PR SAXON 71 (S) A

INTERIM REPORT ON SAXON PROJECT

March 12, 1971.

I.P. Dyson

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INTERIM NOTES ON SAXON PROJECT

INTRODUCTION.

Denison Mines Limited acquired fifty three Coal Licenses in the Saxon Creek area of northeastern British Columbia in the fall of 1970. These licenses covered an area believed to be regionally favourable for the occurrence of thick (more than 10 feet) coal seams of metallurgical grade coal.

The acquisition of the coal rights, based on published regional geology, and a very rapid field check, was followed by approximately one week of geological mapping. A small drilling programme followed this mapping and was completed in January 1971. This report summarizes the above activities and contains recommendations for further work.

ACCESS.

The Saxon project is located in British Columbia adjacent to the Alberta-B.C. border. Access is via Grande Prairie, Alberta to the Two Lakes area of Alberta. Denison Mines Limited then constructed a road in excess of twenty miles long to the furthest drill site. It is believed this road will be useable in the summer of 1971 with only minor repairs.

GEOLOGY.

A week was spent in the field by Mr. W.B. Brady checking the geology of the Saxon prospect. His brief report is included here:

INTRODUCTION.

The area of study lies west of the Alberta-

British Columbia border extending for approximately sixteen miles in a northwesterly direction between Latitudes 54° 15' to 54° 25' W. and Longitudes 120° 0' to 120° 20' N.

The area was previously mapped by Stott (1968) as a simple synclinal valley with the Commotion Formation extending across the entire valley.

STRUCTURAL GEOLOGY

The resistant Cadomin conglomerate provides a distinctive mappable horizon. This formation is overlain by a thin Gething Formation followed by a recessive unit of Moosebar shales. The Commotion Formation overlies the Moosebar and is between 1,600 to 1,800 feet thick.

The Cadomin to Commotion succession trends northwest along the eastern portion of the area with an average dip of 45 degrees southwest. Some repetition of the Commotion succession was observed in the northern part of the area north of the Narraway River.

The top of the Commotion forms a resistant dip slope that can be traced on air photographs over the length of the study area.

The Cadomin to Commotion succession can be traced around the trough of the syncline in the northwesterly part of the area.

A southeasterly plunging anticline, not mapped by Stott, extends the top of the Commotion to within 2 miles

of the Narraway River in the northwestern part of the area.

The Commotion Formation is also exposed along a northwest plunging anticline in the extreme southwesterly part of the area. A 20 foot coal seam is exposed on the east flank of this anticline.

A sixty foot conglomerate bed was observed within the lower one third of the Commotion, north of the Narraway River, and another conglomerate bed marks the top of the Commotion south of Saxon Ridge.

In general, the succession is poorly exposed. The ridges are commonly grass and tree covered or have weathered to a rock rubble where it is difficult to measure the dip and strike. Some coal seams were observed in the lower part of the Commotion but because of poor exposures, could not be traced from ridge to ridge.

The area of interest is bounded on the west by a west-dipping thrust fault which thrusts Nikanassin, or locally Fernie, over the Cadomin to Dunvegan succession. This fault cuts off the Cadomin to Commotion succession in the northwesterly part of the area.

Although outcrops are rare between the top of the Commotion on the east and the thrust fault on the west, it would appear that the valley is floored by folded Shaftesbury and Dunvegan Formations and not by Commotion, as indicated by Stott.

COAL.

Occurrences and Distribution.

The presence of coal in the Commotion and Gething Formations was known from published regional geology. With the exception of the 20 foot coal seam described by Brady (see above), no definite coal seam thicknesses were known.

The drilling programme was set up partly to obtain some initial information on the lateral and vertical distribution of coal within the known coal measures. Angle holes were drilled as shown on the accompanying map and coal intersections noted as shown.

The main conclusions are that

(a) coal of possible viable thicknesses are limited to the lower part of the Commotion Formation,

(b) the Gething Formation is apparently barren in this area.

With respect to the Commotion Formation it would appear that there are five seams with possible commercial significance. The thicknest seam is approximately 40 feet thick and was encountered approximately in the centre of the property.

(It should be noted that the thicknesses shown on the map are those determined from cores not those which might be determined from Gamma Ray-Neutron logs if time permitted.)

QUALITY.

Analyses for the coals recovered are attached in the Appendix to this report.

These analyses are self-explanatory and it is readily apparent that the coals of the Saxon area are of a grade that would be suitable for the metallurgical market. Special attention should be given to the apparently high yield of low ash coal and the low sulphur content.

CONCLUSIONS.

The Saxon area contains very large reserves of metallurgical grade coal. Insufficient information is available to assess the mining potential. The prospect deserves further exploration.

RECOMMENDATIONS.

The surface geology of the Saxon project should be mapped at a scale of 1:50,000 or possibly in even greater detail before any further drilling is carried out.

After the surface geology has been co-ordinated to the boreholes, only then should drilling recommence in the most economically favourable areas.

March 16, 1971.

I. P. Dyson, P. Geol.

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SAXON PROJECT 1971

(WRITTEN) STRATIGRAPHIC LOGS

– APPENDIX 1 – 3/6

I.P. DYSON.

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APPENDIX I

STRATIGRAPHIC LOGS

SDH - 1

SDH-7001

0 - 25	No core.
35 - 48	Conglomerate defining the top of the Commotion, composed generally of very fine pebbles with occasional 1/4" pebbles, bottommost 2 feet are fine sands cross laminated coaly fragments between 26 - 27.
48 - 132	Sandstones: fine to medium grained, laminated, grey to light grey, non effervescent, bottommost 20 feet have mudstone layers, gradational lower contact.
132 - 136.4	Mudstones: dominant, constituting 95% and 5% fine sandy laminae, strongly effervescent, gradational below.
136.4 - 142	Sandstones: fine grained, grey to light grey with interlayering of mudstones, gradational below.
142 - 156	Fossil Bed. almost a coquina bed and is infested with generally articulated Pelecypodsup to 1 1/4" long and healthy development, mainly gastropods.
156 - 156.4	Mudstones: dark grey to black, apparently structureless, strongly effervescent.
156.4 - 158.9	Coal Seam: bright and clean, bottom 0.5' friable coal
158.9 - 169.5	Mudstones: grey, structureless, slightly effervescent.
169.5 - 170.4	Coal: black, hard and bright coal.
170.4 - 172	Mudstones: carbonaceous and friable, dark grey, non effervescent, gradational below.
172 - 173.6	Siltstones: grey, highly muddy and sporadically laminated, gradational below.

173.6 - 174.5 Mudstones: black, carbonaceous and coaly fragments here and there.

174.5 - 183 Mudstones: dark grey, silty, entombing coaly layers occasionally.

183 - 188 Mudstones: dark grey, few coaly layers, strongly effervescent, gradational below.

188 - 189 Coal: bright and core form, clean coal.

189 - 208 Mudstones: grey, slightly silty, becoming very silty bottomwards, strongly effervescent, gradational below. Note: a small syringoporan type coral colony at 195.5, strongly effervescent.

208 - 211 Sandstones: very fine, homogeneously mixed with argillite, dark grey, fine lamination, strongly effervescent, abrupt below.

211 - 219 Mudstones: homogeneously silty, grey, non effervescent, gradational lower contact.

219 - 223.2 Siltstones: light grey, argillaceous, strongly effervescent, laminated, intraformational erosional contacts between silts and muds, gradational below.

223.2 - 226 Mudstones: vague irregular banding, dark grey to grey, thin silty laminae, strongly effervescent, gradational lower contact.

226 - 228.3 Siltstones/mudstones: grey to light grey, interlayering of the two lithologies on a scale of thin layers and laminae, strongly effervescent, slight dominance of siltstones.

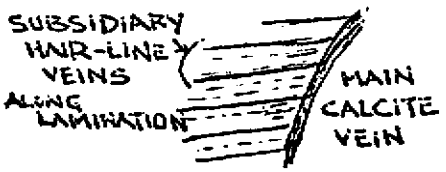
228.3 - 234	Mudstones: silty as thin layers, grey, strongly effervescent, gradational below.
234 - 236.5	Coal Seam: initial 0.2' dull bony coal, rest bright and shaly coal (few kernels of mudstones encountered), only 2 feet of core is there and therefore 0.5' of coal is missing.
236.5 - 239	Mudstones/shales: coaly and a total of 0.4' coal in the interval.
239 - 240.3	Mudstones: black, structureless, non effervescent, gradational below.
240.3 - 240.8	Carbonaceous and coaly mudstones: dark grey to black, gradational lower end.
240.8 - 245	Mudstones: grey to dark grey, apparently structureless feebly effervescent, gradational below.
245 - 248.4	Sandstones: fine grained, grey, admixed with argillite, strongly effervescent, change below by gradation.
248.4 - 256	Siltstones/mudstones: grey, irregularly laminated, dominance of mudstones, strongly effervescent, gradational.
256 - 262.2	Mudstones: greyish brown, non effervescent, vague lamination, gradational below.
262.2 - 263.7	Mudstones: carbonaceous with thin layers of coal, transitional below.
263.7 - 265	Mudstones: dark grey, some shales, non effervescent, gradational below.

265 - 268	Sandstones: grey, medium grained, argillaceous, criss crossed, very thin carbonaceous wisps, strongly effervescent, erosional below.
268 - 274.5	Mudstones/siltstones: slight dominance of mudstones, irregular lamination, strongly effervescent, grey to brownish grey, erosional lower contact.
274.5 - 276.1	Sandstones: grey, fine to medium grained, irregular and wavy lamination, bottomwards very argillaceous, strongly effervescent, gradational below.
276.1 - 281	Mudstones: silty, sporadic but obscure lamination, strongly effervescent, gradational below.
281 - 282	Mudstones: carbonaceous and coaly, dark grey to black, gradational below.
282 - 285	Mudstones: homogeneously silty, dull grey, irregular lamination, gradational below.
285 - 287	Sandstones/mudstones: fine sands, alternations of, abrupt intraformational contact, gradational.
287 - 296	Mudstones: grey, structureless, strongly effervescent, gradational lower contact.
296 - 301	Mudstones: carbonaceous, some carbonaceous and coaly layers throughout, gradational to coal below, non effervescent.
301 - 302	Bright clean coal.
302 - 306	Mudstones: starting two feet are dark grey and carbonaceous, rest silty and non effervescent, gradational.
306 - 309	Siltstones/mudstones: undifferentiated and blended throughout, strongly effervescent, gradational lower junction.

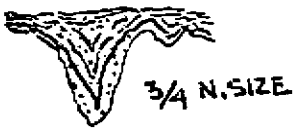
309 - 311	Sandstones: light grey, fine to medium, criss crossed, strongly effervescent, erosional below.
311 - 316.2	Carbonaceous mudstones: thin coaly layers at intervals, becoming silty bottomwards and strongly effervescent, otherwise rest non effervescent, gradational below.
316.2 - 317.6	Mudstones: silty, grey, structureless, gradational lower contact.
317.6 - 318.8	Sandstones: grey, fine grained, highly argillaceous, up to 20 - 30%, strongly effervescent, gradational below.
318.8 - 322	Mudstones: dark grey to black, homogeneously silty, strongly effervescent, gradational below.
322 - 325.7	Sandstones: light grey, medium grained, criss crossed, few coaly shreds, strongly effervescent, clean and abrupt below.
325.7 - 327	Mudstones: very silty, dark grey, strongly effervescent, gradational below.
327 - 337	Sandstones: fine to medium, starts with 2 feet of homogeneously argillaceous siltstones/fine sands and grading below to muddy sands (rest of it) and embodying from 1 to 1 1/2" silty and shaly layers having erosional and abrupt contacts, strongly effervescent, criss crossed, gradational to rocks below.
337 - 338.2	Carbonaceous mudstones: black and homogeneously mixed, gradational below.
338.2 - 339.3	Coal: mixture of shaly and bright coal.
339.3 - 342.5	Mudstones: dark grey to black, sporadic vague lamination, carbonaceous, gradational below.
342.5 - 343.5	Coal: not so bright friable coal.

343.5 - 353	Mudstones: grey, homogeneously silty, effervescent, apparently structureless, gradational.
353 - 355	Siltstones: extensively criss crossed, highly argillaceous, structureless, strongly effervescent, erosional below, light grey.
355 - 356.2	Mudstones: grey silty, structureless, effervescent, gradational below.
356.2 - 358.5	Mudstones: as above.
358.5 - 360.5	Mudstones: muddy sandstones (fine grained), grey, strongly effervescent, gradational.
360.5 - 362	Mudstones: dark grey, structureless,effervescent, gradational lower contact.
362 - 363.5	Sandstones: light grey to grey, fine to medium, effervescent, gradational.
363.5 -372	Mudstones: grey to dark grey, homogeneously silty, strongly effervescent becoming very sandy (fine sands) bottomwards, few delicate laminations, passing below by gradual transition.
372 - 378	Sandstones: starts with very muddy (interlayered) fine sands and dirty, clears up bottomwards and from 375 - 378 are clean and well sorted sands (fine grained) and thoroughly calcite vein infilling (a lot at angles with core axis), bottommost 0.5' has shaly sub-rounded intraclasts, strongly effervescent throughout, gradational lower contact.
378 - 407	Mudstones: grey to dark grey, homogeneously silty (5 - 10%), strongly effervescent, mostly structureless.

407 - 412	Mudstones: very sandy, irregularly laminated, some calcitic veins in the middle, strongly effervescent, abrupt below to coal.
412 - 412.5	Coaly zone: brittle and highly bright coal.
412.5 - 415	Sandstones: grey, medium grained, muddy, carbonaceous, non effervescent, gradational below.
415 - 416	Coal: bright clean coal.
416 - 418	Mudstones: coaly and carbonaceous, non effervescent, dark grey, gradational below.
418 - 426.4	Mudstones: grey, highly silty, feeble lamination, 0.3' coal zone 2 feet above base.
426.4 - 428.6	Mudstones: dark grey, highly silty, strongly effervescent, gradational below.
428.6 - 430	Sandstones: grey, dirty and highly argillaceous, medium grained, non effervescent, structureless.
430 - 432	Mudstones: dark grey, very sandy (fine grained), effervescent, gradational below.
432 - 434	Sandstones: light grey to grey, fine grained, interlayering of mudstones throughout, irregularly laminated, strongly effervescent, gradational below.
434 - 436	Carbonaceous, black, coaly mudstones, non effervescent, gradational below.
436 - 441	Mudstones: non effervescent, infested with calcite veins in the middle (at 80% with core axis).



