

**SUBSURFACE COAL SAMPLING SURVEY, TELKWA AREA,
CENTRAL BRITISH COLUMBIA
(93L/11)**

By Alex Matheson and Brad Van Den Bussche

KEYWORDS: Coal geology, Telkwa, Lower Cretaceous, coal measure stratigraphy, prospector drill, core recovery.

INTRODUCTION

The 1989 coal sampling survey at Telkwa followed the pilot project at Quinsam mine the preceding year (Matheson, 1990, this volume). The budget for the drilling was augmented by funds from the Institute of Sedimentary and Petroleum Geology, enabling a total of 280 metres to be drilled, double that of the previous year. All coal exposures near the drill sites were sampled in addition to the coal recovered as drill core. The drilling was performed under contract by Neill's Mining Company which had replaced the X-ray drill with the Prospector 89, a new drill manufactured by Hydrocore Drills Limited.

LOCATION OF STUDY AREA

The drilling took place in the Telkwa coalfield located to the southwest of the village of Telkwa on the Yellowhead Highway, 18 kilometres southeast of Smithers in west-central British Columbia (Figure 4-4-1). The Canadian National Railway passes through the village and connects it to the port of Prince Rupert 370 kilometres to the west.

THE PROSPECTOR 89 HYDRAULIC DRILL

The Prospector 89 drill (Plate 4-4-1) is light and portable with a total weight of about 200 kilograms (excluding the

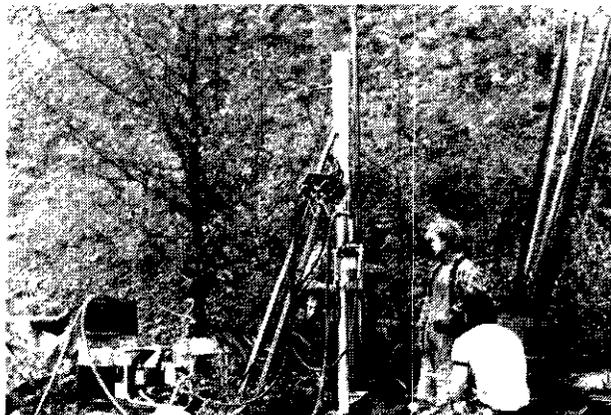


Plate 4-4-1. The Prospector 89 drill.

rods). The weight of the heaviest component, the engine, is 45 kilograms. The unit, which is mounted, is powered by a 16-horsepower air-cooled Briggs and Stratton engine and can drill to a vertical depth of 150 metres. A double swivel core barrel with an internal diameter of 35.0 millimetres (IAX) was used. A total of 280 metres was drilled in nine holes; core recovery varied from 90 to 98 per cent.

GEOLOGICAL SETTING

Outcrop in the area is sparse and it is only in some of the valleys that the coal measures have been exposed by river erosion. The Lower Cretaceous Telkwa coal measures of the Skeena Group consist of interbedded marine and nonmarine sediments divided into three units (Koo, 1984). This sequence unconformably overlies volcanic rocks of the Jurassic Hazelton Group. The area was later intruded by Tertiary dikes and sills. Widespread block faulting forming horsts and grabens has been postulated from Crows Nest Resources Limited drill-hole data. The sediments in the vicinity of the drillsites strike 340° to 350° and dip 10° to 30° east.

DESCRIPTION OF THE COAL MEASURES

The Telkwa coal measures are about 400 metres thick with ten major correlatable coal seams recorded, amounting to an aggregate thickness of up to 24 metres of coal.

The lower unit comprises siltstones, sandstones and grits overlying a discontinuous basal conglomerate (Plate 4-4-2). Distribution of the conglomerate is controlled by paleotopography. Some thin coal seams and the No. 1 coal seam occur in this unit which attains a thickness of up to 120 metres in places. The No. 1 seam, near the top of the unit, ranges up

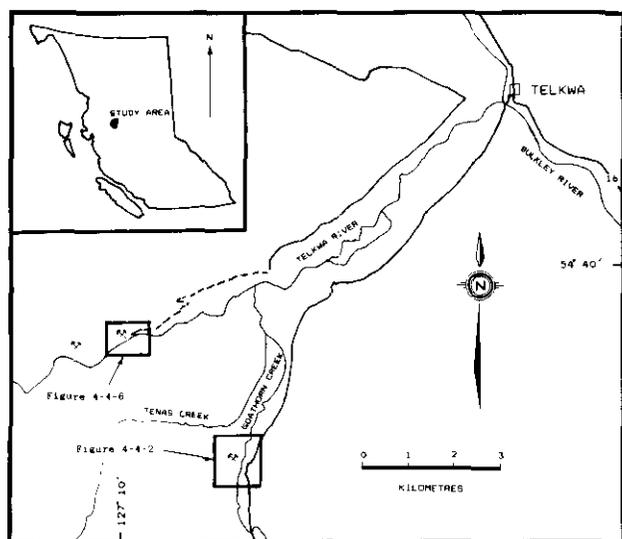


Figure 4-4-1. Location map, Telkwa coalfield, showing location of drilling areas.

