GEOLOGIC SUMMARY AND THERMAL COAL POTENTIAL OF THE BOWRON RIVER COAL PROPERTY OF NORCO RESOURCES LTD. PRINCE GEORGE, B. C.

by

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1.0 INTRODUCTION

The Bowron River coal property of Norco Resources Ltd. is an Upper Cretaceous Tertiary coal deposit located near Prince George, B. C. Coal has been known in the area since before the turn of the century, although it was not until the early 1960's that serious exploration was started. To date some 26,075 metres in 95 boreholes, both diamond and rotary, have been drilled. In addition, two adits were driven, originally for the purpose of extracting coal for the local market and later serving as access for bulk sampling. The drilling programmes from 1967 onwards are of particular importance since the results are adequately documented. Geophysical logging of boreholes was incorporated in the 1980 and 1981 programmes and provided valuable data.

This report summarizes the results of exploration work carried out on the property. It briefly describes the general geology of the deposit, particularly as it relates to its coal potential. It also includes a computation of coal reserves of the "measured" category, as well as an estimate of additional coal reserves outside the drilled area.

Since the property is extensively covered by alluvium and glacial till, the interpretation of the local geology is based almost entirely on the results of borehole drilling. Other interpretations, particularly on regional structure, were interpolated from published government maps and reports.

2.0 SUMMARY AND CONCLUSIONS

The Bowron River coal property of Norco Resources Ltd., near Prince George, B. C., comprises 51 coal licences, of which only 6 licences have been extensively explored. Exploration to date, mainly by borehole drilling, has confirmed the presence of thick coal seams in the southwest sector of what appears to be a northwesterly elongated sedimentary basin. The coal seams occur in the lower half of the Upper Cretaceous and Early Tertiary Bowron River coal measures which, in the drilled area, attain thicknesses exceeding 700 metres. The closely spaced drilling has delineated an area 4.5 km long and 1.5 km wide, from which 49,904,280 tonnes of in-place raw coal from two seams have been calculated.

The average analysis of the raw coal on an air-dry basis is as follows:

Moisture	3.63%
Ash	35.70%
Volatile Matter	26.69%
Fixed Carbon	33.98%
Sulphur	1.33%
BTU/lb	8,154

The coal is non-coking.

Limited tests indicate that the coal can be satisfactorily washed to specified ash levels with relatively high product yields. Additional tests are required to confirm this assumption.

It is anticipated that additional drilling outside the delineated area will appreciably increase the presently known reserves.

3.0 PROPERTY DESCRIPTION

3.1 Location and Access

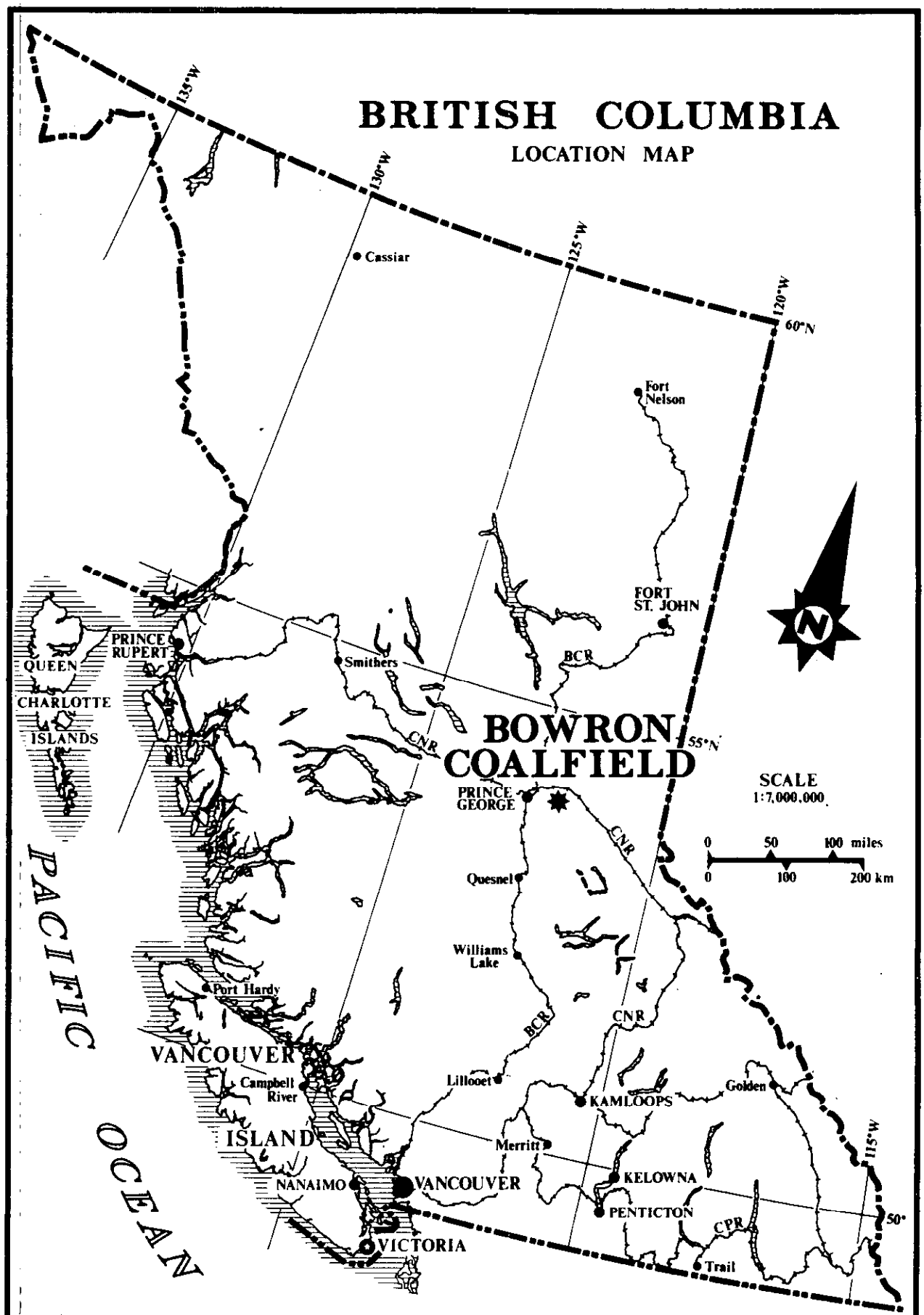
The Bowron River coal property lies approximately 60 km east of Prince George, B. C. (Figure 1). It is accessible from Prince George by some 50 km of paved road on Highway 16 and thence by 10 km of all-weather gravel road. The closest access to rail would be Hansard, a distance of 35 km to the north. Prince George is a large industrial and commercial hub in north central B. C., with daily scheduled commercial jet transportation. It also serves as a major staging point for both B. C. Rail and the C. N. R.