441 - 445	Silty mudstones, inclined lamination, abundant calcite veins, strongly effervescent.
445 - 446.2	Mudstones: coaly and dark grey, including few inches of coal in the sequence.
446.2 - 450	Mudstones: highly silty, structureless (only few obscure lamination), effervescent, gradational below.
450 - 455	Mudstones: dark grey to black, thin coaly layers (sporadically) structureless.
455 - 455.3	Sandstones: fine grained, light grey, laminated, strongly effervescent, gradational below.
455.3 - 460	Mudstones: silty, dark grey, laminated, some places steep sagging of lamination in "V" form, strongly effervescent, gradational below.
460 - 463.2	Sandstones: light grey, fine grained, criss crossed, some calcite veins in lower one foot, gradational below.
463.2 - 469	Siltstones/mudstones: slight dominance of silts, grey, strongly effervescent.
469 - 470.4	Mudstones: dark grey, slightly homogeneously silty, effervescent, gradational lower end.
470.4 - 471.4	Mudstones: coaly, with hair-line calcite veins, gradational below.
471.4 - 476	Mudstones: dark grey to black, strongly effervescent, structureless, gradational below.



476 - 478	Mudstones similar to the above but with thin coaly layering, gradational below.
478 - 481	Mudstones: black, homogeneously carbonaceous, gradational below.
481 - 489	Siltstones (or very fine sandstones), highly argillaceous, interlayered with mudstones.
489 - 495	Mudstones: dark grey to black, carbonaceous, apparently structureless, non effervescent, gradational.
495 - 496.4	Coal Seam: shaly coal with some bright coal.
496.4 - 498.6	Sandstones: light grey, fine grained, some squeezing lamination, ripping up of muddy layers in bottommost 0.4', non effervescent, gradational below.
498.6 - 541	Mudstones/siltstones: dark grey sequence, muds about 70%, silty layers and laminae throughout, strongly effervescent, shaly coal and mudstone between 530 - 531, bottommost 1.25' are fine sands, most intervals are well laminated, patchily effervescent, gradational below.
543 - 556	Siltstones/mudstones: slight dominance of muds, grey to dark grey, some dissemination of fine sands, effervescent, gradational below, laminated, bottommost 1.5' are very silty.
556 - 564.5	Siltstones: very muddy, laminated, criss crossed, effervescent, gradational.
564.5 - 567	Mudstones: dark grey, slightly silty, fully effervescent, gradational.

567 - 567.6 Sandstones: light grey to grey, fine to medium grained, slightly argillaceous, effervescent, gradational.

577.6 - 571.6 Mudstones: grey, effervescent, gradational below.

571.6 - 573.8 Sandstones: light grey, fine to medium, criss crossed, effervescent, erosional below.

573.8 - 607 Siltstones/mudstones: dominance of silts (about 70%), criss crossed, irregularly laminated, grey to dark grey, strongly effervescent, laminated at places at 35% with the core axis, but within the same core interval there are flatter intervals of lamination, so higher angles are probably due to cross stratification.

607 - 608 Coal with muddy kernels.

608 - 617.8 Mudstones: dark grey, homogeneously silty, laminated, effervescent, abrupt below.

617.8 - 619.3 Coal Seam: clean bright coal (only 0.2' of mudstones 0.2' above base of coal).

619.3 - 624.8 Mudstones: dark grey, structureless, non effervescent, coaly shales at two places 0.2' and 0.3' respectively in the bottommost 0.3', abrupt below.

624.8 - 625.8 Coal Seam: clean and bright coal.

625.8 - 627.3 Mudstones: grey, faint lamination, effervescent, gradational below.

627.3 - 647 Coal Seam: S1-A Recovery: about 9 feet
There are about 3 feet of mudstones. Most of the coal is bright type.

647 - 656 Mudstones: black, carbonaceous, non effervescent, structureless, gradational below.

656 - 666	Siltstones/mudstones, grey, about equal representation, gradational below.
666 - 673.6	Mudstones: dark grey and some 0.3' of friable coal at top.
673.6 - 683.2	Mudstones, structureless, non effervescent, (only effervescent bottomwards), gradational below.
683.2 - 688	Siltstones/mudstones: slight dominance of silts, strongly effervescent, gradational below.
688 - 695	Mudstones: dark grey to black, carbonaceous and with thin coaly layers.
695 - 696.3	Coal Seam: with kernels of mudstone (a total of 1 foot of coal in the interval).
696.3 - 706.6	Mudstones: vaguely banded, non effervescent, abrupt below.
706.6 - 712.5	Sandstones: light grey, medium grained, high angled cross lamination, non effervescent, clean, gradational below.
712.5 - 715	Siltstones/mudstones: dark grey, dominance of mudstones, non effervescent, gradational.
715 - 716.5	Sandstones: light grey, fine grained, effervescent, gradational below.
716.5 - 727.5	Mudstones: grey, irregularly laminated, strongly effervescent, abrupt below.
727.5 - 736.4	Sandstones: grey, medium grained, about one foot of mudstones 3 feet from top, strongly effervescent, cross laminated and thin argillaceous "silty" intraclasts.

736.4 - 741.2	Sandstones: light grey to grey, fine grained, criss crossed, argillaceous bottomwards, strongly effervescent, transitional below.
741.2 - 767	Mudstones: grey to dark grey, silty, strongly effervescent (and at places non effervescent), gradational below.
767 - 774	Siltstones/mudstones: grey, about equal representation, feeble effervescence, gradational below.
774 - 782.5	Sandstones: grey, medium grained, criss crossed, effervescent, topmost 1.5' has abundance of muddy intraclasts, gradational below.
782.5 - 790	Sandstones: light grey to grey, very coarse and gritty with coaly fragments, non effervescent, gradational below.
790 - 801	Sandstones: light grey to grey, medium grained, criss crossed (inclined), clean and well sorted, effervescent, bottommost 1.5' very argillaceous, erosional below.
801 - 807	Mudstones: dark grey, strongly effervescent, 0.3' of coal at top, gradational lower contact.
807 - 816	Siltstones/mudstones: predominance of muds (about 75 - 80%), laminated and cross laminated, strongly effervescent, gradational lower contact.
816 - 821	Siltstones/mudstones: about equal, grey, laminated and criss crossed, strongly effervescent, gradational.
821 - 836	Sandstones: light grey, fine to medium,laminated and cross laminated, some darker intervals, at one place very thin carbonaceous intraclasts, strongly effervescent, abrupt below.

836 - 840.4 Mudstones: black, very carbonaceous, structureless, thin coaly streaks, non effervescent.

840.4 - 846 There are several chunks of coaly mudstones and coal fragments which together constitute about 0.5' of core (actually present in box), so there is about 5 feet of lost coal. This interval is apparently picked up on the logs, so the coal seam appears to start at 840 or 840.4 (top of seam).

846 - 866 Coal Seam: The tags and actual core in between them is as follows:

		S1-B	
846 - 850	=	1.5'	All the coal is bright to
850 - 854	=	1.5'	not-so-bright type, only between
854 - 858	=	1.0'	846 - 850 some bony coal and some
858 - 862	=	0.9'	friable bright coal.
862 - 866	=	0.6'	
Total coal = 20'		5.5'	(Recovery) % recovery - 27.5

866 - 868 Mudstones: carbonaceous, all fragments now but appears fairly competent, bottommost 0.5' silty, non effervescent throughout, gradational below.

868 - 873 Siltstones: highly muddy, (up to 30%) especially in upper half, bottomwards well laminated and some down warping of some lamination, strongly effervescent, gradational below.

873 - 877.5 Mudstones: dark grey, strongly effervescent, few thin coaly fragments, gradational below.

877.5 - 881.1 Siltstones: grey, laminated and banded, some thin fine sandy intervals and their mutual contacts (silts with finer sediments) are highly erosional, some flowage

	of lamination, instantly effervescent, gradational below.
881.1 - 906.3	Mudstones: grey, very slightly silty (homogeneously) bottomwards, instant effervescence, no prominent structure, bottommost 2 feet are very highly silty and lighter coloured. The interval at bottom very imperceptibly changes to silty lithology and fine sands.
906.3 - 909.3	Siltstones/fine sandstones: laminated (widely spaced), grey, strongly effervescent, very gradational below.
909.3 - 922.7	Sandstones: regularly laminated, parallel ? laminated (throughout now inclined), light grey to grey, bands of light and dark laminae, strongly effervescent, clean looking and well sorted, medium grained; downards, i.e. between 916 - 918 becomes criss crossed on a small scale and at 916.3 is 0.1' of silty mudstones. Between 917 - 923 are very clean and well sorted medium grained sandstones and regularly laminated, instantly effervescent, gradational below.
922.7 - 933.8	Sandstones: coarse grained, light coloured, apparently criss crossed, strongly effervescent, well washed and sorted, gradational lower end.
933.8 - 936.3	Sandstones: light grey, medium grained, clean and in upper 0.5' thin coaly wisps, a big calcite vein parallel to core axis, abrupt below.
936.3 - 937.9	Sandstones: light grey, coarse grained, very thin coaly shreds in the middle, strongly effervescent, abrupt lower contact.

937.9 - 941.2	Siltstones: grey, highly argillaceous, some deformation and flowage of lamination, strongly effervescent, gradational below.
941.2 - 954.5	Mudstones: highly silty (up to 30 - 35%), grey, laminated, strongly effervescent, bottommost 2 feet fine mudstones and dark grey and strongly effervescent, gradational below.
954.5 - 955	Mudstones: dark grey to black, very carbonaceous, non effervescent.
955 - 956.6	Coal Seam: 0.8' of chewed up bright coal and rest carbonaceous mudstone, gradational.
956.5 - 959.3	Mudstones: black, carbonaceous, effervescent, gradational lower end.
959.3 - 960.7	Siltstones:grey, argillaceous, strongly effervescent, gradational below.
960.7 - 972	Mudstones: dark grey, effervescent, structureless, bottommost 2.5' very silty, gradational.
972 - 977.6	Siltstones: highly argillaceous, grey, irregular but undulating lamination, interlayering of argillaceous matter (comprising 15%), strongly effervescent, sheared contact with coaly mudstones below.
977.6 - 983	Mudstones: carbonaceous, black, non effervescent, some coal from 977.6 - 979 and embodied in it some coaly mudstones: coal 981 - 981.5, abrupt lower junction.
983 - 983.7	Siltstones: light grey, vague irregular lamination, strongly effervescent, abrupt below.

983.7 - 986.2	Mudstones: carbonaceous, dark grey to black, some coaly interval predominant (as core is only 1.5'), gradational below.
986.2 - 991.5	Siltstones: grey, highly argillaceous especially bottommost 2', irregular lamination, strongly effervescent, very gradational below.
991.5 - 994.5	Mudstones: dark grey, strongly effervescent, structureless, abrupt below.
994.5 - 997.2	Sandstones: light grey, fine grained, cross laminated at places, strongly effervescent, erosional below.
997.2 - 997.8	Siltstones: banded, light grey to grey, strongly effervescent, very gradational below.
997.8 - 1016.7	Mudstones: grey to dark grey, at places slightly banded and silty, some 0.8' of carbonaceous mudstones, about 5 feet above base, strongly effervescent throughout, bottommost 0.8' of mudstones are admixed with fine sandstones (homogeneously mixed), very transitional lower junction.
1016.7 - 1018	Sandstones: dull and dirty grey, medium grained, highly argillaceous, devoid of lamination, rootlet-like structures, very gradational below.
1018 - 1019.5	Mudstones: dark grey to black, non effervescent, gradational below.
1019.5 - 1020.3	Siltstones: light grey to grey, very argillaceous, strongly effervescent, irregularly laminated (lamination obscure), gradational below.

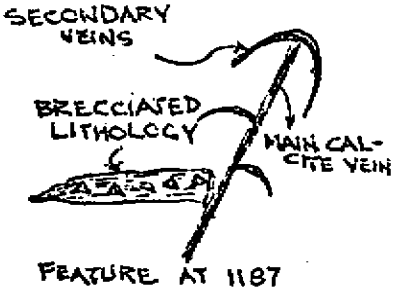
1020.3 - 1021.5	Mudstones: dark grey, homogeneously silty, strongly effervescent, very gradational below.
1021.5 - 1029.5	Siltstones: argillaceous, intricate fine lamination, some fine cross-lamination, delicate carbonaceous wisps in bottommost 1.25' and along here the interval is finely sandy, strongly effervescent, gradational below.
1029.5 - 1033	Mudstones: black, very carbonaceous, effervescent, structureless, gradational below.
1033 - 1034.4	Sandstones: grey, argillaceous, fine grained, effervescent, rootlet-like structures, abrupt below.
1034.3 - 1036	Mudstones: dark grey, strongly effervescent, bottomwards very silty (homogeneously), gradational.
1036 - 1038.1	Siltstones: criss-crossed, ripple type lamination, strongly effervescent bottomwards, bottommost 0.5' have thin fine, sandy layers, some oblique burrows here (at least one very clear one), strongly effervescent, gradational below.
1038.1 - 1039	Sandstones: light grey, fine to medium grained, ripped up argillaceous layers within, bottommost 0.2' have abundant fine shaly intraclasts, clean below, strongly effervescent.
1039 - 1052	Mudstones: with some silty intervals, some channelling and levelling up by subsequent sedimentation, lamination is very oblique and is about 45° with the core axis, some banded zone, strongly effervescent, gradational below.
1052 - 1092.5	Sandstones: could be equivalent to intertidal sands (elsewhere), fine to medium grained, light to light grey; sequence starts with 4 feet of grey highly

argillaceous and muddy fine grained sandstones and grading below to medium sandstones i.e. from 1058 - 1077 and then followed by 10 feet of sandstones with silty intervals (some having intraformational erosional contacts). Note: The interval above these sandstones has not yielded any fossils despite careful research. These are followed by another 5 feet of fine to medium sandstones; calcite veining throughout (vertical). These are followed to the base by silty fine grained sandstones, (argillaceous) which gradually pass below to dark grey to black mudstones/shales. These sandstones as a whole are clean and cross laminated, sometimes readily effervescent, and other times only feebly (but none instantly).

