m.to c.gr. sandstone			
		ļ	89.2-90 broken, blocky,	•		
			90-92.3 Sandstone thinly bdd. to lmn. splints and partings of carb. mudstone			
	92.3-102.2	9.9	Mudstone			0.0%
	1		m. to dk. gy., carb. to coaly, in part minor thin coal bands.	· ·		90%
-	4 ' 1 7					

Page Number 3

Interval	Unit Thickness	Description	< of Bed to Core Axis	Eval.	Rec.
		an a na d dull conthe tout coaly shale			
		92.3-92.4 duil, earthy text. Coary share			
		93.5 - 94 Broken, blocky, silly moustone.			
		94.5-95 - Broken, rubbly.			ł
		95-95.7 Soit, crumbly, SI. Carb. Madistone.			1
		mudstone.			
		98-98.5 Crumbly carb. mudstone, minor clay			
		99.3-99.7 crumbly to blocky, in part carb. mudstone.			
		99.7-100.2 soft, friable carb. to coaly.		ł	ļ
		100.2-100.4 dull to vitreous, shaly coal			1
		100.9 - 101.1 dull, blocky, shaly coal			1
		101.1 - 102.2 broken, blocky, slightly carb. mudstone, minor coal splints.			
		Recoveries			
		90 - 94.5 4.0/4.5			
		94.5-99 4.0/4.5			
		99 - 104 5.0/5.0			
102.2-108	5.8	Interbedded Mudstone & Coal			8
		102.2 - 102.3 Shaly Coal dull,			
		102.3 - 104 Coal friable, drull to bright, mostly durain with minor vitrain, contains thin coaly shale partings.			
		104-104.5 Coal vitreous to bright, mostly			
		clarain, minor vitrain, minor thin coaly shale partings.			
		104.5-105 <u>Mudstone</u> , hd.			
		105 - 105.6 <u>Shaly Coal</u> , dull, duty, soft possibly high fusion content.			
		105.6-105.85 dull, earthy, carb to <u>coaly</u> shale			
		105.85 - 106 <u>Shaly Coal</u> dull, soft to friable			
		106 - 106.5 Shaly coal soft, thinly			
		106-107 Carb. to Coaly Shale dull, soft			
		to friable.			
		Recoveries	1		ł
	ļ	99-104 5.0/5.0 104-106 2.0/2.0 106-108 1.0/2.0			
108-120.3	12.3	Coal Seam 2			8
		108-110 Coal dull to vitreous, with minor bright flecks, soft, mushy.			
		110-111.5 NO CORE	· .	Ì	1
		111.5-111.8 Coal dull to vitreous, soft, mostly clarian with minor shaly coal ptgs.			
		111.8 - 112 Coaly Shale to Shaly Coal dull, duty to touch, minor pyr.			
,		112-113.5 Shaly Coal to Cooly Shale dull, soft, duty to touch			

Page Number 4

	Interval	Unit Thickness	Description	<pre>< of Bed to Core Axis</pre>	Core Eval.	Est. Rec.
•	. <u> </u>		113.5 - 117.3 Coal dull to vitreous, minor bright bands, mostly clairain, soft, friable, minor vitrain, minor shaly coal partings.			
			117.3 - 117.5 No Core			
			117.5 - 118.3 <u>Coal</u> soft, dull to vitreous mostly clarain, minor shaly coal frags.			
			118.3 - 118.5 Carb. to Coaly Shale hd., blocky, minor pyr.			
			118.5 - 119 <u>Coal</u> soft to blocky, mostly clarain with partings of carb to coaly shale.			
-			119 - 119.1 Carb Shale hd., dull			
			119.1 - 119.5 <u>Coal</u> soft to friable, mostly clarain.			
	,		119.5 - 119.6 Durain hd., blocky, lt.wt.			
	• .		119.6 - 120.3 <u>Coal</u> soft to friable, dull to vitreous, mostly clarain, minor carb. ptgs. towards base.			
,			Recoveries $108-11.5$ $2/3.5$ $111.5 - 112$ $0.5/0.5$ $112 - 117.5$ $5.3/5.5$ $117.5 - 118.5$ $1.0/1.0$ $118.5 - 119.5$ $1.0/1.0$ $119.5 - 122$ $2.3/2.5$			
•	120. 3–152	31.7	Siltstone to Fine Grained Sandstone			79.5%
•			Contains minor interbeds of silty mud- stone. m.gy., for the most part massive, in part x-bedded, core is moderately sound & competent, fractures @60° to C/A are most prominent, 2nd less prominent set @ 20° to 30° to C/A and at rt. 's to lst set. Fracture density of approx. l/ft.			
			125-126 more dense fracturing causing broken core.			
			127.8-128.4 Curved vertical fracture, infilled with 1/4" Fe.stn.clay			
			131.9 - 132.3 Broken core caused by high density of fractures, fractures @ 20 ⁰ to C/A			
			141 - 141.5 fracture @ 10 ⁰ to C/A, infilled with Fe.stn. clay			
4 4 -			143-146 Irregular fracturing infilled with Fe.stn. clay.			
			145 - 146 Crumbly, sandy, mudstone, poorly consolidated.			