to 3.5 metres in thickness. Paleosols are common throughout. Near the base the sandstones become a reddish purple in colour indicating the proximity of the underlying volcanic basement.

The middle unit of medium to fine-grained sandstones, siltstones and mudstones ranges up to 140 metres thick and is devoid of any carbonaceous material.

The upper unit comprises up to 300 metres of mudstones, siltstones and sandstones, and is characterized by an absence of coarse-grained material. The coal occurs in the lower 180 metres. There are nine correlatable coal seams varying from 0.5 to 6.0 metres thick, with an aggregate thickness varying from 13 metres to 21 metres. These seams contain the indicated reserves. Paleosols occur throughout the lower half of the unit.

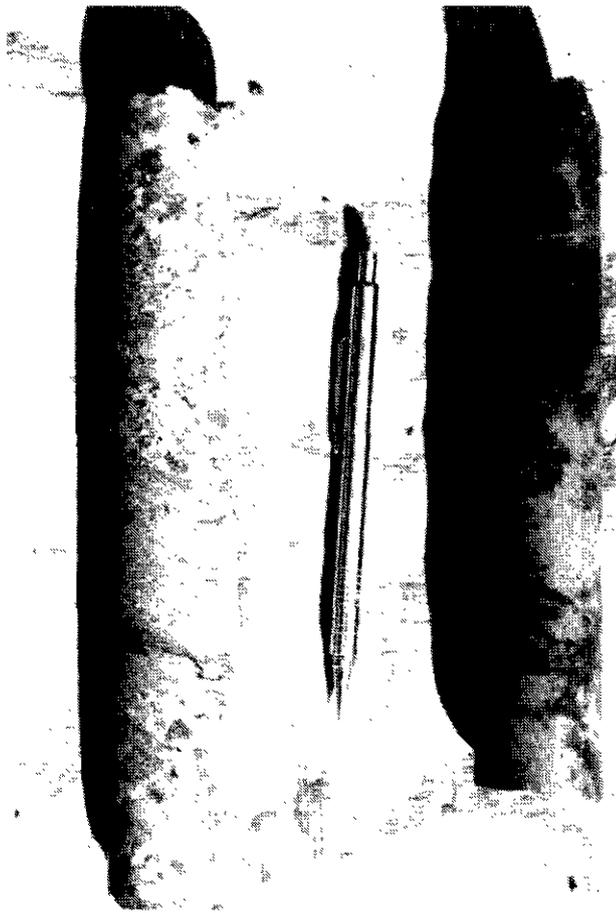


Plate 4-4-2. The basal conglomerate of the lower unit of the Telkwa coal measures.

SAMPLING AND ANALYSIS

A total of 226 samples were taken in the Telkwa coalfield during the 1989 field season; 197 from drill core and 29 from outcrop. Of the drill-hole samples, sixty were from GSB89-01 and 02, thirteen were from GSB89-03 and 04, four from GSB89-05, three from GSB89-07, and 117 were from GSB89-08 and 09. The 29 outcrop samples represent eight seams at seven sample sites.

Outcropping coal seams were described prior to sampling. After cleaning a face across the seam, channel samples were taken perpendicular to bedding. An attempt was made to collect at least three samples at each site in order to represent the upper, middle and lower parts of the seam. Samples ended after 50 centimetres or where a parting occurs, whichever came first.

The coal from the drill core was generally sampled in 20-centimetre increments or shorter intervals as dictated by partings. All samples comprise the entire section of core and were crushed to -20 mesh. Petrographic rank determinations will be done in-house by the vitrinite reflectance method. Analyses will also be made using x-ray defraction on low-temperature ash samples. The following analyses will be carried out by a private laboratory under the auspices of the Institute of Sedimentary and Petroleum Geology: proximate, ultimate, sulphur forms, calorific value, free swelling index, ash analysis, chlorine, fluorine, mercury contents and ash fusion. At the request of Dr. Fari Goodarzi the remainder of the core, after the coal had been removed, was sent to the Institute of Sedimentary and Petroleum Geology in Calgary, primarily for petrographic examination of the maceral composition of the carbonaceous material in the mudstones, siltstones and shales.