F A U L T

1092.5 - 1200 Black mudstones and shales: apparently structureless, but on washing and careful observation it reveals to be intricately laminated and other sedimentary structures. These shales and mudstones differ in many important respects from the previously known Moosebar lithology; thus these mudstones constitute lower sequence of the Commotion Formation.

Note: The core between 1159.5 - 1164 is split into half along the planes of calcite veins. Interval 1152 - 1200 is badly fractured and heavily veined.



FEATURE AT 1187

SDH- 7002

SDH - 2

0 - 41 Overburden.

41 - 92 Sandstones: light grey, fine grained, clean and well sorted. Dominantly fine parallel lamination (sometimes delicate and close), some intervals exhibit very low angled small-scale cross lamination, instantly effervescent throughout, some short shaly intervals (mudstones) at three places constituting up to 3 feet in total, also within these mudstones/shale intervals are the thin repeated sand/shale sequences much like transitional lithologies encountered before passing into Moosebar proper. At places thin wispy shaly/muddy intraclasts and there is one about 1" x 1/2", about five feet above the base. These sandstones are very similar to intertidal sandstones seen at Kakwa. Interval between 82 - 84 fractured due to calcite veining. Sandstones with thin friable shaly intervals, some calcite veining, sandstones are fine grained or coarse siltstones, grades below to intertidal type of interbedding with shales.

95 - 121 Moosebar Formation. Initial five feet have interbedding of fine sands and shales, slight dominance of sandstones, mutual boundaries being very sharply defined and micro-indented. Shales have mega type of burrows. This interval is followed by a repetitive succession of

sands and shales (representation being equal) with all the Moosebar features. Bottommost 10 feet are typical shales of Moosebar formation, only silty layers and laminae intervening. At the bottom is a 0.5' weathered interval followed by sandstones encountered immediately above the Moosebar so there is a fault.

F A U L T

121 - 134.6 Sandstones/mudstones, very fine grained, fine lamination (barely perceptible), initial 6 feet are highly silty (homogeneously mixed) mudstones, feebly effervescent., apparently structureless, another shaly interval at 129 - 131, abrupt below.

134.6 - 141 Mudstones: grey to dark grey, highly homogeneously silty, vague lamination (sparse), non effervescent, few differentiated silty bands, at bottom sheared and calcite veined.

141 - 144 Sandstones: light coloured, fine grained, thick calcite veins and some subsidiary veining, appears to have been a sheared zone, sandstones instantly effervescent and otherwise structureless, abrupt below.

144 - 156.4 Mudstones: grey, apparently structureless, non effervescent, homogeneously silty, similar to the interval between 134.6 - 141, bottommost 1.6' are fine grained, light coloured, sandstones, no effervescence, clean and sharp contact below.

156.4 - 315 Moosebar Formation. From 156.4 - 225.6 though shales predominant, sands and fine silts recur as thin layers

and impart banded appearance to the sequence. After 225.6 any noticeable sands disappear and sequence is dark grey shales with abundant mega burrows. Non effervescent and only effervescent where there are thin silty lenses. Bottommost 35 feet or so are impoverished in burrows. Bentonitic layers: 309 (about 2 inches) and at 315 just 1/2" thick.

315 - 316.5 Conglomerate: very fine to fine pebbles sparsely dispersed in dark grey mudstones, abundance of glauconite. Bottom of the conglomerate is highly irregular and sharp and deep "trenches" sand infilled.

316.5 - 316.9 Mudstones: grey, very silty, calcite veins, non effervescent, abrupt.

316.9 - 318 Sandstones: fine to medium, brownish grey, cross stratifiedstrongly effervescent, gradational below.

318 - 324 Siltstones/mudstones: slight dominance of siltstones, grey to dark grey, laminated and mottled appearance, strongly effervescent, mottling due to organic disruption, abrupt.

324 - 326 Sandstones: grey, richly argillaceous, fine grained, thin silty layers having erosional contacts with sandstones, irregularly laminated, strongly effervescent, erosional below.

326 - 346 Siltstones/mudstones: slight dominance of muds, sequence grey to dark grey, siltstones prominently criss crossed, strongly effervescent, very transitional below.

346 - 357.6	Sandstones: light grey, fine to medium grained (more towards medium), cross laminated throughout, bold cross stratified units due to concentration of darker minerals in the laminae, strongly effervescent, erosional below.
357.6 - 364.5	Mudstones: dark grey to black, very thin layers of very fine silts, few rounded pyritic blobs, instantly effervescent, abrupt and slightly erosional below.
364.5 - 366.2	Sandstones: grey, fine grained, highly argillaceous and few thin shaly layers, strongly effervescent, gradational.
366.2 - 370	Mudstones: grey, homogeneously silty and also some irregular thin silty (very fine) lenses, otherwise structureless, instantly effervescent, gradational below.
370 - 375	Carbonaceous mudstones: black, thin carbonaceous streaks, slightly silty, non effervescent, imperceptible below.
375 - 376	Siltstones: brownish grey, very argillaceous, cross laminated, strongly effervescent, gradational below.
376 - 380.9	Siltstones/mudstones: about equal, repetition of thin layers, grey, laminated, instantly effervescent, bottommost 1 foot coaly and fragmented, gradational below.
380.9 - 383.3	Sandstones: grey, very argillaceous and ill-sorted and poorly washed, few elongate shaly intraclasts in the middle, fine to medium grained, effervescent, gradational below.
383.3 - 398	Mudstones: grey to dark grey, initial 2.5' are homogeneously silty (richly), banded and irregularly

	laminated at places, some warping of layers bottomward, strongly effervescent, gradational.
398 - 410	Carbonaceous mudstones: dark grey to black, coaly layers throughout, some thin silty intervals (homogeneously), bottommost 1.5' appears to be weathered and is fragmented, gradational.
410 - 413.5	Mudstones: grey, homogeneously silty (highly), dull, structureless, non effervescent, gradational below.
413.5 - 425.5	Sandstones: light grey, medium grained, structureless, fractured (badly) and some places occasionally coated with calcite, clean, non effervescent, bottomost 2 feet are homogeneously muddy and grades to mudstone below.
425.5 - 437	Mudstones: dark grey, silty intervals and at places carbonaceous, non effervescent, gradational,bottommost 0.7' very coaly and black.
437 - 443.5	Silty mudstones: vague bands of silty intervals, dark grey, feebly effervescent where silty intervals encountered, poorly laminated, gradational below.
443.5 - 446	Siltstones/mudstones: slight dominance of silts, light grey to grey, laminated and few cross-stratified units, strongly effervescent, change below by gradation.
446 - 457.8	Mudstones: highly silty, grey, obscure lamination, 1 foot of siltstones in the middle, gradational.
457.8 - 463.5	Siltstones/mudstones: almost homogenized sequence and overall slight dominance of silts, grey, laminated, few delicate cross laminated intervals, strongly effervescent, gradational.

463.5 - 474.5 Mudstones: dark grey to black, very vaguely banded at intervals, silty intervals sometimes have very erosional contents, interval between 470.5 - 472 very carbonaceous and black, non effervescent throughout.

474.5 - 476.8 Sandstones: light coloured, medium grained and fine grained, argillaceous layers, few calcite veins along shear planes, non effervescent, gradational below.

476.8 - 487.6 Mudstones: dark grey, homogeneously silty, non prominent lamination, non effervescent, some stretches show differentiated silty lamination, very gradational below.

487.6 - 489 Sandstones: grey, fine grained, richly argillaceous, non effervescent, gradational below.

489 - 491 Mudstones: dark grey, structureless, non effervescent.

491 - 492.5 Coal Seam: dominantly friable bright coal, initial 0.1' shaly.

492.5 - 493 Black carbonaceous mudstones, gradational below.

493 - 499 Mudstones: dark grey to black, dull, structureless non effervescent, changes imperceptibly to the lithology below.

499 - 504 Highly silty mudstones: grey, silts homogeneously dispersed but also as thin occasional lenses and streaks, no prominent structures, non effervescent.

504 - 512.5 Mudstones: grey, with occasional thin fine sandy layers, non effervescent, gradational lower junction.

512.5 - 514.5 Siltstones: grey, obscure and irregular lamination, feebly effervescent, abundantly argillaceous, gradational below.

514.5 - 529.5	Mudstones: grey, with thin 1" - 2" fine sandstone intervals, non effervescent, gradational below.
529.5 - 535	Sandstones: extremely impure (15% argillaceous matter homogeneously dispersed), fine grained, grey, also thin differentiated shaly layers, feeble effervescence, gradational below.
535 - 541.4	Sandstones: light coloured, fine to medium grained, abundantly laminated and cross laminated, effervescent (not effusively), abrupt below.
541.4 - 556	Conglomerate: Cadomin. generally coarse pebbles, but fine to medium pebbles also present, abundance of dark grey pebbles, sandy matrix of coarse to fine sandstones.

SDH - 3

SDH - 7003

0 - 12	No core.
12 - 17	Sandstones: grey, medium grained, criss crossed and occasionally laminated, gradational below.
17 - 36	Sandstones: medium grained, grey to dark grey, with lots of interlaminated mudstones.
36 - 42.5	Mudstones: dark grey, sparse lamination of siltstones, effervescent, gradational below.
42.5 - 48.4	Silty mudstones, grey, bottommost 0.5' carbonaceous mudstones, sparingly effervescent, gradational below.
48.4 - 51	Mudstones: coaly with lots of chunks of coal, rather abrupt.
51 - 56	Sandstones: medium grained, highly argillaceous, cross bedded, strongly effervescent, gradational below.
56 - 57.5	Mudstones: dark grey, slightly silty (homogeneously), and occasional fine sandy intervals, gradational below.
57.5 - 69	Sandstones: medium grained, grey to light grey, criss crossed, last 6 feet coarse sandstones.
69 - 71	Mudstones: dark grey to black, non effervescent, structureless, gradational below.
71 - 84	Mudstones/siltstones: alternating sequence of the two lithologies, siltstones particularly laminated, gradational below.
84 - 95	Mudstones: dark grey, occasionally laminated, non effervescent, gradational lower junction.
95 - 96	Sandstones: fine to medium grained, grey, abundant coaly bits, gradational below.

96 - 97.5	Mudstones: carbonaceous, structureless, few coaly streaks, non effervescent, gradational lower contact.
97.5 - 99	Coal Seam: All bright with only few inches of shales, gradational below.
99 - 111	Siltstones: grey, sporadically argillaceous, effervescent, laminated, gradational below.
111 - 114.4	Sandstones: fine grained, grey, slightly argillaceous, effervescent, gradational below.
114.4 - 115.6	Mudstones: black, darker lamination of carbonaceous matter, non effervescent.
115.6 - 118.5	Coal Seam: 0.3' Shaly coal. 0.4' Lumps of clean bright coal. 2.2' Bright friable coal with slight dirt in it. 2.9'
118.5 - 121.8	Mudstones: dark grey to black, very carbonaceous, non effervescent, gradational lower contact.
121.8 - 126	Mudstones: grey, very silty and sporadically laminated, gradational below, effervescent.
126 - 130.5	Sandstones: fine grained, argillaceous, cross laminated, effervescent, erosional below.
130.5 - 132	Mudstones: grey, all chewed up.
132 - 135	Mudstones: carbonaceous, dark grey, impregnated with abundant big calcite veins.
135 - 149	Siltstones: grey, richly argillaceous, high-angled lamination, effervescent, gradational below.
149 - 180	Siltstones/mudstones: mixed sequence, some intervals differentiated, grey to dark grey, strongly effervescent, few calcite veins, gradational lower contact.

180 - 185	Mudstones: grey to dark grey, highly silty (homogeneously), strongly effervescent, sporadic lamination, gradational below.
185 - 189	Siltstones: brownish grey, strongly effervescent, gradational below.
189 - 194	Mudstones: grey, homogeneously silty, feebly effervescent, transitional lower boundary.
194 - 196	Coal Seam: All of it is clean bright core-form coal.
196 - 198	Mudstones: dark grey to black, highly carbonaceous, non effervescent, gradational below.
198 - 205	Siltstones: grey to light grey, highly argillaceous, well laminated, abrupt below.
205 - 207.5	Coal Seam: Dominantly clean bright (core-form) coal; bottommost 0.5' friable bright coal.
207.5 - 208.8	Mudstones: black, very carbonaceous, non effervescent, bottommost 0.4' have a wedge of bright coal, abrupt below.
208.8 - 213.8	Mudstones: dark grey, very silty as short interlaminated layers, gradational below.
213.8 - 216.0	Coal Seam: Bright, clean and core-form coal except bottommost 0.8' that is friable and bright.
216 - 221.5	Mudstones: grey, highly silty, a small fracture in the middle and thin calcitic filling. Also calcite-filled void between 216 - 216.3, gradational below.
221.5 - 226	Coal Seam: Bright, clean core-form coal but only 1.8' retrieved. Not sampled. Seam A.