			147 - 147.6 silty mudstone			
•			147-6 - 148 crumbly, crusty, sandy, mudstone.	•		
• •			148- 150.5 sandy mudstone, badly broken @ 150 to 150.5			
		152	Total Depth		× -	
-	i					
		1		4	1	1

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SCALE		SCALE	SAGE CREEK COAL DENSITY LOG BIRTLEY ENG	SCALE	SAGE CREEK COAL DENSIT	Y LOG BIRTLEY ENG.	SCALE	SAGE CREEK COAL	DENSITY LOC	BIRTLEY ENG.	SCALE	SAGE CREEK COAL	DENSITY LOG BIRTLEY ENG.	
	6-01	FEET	SAMPLE SAMP Xage SAMP MOIST S.G. F.S.L INT. S.G. RAW F.S.L RAW ASH ASH ASH	FEET SAA	MPLE SAMP X age SAMP MOIST S.G. F.S.L INT. S.G.	G RAW F.S.L RAW S.G.	FEET SEAM	4 SAMPLE SAMP % age SAMP MOIST S.G. F.	S.L INT. S.G. RAW	F.S.I. RAW S.G.		PLE SAMP X age SAMP MOIST S.G. F.S.	LL INT. S.G. RAW F.S.L RAW S.G.	
Î	sverburden & broken rock		7007		9000	,	appei	2001			BI2	900		
	6.4			C-21	938 0-8 798 3	4 44-8 1-68	1							
KM		87-		262-C-215	939 1.0 100 2080 5	0 918 2.54	540-	C-21945 I-5 1657 2	¹ /2	2 30-4 1-52	8/4	61 3-0 76 4727 · N.	A. N.A. 90-1 2-53	
Ka	mod to severa froc at 45° to C/A		C-2/927 0-2 500-5 1 0 82-2 2-36					100		2% 19-5 1-40				
	commans beselly - fractures 35 ^e - 45 ^e to C/A	89-		254- C-215	940 2.4 1831 4	6 201 1-4	542-4	0-21040 10 100			8/6- C-2/9	62 2·0 4349 N.	A N.A. 89-2 2-51	
A HORIZON	shate interlaminated coal		100					C- 21947 1-9 1714 5	1/2 I	4% 20.7 1-4		80		
	site./intbde. corb.shcie		C-21929 0.9 8165 8 ¹ / ₂	C-215	941 1.4 1294 31/2	2 58-1 1-84					C-219	63 I-0 925 I	1 69-4 2-11	
								C-21948 1 2 94 1414		1 44-1 1-74	C-215	4 1-2 2034 1	N.A. 87.2 2.47	
	shale interiorisated cod				100				11-8 1-48 25-5					
	gridational Correct beatly	93-		268-C-215	942 3-6 4076 21/2	0 85 2 2 35	546-	C-21949 1.9 2027 1	1/2	1 21-3 1-46	620-C-219	42 15 2-8 1169 N.4	A. 1 49-5 1 83	
	carb shale abrupt contact		100											
200	state	95-		270-			548-	C-21950 2-1 2487 8	1/2	2 17:3 1-41	822-			
Kuro-Con	severe frocturing - rubble zone coorsens baselty to conglomerate			C-21	1943 2.0 3491 5 ¹ / ₂	0 92-6 2-61		92				N.R. N.S	s.	
	ismineted of 45° to C/A - maybe X - bdg portfoly decamanted coorsene basally	97-	C-21930 0.5 860 2 0 743 2.8	272	100		550 -	C-21951 2.0 2149		7/2 17-1 1-38	824			
# t HORIZON	shale interleminated coal			C-21	1944 1-6 2225 1	1 65.5 1.93					C- 219	6 1:5 80 1287	31/2 22-9 1-47	
		-		274 -			552				826- C-2/9	i7 1-0 100 568 4-1	5 8.0 1.33	
300											C-219	38 0·9 970 1·5	2 28-4 1-55	
		131-		-			-				826-C-219	i9 0-7 865 i	1 46-0 1-76	
	core is severely broken						SEAM	4			C-2197	0 2 2 2634	1/2 20.9 1-49	
	Carb, shale Copi Bond Santa	133-		SEAM 2			592	C-21952 0-7 805 0	15	1/2 83 9 2.41	630-	9.9 105	19 1.51 271	
SEAM 2			C-21931 I-6 1828 3 6 ¹ / ₂ 297 I-46					C-21954 I-0 1261 4	5	4 29.0 1.56		1.7 4640	3 105 146	
400	shale-carb at top becoming sity pavally)			C-219	926 1 704 3	4 370 1.62		60			C-2197	1042 2		
	gredational	135	100	20%				C-21955 2.7 798 1	5	1 32-0 1-63		72 1-8 83 1652 9	3 24.9 1.53	
											C-219			