3.2 Size

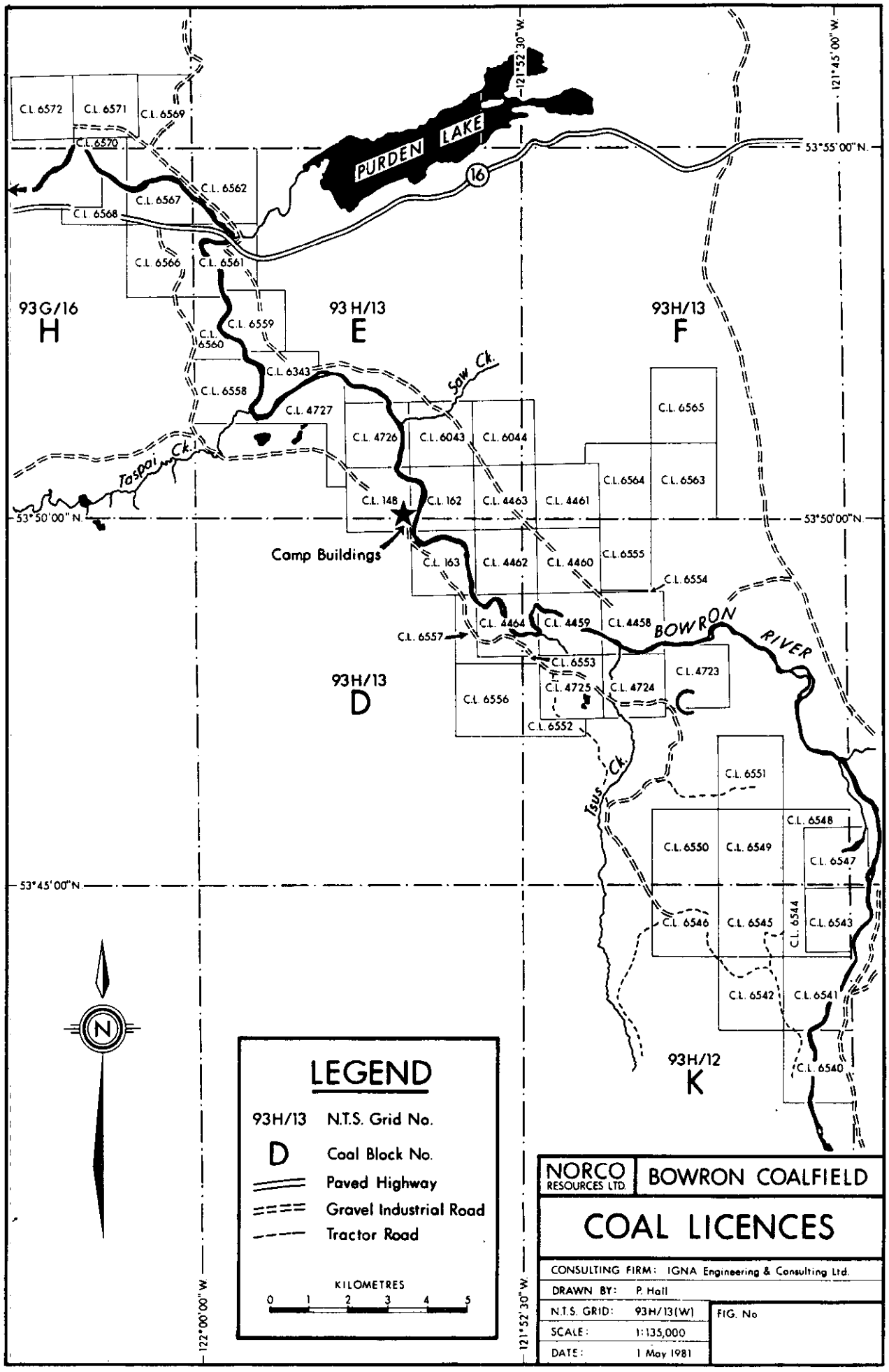
The Bowron River coal property of Norco Resources Ltd. comprises a total of 51 coal licences (Figure 2). Of this total, only six licences (C.L. 148, 162, 163, 4459, 4462, and 4464) have been explored by borehole drilling. The licences more or less follow and straddle the northwest-flowing Bowron River along a distance of nearly 34 km.

3.3 Physiography

The most notable physiographic feature of the area is the narrow northwest trending valley that contains the mature flood plain of the Bowron River. Except for a few gravel terraces the valley is relatively flat with elevations averaging about 750 metres above sea level. The dominant surficial materials are river gravels which, over a wide area, average 30 metres to bedrock. The valley rises on each flank to elevations exceeding 1,200 metres above sea level.



IGNA engineering & consulting ltd.	NORCO RESOURCES LTD. **BOWRON COALFIELD**	DATE FIG. No.