226 - 226.3	Carbonaceous mudstones.
226.3 - 236.0	Seam B. In this interval the actual recovered core is 6 feet. Initial 3 feet of which are slightly dirty friable coal and remaining 3 feet are black mudstones. ?Loss of coal.
236 - 239.5	Mudstones: black, slightly carbonaceous, non effervescent, structureless.
239.5 - 242	Coal Seam: Initial one foot clean bright core-form coal and the rest bright friable coal. Seam C.
242 - 246	Only 2 feet of core in this interval. Initial 1.4' are black mudstones and rest, i.e. 0.6', slightly shaly coal - may be loss of coal here (?about 2').
246 - 247	Mudstones: carbonaceous, black, coaly streaks and slightly silty, non effervescent.
247 - 248.2	Siltstones: grey, highly argillaceous, vaguely laminated, effervescent, gradational below.
248.2 - 255.5	Sequence starts with two feet of dirty fine grained sandstones, rest cleaner, well sorted and distinctly medium grained, gradational below, effervescent.
255.5 - 260	Siltstones: brownish grey, highly argillaceous, laminated, strongly effervescent, transitional below.
260 - 273.3	Sandstones: light grey, medium grained (dominance of medium sands), effervescent.
273.3 - 293	Mudstones/siltstones: about equal representation, effervescent throughout, gradational below.
293 - 296	Mudstones: black, very carbonaceous and thin coaly intraclasts, gradational below.

296 - 304	Mudstones: dark grey to grey, short silty intervals, laminated, effervescent, gradational.
304 - 317.5	Sandstones: grey to brownish grey, fine to medium grained, strongly effervescent, cross-stratified (high-angled), transitional below.
317.5 - 317.9	Mudstones: homogeneously silty and obscurely laminated, effervescent, erosional below.
317.9 - 319.7	Sandstones: grey, fine grained, highly argillaceous, apparently structureless, effervescent, gradational below.
319.7 - 332	Mudstones: grey, silty and a differentiated 1.5' of silts in middle, gradational below.
332 - 335	Siltstones: light grey to brownish grey, highly dirty (argillaceous), effervescent.
335 - 336	Mudstones: dark grey, carbonaceous, non effervescent, structureless.
336 - 354	Mudstones: dark grey to black, highly silty (homogeneously and as differentiated), sparingly effervescent, occasionally laminated, gradational below.
354 - 356	Mudstones/siltstones: predominance of siltstones (about 65%), siltstones are well laminated, mudstones, grey and structureless.
356 - 357	Mudstones: homogeneously silty, grey, effervescent, gradational.
357 - 360.8	Sandstones: fine to medium (dominance of fine sands in the sequence), brownish grey, ill-sorted, vaguely laminated, effervescent, abrupt below.

360.8 - 391	Siltstones/fine grained sandstones: dominantly siltstones with short intervals of fine grained sandstones, criss crossed and cross laminated. The siltstones/fine sandstones lithologies are at most places differentiated.
391 - 399	Mudstones: dark grey to black, structureless, coaly streaks and thin layers here and there, non effervescent, gradational below.
399 - 406	Coal Seam D. (Sampled) only 5.5' of core present. 0.5' Laminated coal. 5.0' Bright core-form coal. 5.5'
406 - 410	Carbonaceous and coaly mudstones with lots of coaly lumps.
410 - 419	Mudstones: grey, homogeneously silty and some distinct silty lamination, strongly effervescent, very transitional below.
419 - 422.5	Siltstones/mudstones: Alternations of the lithologies and the silty intervals exhibit ripple-drift type of lamination, gradational below.
422.5 - 426	Mudstones: brownish grey to black, effervescent, obscurely laminated, gradational.
426 - 431	Siltstones: highly argillaceous, few calcitic veins, effervescent, transitional below.
431 - 432.5	Mudstones: very silty (homogeneously), grey, at least 0.5' of the interval is thoroughly decayed into clay.
432.5 - 445	Siltstones: light grey, very clean and well washed, hair-line calcitic structures (along lamination) and some vertical.
445 - 456.4	Sandstones: fine to medium grained, grey to brownish

grey, last 1.5' have shaly intraclasts, gradational, strongly effervescent.

456.4 - 458 Siltstones: grey, little argillaceous sediments, effervescent, laminated.

458 - 460.3 Sandstones: medium grained with very large black mudstone angular intraclasts. Clasts up to 3" in length and 2" wide, erosional below.

460.3 - 481 Siltstones/mudstones: about 75% are silts that are clean and display a variety of sedimentary structures; 25% mudstones that occur at intervals, some oblique calcite veining, gradational below.

481 - 483.5 Mudstones: highly silty, grey and spuriously laminated, effervescent.

483.5 - 501 Siltstones/mudstones about 80%, differentiated silty intervals, effervescent.

501 - 506 Mudstones: grey, laminated at few places where distinctly silty, strongly effervescent, abrupt below.

506 - 515 Coal Seam E. not sampled, only 5' of the core present in this interval.

2.5'	Extremely dirty coal (shaly).
2.5'	Bright coal.
5.0'	

515 - 526 Mudstones: dark grey to black, very carbonaceous and coaly bits here and there, non effervescent, apparently structureless, gradational below.

526 - 527.5 Siltstones: grey, highly argillaceous, very hard siltstones, effervescent.

527.5 - 546 Siltstones/mudstones: siltstones of lighter hue and mudstones are very dark and non-laminated, silts

	particularly effervescent and well-laminated.
546 - 552	Mudstones: grey, very richly argillaceous, some vuggy calcitic infillings in latter half of the core, effervescent throughout.
552 - 564	Mudstones/siltstones: about 30% siltstones, laminated and oblique banding (emphasized by the angle of penetration).
564 - 579	Siltstones: dirty grey, richly argillaceous, sporadically laminated, gradational below.
579 - 584	Siltstones/mudstones: light grey to brownish grey sequence, intermittantly laminated and banded, strongly effervescent throughout, slight dominance of mudstones.
584 - 586	Black coaly mudstones: structureless, non effervescent, very gradational below.
586 - 606.8	Mudstones: grey, very slightly silty (homogeneously), effervescent, gradational below.
606.8 - 626.5	Mudstones: about 15% of siltstones homogeneously mixed, vaguely laminated.
626.5 - 634	Mudstones: very carbonaceous and black, last 0.3' silty. A total of about one foot of coal in this interval (aggregate).
634 - 638	? Coal Seam F. only about 1.5' of coal which also has large "blobs" of carbonaceous mudstones.
638 - 651	Mudstones: black, very silty and carbonaceous, structureless, gradational below.
651 - 655	Siltstones: highly argillaceous (homogeneously), bottommost 1' hair-line and intertwining calcite veins.
655 - 685	Mudstones: about 80% silts and 20% as non-descript sequence of muds/silts, grey to dark grey, few sedimentary structures, effervescent.

685 - 695	Siltstones: slightly argillaceous, grey, few finely disseminated coal "sand" grains, few oblique calcite veins at places closely spaced, laminated at intervals, very transitional below.
695 - 696	Siltstones/mudstones: alternations of, grey, laminated, effervescent.
696 - 707.5	Siltstones/mudstones: about 70% siltstones and rest mudstones, very oblique angle of lamination here (because of drilling angle).
707.5 - 713	Mudstones: dark brownish grey, slightly shaly, effervescent, gradational.
713 - 720	Siltstones/mudstones: about equal representation, effervescent, laminated, gradational.
720 - 727	Mudstones: dark grey to black, structureless, non effervescent, transitional below.
727 - 736	Only 4 feet of core in this interval and initial 3.5' of which are clean mudstones and last 0.5' chewed up coal, so if there was some coal it would be between 729.5 - 736. ? Coal Seam G.
736 - 747.5	Siltstones: light coloured, laminated, fairly cross bedded, effervescent, gradational below.
747.5 - 748.3	Mudstones: black, richly carbonaceous and sporadic coal layers, gradational.
748.3 - 752.6	Siltstones: grey, well laminated and criss crossed, argillaceous, gradational.
752.6 - 758.6	Coal Seam H. Only 4 feet of core present. Generally clean coal but has few thin heavier intervals of coaly core.

758.6 - 761	Sandstones: fine to medium grained, clean and well sorted, cross bedded (boldly), few intraformational erosional contacts, strongly effervescent, gradational below.
761 - 766	Sandstones: medium grained, very clean, cross bedded, gradational below.
766 - 767.5	Sandstones: medium grained and in fact, continuation of the above lithology, but this intervals is thoroughly punctured by burrowing organisms.
767.5 - 788	Sandstones: clean medium grained with short (from few inches to 1/2') gritty intervals, strongly effervescent.
788 - 790.5	Alternations of mudstones and very fine sandstones, sharp intraformational boundaries, strongly effervescent gradational below.
790.5 - 791	Sandstones: fine grained, highly muddy, fine pebbles and grits.
791 - 993	Sandstones: fine grained light coloured, clean and well sorted. This is very akin to intertidal facies. Lots of calcite criss crossing between 867 - 880. This is apparently due to local fracture-filling and not ascribable to any regional faulting, only 0.3' of intraclastic zone at 888.3'. (Muddy intraclasts in fine grained sandy medium, some of these intraclasts well-rounded), gradational below.
993 - 996	Rapid alternations of fine sandstones and mudstones: sharp and some true erosional intraformational boundaries, sandstones generally very clean and well-sorted and vague apparent parallel lamination, strongly effervescent.

996 - 1185	Moosebar Formation: Have some large fine sandstone intervals,between 1027 - 1054.5 there are about 17 feet of sandstones in total at various levels, bentonite layers in the bottommost 5 feet. Conglomerate at 1184.5' defining the bottom of Moosebar Formation. The pebbles in it are very sparsely dispersed and abundance of coarse green sands (?glauconite), about 0.5' thick, i.e. from 1184.5 - 1185.
1185 - 1192	Mudstones: dark grey to black, dominantly homogeneously silty but at places well defined silty bands that are well laminated, strongly effervescent, gradational below.
1192 - 1193	Siltstones: light brownish grey, very highly argillaceous, few calcitic veins along lamination, strongly effervescent, very transitional below.
1193 - 1230	Siltstones/mudstones: sequence generally dark grey, slight dominance of Mudstones; sporadically laminated, effervescent, gradational.
1230 - 1240	Siltstones: grey, richly argillaceous (comprising up to 20% argillite), well defined lamination and some criss-crossing, effervescent, gradational.
1240 - 1241	Mudstones: black, very coarsely, non effervescent, structureless gradational below.
1241 - 1272	Mudstones: grey, slightly silty, strongly effervescent, vaguely laminated.
1272 - 1285	Conglomerate: Cadomin: starting at 1.5' are coarse gritty sandstones, and have extremely sparsely distributed pebbles, thence forth larger pebbles ensue.

SDH - 4 SDH-7004

0 - 23	No core.
23 - 41.5	Sandstones: fine grained, well-laminated, silty and slightly argillaceous.
41.5 - 53.5	Sandstones: very coarse and gritty with sprinkling of fine to medium pebbles throughout, coaly fragments, bottommost 2.5' fine conglomerate.
53.5 - 76.9	Mudstones: grey, silty at places e.g. 70.5 - 71.5, gradational below.
76.9 - 81.5	Sandstones: medium grained, cross bedded, some fine grained sandy intervals, angular muddy intraclasts in sequence one foot above the base, gradational to siltstones below.
81.5 - 82.5	Siltstones: coarse, slightly argillaceous, gradational below.
82.5 - 84.5	Mudstones: grey to dark grey, structureless, gradational below.
84.5 - 88.5	Sandstones: fine grained, argillaceous (as well-defined layers), gradational below.
88.5 - 106.3	Siltstones/mudstones: about 70% mudstones and rest siltstones, transitional below.
106.3 - 106.6	Mudstones: dark grey, slightly silty and laminated, gradational below.
106.6 - 106.9	Sandstones: fine grained, slump structures, gradational lower end.
106.9 - 108	Mudstones: slightly silty, brownish grey, gradational below.

108 - 109	Sandstones: fine to medium (dominance of fine grained), gradational.
109 - 112	Mudstones: slightly silty, argillaceous, sporadic laminations, gradational.
112 - 115.7	Sandstones: fine grained, light grey, cross laminated, transitional below.
115.7 - 126.9	Mudstones with short intervals of siltstones.
126.9 - 131	Sandstones: fine grained, very thin silty and argillaceous intercalations, bottom highly eroded or channeled.
131 - 142	Siltstones/mudstones: about equal representation, gradational.
142 - 165	Mudstones: brownish grey, short silty intervals (constituting 5%), gradational.
165 - 172	Sandstones: medium grained, clean, cross-bedded, initial 2 feet distinctly medium grained, gradational below.
172 - 182	Mudstones: grey, slightly silty and obscurely laminated, gradational.
182 - 184.5	Sandstones: fine grained, criss-crossed, slightly argillaceous, gradational below.
184.5 - 186.5	Mudstones: dark grey to black, richly carbonaceous, gradational.
186.5 - 187	Sandstones: fine grained, clean and reasonably sorted, gradational.
187 - 199	Mudstones: highly silty, dark grey, gradational below.

199 - 201	Mudstones: richly carbonaceous and dark grey to black, gradational.
201 - 206	Mudstones: grey, slightly silty (homogeneously), gradational lower end.
206 - 207	Mudstones: highly carbonaceous, few coaly streaks, structureless, gradational below.
207 - 208	Coal: very dirty, only about 0.7' recovered.
208 - 240	Mudstones: dark grey to grey, about 5% of siltstones (as thin differentiated layers throughout), laminated, transitional below.
240 - 250	Sandstones: fine grained (initial 3 feet), rest of the sequence siltstones/mudstones.
250 - 252	Mudstones: dark grey, very carbonaceous, gradational to coal seam below.
252 - 256.5	Coal Seam: only 1.5' recovered.

0.3' Hard bony coal.
0.3' Evenly laminated coal.
0.6' Bright, solid coal.
0.3' Bright, friable coal with some dirt bands.
1.5'

256.5 - 258.5	Siltstones: grey, very muddy, bottommost 0.5' fine sandstones.
258.5 - 287	Siltstones: light brownish grey, thin intervals of fine sandstones, slightly argillaceous (homogeneously), laminated, gradational below.
287 - 294.5	Mudstones: very silty, last two feet very carbonaceous and have coaly stringers, abrupt below.
294.5 - 295.5	Coal: bright, solid coal.
295.5 - 296	Mudstones: black and richly carbonaceous, gradational.