	minor fracturing at 25° 50 C/A moderate to space fractures the	137-	C-21932 0-6 408-5 5 ¹ / ₂ 7 ¹ / ₂ 14-5 1-34	256-	100		596-				014-C-219	75 1-5 1318 3	31/2 21-5 1-48	
	two safe of 450 and 600 to C/A							C-21956 3-0 50 1859	5	4 281 154				LEGEND
1	ahole - high carb) bodly oke	- 139-		358-			598-				836- C - 219	74 1-7 76 1275 1	2 19-3 1-47	
500														Overburden
	moderate to severe fracturing with braccia points finally tem at 60 th to C/8	141-	100	560- C - 2H	909 1-5 100 2848 31/2	4/2 28-7 164	600-	C-21957 2-0 63 1588	5 17-5 1-51 27-1	1 47-2 1-51	838 X			Science Control
SEAM 4 upper	sharp contact							7	-		C-28	75 5-0 40 1811 Z	4 /2 3/ 3 1.36	Gravel
	France gradefilience	143		362-C-21	1910 1-5 1547 6	7 13 1-36	602-				840			Claystone
	finely ten at 50° breccis zones				1/2 560	14 33.4 160					C-219	76 1.0 80 913 0	N.A 80.4 2-35	REPORTED A
600	and the second s	145-	C-21933 1-6 1822 4 ¹ /2 5 33-9 1-52	M4 -	80		604-				842-			Conglomerate
SEAM 4 lower	costy, carb mudstone		C-21934 0.7 100 1765 11/2 1/2 78.4 2.20					NR						Sandstone
1.2		117	C-21935 1-2 1054 6 ¹ / ₂ 7 ¹ / ₂ 13-3 1-33	C-21	912 2.5 1386 6	572 13-3 1-38	806-				C-215	77 5-0 28 2432 N.	A. N.A. 81-C 2-38	
	gredational													Siltstone
	gradeTiensi			C-2H	913 1.9 1884 11/2	7 15-8 i-40		· ·						rmedium gray
200	Coursering powersy and bond contact	149		368-			608-	V I I I I I I			945			Shale
100				C-21	914 1 4 82 1886 61/2	1 50-6 1-78					C-219	78 2-0 65 1259 4	5% 23-7 1-47	Ldark gray
- 283	methy duran and multione continued to the set	151-		370-			610-	C-21958 5-0 70 2355	1	11/2 47 2 1 78	848			moderate
	=		100	C-2#	915 2-2 1137 4	3 45-3 1-70								Carbonaceous Shale
1200		100-		571	245 1-5	4 286	612				-			'nign
				C-21	1916 1.7 1848 172	1 50-3 1 80	111111111111111111111111111111111111111	C-21959 1-5 100 2561 C	20	N.A. OFO ENO				Shale Interlaminated Coal
800	2446ing 65*	195-		374			614	C-21960 0.5 100 599 2	.5	1 70-0 2-08	-			mostly clarain and/or
				- C-2	1917 5.3 2537 7/2	8 18-0 1-42								claro-vitrain
SEAM D		157-	C_21936 1.0 2021 1/2 0.819 2.34	376			-							shaly
Basel Sandstore T.D. 864	MP up 1 Canhach													
		159-		278-	1918 1-1 1139 7½	7 27-9 1-62	-							COAL-mostly durain
900			100	C-21	919 1-5 14-7 31/2	1/2 45-0 1-7								high in fusain
		16		390-	96		-				_			inducated with clay
2				c-2	1920 2-4 2490 5½	61/2 24 0 1 48								inconstant mini citay
		163-	C-21937 0-8 780 3 2 52-0 1.73	382										Undifferentiated Coal
														Braccia Adda
1000				C-21	1921 2-3 2317 6%	8 /2 16 7 1 42								
					1922 1-5 90 MIN7 4 ¹ /	11/2 1000 1000								Clay or Clay gouge
				0.2		1/2 000 100								
		1		386-C-21	1923 1-4 1228 7½ .	1/2 79 6 2.25								
				C-21	1924 0·5 6/9 /1/2	0 81-8 2-33								Checked by: 271 (3)
	0.000	-		388 C- 21	1925 1-2 100 1337 5 ¹ /2	1/2 78-8 2·21	-							Approved by: 27'
1100								2						Revised:
		-		390										RIO TINTO CANADIAN EXPLORATION LTD.
											2			SAGE CREEK COAL LTD B.C.
		-		592-			-							
														HORTH HILL - HOLE (000)