NORCO RESOURCES LTD.

BOWRON COALFIELD

COAL LICENCES

CONSULTING FIRM:	IGNA Engineering & Consulting Ltd.
DRAWN BY:	P. Hall
N.T.S. GRID:	93H/13(W)
SCALE:	1:135,000
DATE:	1 May 1981
FIG. No	

4.0 HISTORY

Coal in the area was discovered by G. M. Dawson of the GSC in 1870. Prior to 1960 several small companies hand-sorted coal from small underground workings and sold it locally in Prince George. In 1960 Northern Coal Mines Ltd. acquired coal licences covering a large area and, between 1964 and 1966, drilled 32 boreholes, ranging in depth from 50 to 150 metres. All the core from the drilling was neglected and destroyed. In 1967, 10 diamond drill holes were completed under the supervision of Dr. S. M. Black. The results of this drilling were well documented and the core is reportedly still intact. It was during this same period that two adits were driven, apparently for the purpose of exploring the coal seam. In 1971 Northern Coal Mines optioned their property to Bethlehem Copper Mines which completed 5 diamond drill holes under the supervision of Dr. Kucera.

In 1973 Zulu Explorations Ltd. staked mineral claims in the area and drilled 10 boreholes. The results of the drilling are poorly documented. Shortly thereafter, Northern Coal Mines was reorganized and renamed Norco Resources Ltd. Norco sampled one of the adits and shipped 12 tons to the Department of Energy, Mines & Resources, and to Cyclone Engineering, both of Edmonton, Alberta, for testing. In 1977 a major diamond drilling programme comprising 25 diamond drill holes was completed under the direction of Kerr, Dawson & Associates. The results of this programme are very well documented. Further borehole drilling, both diamond and rotary, was carried out in 1980 and 1981 under the direction of I. Borovic, P. Eng. During both years a total of 10,894 metres in 24 boreholes was completed.

5.0 PREVIOUS EXPLORATION

5.1 Borehole Drilling

The surface geology of the Bowron River coal property is obscured by a thick mantle of alluvium and glacial till. Limited rock exposures are found only along the banks of the Bowron River and on higher elevations on both sides of the Bowron River Valley. Consequently, past exploration programmes have been limited mainly to borehole drilling. During the 1980 and 1981 exploration programmes, rotary drilling was introduced specifically to penetrate the thick overburden. A summary of borehole drilling carried out on the property since 1964 is shown below in Table 1.

TABLE 1

SUMMARY OF BOREHOLE DRILLING

Year	No. of Holes	Total Length
1967	32	5,220.4 m
1971	5	2,517.5 m
1973	9	1,746.9 m
1977	25	5,701.6 m
1980	14	5,328.8 m
1981	10	5,564.7 m
	95	26,075.9 m

5.2 Adits and Bulk Sampling

Two old adits are present on the property, both of which were driven for the purpose of mining coal. These adits were later utilized for bulk sampling. The first bulk sampling was carried out in 1968 by the DEMR and consisted of 727 kg of coal. The second bulk sampling was carried out by H. S. Haslam & Associates in 1976 and consisted of a 12 tonne sample. The results from the bulk samplings are appended to this report and are discussed in the section on coal quality.

6.0 GEOLOGY

6.1 General Setting

The Bowron River coal deposit is situated in a narrow northwesterly elongate basin at the northern end of the Cariboo Mountain range. The basin is mainly comprised of the Upper Cretaceous or Early Tertiary Bowron River coal measures, which unconformably overlie the Mississippian Antler Formation. A few outcrops of the Bowron River coal measures occur over a strike length of 11 km along a narrow band bounded by rocks of the Antler Formation (Figure 4). Published government aeromagnetic maps indicate that the basin could be as much as 19 km long with an average width of 2.5 km. The structural trend of the basin appears consistent with the northwesterly regional strike of the surrounding older formations.

6.2 Stratigraphy

The following summary of the stratigraphy of the property is based mainly on borehole information and limited government publications. The rock units comprising the Bowron River coal measures are characterized by rapid changes in lithology indicative of rapidly changing depositional environment. The stratigraphy is therefore complex and correlation would only be possible on a local basis. A typical stratigraphic section of the property is shown in Figure 5.

6.2.1 Antler Formation

The oldest rock on the property is the Mississippian Antler Formation that belongs to the Slide Mountain group. The formation is comprised of pillow basalt, breccia, tuff, minor diorite and gabbro, chert, argillite and lithic sandstone. It is regional in distribution and appears to have been subjected to the same degree of deformation as the surrounding sedimentary rocks. The majority of the boreholes drilled on the property bottomed in volcanics and tuffaceous sandstone of the Antler Formation.

6.2.2 Bowron River Coal Measures

Resting unconformably on the Antler Formation are the Upper Cretaceous or Early Tertiary Bowron River coal measures, chiefly comprised of conglomerate, breccia, shale, sandstone, and coal. The deepest hole on the property, DDH 81-22, penetrated close to 1,150 metres of Bowron River coal measures, representing a total true thickness of at least 700 metres.