296 - 306	This interval is depicted by two markers but only 6 feet of core recovered that is composed of mudstones, some coaly mudstones between 297.5 - 298.5. Since the core is short by four feet, could it be coal?
306 - 311	Mudstones: grey to dark grey, richly silty (homogeneously), gradational below.
311 - 315	Sandstones: fine grained, interlayering of thin siltstone bands, laminated, gradational.
315 - 325	Mudstones: very silty and sporadically laminated, gradational.
325 - 329	Siltstones: coarse grained (or very, very fine sandstones), fine argillaceous intraclasts, transitional below.
329 - 335	Mudstones: black and very carbonaceous, thin coaly layers, gradational below.
335 - 336	Siltstones: brownish grey, slightly argillaceous (homogeneously), transitional.
336 - 338	Mudstones: homogeneously silty, structureless, gradational lower end.
338 - 365	Siltstones/mudstones: slight dominance of siltstones (laminated), gradational.
365 - 366.8	Mudstones: black, slightly carbonaceous, abrupt below.
366.8 - 368.8	Sandstones: medium grained.
368.8 - 375	Mudstones: grey, very silty, gradational below.
375 - 380	Siltstones: highly argillaceous, well laminated, transitional below.
380 - 385.3	Mudstones: homogeneously silty, brownish grey, gradational.

385.3 - 388.3	Mudstones: richly carbonaceous and sporadic coal stringers.
388.3 - 405	Sandstones: medium grained, prominently cross-bedded and some cross-sets exhibit erosional contacts (truncated cross-sets), gradational below.
405 - 406	Siltstones: laminated (obscurely), argillaceous, gradational.
406 - 410	Mudstones: homogeneously silty, structureless, gradational below.
410 - 413	Carbonaceous mudstones, some coaly layers.
413 - 456.5	Mudstones: grey to dark grey, no apparent siltstones (may be homogeneous).
456.5 - 458	Mudstones: richly carbonaceous and some shales.
458 - 460	Coal: friable, bright with shaly layers.
460 - 462	Carbonaceous shales/mudstones.
462 - 464.5	Coal: bright and solid.
464.5 - 481	Mudstones: initial 5 feet richly carbonaceous and have coaly stringers, rest dark grey to black mudstones, gradational below.
481 - 484	Sandstones: light grey, fine grained, very little argillaceous matter, gradational.
484 - - 496	Siltstones/mudstones: about equal representation, gradational below.
496 - 510	Sandstones: light grey, fine grained, clean and well-sorted, profusely criss crossed; bottommost 5 feet have thin layers of mudstones that have erosional contacts, abundant argillaceous intraclasts here and

there, very transitional lower end.

510 - 552.5 Sandstones: coarse grained, clean and well-washed, fairly well sorted, gritty intervals at places, coaly fragments, very distinctly cross-bedded but some intervals are structureless, e.g. bottommost 15 feet, gradational below.

552.5 - 555 Mudstones: grey to light grey, highly silty (homogeneously), gradational below.

555 - 556 Sandstones: fine grained, argillaceous, gradational below.

556 - 556.5 Mudstones: slightly silty, sharp erosional contact below.

556.5 - 563 Sandstones: medium grained, cross-bedded, few silty intervals with sharp mutual boundaries, erosional below.

563 - 567 Mudstones: bottommost 2.5' black and carbonaceous.

567 - 571 Coal Seam: (only 2.2' core recovered).

1.1'	Bright, solid coal.
0.8'	Carbonaceous mudstones.
0.3'	Chewed up dirty coal.
2.2'	

571 - 578 Mudstones: black carbonaceous structureless, gradational.

578 - 586.2 Sandstones: medium grained, clean, profusely cross laminated, gradational.

586.2 - 596 Siltstones/mudstones: about 70% siltstones, gradational below.

596 - 597.5 Sandstones: fine grained, slightly dirty, gradational to silts below.

597.5 - 600.5 Siltstones: high argillaceous, laminated, gradational below.

600.5 - 635.5 Mudstones: silty at places, much of the sequence homogeneous, gradational.

635.5 - 637	Mudstones: carbonaceous, some coaly intervals (as stringers), gradational.
637 - 641	Mudstones: brownish grey, very silty and occasional vague lamination, gradational.
641 - 646.3	Siltstones: grey, high argillaceous content, laminated. Bottom 1.5' fragmented throughout and the fracture planes encrusted with calcite.
646.3 - 656	Mudstones: dark grey, very carbonaceous between 651 - 651.3, gradational.
656 - 670	Siltstones/mudstones (slight dominance of silts), laminated at places, gradational.
670 - 700	Siltstones: grey, argillaceous and vaguely laminated, gradational.
700 - 710	Mudstones: homogeneously silty, structureless.
710 - 720	Mudstones: Between 710 - 720 only a foot of core (as large fragments of mudstones), some coaly fragments here and there.
720 - 727	Coal Seam: only 1 foot recovered. The coal is thoroughly fragmented and is of bright type.
727 - 734	Mudstones: initial 4 feet carbonaceous and at places coaly, rest have thin silty layers that are well laminated, abrupt below.
734 - 735	Coal: bright, solid - some of it fragmented.
735 - 736	Mudstones: dark grey to black, carbonaceous, gradational below.
736 - 741	Siltstones: richly argillaceous, laminated, profusely criss crossed, transitional below.
741 - 765.6	Mudstones: grey, initial 5 feet have silty laminae, gradational below.

765.6 - 772	Mudstones: black, locally carbonaceous (especially discernible on the shiny and sheared surfaces). This interval is highly impregnated with calcitic matter throughout. It occurs (calcite) more as a fissure-filling than as veins (disordered, chaotic and bifurcating or anastomosing structures of calcite). On the whole, this lithology is very reminiscent of the rocks encountered at the bottom of SDH 1 that were thought to be in anamolous juxtaposition and hence the inferrence of a fault. Another distinct feature encountered here is the very steep nature of the lamination (in relation to the core axis) and the rocks immediately above and below this interval exhibit much more gentle lamination. Also, features such as micro-slip faulting (emphasized by calcite veins) occur.
772 - 784	Siltstones/mudstones: slight dominance of mudstones, difficult to differentiate the lithologies because of imperceptible blending of each other.
784 - 797	Mudstones: grey, highly silty, short laminated intervals, gradational below.
797 - 839	Sandstones: fine grained, blend at places into short silty intervals, laminated, uniformly disseminated argillaceous sediments.
839 - 859	Mudstones: grey, exhibit slight silty laminae.

859 - 902

Coal Seam: Seam A sampled

Interval	Recovery	Lithology
859 - 864	0.8'	Initial 0.3' bony coal, rest bright lumps of coal.
864 - 867	0.8'	All bright lumps of coal, light.
867 - 870.5	2.0'	Dominantly bright coal, but bottomwards heavy chunks of coal.
870.5 - 872.5	1.0'	Bright coal, all fragmented.
872.5 - 876	0.5'	Bright and light coal.
876 - 880	1.0'	Initial 0.5' bright solid coal, rest friable coal.
880 - 882.6	1.5'	Bright, but some heavier chunks of coal.
882.6 - 886	1.5'	Bright and well laminated coal lumps.
886 - 890	0.4'	Bright chunks of coal.
890 - 891.5	0.8'	Bright solid coal.
891.5 - 896	5.0'	Carbonaceous and coaly mudstone (not included in the sample).
896 - 902	6.0'	Bright coal and 0.4' mudstone layer.
43'	21.3' (49.5%)	

902 - 927 Sandstones: coarse grained, very clean, light grey, widely spaced cross-bedded units, abrupt below.

927 - 931 Sandstones: medium grained, light brownish grey, siltstones/mudstones intraclasts in the middle 1.5', very gradational below.

931 - 931.8 Sandstones: medium grained, well-washed and fairly well sorted, few greenish flat intraclasts, sporadic quartzite pebbles. Note that this interval is not a conglomerate - just a few pebbles "floating" in clean medium grained sandstones, very transitional below.

931.8 - 1026 Sandstones: fine grained, light coloured, clean, characteristically becoming finer (very gradually) bottomwards. Bottommost 35 feet are therefore very fine sandstones and have occasionally thin, platy shaly intraclasts, some shaly layers, transitional below.

1026 - 1037	Siltstones/shales: rapid alternations of (slight dominance of siltstones), mutual erosional contacts, gradational below.
1037 - 1058	Mudstones/shales: These are typical Moosebar lithologies, well laminated mudstones with occasional burrows.

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PR-SAXON 71(4)A

1971 SAXON PROJECT
(INTERIM REPORT)
- APPENDIX -
ANALYSES
PR-SAXON 71(4) A
SAXON CREEK LTD A.C. MOULD.

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APPENDIX

ANALYSES

BOREHOLE SAMPLES: REPORT OF ANALYSES ON FLOAT-SINK MATERIAL.

CLIENT: Denison Mines Limited DATE: January 27, 1971.

PROJECT: Saxon C.E.S. PROJECT NO.: S1-84

SAMPLE NO.: S1-A Seam E C.E.S. SAMPLE NO.: 90

TABLE 1. SIZE AND FLOAT-SINK ANALYSES.

Size \ Sp.Gr.	- 1.40	1.40-1.50	1.50-1.60	+ 1.60	TOTAL
1/4" x 28 m.	31.68	1.76	1.37	49.19	84.00
28 x 200 m.	6.27	1.22	1.10	3.48	12.07
TOTAL	37.95	2.98	2.47	52.67	96.07
- 200 m.	This fraction forms 3.93% of the total sample.				

TABLE 2. ANALYSES.

Fraction \ Property	Wt. %	Ash %	V.M. %	F.C. %	B.T.U. /lb.	F.S.I.	S. %
- 1.40	37.95	3.81	24.80	70.93	15,020	8½,8½,9	0.61
1.40 - 1.50	2.98	17.67	24.18	57.69	13,100	7,7,7	0.61
1.50 - 1.60	2.47	19.14	20.72	59.68	12,300	6,6,6	0.62
+ 1.60	52.67	78.80					0.38
- 200 mesh	3.93	25.30				3,3,3	0.52
TOTAL	100.00	44.94					0.49

C.E.S. FORM 22

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Denison Mines Limited DATE: January 27, 1971.

PROJECT: Saxon C.E.S. PROJECT NO.: S1-84

CLIENT SAMPLE NO.: S1-B Seam D C.E.S. SAMPLE NO.: 91

ANALYSES ON AIR DRY BASIS:

ASH:	8.95%
VOLATILE MATTER:	
RESIDUAL MOISTURE:	0.37%
FIXED CARBON:	
FREE SWELLING INDEX:	6½,6½,6½
B.T.U./lb.:	
SULPHUR:	0.30%
RANK:	

REMARKS:

C.E.S. Form 17

CYCLONE ENGINEERING SALES LTD.

RSS:hg

Per: R. S. Sehgal, P. Eng.
Head of Laboratory

BOREHOLE SAMPLES: REPORT OF ANALYSES ON FLOAT-SINK MATERIAL.

CLIENT: Denison Mines Limited DATE: January 27, 1971.

PROJECT: Saxon C.E.S. PROJECT NO.: SI-84

SAMPLE NO.: SI-B Seam D C.E.S. SAMPLE NO.: 91

TABLE 1. SIZE AND FLOAT-SINK ANALYSES.

Size \ Sp.Gr.	- 1.40	1.40-1.50	1.50-1.60	+ 1.60	TOTAL
1/4" x 28 m.	66.11	4.52	2.46	6.08	79.17
28 x 200 m.	14.35	0.79	0.16	0.97	16.27
TOTAL	80.46	5.31	2.62	7.05	95.44
- 200 m.	This fractions forms 4.56% of the total sample.				

TABLE 2. ANALYSES.

Fraction \ Property	Wt. %	Ash %	V.M. %	F.C. %	B.T.U. /lb.	F.S.I.	S. %
- 1.40	80.46	3.60	25.41	70.62	15,060	8½,8½,8½	0.31
1.40 - 1.50	5.31	14.86	23.08	61.69	12,550	4,4½,4½	0.30
1.50 - 1.60	2.62	19.39	28.05	52.19	10,740	3½,4,4	0.18
+ 1.60	7.05	38.94					0.15
- 200 mesh	4.56	10.81				5,5,5½	0.30
TOTAL	100.00	7.43				6½,6½,6½	0.29

C.E.S. FORM 22

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Denison Mines Limited

DATE: February 23, 1971.

PROJECT: Saxon

C.E.S. PROJECT NO.: S1-84

CLIENT SAMPLE NO.: SDH-3 - Seam D

C.E.S. SAMPLE NO.: 96

ANALYSES ON AIR DRY BASIS:

ASH:	7.20%
VOLATILE MATTER:	24.95%
RESIDUAL MOISTURE:	0.35%
FIXED CARBON:	67.50%
FREE SWELLING INDEX:	7, 7, 7½
B.T.U./lb.:	14,620
SULPHUR:	0.39%
RANK:	mvb

REMARKS:

March 9, 1971 - B.T.U., Sulphur and rank added.

C.E.S. Form 17

CYCLONE ENGINEERING SALES LTD.

RSS:hg

Per: R. S. Sehgal, P. Eng.
Head of Laboratory

BOREHOLE SAMPLES: REPORT OF ANALYSES ON FLOAT-SINK MATERIAL.

CLIENT: Denison Mines Limited DATE: February 24, 1971.

PROJECT: Saxon C.E.S. PROJECT NO.: S1-84

SAMPLE NO.: SDH-3 (Seam D) C.E.S. SAMPLE NO.: 96

TABLE 1. SIZE AND FLOAT-SINK ANALYSES.

Size \ Sp.Gr.	- 1.40	1.40-1.50	1.50-1.60	+ 1.60	TOTAL
1/4" x 28 m.	67.50	2.69	1.72	4.49	76.40
28 x 200 m.	17.64	0.96	0.42	0.97	19.99
TOTAL	85.14	3.65	2.14	5.46	96.39
- 200 m.					3.61

TABLE 2. ANALYSES.