1200		-		394			-							AND
12.3														DETAILED COAL BED LITHOLOGY
1.5.5														DATE Dec / 76 BY O. C. / MAPS. DWG.

SCALE N FEET	SCALE N FEET	SAMPLE SAMPLANDET	FEET CEAN A SAMPLE SAMP 2	AGE CREEK COAL DENSITY	BAW CALL BAW CO.	SCALE N N FEET SAMPLE SAMP X NOIST OF CALL DENSITY	LOG BIRTLEY ENG.	-
↓ 76 ₀ 02	+ #1 HORI ZON	NUMBER WOTH RECOV WIGH LOSS S.G. P.S.L. INC. S.G. ASH P.S.L. ASH	Upper NUNBER WOTH RE	COV WITING LOSS OUL, P.A.L IIII, AU	ASH CALL ASH ALL	SEAM 5 HUMBER WIDTH RECOV WIGH LOBS ACC P.S.L MIL acc	ASH CAR ASH ALL	-
0 <u>6 (</u> K ₃)								
has in 45° & 25°	70-		340 C-21998 2-0 10	0 3958 N-A	N-A 92-9 2-60	634-		
grada consci grada consci model orientani cool						C-28030 1-5 2814 N-A	1/2 74·8 2·19	-
100 and 100 an	72-		342-		NA 70'3 2'24	636- C-28031 0-5 956 N-A	Vz 68-1 2-08	
A rubbiy, in part decemented A abrit Fir atn	74		344-			C-28032 I-0 93 1029 I-1/2	1 37-8 1-68	
A abscrat			C-22000 42 4	6 1369 5	4 16-7. 1-42	C-28033 I-5 1732 3	4 241 1.47	
coarseing beachy	76-	2-21979 1 2 100 1832 300 1 759 2 16	346-			640		
17 June 19 Jun			C-28001 1-5	1543 7	7 17-6 1-41	C-28034 2-5 2344 2 ½	4 ½ 12-5 1-38	
200	- 78-		348-			642		
			C-28002 2-0 10	0 2203 4 Vg	2 1/2 42.5 1.70	C-28035 3-0 3758 2	4 21-1 1-48	
m produced or 20" to C/A	80-		50- C-28003 1-5	1451 4	5 1/2 16-1 1-41	100 155 146	25	
SEAM 2	87-		382-	1967 8 14	8 4 18.2 1.40	646-C-28036 2:0 2609 I	1 26-6 1-54	
300								
A. A. A. breccelled	85-	C-21981 2 2 100 2366 5 ½ 5 ½ 10 3 1 35	- 354- C-28005 2-0 9	2215 3 1/2	4 24-2 1-47	648- C-28037 16 1700 2.	2 14-8 1-41	
						C-28038 10 1185 2%	4½ 14-4 1-41	
SEAM 4 upper	8-		356- C-28006 2-0	1623 4	2 1/2 17-2 1-42	650- C-28039 2-4 2433 4	41/2 17.5 1-42	
SEAM 4 lower	urm		C-28007 1-5	1195 2	4 21-9 1-50	652		
						C-28040 0-8 999 2	11/2 24-0 1-49	
* nex # 20*6 45* % GA	260-	z-21982 0:9 100 1070 1 ½ z ½ 50-1 i-78	C-28008 2-0 10	0 1841 6 ¹ / ₂ 30-5 1-45	24-0 7 16-3 1-41	62.5		
bog at 60° to C/A			C-28009 1-5	1367 i ½	1 1/2 24-6 1-51	C-2804i 32 1889 2	372 31-4 1-36	LEGEND
	262		No-					
500 Instruet at 20 ^p to C/A			C-28010 2-0	1894 i ½	1 1/2 28-6 1-60	C-28042 2:0 60 1648 1/2	½ 6i-8 2:00	Overburden
Bis, purtially decembration body bias, writed appear in part decemented bias writed manage controls decemented	264	C-21983 0-7 100 628 1 ½ 4 37-8 1-63	364- C-28011 1-5 7	4 823 1	1 18-1 1-44	639	-	Gravel
'0' HORIZON	266-		366-			C-28043 2-1 2985 4	172 01-9 1-60	Clavstone
fractured of 20 th tr C/A		72 776 624	C-28012 115		1 113 134	C-28044 1.9 2118 2½	1 1/2 35-4 1-61	
600 at using traching and traccolled	265-	C-21985 2-0 3787 1 1/2 82-7 2-33	C-28013 1-5	1509 Z	1 1/2 21-2 1-46	662		Congiomerate
cruted core	SEAM 2	C-21986 1-4 90 (460 1 8 ^{-/} / ₄ 20-5) -45	C-28014 1-5	1706 5	3 8-9 1-35	C-28045 30 100 3823 1/g	2 29-1 1-53	Sandstone
SEAM 5 upper	270-		370	1443 4	3 1/2 14-3 1-41			Siltstone
SEAM 5 lower		C-21987 1-6 778 6 4 5-3 1-29	•			C-28046 1-4 1464 41/2	4 26-7 1-49	medium gray
700 - togi tan, whet useer		C-21986 I:0 1032 8 4 27.9 I:53	C-28016 1-5 10	10 1345 7 ½	8 6-7 1-31			Shale dark gray
T.D. 7/2	274-	C-21989 1-2 1278 6 5 1/2 30-1 154	574- C-28017 I-6	1783 8 %	8 10-0 1-33	668- C-28047 2-6 823 4.A.	5½ 19-0 1-43	
		C-21990 1:4 10 1146 4 1/2 10-1 1-35	C-28018 0-7	1194 7	1 49-7 2-11			Carbonaceous Shale
	276-4	C-21991 1-4 1145 6 1/2 9-1 1-35	376- C-28019 1-2	1188 N·A	6 31-8 1-55	670- C-28048 3-0 73-3 1818 7	7 15-3 1-39	^L high
800		17.5 144 23-5		0		260 152	276	Shale Interlaminated Coal
			3/8 C-28020 3-5	3520 N-A	N-A 87-6 2-35			mostly clarain and/or claro-vitrain
	280-	C-21992 5.0 34 1146 5 ¹ / ₂ 8 12-1 1.36	380			674- C. 2008 40 225 1078 2	44 202 143	shaly
			SEAM 4					COAL-mostly durain
	200	C-21993 1-1 1001 6 8 17:5 1-38	384			676		
900		-73	C-28021 2-0	2964 N-A	N-A 91-9 2-56	C-28050 20 90 2 ¹ / ₂	7 50-4 1-8	nigh in tusain
	204-	C-21994 1-9 934 87g 17-2 1-40	. 396 -			679 C-28051 2.0 95 2048 6 ³ /z	4 17.7 1-42	lindurated with clay
	286-	C-21995 1-4 1455 6 ¹ /2 4 25-4 1-48	C-28022 2·2	3067 I	½ 66-4 ⊩99	680		Undifferentiated Coal
		C-21996 1-4 100 1269 6 4 ½ 28-8 1-50	C-28023 1-3 94	45 1570 3	11/2 24-2 1-49	C-28052 F0 100 1129 1	1 ½ 17-4 1-43	Breccia
1000	- 210-		390-			687-	1/2 340 139	Clay or Clay optice
		C-21997 I'9 2635 N.A 3 60-2 1-86	C-28024 2-0	1677 4 ¹ /g	2 1/8 22-8 1-48	C-28054 2.0 65 (335 2 ¹ /z	3 1/2 14-7 1-39	
	. 290-		392 C-28025 I-5	961 I	1 20-2 1-46	684 C-28055 I-0 90 688 5	1 22-0 1-48	No recovery
			394-		24.8	C-28056 1:0 80 7½	4 ½ 15-5 1-39	Checked by:
1100			6-28026 3.8	2 5%	2 31-6 1-55	C-28057 - 151 N.A.	1 73-5 2-16	Approved by:
	-		38-					RIO TINTO CANADIAN EXPLORATION LTD.