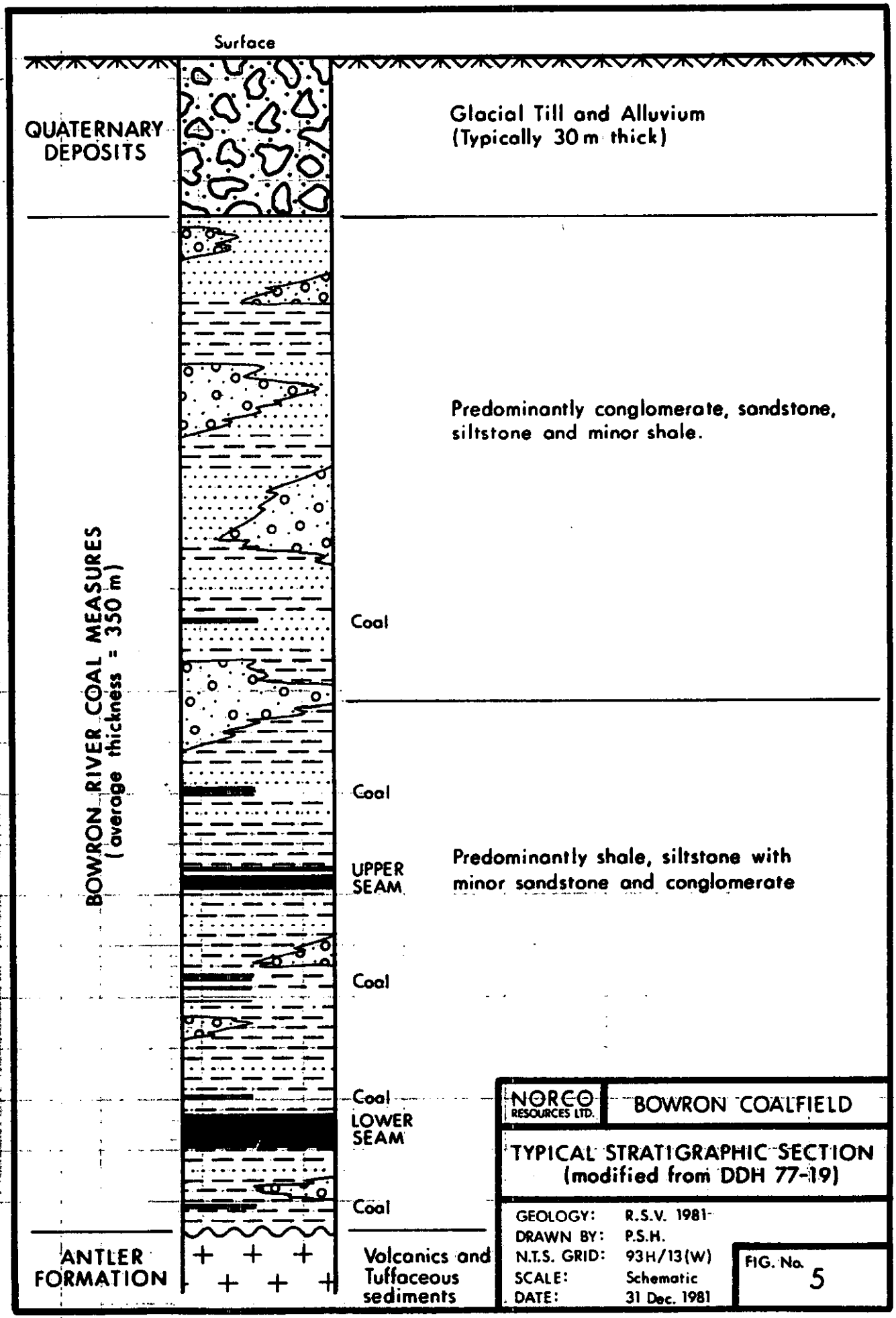
A distinct feature of the sedimentary environment of the area is the frequent, although irregular, appearance of conglomeratic units varying from less than a metre to greater than 18 metres in thickness throughout the entire stratigraphic succession. The conglomerates, which rarely include coal beds, are interbedded with dominantly carbonaceous and coaly shales and sandstones.

The lateral distribution of the conglomerates is not well understood although there are indications that they thicken eastward. The dominant rock types of the Bowron River coal measures are carbonaceous shales and siltstones. Although they occur throughout the stratigraphic sequence, they appear to predominate in the lower half of the section. They are the main units that envelope the major coal seams.

6.3 Structure

A structure contour map, drawn at the base of the Lower Seam, is shown in Figure 6. The map details the structure of a part of the basin and shows a small, south-plunging syncline terminated by a northeast transverse fault. The syncline has an average width of 1,200 metres. It is symmetrical, with its flanks dipping an average of 35 degrees. South of the transverse fault, the dips progressively steepen southwards to a maximum of 65 degrees west of DDH No. 22.

Evidence is lacking to support the suggestion of previous writers that the basin is graben-modified where the Bowron River coal measures are in fault contact with the Antler Formation. Borehole data indicates that the occasional truncation of the coal measures by the Antler Formation could be due to an initial topography at the start of sedimentary deposition. The steep dips on the southwest flank of the basin appears consistent with the tight folding that characterizes the structural profile of the rocks to the east and southeast.


Surface
QUATERNARY DEPOSITS
Glacial Till and Alluvium
(Typically 30 m thick)
BOWRON RIVER COAL MEASURES
(average thickness = 350 m)
Predominantly conglomerate, sandstone, siltstone and minor shale.
Coal
Coal
UPPER SEAM
Predominantly shale, siltstone with minor sandstone and conglomerate
Coal
Coal
LOWER SEAM
Coal
ANTLER FORMATION
Volcanics and Tuffaceous sediments
NORCO RESOURCES LTD.
BOWRON COALFIELD
TYPICAL STRATIGRAPHIC SECTION
(modified from DDH 77-19)
GEOLOGY: R.S.V. 1981
DRAWN BY: P.S.H.
N.T.S. GRID: 93H/13(W)
SCALE: Schematic
DATE: 31 Dec. 1981
FIG. No. 5

6.4 Coal Seams

A simplified depositional model of the Bowron River coal measures suggests predominant swamp environment which was frequently interrupted by alternating and/or interacting lagoonal and fluviatile conditions. Most of the swamp developments, particularly in the upper part of the section, were short-lived, as they were either inundated during periods of marine incursions or destroyed by meandering streams.

Several coal seams occur throughout the Bowron River coal measures, either as discrete individual coal beds or as zones comprising a number of coal beds. Only two coal zones appear to be important.