Fraction \ Property	Wt. %	Ash %	V.M. %	F.C. %	B.T.U. /lb.	F.S.I.	S. %
- 1.40	85.14	3.94	25.54	70.17	13,620	8,8,8½	0.43
1.40 - 1.50	3.65	14.88	23.43	61.34	12,560	2,2,2½	0.32
1.50 - 1.60	2.14	20.80			10,970	1,1½,1½	0.29
+ 1.60	5.46	47.44					0.15
- 200 mesh	3.61	13.97	25.17	53.68		3½,4,4	0.34
TOTAL	100.00	7.44					0.40

C.E.S. FORM 22

March 9/71 - B.T.U. and Sulphur added.

RSS:hg

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Denison Mines Limited

DATE: February 24, 1971.

PROJECT: Saxon

C.E.S. PROJECT NO.: S1-84

CLIENT SAMPLE NO.: SDH-3, Seam A

C.E.S. SAMPLE NO.: 97

ANALYSES ON AIR DRY BASIS:

ASH:	9.03%
VOLATILE MATTER:	21.19%
RESIDUAL MOISTURE:	0.40%
FIXED CARBON:	69.58%
FREE SWELLING INDEX:	2½, 2½, 2½
B.T.U./lb.:	13,970
SULPHUR:	0.35%
RANK:	mvb

REMARKS:

March 9, 1971 - B.T.U., Sulphur and Rank added.

C.E.S. Form 17

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Head of Laboratory

RSS:hg

BOREHOLE SAMPLES:

REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Denison Mines Limited

DATE: January 27, 1971.

PROJECT: Saxon

C.E.S. PROJECT NO.: S1084

CLIENT SAMPLE NO.: S1-A Seam E

C.E.S. SAMPLE NO.: 90

ANALYSES ON AIR DRY BASIS:

ASH:	45.12%
VOLATILE MATTER:	
RESIDUAL MOISTURE:	0.46%
FIXED CARBON:	
FREE SWELLING INDEX:	3½,3½,4
B.T.U./lb.:	
SULPHUR:	0.50%
RANK:	

REMARKS:

C.E.S. Form 17

CYCLONE ENGINEERING SALES LTD.

RSS:hg

Per: _____

R. S. Sehgal, P. Eng.
Head of Laboratory

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Denison Mines Limited

DATE: February 24, 1971.

PROJECT: Saxon

C.E.S. PROJECT NO.: S1-84

CLIENT SAMPLE NO.: SDH-4, Seam A

C.E.S. SAMPLE NO.: 98

ANALYSES ON AIR DRY BASIS:

ASH:	13.60%
VOLATILE MATTER:	22.43%
RESIDUAL MOISTURE:	0.32%
FIXED CARBON:	63.65%
FREE SWELLING INDEX:	4½, 5, 5½
B.T.U./lb.:	13,120
SULPHUR:	0.24%
RANK:	mvb

REMARKS:

March 9, 1971 - B.T.U., Sulphur and Rank added.

C.E.S. Form 17

CYCLONE ENGINEERING SALES LTD.

RSS:hg

Per: R. S. Sehgal, P. Eng.
Head of Laboratory

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1971 SAXON PROJECT
ANALYSES
— APPENDIX II — 4/6

PR-SAXON 71(4)A
SAXON COAL LTD.

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APPENDIX II

ANALYSES

BOREHOLE SAMPLES: REPORT OF ANALYSES ON FLOAT-SINK MATERIAL.

CLIENT: Denison Mines Limited DATE: January 27, 1971.

PROJECT: ~~Kakwa River Coal~~ SASKON C.E.S. PROJECT NO.: S1-84

SAMPLE NO.: S1-A Seam E C.E.S. SAMPLE NO.: 90

TABLE 1. SIZE AND FLOAT-SINK ANALYSES.

Size \ Sp.Gr.	- 1.40	1.40-1.50	1.50-1.60	+ 1.60	TOTAL
1/4" x 28 m.	31.68	1.76	1.37	49.19	84.00
28 x 200 m.	6.27	1.22	1.10	3.48	12.07
TOTAL	37.95	2.98	2.47	52.67	96.07
- 200 m.	This fraction forms 3.93% of the total sample.				

TABLE 2. ANALYSES.

Fraction \ Property	Wt. %	Ash %	V.M. %	F.C. %	B.T.U. /lb.	F.S.I.	S. %
- 1.40	37.95	3.81	24.80	70.93	15,020	8½,8½,9	0.61
1.40 - 1.50	2.98	17.67	24.18	57.69	13,100	7,7,7	0.61
1.50 - 1.60	2.47	19.14	20.72	59.68	12,300	6,6,6	0.62
+ 1.60	52.67	78.80					0.38
- 200 mesh	3.93	25.30				3,3,3	0.52
TOTAL	100.00	44.94					0.49

C.E.S. FORM 22

CYCLONE ENGINEERING SALES LTD.

Per: _____
R. S. Sehgal, P. Eng.
Laboratory Manager

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Denison Mines Limited DATE: January 27, 1971.

PROJECT: ~~Kakwa River Coal~~ Saxon

C.E.S. PROJECT NO.: S1-84

CLIENT SAMPLE NO.: S1-B

C.E.S. SAMPLE NO.: 91

Seam D

ANALYSES ON AIR DRY BASIS:

ASH:	8.95%
VOLATILE MATTER:	
RESIDUAL MOISTURE:	0.37%
FIXED CARBON:	
FREE SWELLING INDEX:	6½,6½,6½
B.T.U./lb.:	
SULPHUR:	0.30%
RANK:	

REMARKS:

C.E.S. Form 17

CYCLONE ENGINEERING SALES LTD.

RSS:hg

Per: R. S. Sehgal

R. S. Sehgal, P. Eng.
Head of Laboratory

BOREHOLE SAMPLES: REPORT OF ANALYSES ON FLOAT-SINK MATERIAL.

CLIENT: Denison Mines Limited DATE: January 27, 1971.

PROJECT: ~~Kakwa River Coal~~ Saxon C.E.S. PROJECT NO.: S1-84

SAMPLE NO.: S1-B Seam D C.E.S. SAMPLE NO.: 91

TABLE 1. SIZE AND FLOAT-SINK ANALYSES.

Size \ Sp.Gr.	- 1.40	1.40-1.50	1.50-1.60	+ 1.60	TOTAL
1/4" x 28 m.	66.11	4.52	2.46	6.08	79.17
28 x 200 m.	14.35	0.79	0.16	0.97	16.27
TOTAL	80.46	5.31	2.62	7.05	95.44
- 200 m.	This fractions forms 4.56% of the total sample.				

TABLE 2. ANALYSES.

Fraction \ Property	Wt. %	Ash %	V.M. %	F.C. %	B.T.U. /lb.	F.S.I.	S. %
- 1.40	80.46	3.60	25.41	70.62	15,060	8½,8½,8½	0.31
1.40 - 1.50	5.31	14.86	23.08	61.69	12,550	4,4½,4½	0.30
1.50 - 1.60	2.62	19.39	28.05	52.19	10,740	3½,4,4	0.18
+ 1.60	7.05	38.94					0.15
- 200 mesh	4.56	10.81				5,5,5½	0.30
TOTAL	100.00	7.43				6½,6½,6½	0.29

C.E.S. FORM 22

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Denison Mines Limited DATE: February 24, 1971.

PROJECT: Saxon Coal C.E.S. PROJECT NO.: S1-84

CLIENT SAMPLE NO.: SDH-3, ~~Seam H~~ Seam A. C.E.S. SAMPLE NO.: 97

ANALYSES ON AIR DRY BASIS:

ASH:	9.03%
VOLATILE MATTER:	21.19%
RESIDUAL MOISTURE:	0.40%
FIXED CARBON:	69.58%
FREE SWELLING INDEX:	2½, 2½, 2½
B.T.U./lb.:	13,970
SULPHUR:	0.35%
RANK:	mvb

REMARKS:

March 9, 1971 - B.T.U., Sulphur and Rank added.

C.E.S. Form 17

CYCLONE ENGINEERING SALES LTD.

Per: _____
R. S. Sehgal, P. Eng.
Head of Laboratory

RSS:hg

BOREHOLE SAMPLES: REPORT OF ANALYSES ON FLOAT-SINK MATERIAL.

CLIENT: Denison Mines Limited DATE: February 24, 1971.

PROJECT: ~~Kakwa River~~ SPRING CREEK Coal C.E.S. PROJECT NO.: S1-84

SAMPLE NO.: SDH-3 (~~Seam H~~) Seam A C.E.S. SAMPLE NO.: 97

TABLE 1. SIZE AND FLOAT-SINK ANALYSES.

Size \ Sp.Gr.	- 1.40	1.40-1.50	1.50-1.60	+ 1.60	TOTAL
1/4" x 28 m.	64.54	12.63	3.08	1.57	81.82
28 x 200 m.	12.82	1.76	0.41	0.45	15.44
TOTAL	77.36	14.39	3.49	2.02	97.26
- 200 m.					2.74

TABLE 2. ANALYSES.

Fraction \ Property	Wt. %	Ash %	V.M. %	F.C. %	B.T.U. /lb.	F.S.I.	S. %
- 1.40	77.36	5.59	21.77	72.24	14,690	3½,4,4	0.35
1.40 - 1.50	14.39	16.88	18.75	63.97	12,400	1,1,1½	0.28
1.50 - 1.60	3.49	29.81			10,170	1,1,1	0.21
+ 1.60	2.02	51.73					0.18
- 200 mesh	2.74	16.91	16.89	52.90		1,1,1	0.38
TOTAL	100.00	9.30					0.33

C.E.S. FORM 22

March 9/71 - B.T.U. and Sulphur added.

RSS:hg

CYCLONE ENGINEERING SALES LTD.

Per: R.S. Sehgal

R. S. Sehgal, P. Eng.
Laboratory Manager

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Denison Mines Limited

DATE: February 23, 1971.

PROJECT: ~~Kelwa River~~ Saxon Coal

C.E.S. PROJECT NO.: SI-84

CLIENT SAMPLE NO.: SDH-3 - Seam D

C.E.S. SAMPLE NO.: 96

SEAM D

ANALYSES ON AIR DRY BASIS:

ASH:	7.20%
VOLATILE MATTER:	24.95%
RESIDUAL MOISTURE:	0.35%
FIXED CARBON:	67.50%
FREE SWELLING INDEX:	7, 7, 7½
B.T.U./lb.:	14,620
SULPHUR:	0.39%
RANK:	mvb

REMARKS:

March 9, 1971 - B.T.U., Sulphur and rank added.

C.E.S. Form 17

CYCLONE ENGINEERING SALES LTD.

RSS:hg

Per: R. S. Sehgal, P. Eng.
Head of Laboratory

BOREHOLE SAMPLES: REPORT OF ANALYSES ON FLOAT-SINK MATERIAL.

CLIENT: Denison Mines Limited DATE: February 24, 1971.

PROJECT: ~~Kelowa River~~ SAXON CREEK Coal C.E.S. PROJECT NO.: SI-84

SAMPLE NO.: SDH-3 (Seam D) SEAM D C.E.S. SAMPLE NO.: 96

TABLE 1. SIZE AND FLOAT-SINK ANALYSES.

Size \ Sp.Gr.	- 1.40	1.40-1.50	1.50-1.60	+ 1.60	TOTAL
1/4" x 28 m.	67.50	2.69	1.72	4.49	76.40
28 x 200 m.	17.64	0.96	0.42	0.97	19.99
TOTAL	85.14	3.65	2.14	5.46	96.39
- 200 m.					3.61

TABLE 2. ANALYSES.

Fraction \ Property	Wt. %	Ash %	V.M. %	F.C. %	B.T.U. /lb.	F.S.I.	S. %
- 1.40	85.14	3.94	25.54	70.17	13,620	8,8,8½	0.43
1.40 - 1.50	3.65	14.88	23.43	61.34	12,560	2,2,2½	0.32
1.50 - 1.60	2.14	20.80			10,970	1,1½,1½	0.29
+ 1.60	5.46	47.44					0.15
- 200 mesh	3.61	13.97	25.17	53.68		3½,4,4	0.34
TOTAL	100.00	7.44					0.40

C.E.S. FORM 22

March 9/71 - B.T.U. and Sulphur added.

RSS:hg

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal

R. S. Sehgal, P. Eng.
Laboratory Manager

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Denison Mines Limited
DATE: February 24, 1971.

PROJECT: ~~Kaiwa~~ Saxon River Coal
C.E.S. PROJECT NO.: S1-84

CLIENT SAMPLE NO.: SDH-4, Seam A
C.E.S. SAMPLE NO.: 98

SEAM A

ANALYSES ON AIR DRY BASIS:

ASH:	13.60%
VOLATILE MATTER:	22.43%
RESIDUAL MOISTURE:	0.32%
FIXED CARBON:	63.65%
FREE SWELLING INDEX:	4½, 5, 5½
B.T.U./lb.:	13,120
SULPHUR:	0.24%
RANK:	mvb

REMARKS:

March 9, 1971 - B.T.U., Sulphur and Rank added.

C.E.S. Form 17

CYCLONE ENGINEERING SALES LTD.

RSS:hg

Per: _____
R. S. Sehgal, P. Eng.
Head of Laboratory

BOREHOLE SAMPLES: REPORT OF ANALYSES ON FLOAT-SINK MATERIAL.

CLIENT: Denison Mines Limited DATE: February 24, 1971.

PROJECT: ~~Kakwa River~~ SAXON CREEK Coal (NARRAWAY) C.E.S. PROJECT NO.: S1-84

SAMPLE NO.: SDH-4 (Seam A) SEAM A C.E.S. SAMPLE NO.: 98

TABLE 1. SIZE AND FLOAT-SINK ANALYSES.

Size \ Sp.Gr.	- 1.40	1.40-1.50	1.50-1.60	+ 1.60	TOTAL
1/4" x 28 m.	51.27	6.88	3.99	11.41	73.55
28 x 200 m.	17.17	2.42	0.67	2.07	22.33
TOTAL	68.44	9.30	4.66	13.48	95.88
- 200 m.					4.12

TABLE 2. ANALYSES.