						- 100		SAGE CREEK COAL LTD B.C.
			310 C-28027 2-0 5	0 [.] . 679 5 ¹ /2	1 1/2 17-9 1-42			NORTH HILL - HOLE 76002
1200			C-28028 1-0 5	0 393 7	4 1/2 24-3 1-47			COLUMNAR SECTION
			C-28029 2-0 10	10 2103 N-A	N-A 88-4 2-45			DETAILED COAL BED LITHOLOGY
			402					DATE Dec./76 BY O.C. / MAPS. DWG.

SCALE	SCALC SAGE CREEK COAL DENSITY LOG BIRTLEY ENG.	SCALE SAGE CREEK COAL DENSITY LOC	G BIRTLEY ENG. SCALE SAGE CREEK COAL DENSI	TY LOG BIRTLEY ENG. SCALE	SAGE CREEK COAL DENSITY LOG BIRTLEY ENG.	
FEET 76:03	FEET SAMPLE SAMP X age SAMP MOIST S.G. F.S.L INT. S.G. RAW F.S.L RAW S.G.	FEET SEAM 4 SAMPLE SAMP X age SAMP MOIST S.G. F.S.I. INT. S.G. RAM	W F.S.L BAW S.G. F.S.L INT. S AMPLE SAMP X age SAMP MORT S.G. F.S.L INT. S	G RAW F.S.I. RAW S.G. FEET	SAMPLE SAME Xage SAME MOIST S.G. F.S.L INT. S.G. RAW F.S.L RAW S.G.	
	SCHIEC PERI	upper year		S SCA		
N N						
T HORIZON Highly fiscured					100	
I m p/, coarsen boally	12-	346-	406	610-		
Steel Sondstone her beauty decemented					C-28105 0-5 539 8½ 5 44-7 1-67	-
and the difference	124	C-28063 0-5 645 7	4 33.0 1.59		C-28106 1-3 2911 N.A. N.A. 85-1 242	
conglomentie abruer imag contect						
vertical frace, mean claite cooling of frac surfaces		C-28064 2-4 100 4057 N.A.	1 72-3 2-14 C-28089 2-7 3097 Z	1 346 161	C-28107 175 1994 4 7 ¹ / ₂ 11-3 1-36	
dorupt irregular contact breccuted	126-	350-	410-	E14-	38 -	
SEAM 2		C-28065 0-5 657 6	3/ 29-2 1-48			
shaftend and breactated sit to 1 gr writical frag				2 236 149	C-28108 2.15 2707 11/2 21/2 33-9 162	
boots bin and bracciated	128-	252 C-28066 3-2 4927 N.A.	1/2 74.5 2.14			
99 1 Sandstone -san, kigh dens frocs, whird, Fe stn	C-28059 5-0 53 2037 7 ¹ /s 6 ¹ /s 21-6 1-42		C-28091 2:05 2302 1 ½	1 1/2 30-4 1-55		
200	10-	334-		58-	C-28109 23 2339 1 ½ 1 45-4 174	
- trecorded and ban		C-2806/ 0-5 100 591 N.A.	372 22-1 1-94			
- brez	8'8 P60 29-8		C-28092 2.95 3658 6 ½	4 20-1 1-45	65	
- severally bkn a.1. to figs	12	356- C-28068 3-6 7992 N.A	N.A. 89-6 244	420-4	C-28110 3-2 2714 1 4% 19-2 145	
*2 Sandstone bit out bec	C-28060 I-5 I437 6 77 ₂ I9-0 I-42		210 1	52 27.6		
abrupt contacts with as above and below	94-	358-	418	4 29.9 155 422		
300 The contract of the contra	C-28061 2-3 96 2437 6 ¹ / ₂ 5 ¹ / ₂ 15-4 1-39	C-28069 I.O. 1767 M.A.	1 75.0 2.15		C-28111 06 653 11/2 3 248 F51	
- Skn, breccipted		100	C-28094 0'9" 153	1 34-0 1-59	C-281/2 2-2 2397 2 21 155 29-1 1 309 158	
- Sen and Stocky - breccurred	13-	NO-00000 1.0 9007	Alb 23.6 1.46	626-		
		C=COLO 3.0 5301 0.15	C-28095 24 2144 2	6 ½ 28-6 1-51		
	- 136	82-	42	626-	C-28113 2-2 2552 2 ¹ / ₂ 2 ¹ / ₂ 2 16-7 1-43	
SEAM 4 upper		C-28071 1-45 1535 2½	4½ 24 8 149 C-28096 11 1227 2	5 15-1 1-39		
400		264-C-26072 1.95 100 2424 65	7 15 3 1 39	5 21-3 1.45	C-28114 2:35 2562 5 ¹ /2 4 29-0 1-54	