6.4.1 Lower Seam

The Lower Seam is actually a coal zone that occurs within 50 to 100 metres above the Antler Formation and is generally comprised of several closely spaced coal beds separated by rock bands. The zone includes coal beds ranging widely in thickness to as much as 6.7 metres. The rock bands range from laminae to a thickness of 1 metre. In places the seam is comprised of only one coal bed with thicknesses of as much as 5 metres. In general, the seam is comprised of interbedded coal and rock with thicknesses of up to 15 metres. At section 27 + 00 N, a rock band in the Lower Seam develops and, as it progresses southeastward, thickens and divides the seam into an upper and lower split with each split maintaining appreciable thicknesses.

The Lower Seam is persistent and correlatible over long distances.

6.4.2 Upper Seam

The Upper Seam occurs within 50 metres above the Lower Seam. It is less developed and less persistent although, like the Lower Seam, it includes a number of rock bands. Typically, the Upper Seam comprises two coal beds separated by a rock band nearly one metre thick. The maximum aggregate thickness of coal and rock observed in the Upper Seam was 4.75 metres. The seam appears better developed on the west flank of the basin.

7.0 COAL QUALITY

7.1 Proximate Analysis and Washability Tests

The coal from Bowron River has always been considered a thermal coal. However, additional laboratory tests are required to establish its quality. From the 1977 drilling programme, 30 core samples were submitted for Proximate Analyses and returned the following averages on an air-dry basis:

Moisture	3.63%
Ash	35.70%
Volatile Matter	26.79%
Fixed Carbon	33.98%
Sulphur	1.33%
BTU/lb	8,154

No washability tests were carried out on any of the above samples. The original laboratory results are found in Appendix I.

Two composited coal samples from the 1981 drilling programme were submitted for float and sink analysis, the results of which are included in Appendix I. It would appear from these meagre results that the coal can be cleaned to less than 10% ash at product yields between 60% and 70%.

The results of washability tests on the two bulk samples are inconclusive and inadequate. The results can be found in Appendix II.

Additional analyses will be required to establish coal quality, as it would affect a mining plan as well as the proper design of a washplant.

7.2 Petrography

A petrographic study of a coal seam (presumably the Lower Seam) was carried out by the Geological Survey of Canada in 1972. The results indicate that the bright coal is principally comprised of vitrain and clarain almost in equal proportion. The maximum average reflectance for the whole seam is 0.65%.

7.3 Amber Resin

Unique to Bowron River coal is the random occurrence of amber resin in the form of blebs, stringers, and disseminations, which amounts to as much as 4% of the coal by weight.

8.0 COAL RESERVES

8.1 "Measured" Reserves

Exploratory borehole drilling has delineated appreciable reserves of high volatile bituminous coal over a part of the Bowron River coal property. These reserves occur in coal seams in the lower half of the Upper Cretaceous to Early Tertiary Bowron River coal measures. Figure 6 illustrates the relationship of the delineated reserve area with respect to the basin as a whole. It also illustrates the density of borehole drilling which provided closely spaced data that enabled a high degree of geological confidence in the interpretation of the structure and the correlation of seams. The calculated reserves confined within the drilled area are, therefore, of the "measured" category.

A summary of the "measured" coal reserves by seam is as follows:

Lower Seam (lower split)	40,540,272 tonnes
Lower Seam (upper split)	7,970,136 tonnes
Upper Seam	1,393,872 tonnes
TOTAL	49,904,280 tonnes

8.1.1 Computation Method and Parameters

The cross-section method of reserve computation was used. Cross sections were drawn to accommodate as many boreholes as possible at 300 metre spacings. In the closer spaced drilling the spacings were at 150 metres. In the computation of tonnage from each section the following formula was used:

Tonnes $\simeq$ SL x W x T x SG

Where: SL = seam length as measured from cross section
W = Width of cross section which is the cross section spacing
T = Average seam true thickness from bore hole intersections
SG = Specific Gravity of the coal (assumed uniform at 1.60)

It must be noted that the seam thickness is the aggregate total true thickness of each coal bed within a seam and does not include the rock bands within the seam. The true mining thickness would therefore be the seam thickness (as used in the computation of reserves) plus the interseam rock bands. These rock bands would constitute the inseam dilution in the calculation of future mining reserves.

The assumed Specific Gravity of 1.60 is estimated to be near the true value for an average head ash of 35.70% for Bowron River coal. Several specific gravity measurements from coal samples would be required to establish a true specific gravity figure.

In cross sections where no borehole data is available, average seam thicknesses were borrowed from adjacent cross sections.

A summary of the computation of coal reserves is shown in Table 2.

TABLE 2 - SUMMARY OF COAL RESERVE COMPUTATION

Lower Seam (Lower Split)

Section	Seam Length (Metres)	Width	Average Thickness	S.G.	Tonnes
9 + 00 S	1,850	300	4.42	1.60	3,924,960
6 + 00 S	1,720	300	3.67	1.60	3,029,952
3 + 00 S	1,650	300	3.67	1.60	2,906,640
0 + 00	1,650	300	3.67	1.60	2,906,640
3 + 00 N	1,420	300	4.84	1.60	3,298,944
6 + 00 N	2,000	300	3.84	1.60	3,686,400
9 + 00 N	1,950	300	3.84	1.60	3,594,240
12 + 00 N	1,860	225	4.05	1.60	2,711,880
13 + 50 N	1,890	150	4.33	1.60	1,964,088
15 + 00 N	1,150	225	6.95	1.60	2,877,300
18 + 00 N	1,200	300	5.73	1.60	3,300,480
21 + 00 N	1,160	300	3.08	1.60	1,714,944
24 + 00 N	1,120	225	3.49	1.60	1,407,168
25 + 50 N	690	150	1.86	1.60	308,016
27 + 00 N	850	150	2.98	1.60	607,920
28 + 50 N	750	150	5.00	1.60	900,000
30 + 00 N	750	150	3.11	1.60	559,800
31 + 50 N	680	150	5.02	1.60	512,040
33 + 00 N	540	150	4.06	1.60	328,860
				TOTAL:	40,540,272