Fraction \ Property	Wt. %	Ash %	V.M. %	F.C. %	B.T.U. /lb.	F.S.I.	S. %
- 1.40	68.44	5.77	21.79	72.12	14,850	7½, 7½, 7½	0.33
1.40 - 1.50	9.30	15.73	20.41	63.54	12,450	2½, 2½, 3	0.27
1.50 - 1.60	4.66	23.59			10,670	2, 2, 2	0.14
+ 1.60	13.48	47.73					0.18
- 200 mesh	4.12	13.70	24.23	51.86		2½, 2½, 2½	0.22
TOTAL	100.00	13.51					0.29

C.E.S. FORM 22

March 9/71 - B.T.U. and Sulphur added.

RSS:hg

CYCLONE ENGINEERING SALES LTD.

Per: R. S. Sehgal, P. Eng.
Laboratory Manager

BOREHOLE SAMPLES: REPORT OF ANALYSES ON RAW MATERIAL

CLIENT: Denison Mines Limited DATE: January 27, 1971.

PROJECT: ~~Kakwa River Coal~~ SAXON C.E.S. PROJECT NO.: S1684

CLIENT SAMPLE NO.: S1-A C.E.S. SAMPLE NO.: 90

SEAM E

ANALYSES ON AIR DRY BASIS:

ASH:	45.12%
VOLATILE MATTER:	
RESIDUAL MOISTURE:	0.46%
FIXED CARBON:	
FREE SWELLING INDEX:	3½,3½,4
B.T.U./lb.:	
SULPHUR:	0.50%
RANK:	

REMARKS:

C.E.S. Form 17

CYCLONE ENGINEERING SALES LTD.

RSS:hg

Per: _____
R. S. Sehgal, P. Eng.
Head of Laboratory

SAXON PROJECT

INTERIM REPORT

A.C. MOULD

OCTOBER, 1971

SAXON PROJECT

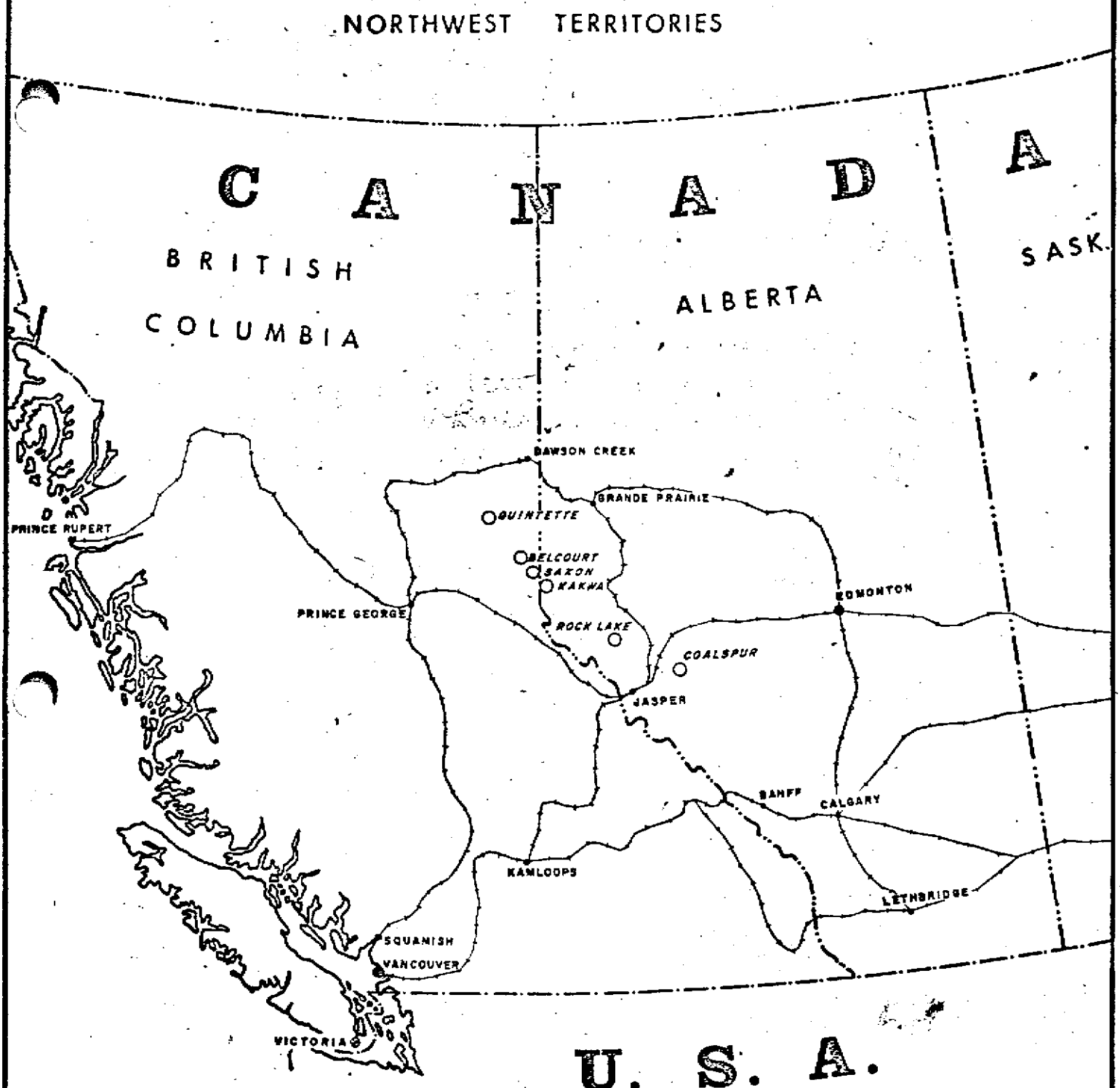
INTERIM REPORT

OCTOBER, 1971

A.C. MOULD

UNDER THE SUPERVISION OF A.A. JOHNSON

DENISON MINES LIMITED



DENISON MINES LIMITED
(COAL DIVISION)

LOCATION MAP OF COAL PROPERTIES

O PROPERTY COVERED BY THIS REPORT

DWG. No.: MISC 71-0157-R01

INTRODUCTION

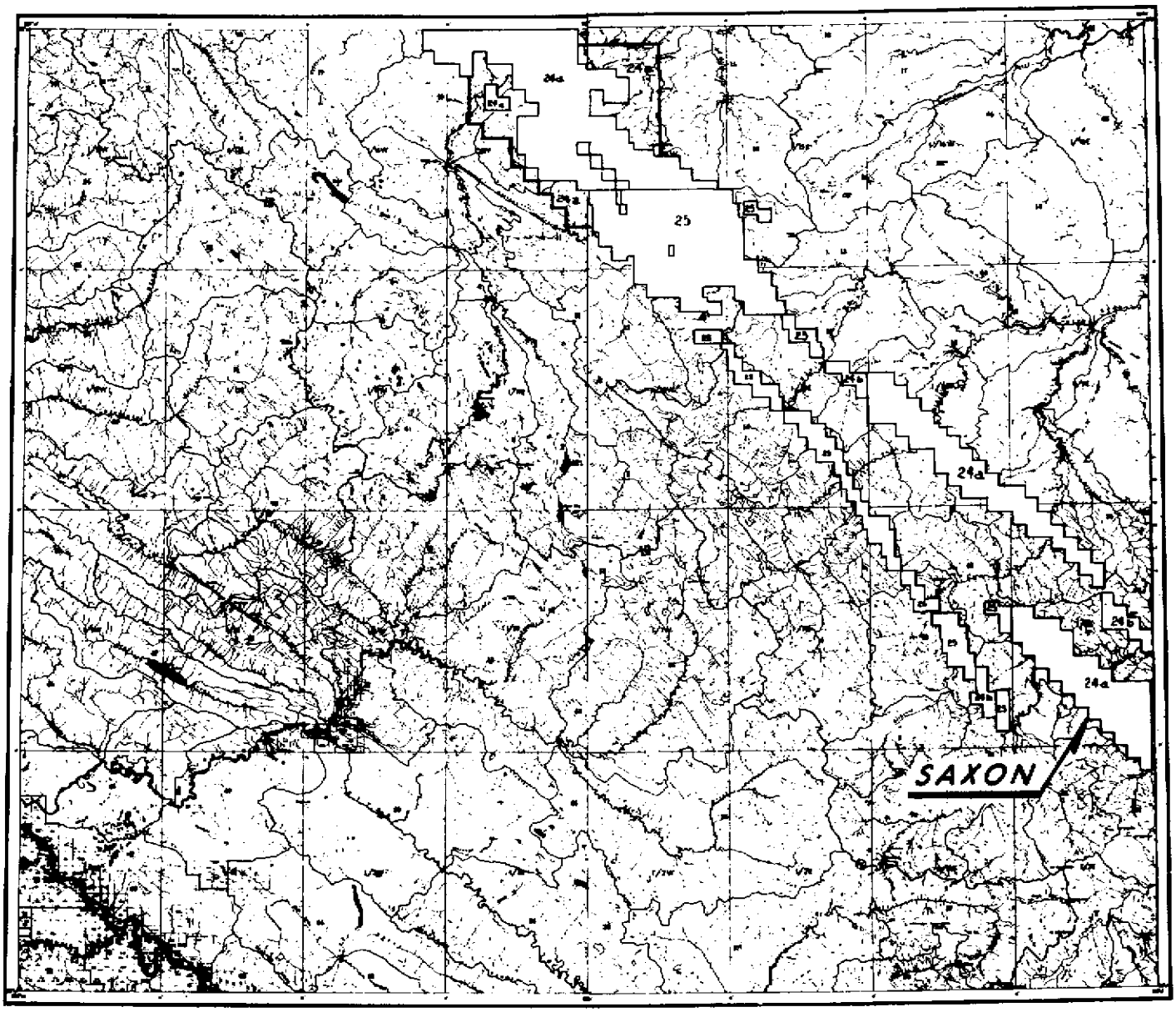
Denison Mines Ltd. acquired 53 coal licenses (33,440 acres) in the Narraway River / Saxon Creek area of Northeastern B. C. in the Fall of 1970.

The acquisition of the coal rights, based on published regional geology, was followed by approximately one week of geological mapping. A four hole drilling program followed this mapping and was completed in January 1971.

A report on the above work was written by Mr. P. Dyson in March 1971.

There were slight discrepancies in the naming of the seams in this report. The same seams in the radiation logs were given different letters to their equivalents in the lithologic logs in some cases. The lettering of seams has now been standardized, and the letters A through E represent the 5 main coal horizons in the Gates from the bottom up. The radiation logs are included in this report.

In the summer of 1971 another week of helicopter-assisted mapping by an eight man crew was completed. This report describes the above activities and results, and contains recommendations for further work.



DENISON MINES LIMITED

CALGARY , ALBERTA

SAXON
CLAIM MAP

DRAWN BY: E.J.T.	DATE: SEPT. '71	SCALE: 1"=12 miles
APPROVED BY:	DRAWING No: SAXON 71-D165-R01	

ACCESS

The Saxon project is located in British Columbia adjacent to the Alberta border. Access is via Grand Prairie, Alberta, to the Two Lakes area of Alberta. Denison Mines Ltd. constructed a road in excess of twenty miles long to the furthest drill site. This road can be re-used with minor repair work.

LOCATION

The area of study lies west of the Alberta / British Columbia boundary, extending sixteen miles in a northwest direction between latitudes $54^{o}15'$ to $54^{o}25'$ west, and longitudes $120^{o}0'$ to $120^{o}20'$ north.

The license numbers are 1483 to 1535 inclusive. Rentals, which are due on October 16th 1971, total $16,720.00.

A location map is included in this report.

STRATIGRAPHY:

TABLE OF FORMATIONS:

Series	Group		Formation	Thickness	Lithology
Upper Cretaceous	Fort St. John		Dunvegan	300-1200'	Marine and non-marine, sandstone and shale.
		Shafterbury 1400 - 1900'	Cruiser	350-800'	Dark grey marine shales, sideritic concretions, some sandstone.
			Goodrich	50-1350'	Fine grained, cross-bedded sandstone, shales and mudstones.
			Hasler	500-1500'	Silty dark grey marine shale, sideritic concretions, siltstone and sandstone in lower part, minor conglomerate.
Lower Cretaceous		Commotion 1080 - 1600'	Boulder Creek	240-560'	Fine grained, well sorted sandstone; non-marine sandstone and mudstone.
			Hulcross	0-450	Dark grey marine shale with sideritic concretions.
			Gates	220-1400'	Fine grained marine and non-marine sandstones; conglomerate, coal, shale and mudstone.
			Moosebar	100-1000'	Dark grey marine shale with sideritic concretions, glauconitic sandstones and pebbles at base.
	Bullhead		Gething	75-1000'	Fine to coarse brown calcareous sandstone; coal carbonaceous shale, and conglomerate.
			Cadomin	45-600'	Massive conglomerate containing chert and quartite pebbles.

GEOLOGY

Introduction

The area has previously been mapped by Stott (1968) as a simple synclinal valley with the Commotion formation extending across the entire valley.

A week's mapping by W. B. Brady in 1970 extended and modified Stott's work.

A further week's mapping by 4 teams of geologists in 1971 confirmed, on the whole, the previous structural interpretations of the area, except that a southeasterly plunging anticline exposing Commotion Formation northwest of the Narraway River as mapped by W. B. Brady was not noted in field traverses by the 1971 expedition. There is, however, indirect structural evidence for this anticline in the fact that the dips presently ascribed to the Shaftesbury Formation would require the Shaftesbury to be many thousands of feet thick in order to extend at surface to the western thrust fault in the area. The Shaftesbury Formation is actually thought to be of the order of one thousand feet. This structure must be elucidated, as it will certainly increase the coal reserves if it is present.

The 1971 work has added greatly to our understanding of the coal bearing horizons and tentative correlations between field traverses, and gamma/ neutron logs of the four drill holes have been made. These correlations have allowed a fairly precise reserve/quality table to be made for the coal seams.