SEAM 4 lower		V AND 1 K 1 FW 1 YW 5 TAT	C-28097 2'8 3189 7			
			425-		93	
		C-28073 1-6 1645 6 ¹ /2	31/2 14-2 1-40 C-28098 H 1404 N.A.	2 28-3 1-52	C-26115 2-15 2337 21/2 2 24-2 1-51	
braccipted			C-28095 HI 1102 7	7/2 17.1 142		LEGEND
vertical frac		348-	425-	2 357 160	C-28116 1.2 1697 2½ 3 46-1 178	
500 70 HORIZON		C-28074 3-2 3347 6 1/2	4 1/2 212 145			Comburdes [10]
		100			C-28117 23 2845 4 2 34-7 1-63	Overburden
		370-	420			Gravel
high Sensity Inschuring sourcing ben core		C-28075 1-8 1889 6½	2 ¹ / ₂ 27.7 154		C-28118 10 1906 NA NA 63-8 2-41	
budy the		972-		636-	C-28119 0.5 547 NA 1/2 69.7 2.12	Claystone
#4 Sandstone		C-28076 2.35 ION 2472 6 ¹ /2	7 137 139			Non Arriver and Arriver
600 000					C-28120 1-65 3022 N.A. NA. 86-0 2-45	Conglomerate
breckinfed		C-28077 045 752 N.A.	1 687 2-13		C-28121 0.86 285 41/2 11/2 43.7 1.71	
SEAM 5 upper		320 146 24-5	5		C-28122 10 1217 21/2 21/2 10 169	Sandstone
		376-		640-		Siltstone
SEAM 5 lower		C-28078 5-7 100 4218 4	1 217 190		74	
T.D. 671 bin core into 1/2 to 15 long pieces					C-28123 25 2963 I 7/2 71.7 2.20	r medium gray
		378-				Shale
700						^L dark gray
		380- C-28079 3-5 100 3680 2 %	1 19-2 1-45	644-	C-26125 1-15 2109 N.A. N.A. 00'6 C41	moderate
					C-28125 175 2502 3 1% 40-8 170	Corbonaceus Chala
			DHORIZON		100	Carbonaceous Snale
		C-28080 I-0 1057 31/2	11/2 17.4 150			
		C-28081 0.7 1255 N.A.	1/2 37:1 1:99		C - 28127 2.1 2787 3 2 35-1 163	Shale Interlaminated Coal
.800		384-	498- C-28102 07 970 4	21/2 16-0 1-42 648-	C-28/28 0-35 334 7½ 3 265 150	mostly decise and for
		100			C-28129 0-7 939 1 Vg 74-4 2-23	claro-vitrain
		9 44 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9			@+ 28130 125 1398 2½ 278 150	ebat.
					ac 1425 1-57 30-1	ondry
			C-28103 H H415 L ¹ /2	31/2 49.1 1.76		COAL-mostly durain
		386-C-28083 20 2208 5	3 1/2 19-5 1 42 50	652-	C-28131 27 2830 6 3 ¹ / ₂ 200 143	
000			C-28104 1-75 2127 8	1 40.4 1-67		high in fusain
		100				
		C-28084 3-0 3244 7	7 10-4 1-36	654-	C-26132 3-1 3510 5½ 4 255 ≥50	lindurated with clay
		352-	1/4 53-4 2.24	656-	1 1 1 1 1 1 1 1 1 1	Undifferentiated Coal
		C-26066 0.6 302 6 ¹ / ₂	7½ 273 152			Reccia (0.0.0.0
1000		C-28087 0.7 1123 1	2 548 181		C-28133 24 2470 5 3 34-3 1-58	
		594-000 C-28088 0.5 85 908 N.A.	N.A. 875 241	858		Clay or Clay gouge
					C-20134 U.9 0/U N.A. 1 86-6 2-33	[3/4/3/]
		396-		540-		No recovery
						Checked by:
						Approved by:
1100						Revised:
						RIO TINTO CANADIAN EXPLORATION LTD.
						SAGE CREEK COAL LTD B.C.
						NORTH HILL - HOLE 76-03
1800						COLUMNAR SECTION
						DETAILED COAL BED LITHOLOGY
						DATE Dec./76 BY O.C. / MAPS DWG.

	SCALE IN	SCALE	SAGE CREEK COAL	DENSITY LOG BIRTLEY ENG.	SCALE	SAGE CREEK COAL DENSIT	Y LOG BIRTLEY ENG.	