TABLE 2 (Continued)

Lower Seam (Upper Split)

13 + 50 N	1,350	150	2.83	1.60	916,920
15 + 00 N	900	225	4.92	1.60	1,594,080
18 + 00 N	480	300	6.43	1.60	1,481,472
21 + 00 N	580	300	5.64	1.60	1,570,176
24 + 00 N	940	225	3.12	1.60	1,055,808
25 + 50 N	540	150	5.80	1.60	751,680
27 + 00 N	500	150	5.00	1.60	600,000
				TOTAL:	7,970,136

Upper Seam

24 + 00 N	340	225	1.97	1.60	241,128
25 + 00 N	300	150	1.12	1.60	80,640
27 + 00 N	820	150	1.13	1.60	222,384
28 + 50 N	740	150	1.33	1.60	236,208
30 + 00 N	710	150	1.69	1.60	287,976
31 + 50 N	820	150	0.92	1.60	181,056
33 + 00 N	350	150	1.72	1.60	144,480
				TOTAL:	1,393,872

TOTAL TONNAGE IN UPPER AND LOWER SEAMS: 49,904,280

8.2 Potential Reserves

The drilled area from which measured coal reserves have been calculated comprises only a small portion of the Bowron River sedimentary basin. The distribution of outcrops, even if sparse, and aeromagnetic data support the interpretation that rocks of the Bowron River coal measures underlie the whole basin. Based on this interpretation, it is therefore possible to make an order of magnitude estimate of the coal potential of the remaining area outside the drilled area.

In the following calculation only the Lower Seam is considered:

Total Area	37,530,000 sq. m
Average Seam Thickness (Assumed minimum)	4 m
Specific Gravity (Assumed)	1.6

Thus: 37,530,000 x 4 x 1.6 = 240,192,000 tonnes.

It is obvious that the above estimated tonnage must be moved to a more realistic figure consistent with the level of confidence in the geological interpretation. This confidence level may be expressed as a geologic factor which, in the case of the insufficient data in the above calculation, is set at 40%. The potential reserve calculation, based on the above assumptions, would therefore be:

37,530,000 x 4 x 1.6 x 0.40 = 96,076,800 tonnes

9.0 RECOMMENDATIONS

9.1 Borehole Drilling

Figure 8 shows the location of proposed drill holes. The proposed drilling programme has the following objectives:

(a) to verify specific structural interpretations.
(b) to extend the presently known reserves.
(c) to identify other areas for more detailed drilling.

9.2 Bulk Sampling

Bulk samples should be taken either from old adits or from a new adit to provide sufficient material for the following tests:

(a) pilot plant washability
(b) combustion (clean coal)
(c) attrition (raw coal and rock)

9.3 Coal Seam Logging, Sampling and Analysis

In the event that a core drilling programme is initiated, a comprehensive procedure should be drawn on coal seam logging, sampling, and laboratory analysis. Washability tests should be included where core recoveries are high and the flow sheet should be designed to ultimately provide simulated plant yields.

December 31, 1982

Ruben Verzosa, P. Eng.

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B.C. MMAR (1914, 1946, 1948, 1967)

APPENDIX I

DRILL CORE ANALYTICAL RESULTS

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE #: 77-1

Footage: 632.0 - 637.5

	Air-dry Basis	Dry Basis
Ash %	19.13	19.95
R.M. %	4.07	--
V.M. %	32.42	33.79
F.C. %	44.38	46.26
S. %	1.24	1.29
BTU/lb.	10,720	11,170

Estimated Amber Resin Content: 0.4%

CYCLONE ENGINEERING SALES LTD.

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE #: 77-1

Footage: 639.0 - 647.5

	Air-dry Basis	Dry Basis
Ash %	27.74	28.83
R.M. %	3.77	--
V.M. %	29.39	30.54
F.C. %	39.10	40.63
S. %	2.11	2.19
BTU/lb.	9,370	9,740

Estimated Amber Resin Content: 0.3%

CYCLONE ENGINEERING SALES LTD.

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE #: 77-1

Footage: 651.5 - 659.0

	Air-dry Basis	Dry Basis
Ash %	34.02	35.23
R.M. %	3.43	--
V.M. %	28.11	29.11
F.C. %	34.44	35.66
S. %	2.87	2.97
BTU/lb.	8,690	9,000

Estimated Amber Resin Content: 0.6%

CYCLONE ENGINEERING SALES LTD.

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE: DDH 77-2

Footage: 623' - 628'

	Air-dry basis	Dry basis
Ash %	30.57	31.83
R.M. %	3.95	--
V.M. %	29.94	31.17
F.C. %	35.54	37.00
S. %	1.37	1.43
B.T.U./lb.	9,140	9,520

Estimated Amber Resin Content: 0.8%

CYCLONE ENGINEERING SALES LTD.

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE: DDH 77-3

Footage: 765' - 774'

	Air-dry basis	Dry basis
Ash %	50.98	52.54
R.M. %	2.97	—
V.M. %	22.89	23.59
F.C. %	23.16	23.87
S. %	0.79	0.81
B.T.U./lb.	6,310	6,500

Estimated Amber Resin Content: 0.1%

CYCLONE ENGINEERING SALES LTD.

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE: 77-4

Footage: 756' - 765'

	Air-dry basis	Dry basis
Ash %	34.88	35.97
R.M. %	3.03	--
V.M. %	27.85	28.72
F.C. %	34.24	35.31
S %	1.32	1.36
BTU/lb.	8,120	8,370

Estimated Amber Resin Content: 0.1%

CYCLONE ENGINEERING SALES LTD.