DRILLING

Drill holes GSB89-01 and 02 (Figure 4-4-2), 28.5 and 25 metres deep respectively, were each drilled 7 metres from the west bank of Goathorn Creek and 70 metres apart. The northern hole is about 100 metres south of the Bulkley Valley mine site. The coal exposed by the river was sampled

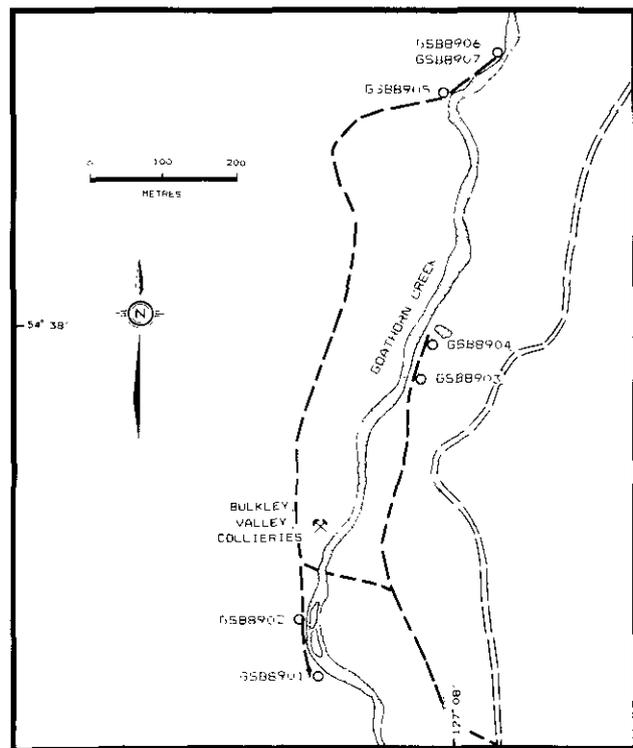


Figure 4-4-2. Location of drill holes along Goathorn Creek near the Bulkley Valley mine (see also Figure 4-4-1).

adjacent to each drill site. Both holes were spudded fairly low in the upper unit, along strike from each other. It is assumed that Nos. 2, 3, 4 and 5 seams were intersected (Figure 4-4-3). There is evidence of seams, splitting, pinching and swelling within the short distance separating the holes.

Drill holes GSB89-03 and 04 (Figure 4-4-2), 52.0 and 25 metres deep respectively, are located on the east bank of the Goathorn Creek about 250 metres north of the Bulkley Valley mine site. They are 55 metres apart and about 15 metres from outcrops in the river. They were spudded in the lower unit of the Telkwa coal measures and each intersected three coal zones, in all probability below No. 1 seam (Figure 4-4-4). The holes were stopped before reaching the basement.

Hole GSB89-05 is located 350 metres north of GSB89-04 on the west side of Goathorn Creek, 22 metres from a cliff face (Figure 4-4-2) and was drilled to a depth of 45.6 metres. It cut rocks of the lower unit which are generally coarser grained than the upper unit. Four minor coal zones were intersected.

Holes GSB89-06 and 07 were drilled 100 metres to the northeast (Figure 4-4-2). Hole GSB89-06 (Figure 4-4-5) was abandoned at 19.2 metres because the coal seam exposed in the river was not intersected and appeared to have been eroded. This was proven to be correct when Hole GSB89-07 was drilled halfway to the outcrop, 12 metres from the westbank of the Goathorn Creek. It intersected 0.7 metre of coal as expected and was stopped at 10.3 metres.

Holes GSB89-08 and 09 (Figure 4-4-6) are located south of the Avelling mine and north of the Telkwa River. GSB89-08 is 20 metres from the river and has a depth of 33.4 metres (Figure 4-4-7). It intersected 11 metres of coal in five seams. GSB89-09 is 40 metres from river, roughly along strike. It was drilled to 43.3 metres and intersected five coal seams with an aggregate thickness of 9.6 metres. Both holes are in the upper unit of the Telkwa coal measures and possibly