The Boulder Creek member in the Saxon area is represented by an upper 20 feet of small pebble conglomerate and a lower 170 feet of sandstones which grade down from terrestrial to marine at the lower contact with the Hulcross marine shale. The pebbles are uniformly less that ½" inch, rounded, and consist of flint, green and grey chert and quartz. The matrix is silica and medium sands. The conglomerate forms pronounced erosional dip slopes.

The marine Hulcross shales are only 20 feet thick, and were presumably deposited close to the time of maximum transgression of the Hulcross Sea. This is not a condensed sequence, and therefore beds of lower and upper Hulcross in areas to the northwest, where marine sediments are thicker, have their time equivalents in the Upper Gates and lower Boulder Creek respectively. The Hulcross can be distinguished from other marine sequences by its silty nature. As a consequence of this it is more resistant to weathering, forming blocky fragments with a light brown to purplish colour.

The underlying Gates is, in this area,readily divisibly into three sections:

The lowermost 200 feet consists of medium grained clean, well-sorted sands. These are marine. Ammonites and pelecypods were noted by several field workers. This section contains no coal.

The middle 600 feet consists of alternating sandstones, shales and coals. Five main coal horizons have been recognized.

The upper 500 feet to 600 feet consists predominantly of sandstones and shales, which appear to be barren of economic coal beds. These are continental.

The Moosebar formation is a sequence of marine shales. In places there are layers of clay ironstone. The upper part contains sandstone beds. Its upper contact with the Commotion is taken to be at the first predominantly sandy section. Marine megafossils, pecten, inoceramus, pleuromya have been found in this formation by several field workers.

The shales weather readily to a dark grey rubble. The unit is typically recessive. The dark grey shales abound with megaburrows; these are non-effervescent. The bottomost 35 feet are impoverished in burrows. Two bentonitic layers occur in the shales, both are less than 2 inches.

The base of the Moosebar is punctuated by a narrow (6") band of conglomerate. The pebbles are fine to very fine and dispersed in dark grey shale. There is an abundance of glauconite.

The Gething formation underlies this conglomeratic band. It consists of interbedded mudstone, coal, and sandstone. The clastics are distinctive in their fine grained nature from the underlying Cadomin and the younger Gates. There are 2 seams in some localities, though these were never picked up in the drill-holes.

The Cadomin formation is very distinctive in the field. It provides a very useful mappable horizon, forming prominent

ridges. It is a massive conglomerate composed of flattened and well rounded pebbles and cobbles of black, white and green chert, white and grey quartzite and quartz which range in size from 1/4 inch to over 3 inches in diameter. Its upper and lower contact with finer grained formations are very distinct. Pebble size and thickness of the formation decrease in the northeasterly direction. The matrix is a coarse to medium sandstone.

Underlying the Cadomin is a thick sequence of tightly folded sands and shales, with very minor coal and conglomerate. This is the Lower Cretaceous Nikanassin Formation. Its mode of deformation and repetitious lithology is rather like Flysch, There are, however, many shallow water structures in the sandstones. A fluvial depositionary environment is postulated for most of the section with occasional and short lived marine incursions giving pelecypod fossils. The overall deformational style, repetitious lithology and predominance of fine grained sediments are helpful in distinguishing this formation from other sand / shale sequences in the Cretaceous section.

STRUCTURAL GEOLOGY

The Cadomin to Commotion sucession trends northwest along the northeastern part of the property with average dips of 40^{o} to 60^{o} southwest. On Saxon Ridge several repetitions of Cadomin suggest that there might be small scale thrusting within the economic horizons. Further evidence to support this consideration comes from D.D.H. #2 in which two sections of Moosebar were logged in the first 315 feet of drilling. The attitudes of the beds in this core suggest the repetition was due to a thrust fault. Faulted core, brecciated mudstones and sandstones, were logged from 1100 feet to 1200 feet in hole #1. The type of faulting was not determined.

On Mount Torrens, immediately adjacent to the Saxon property, three faults were mapped by Dr. Stott of the G.S.C. One of these faults, a thrust, places Moosebar on Commotion. The other two smaller faults were restricted to the Commotion Formation. It is probable that these faults are also thrusts.

A dextral tear fault was mapped at the northern end of the property. Its strike is perpendicular to the main structural grain, and coincident with a creek valley. The main drainage pattern in the area is perpendicular to the structural trend. There is a possibility that the drainage pattern was initiated by such faulting.

At the northern limit of the property the otherwise linear outcrop bends around in a synclinal form. This area is owned by McIntyre Porcupines Mines Limited. In this locale the syncline is plunging to the southeast.

The axis of this syncline probably continues the full length of the property exposing Shaftesbury and Dunvegan sediments to the southeast.

In the southern-most portion of the property the southwest limb of the above mentioned syncline constitutes the northeast limb of a northwesterly plunging anticline, which brings to surface the Commotion Formation. Previous cat work exposed a twenty feet thick seam on this structure. A. Chowdry and D. Parkes noted much small scale folding on this limb of the anticline.

North of the Narraway River a southeasterly plunging anticline was mapped by W. D. Brady in 1970. This anticline must be the structural equivalent of the anticline in the southern part of the property. Brady noted that this structure "extends the top of the Commotion to within two miles of the Narraway River.

The area of interest is bounded on the southwest by a westerly dipping thrust fault, which thrusts Nikanassin, and locally Fernie, over the Cadomin to Dunvegan succession.

POTENTIAL COAL IN PLACE

Block 1. - Drill Hole #1 is located at the north end of this block. The intersections in this hole indicate that 40 feet would be a reasonable, if conservative, aggregate thickness for coal seams B and E in the Gates in this block. Seam A was not intersected in hole #1. For mechanical reasons the hole was stopped short of this coal horizon. Hole #2 was drilled to overlap with hole #1, but unfortunately did not. It was spudded 50 feet stratigraphically lower. So seam A horizon has not been drilled in this vicinity. K. Smith observed a 20 foot seam in the field in this part of the section. Thus in these calculations a thickness of 20 feet has been ascribed to Seam A, bringing the aggregate thickness to 60 feet for block 1. Seam D horizon was intersected in Hole #1. There was no coal seam developed at this horizon, only a shaleequivalent, and no reserve has therefore been calculated for this seam. Seam C because of its poor (though recognizable)development over the entire property,has not been used in reserve calculations. The coal in this block dips about 50^{o} southwest. No coal thicknesses were reported for this block by field workers.

Using an aggregate thickness of 60 feet for this block:

(a) a potential coal above drainage (4000 feet A.S.L.)= 52 million tons.

(b) a potential coal below drainage to a working depth of 1,500 feet = 8 million tons.

Total = 60 million tons.

Block 2 - Block 2 is straddled by drill holes # 1 and # 4. No field traverses reported any coal thicknesses in this area, so an aggregate thickness has been derived from averages of seams intersected in holes # 1 and # 4. This thickness is 65 feet for coal in the Gates, 60 feet has been used in calculations, Dips average 45° southwest.

On this basis:

(a) potential coal in place above drainage
= 59 million tons.

(b) potential coal in place below drainage to a mining depth of 1,500 feet = 12 million tons.

Total = 71 million tons.

Block 3 - Block 3 is straddled by holes # 3 and # 4. No thicknesses were reported from field traverses and so an aggregate thickness has been derived from averages of seams intersected in holes # 3 and # 4. This thickness is 51 feet and has been used in calculations. Average attitudes in the Gates Formation in this area are 40° southwest.

on this basis:

(a) potential coal in place above drainage
= 42 million tons.

(b) potential coal in place below drainage to a working depth of 1,500 feet = 25 million tons.

Total = 67 million tons.

Block 4 - Based on intersections in Hole # 3 an aggregate thickness of 45 feet has been used in this block. No thicknesses were reported, in this area, from field traverses. Average attiitudes in the Gates Formation are 45^{0} southwest.

On this basis:

(a) Potential coal in place above drainage = 25 million tons.

(b) Potential coal in place below drainage to a mining depth of 1,500 feet = 17 million tons.

A total potential coal in place above drainage for Saxon = 178 million tons.

A total potential coal in place below drainage to a working depth of 1,500 feet = 62 million tons

Total = 240 million tons.

COAL QUALITY

Summary of Analyses of Raw Coal

Seam	Ash	V. M.	R. M.	F. C.	F. S. I.	B. T. U.	S.
A	11.3	21.8	0.36	66.6	3½, 4	13670	0.30
D	8.1	24.9	0.36	67.5	7	14620	0.34
E	45.1	-	0.46	-	3½, 4	-	0.50

Analyses for the coals recovered are attached in the appendix to this report.

Seam A in both holes #3 and #4 has a rather low F.S.I. in the raw state. It washed to a satisfactory level in hole #4 but not in #3. The seam was sampled at a depth of greater than 700 feet and was presumably unoxidized. This low F.S.I. is possibly a parameter inherent to the seam. Blending will probably bring its F.S.I. up to acceptable levels. The other properties are good.

Seam D gave good results in the raw state. Its low ash, low sulphur and good F.S.I. make it very attractive (see chart).

Seam E was sampled in hole #1, its recovery was less than 50% and of this 30% were shale partings which were analysed in the raw coal sample. Because of this the ash of 45% is disproportionately high.

Seams B and C were not sampled. From the radiation logs B looks like fairly good coal. Perhaps not quite as good as Seam D.

CONCLUSIONS

The Saxon property has a high reserve of potential coal in place, possibly 240 million tons. Of this figure about 20% would be recoverable, giving a potential saleable coal of 48 million tons. A large proportion of this coal, approximately 75%, is above drainage. Thus, mining costs and techniques would be lower and simpler for this coal.

At this point, Seams (A, B, D, E) are most economically interesting. Seam C is rather thin. All the seams vary in thickness and nature from hole to hole. The exact reasons for this are not known, however, such variation is to be expected in widely spaced holes such as these. Roof and floor conditions vary according to the paleogeographic setting, as do thicknesses, although these are influenced structurally also. A program of supplementary drilling and trenching has been recommended to help elucidate these variations, and give more quality data.

RECOMMENDATIONS

Further coal seam quality and continuity parameters must be determined in order to put our presently tentative correlations on a firm footing. For this reason several drill holes have been recommended. Top of seam trenching between holes obtaining encouraging coal intersections and qualities is also recommended to test continuity of the structure and also bring to light any pattern of faults (and their type) which might exist along or across the structural trend. It is the writers experience that in the Foothills and Rockies most stream courses today were initiated by faults or tight folds. These faults are generally normal, of small displacement, and form a pattern at about 90^{0} to the main structural trend (which was itself located by overthrusting). Mapping of joint and fracture patterns and faults observed in seam trenching will be invaluable to eventual underground mine and/or pit wall slope design. Cat 'cross cut' trenches will enable optimum location of drill hole sites, and also seam thicknesses in trenches will be obtained every 500 feet along strike by small cross cuts off the top of seam trenches.

Holes #5 to 11 inclusive are located on the sections and map accompanying this report.

Hole #5 - About 800 feet of Gates member drilling on the east limb of an anticline to obtain figures on coal thicknesses, quality and the relationship of bedrock to topography.

A substantial strippable reserve might exist on this anticline in the Gates Formation. A twenty foot thick seam was mapped here in a trench by W. Brady in 1970.

Hole #6 - This hole is located at the southern end of the property. It is to test coal thicknesses and quality at this point on the main structural trend.

Hole #7 - If the radiation log of hole #6 compares well with that of hole #1, then hole #7 will be superfluous, and will not be drilled.

Hole #8 - This hole will be drilled in the Gates Formation to give information on a section which is well removed from other sources of information and will hopefully firm up the correlation between holes #1 and #4.

Hole #9 - This is to be a short hole drilled from a very exact stratigraphic horizon in the Gates Formation to test for a 20 foot seam (Seam A) which was missed in holes #1 and #2, but was seen at surface in this vicinity by K. Smith. Whether or not this hole is drilled depends on intersections in holes #6, #7, and #8. If Seam A is present and continuous in these three holes then hole #9 will be dropped.

Hole #10 - Again to be drilled in the Gates, and will give us more control between holes #4 and #3.

Hole #11 - To be drilled in the Gates at the northern end of the property. It will furnish information on quality, thickness and

relationships of the coal seams. This part of our property borders on a very interesting syncline presently owned by McIntyre Porcupine Mines Limited. This syncline might have a substantial strip reserve.

As reported earlier some of the Gates sequence is predominantly shaley and sandy. By cat-assisted location of the holes in the field superfluous drilling will be avoided, and holes #5 through #11 (excepting #9) will be around 800 / 900 feet. Total drilling will therefore be around 5,000 feet. 15 miles of cat trenching will be required.

In conjunction with the cat trenching, work sites for several adits(4 to 8) can be prepared. These adits will provide bulk samples for coal washability testing. They will also help in determining to what depth oxidation of the coal, along its exposure, has developed.

STATEMENT OF QUALIFICATIONS

Mr. Alan A. Johnson planned and directed the exploration of Denison Mines Limited's Saxon project subsequent of May 1, 1971. The field mapping was done as directed by Mr. A.C. Mould with the assistance of various geologists and student geologists assigned to the project.

Alan A. Johnson, B.Sc., graduated in Geology from Mount Allison University in Sackville, New Brunswick in 1963. Mr. Johnson has had a number of years experience as a geologist employed by mining companies in British Columbia. He currently holds the position of Chief Geologist (coal) for Denison Mines Limited.

Mr. Anthony C. Mould, B.Sc., graduated in geology from Sheffield University, Yorkshire, England in June 1968. Subsequent to his graduation Mr. Mould has worked for mining companies in British Columbia and Yukon Territory. He is presently employed as a project geologist for Denison Mines Limited.

I consider both the aforementioned geologists to be well qualified to undertake the responsibilities with respect to this project. I am satisfied that the attached report dated October, 1971 has been competently prepared and fairly represents the information obtained from this program.

D.M. Parkes

D.M. Parkes P. Eng.

October 14, 1971