	76004	AMPLE SAMPLE NUMBER	SAMP % Age SAMP MOIST S.C. F.S. WICTH RECOK WT(gel LOSS S.C. F.S.	INT. S.G. ASH P.S.L RAW ASH S.G.	SEAM 2 SAMPLE SEAM 2 NUMPER	SAMP K 199 SAMP MODIT S.G. P.S.1 HYT. S.C. WETT RECOV VT 199 LOSS S.G. P.S.1	2. RAW F.S.I. RAW AGH S.G.	
	Yean provinces from at 20" to (/A, Yean), second from at 20" to (/A, Yean), second from the at 20" to (/A, Yean), second from a second from a second from a Yean at 20" to (Yean) at 20" to (Yean) at 20" to (Yean) Yean at 20" to (Yean) at 20" to (Yean) at 20" to (Yean) Yean at 20" to (Yean) at 20" to (Yean) at 20" to (Yean) Yean at 20" to (Yean) at 20" to (42	100		328 - C-28144	2.1 84.0 2323 6 ½	3V2 29.7 1.54	
	X'HORIZON	24-	0.6 436 8	8 10.3 1.37	330 - C-28145	1.9 1203 4	3 1/2 41.4 1.69	
	• t - t p	C-28136 C-28137 C-28138	0.2 433 5 0.6 563 6 0.3 430 5	4 52.9 173 5 ¹ / ₂ 124 1.23 2 ¹ / ₂ 57.1 1.01	332-C-28146	1.5 2157 3¥2 6 1.71	1 37.2	
	standart Fe sin Inrite, rubby n. g. 200 trans.	19.	- 71.4		C-28147	1.1 90.0 1346 3½	3 ½ 34.3 i.57	
	Box Sandatore n - c gr to locally cargiomeratic				C-28/48	1.4 1916 0	N.A. 87.6 2.37	
	botten, marthed, botten, marthed, and the segment in part with toth & coal strenger & second, discharger if an an	150 C-28139	0.4 657 577 41/2	4 47.7 1.68	535 - C-28149	2.5 100 27M 8 ½	5 ½ 37.6 i.62	
	Mare Con Societorie 2000 - K.e. X. partielle sensi. Interconteil Interconteil	12-			338 - C-28150	2.5 2960 6 ¹ / ₂	5 I7.0 L4i	
	5EAM 2 TO 355	36-	100		C - 2015)	2.4 2826 8	15 20.7 7 ¹ /2 11.7 1.39	
	100	C-28140	0.7 734 7 0.6 655 6½	7½ 13.3 1.34 4½ 31.2 1.51	C-28152	2.6 2283 7 ¹ /2	5 ¹ /2 16.8 1.42	
		- OF	88.4		C-28153	1.3 1376 8	s½ 11.0 1.34	
					C-28154	0.9 1131 2 ½	2 64.8 1.94 3 ½ 60.0 1.75	LEGEND
	500	142			348- C-28156	2.3 3.30 N.A.	N.A. 83.9 2.36	Overburden
		144	100		350-			Gravel
		146			552 - C-28157 C-28158	1.4 2725 N.A. 0.9 492 7 ¹ /2	N.A. 72.8 2.10 7 ¹ /2 26.5 1.46	Claystone
	600	148			354			Conglomerate
		C-28/42	96.0 1.8 2903 4	21/2 50.2 1.69	385			Sandstone
								Siltstone
-	790	152	800 ·					Shale dark gray
								Carbonaceous Shale
	100	-						Shale Interlaminated Coal
								claro – vitrain
								COAL-mostly durain
	100				-			high in fusain
								indurated with clay
					-			Undifferentiated Coal
	000	-			-			Clay or Clay gouge
		-						No recovery
	1100							Checked by: Approved by: Revised:
		7-						RIO TINTO CANADIAN EXPLORATION LTD. SAGE CREEK COAL LTD B.C.
								SOUTH HILL - HOLE 76 D04
	1200				-			DETAILED COAL BED LITHOLOGY
1		15 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						DATE Dec. / 76 BY O. C. / MAPS. DWG.

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SCALE	SCALE		SAG	E CRE	EK COAI		DENS	ITY LO	OGE	BIRTL	EY E	NG.	
™ FEET ↓ 76 ₀ 05		LE SAMP	R %age	SAMP M	OIST OSS S.G.	F.S.I.	INT.	S.G. A	IAW ISH	F.S.I.	RAW	S.G.	
deundant Felam high deniny fracturing, brac, particity decemented beautyrec, part decemented	160	_	80.0	\vdash					$\left \right $	-	-		1
body broken, couled by high density of fracturing, fractures in 2 deed or 20° to 30° to CA 8.60° to CA 3.60° to CA 1.10 list set particulty decemented	C- 20	8160 1-8	Ĩ	1334		0				N.A.	58-1	85	
mic gribodily conglom prominent froz pare, marty at 20 ⁹ to C/A, thos surfaces with time strategy rubbit, broken	162		T										
uco soft, pearly carb, to partially dec, don't limit, stri A (A) beneciated beneciated sedimentary precia	164												
ober Fe sin Copye testure	C - 2	8161 5-0	34.0	2437		0				E I	57.5	99	
brecoled City bond ber partnally decamented	166-		1										
SEAM 2	C - 2	8162 04	100	524	_	0				N.A 1	87·3	2 42	
200 bit of mudistore	168	0.03 0.0		001	1.								