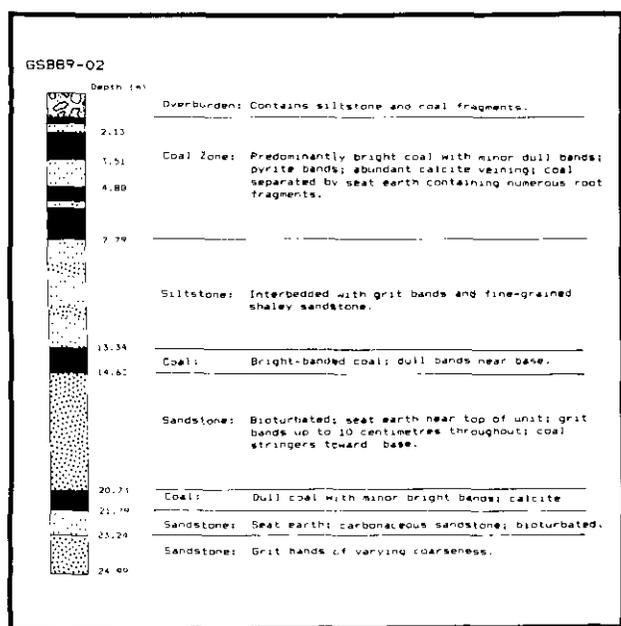


Figure 4-4-3. Simplified stratigraphic log of Hole GSB89-02 (for location see Figure 4-4-2).

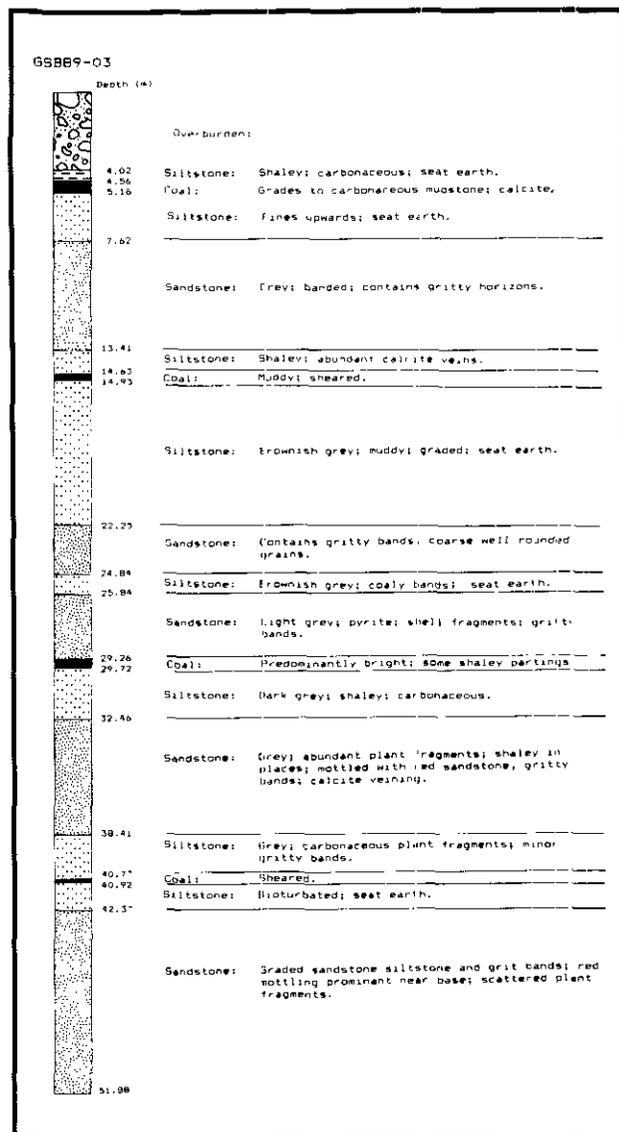


Figure 4-4-4. Simplified stratigraphic log of Hole GSB89-03 (for location see Figure 4-4-2).

low in the sequence as indicated by the grouping of the coal seams. Here again there is evidence of seams splitting, thinning and swelling over a very short distance.

CONCLUSIONS

The drill achieved an average core recovery of 95 per cent, which is excellent, and is well suited to drilling in sedimentary rocks. Core recovery in the coal was particularly good, about 97 to 98 per cent. This, however, may be partially attributable to the character of the coal. In the streams the coal is more resistant to erosion than the surrounding sediments.

The drill is easily portable, in sections, along a prepared foot trail. The success of the project has resulted in plans by two major coal mining companies to use the drill for exploration work and for coal-quality control in pit areas.