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE: 77-4

Footage: 765' - 773'

	Air-dry basis	Dry basis
Ash %	42.26	43.31
R.M. %	2.42	--
V.M. %	25.79	26.43
F.C. %	29.53	30.26
S %	0.76	0.78
BTU/lb.	7,090	7,270

Estimated Amber Resin Content: 0.09%

CYCLONE ENGINEERING SALES LTD.

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE: 77-4

Footage: 773' - 778'

	Air-dry basis	Dry basis
Ash %	28.16	29.09
R.M. %	3.19	--
V.M. %	31.90	32.95
F.C. %	36.75	37.96
S %	0.73	0.75
BTU/lb.	9,280	9,590

Estimated Amber Resin Content: 0.1%

CYCLONE ENGINEERING SALES LTD.

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE# 77-5

Footage: 893' - 909'

	Air-dry basis	Dry basis
Ash %	33.36	34.37
R.M. %	2.95	--
V.M. %	31.20	32.15
F.C. %	32.49	33.48
S. %	1.11	1.14
BTU/lb.	8,350	8,600

Estimated Amber Resin Content: 0.09%

CYCLONE ENGINEERING SALES LTD.

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE: 77-5

Footage: 912' - 919'

	Air-dry basis	Dry basis
Ash %	33.25	34.27
R.M. %	2.98	--
V.M. %	30.37	31.30
F.C. %	33.40	34.43
S.	2.01	2.01
BTU/lb.	8,600	8,860

Estimated Amber Resin Content: 0.23%

CYCLONE ENGINEERING SALES LTD.

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE: #77-6

Footage: 695.5' - 709.5

	Air-dry basis	Dry basis
Ash %	36.08	37.05
R.M.%	2.62	--
V.M.%	33.04	33.93
F.C. %	28.26	29.02
S. %	0.82	0.84
BTU/lb.	7,820	8,030

Estimated Amber Resin Content: 0.16%

CYCLONE ENGINEERING SALES LTD.

NORCO RESOURCES LTD.

PROJECT: Bowron River

HOLE: 77-7

Footage: 528.5' - 538'

	Air-dry basis	Dry basis
Ash %	23.65	24.62
R. M. %	3.93	--
V. M. %	36.08	37.56
F. C. %	36.34	37.83
S. %	1.13	1.18
BTU/lb.	9,940	10,350

Estimated Amber Resin Content: 0.26 %

CYCLONE ENGINEERING SALES LTD.

CABLE ADDRESS COMTEC(
TELEX 04-35289

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

Please address all correspondence to:
147 Riverside Dr., North Vancouver, B.C. V7H 1T6

Office: Tel. (604) 929-2228

September 15, 1977

WRIGHT ENGINEERS LTD.
Ste. #100 - 1444 Alberni St.
VANCOUVER, BC
V6G 2Z4

Report No. 64-16093 - 101

Sample Identification:

77-8	471-478'	77-11	988-997'
77-8	478-485'	77-11	1038-1045'
77-9	835-839.5'	77-12	919-927.5'
77-10	1262.5-1271'	77-13	958.5-962.5'
		77-15	697.5-707'

PROXIMATE ANALYSES

Sample No.		As Received	Dry Basis
77-8 471-478'	% Moisture	4.77	xxxxx
	% Ash	24.52	25.75
	% Volatile	29.33	30.80
	% Fixed Carbon	41.38	43.45
		100.00	100.00
	Btu	9481	9956
	% Sulphur	1.73	1.82
77-8 478-485'	% Moisture	5.07	xxxxx
	% Ash	25.69	27.06
	% Volatile	29.30	30.86
	% Fixed Carbon	39.94	42.08
		100.00	100.00
	Btu	9297	9794
	% Sulphur	1.46	1.54
77-9 835-839.5'	% Moisture	4.32	xxxxx
	% Ash	21.84	22.83
	% Volatile	30.33	31.70
	% Fixed Carbon	43.51	45.47
		100.00	100.00
	Btu	9976	10426
	% Sulphur	2.71	2.83

Continued Page 2/ ...

Sample No.		As Received	Dry Basis
77-10	% Moisture	3.29	xxxxx
1262.5-1271'	% Ash	41.23	42.63
	% Volatile	22.57	23.34
	% Fixed Carbon	32.91	34.03
		100.00	100.00
	Btu	7267	7514
	% Sulphur	1.17	1.21
77-11	% Moisture	3.22	xxxxx
988-997'	% Ash	42.13	43.53
	% Volatile	22.94	23.70
	% Fixed Carbon	31.71	32.77
		100.00	100.00
	Btu	7134	7371
	% Sulphur	1.65	1.70
77-11	% Moisture	4.36	xxxxx
1038-1045'	% Ash	29.81	31.17
	% Volatile	26.38	27.58
	% Fixed Carbon	39.45	41.25
		100.00	100.00
	Btu	8763	9163
	% Sulphur	1.22	1.28
77-12	% Moisture	3.36	xxxxx
919-927.5'	% Ash	46.94	48.57
	% Volatile	19.93	20.62
	% Fixed Carbon	29.77	30.81
		100.00	100.00
	Btu	6307	6526
	% Sulphur	0.83	0.86
77-13	% Moisture	4.64	xxxxx
958.5-962.5'	% Ash	20.89	21.91
	% Volatile	32.12	33.68
	% Fixed Carbon	42.35	44.41
		100.00	100.00
	Btu	10012	10499
	% Sulphur	0.96	1.01

Continued Page 3/ ...