TD 222		8164 3-0	3 13-3	600		0	7-0	1.68.3	5	Ţ,	58-1	2 03	
		10028-08			-								
	C - 2	28165 1-0	> 	679		0 7 1/2				N.A 5	30.4	. 55	
300			+						ł				
	174- C - Z	8167 1-8		1830	_					0			
	176- C-1	28168 2	100	2672		6 1/2				7 1/2	6.7	1 . 32	
											16.0	1.54	
400	178- C - 2	28170	5	1647		5 8 1/2	12 0	1 43 2	230	9	8-4	1.34	5
			-			+						- 1	
	c -	28171 2-	100	3203		7				6	22.3	1 46	
	282 -	28172 0	5	778		4 14				5%	33.6	1.55	LEGEND
500	C - 2	28173 0-4	45	712		1 1/2	1		1111	1 1/2	77-3	2 - 23	Overburden
	184	28175 1	-	1327		2 1/2					29.2	1.54	Gravel
			_ 100	,	1						1		Clauston
	106-	1											Claystone
500	188-		-									1 13	Conglomerate
													Sandstone
	-												Siltstone
						i.							medium gray
700	_												Shale dark gray
	-												moderate
													Carbonaceous Shale
													nign
800													Shale Interlaminated Coal
													mostly clarain and/or [claro - vitrain
													shaly
													COAL-mostly durain
													high in fusain
100													indurated with clay
	1												Undifferentiated Coal
													Breccia
1000													Clay or Clay gouge
													No recovery
													Checked by
	+												Approved by:
2000 :									ļ				Revised:
													COLUMNAR SECTION
in the second							1	1	1	1	1		AND
1200					1 L								DETAILED COAL BED LITHOLOGY

			SCALE		5	SAGE	CREE	K COAL	DENSI		бві	RTLE	Y ENG.			
	SCALE IN FEET			M 2 NUMBER	SAMP WIDTH P	Kage SA	MP MOI	IST S.G. F.S.I.	INT.	S.G. R	AW F.S	S.I. RA	S.G.			
	- 76 ₀	06 pshally decemented objects to broken, controlly decemented	, SEA		(PECT)											
		m part breccisted, decemented B / abundant Fe stn	96													
		mentova al 30° to C/A micro fault of 02 displ protein Bi rubbly				-										
		in part decemented abundant Fistin, partially decemented becorded	100 -	C - 28176	0.7	10	71	-1				68	1 2.06			
	100	broken, rubbly shale interlaminated cool		C - 28177	1.8	100 33	364	1 ¹ /2			N	A 88	7 2 53			
	SEAM 2	curved fracture, vertical, infilled 11/4" Fe atm.clay	102 -		-	-	+				T		-			
	TD 152	ultat to fight as		C - 28178	1.8	2	615	51/2			5	1/2 30	1 1.53			
			104 -	C-28179 C-28180	0.5	5	63	6 ¹ /2 0			N	4 32 I A 86	7 1 55			
	200		106 -	C - 28181	1.0	100	695	175				1 63	-1 1-98			
	200			C-28182	2.0	50 0 14	471	3 1/2				1/2 78	5 2 23			
			108	<u> </u>	-	-	-	_				-	-	-		
)3
			110	C - 28183	3.5	57-1 1	897	6 1/2				6 . 10	4 1.37			
	300			\times												2 D
				C-28184	0.5	100	490	7 1/2			5	1/2 3	6 1.54	4		
				C-28185	15	ľ	439	8 1/2					9 1 3 3			
			114-	C-28186	15	96·3 I	545	5	11-0	1-52 2	27 6	6 1	9 1.45			
						† †			1							
	400		116	C - 28187	2-5		2462	6 ¹ /2			•	5 1/2 2	0 0 1 43			
				C - 20100	1.0	100	949	2				2 1/2 5	2.0 1.75			
				C - 28189	0.6	100	537	1 1/2				3 1/2 5	5-3 1-8-		LEGEND	
			120 -	C - 28190	0.4		300	2 4½				1 1/2 3	7-3 1-5	9		
	500					92.0									Overburden	
			122 -	0.000		-	R I								Gravel	
									l i						Charles -	
			-												Claystone	
-														- 10	Conglomerate	
\bigcirc	600														Sandstone	·
-															Silitatana	
															Sinatone	
			-							1					Shale	
	700														dark gray	
			-												moderaf	le
			5												Carbonaceous Shale	
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															Shale Interlaminated Coal	
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							i -								shaly	
															durain	
															COAL mostly durant	
	900														high in fusain	
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											1				Undifferentiated Coal	
			1												Pressie	
															Breccia	
	1000		1 1												Clay or Clay gouge	<u>BEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE</u>
															No recovery	\ge
															Charled by	\sim
	1														Approved by:	16
	1100														Revised:	U
			-												RIO TINTO CANADIAN EXPLOR	RATION LTD.
															SAGE CREEK COAL LT	D B.C.
			-												SOUTH HILL - HO	le 76 _d 06
								2								N
	1200														DETAILED COAL BED LIT	HOLOGY
															DATE Dec. / 76 BY O. C. / MAPS	DWG.