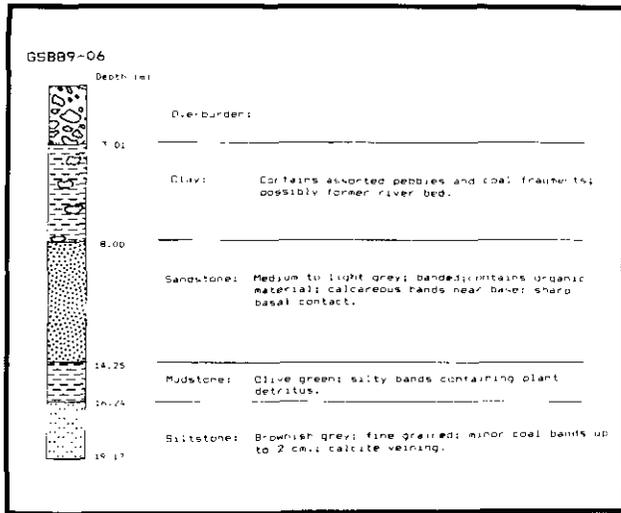


Figure 4-4-5. Simplified stratigraphic log of Hole GSB89-06 (for location see Figure 4-4-2).

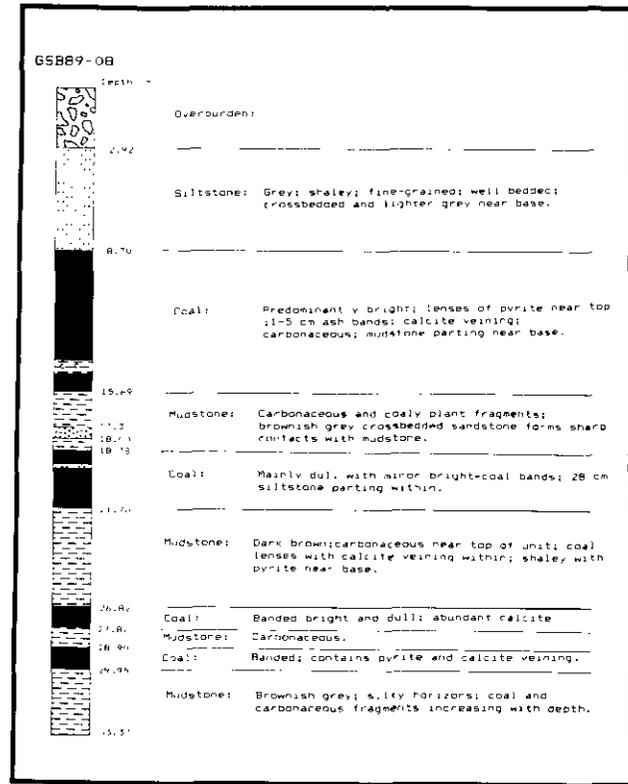


Figure 4-4-7. Simplified stratigraphic log of Hole GSB89-08 (for location see Figure 4-4-6).

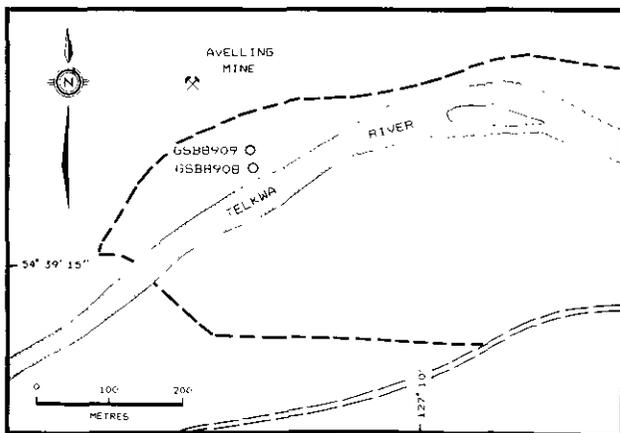


Figure 4-4-6. Location of drill holes along the Telkwa River near Avelling mine (see also Figure 4-4-1).

ACKNOWLEDGMENTS

The authors would like to extend their appreciation to Brian McKinstry of Crows Nest Resources Limited for his very kind assistance, to Fari Goodarzi for his keen interest

and participation in the program, to their colleagues of the Coal Subsection, to Kenny Neill for his assistance in the field and crushing room, and to Rebecca Arnet for her stenographic support.

REFERENCES

- Koo, J. (1984): Telkwa Coalfield, West-central British Columbia (93L). *B.C. Ministry of Energy, Mines and Petroleum Resources*, Geological Fieldwork 1983, Paper 1984-1, pages 113-121.
- Matheson, A. (1990): Subsurface Coal Sampling, Quinsam Area, Vancouver Island, British Columbia (92F); *B.C. Ministry of Energy, Mines and Petroleum Resources*, Geological Fieldwork 1989, Paper 1990-1, this volume.