Sample No.		As Received	Dry Basis
77-15	% Moisture	4.33	xxxxx
697.5-707'	% Ash	34.37	35.93
	% Volatile	26.35	27.54
	% Fixed Carbon	34.95	36.53
		100.00	100.00
	Btu	8125	8493
	% Sulphur	1.34	1.40

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

C. D. Saville
Manager

js

CABLE ADDRESS COMTE
TELEX 04-352

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

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147 Riverside Dr., North Vancouver, B.C. V7H 1T6

SINCE 1908

Office: Tel. (604) 929-2228

September 27, 1977

WRIGHT ENGINEERS LTD.
Ste. #100 - 1444 Alberni St.
VANCOUVER, BC
V6G 2Z4

Report No. 64-16148 - 50

Attention: Dr. L. S. Gormely, Mr. N. R. Krpan

Sample Identification: DDH WL-3 846-859'
DDH 77-17 1109-1114.5'
DDH 77-17 1048.5-1057'

PROXIMATE ANALYSES

Sample No.		As Received	Dry Basis
WL-3 846-859'	% Moisture	4.49	xxxxx
	% Ash	41.37	43.32
	% Volatile	24.72	25.88
	% Fixed Carbon	29.42	30.80
		100.00	100.00
	BTU	6646	6958
	% Sulphur	0.96	1.00
77-17 1109-1114.5'	% Moisture	3.68	xxxxx
	% Ash	35.07	36.41
	% Volatile	25.99	26.98
	% Fixed Carbon	35.26	36.61
		100.00	100.00
	BTU	8095	8404
	% Sulphur	1.09	1.13
77-17 1048.5-1057'	% Moisture	2.92	xxxxx
	% Ash	55.83	57.51
	% Volatile	19.90	20.50
	% Fixed Carbon	21.35	21.99
		100.00	100.00
	BTU	5103	5256
	% Sulphur	0.50	0.51

Continued Page 2/ ...

CABLE ADDRESS CC
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Please address all correspondence to:
147 Riverside Dr., North Vancouver, B.C. V7H 1T6

Office: Tel. (604) 929-

October 12, 1977

WRIGHT ENGINEERS LTD.
Ste. #100 - 1444 Alberni Street
VANCOUVER, BC
V6G 2Z4

Report No. 64-16162-64

Attention: Dr. L. S. Gormely
Mr. N. R. Krpan

Sample Identification: DDH 77-18 1145 - 1158.5'
1161 - 1167.5'
1169 - 1175'

PROXIMATE ANALYSIS

SAMPLE NO.		AS RECEIVED	DRY BASIS
DDH 77-18	% Moisture	3.42	xxxxx
1145-1158.5'	% Ash	47.86	49.56
	% Volatile	22.66	23.46
	% Fixed Carbon	26.06	26.98
		100.00	100.00
	BTU	6194	6413
	% Sulphur	1.06	1.10
DDH 77-18	% Moisture	3.03	xxxxx
1161-1167.5'	% Ash	47.90	49.40
	% Volatile	23.85	24.60
	% Fixed Carbon	25.21	26.00
		100.00	100.00
	BTU	6132	6324
	% Sulphur	1.23	1.27
DDH 77-18	% Moisture	3.93	xxxxx
1169-1175'	% Ash	36.30	37.79
	% Volatile	27.48	28.60
	% Fixed Carbon	32.29	33.61
		100.00	100.00
	BTU	7883	8205
	% Sulphur	1.58	1.64

DENSITY: DDH 77-18 1161 - 1167.5' = 98.3 lbs/cu ft.

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

C. D. Saville
Manager

jp

CABLE ADDRESS CO
TELEX 0

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

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Office: Tel. (604) 929-2

October 12, 1977

WRIGHT ENGINEERS LTD.
Ste. #100 - 1444 Alberni Street
VANCOUVER, BC
V6G 2Z4

Report No. 64-16211-13

Attention: Dr. L. S. Gormely
Mr. N. R. Krpan

Sample Identification: DDH 77-19 1015.5 - 1027'
1027 - 1040'
1040 - 1047'

PROXIMATE ANALYSIS

SAMPLE NO.		AS RECEIVED	DRY BASIS
DDH 77-19	% Moisture	3.53	xxxxx
1015.5-1027'	% Ash	40.69	42.18
	% Volatile	19.22	19.92
	% Fixed Carbon	36.56	37.90
		100.00	100.00
	BTU	7278	7544
	% Sulphur	1.34	1.39
DDH 77-19	% Moisture	3.04	xxxxx
1027-1040'	% Ash	49.84	51.40
	% Volatile	19.42	20.03
	% Fixed Carbon	27.70	28.57
		100.00	100.00
	BTU	5828	6011
	% Sulphur	1.42	1.46
DDH 77-19	% Moisture	4.21	xxxxx
1040-1047'	% Ash	34.73	36.26
	% Volatile	19.16	20.00
	% Fixed Carbon	41.90	43.74
	BTU	8104	8460
	% Sulphur	1.28	1.34

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

C. D. Saville
Manager

jp

F-462

file 2

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., P.O. BOX 127
SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

NORCO RESOURCES LTD.
412-200 Granville Street
Vancouver, B.C., Canada
V7C 1S4

June 11, 1981

Sample identification by Norco Resources Ltd.

Kind of sample reported to us	Coal from D.H. #2
Sample taken at	Norco Resources Ltd.
Sample taken by	Norco Resources Ltd.
Date sampled	-----
Date received	-----

Composite of "A" samples.
Samples crushed to 6 mm x 0.

Analysis of Raw Coal Head Sample.

Analysis report no. 71-71962

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	3.48	xxxxx
% Ash	24.54	25.42
% Volatile	36.37	37.68
% Fixed Carbon	35.61	36.90
	100.00	100.00
Btu/lb.	9671	10020
% Sulfur	1.76	1.82

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R. A. HOUSER, Manager, Midwest Division

Original Copy Watermarked For Your Protection

Charter Member

NORCO RESOURCES LTD.
Vancouver, B.C.

D.H. #2
Composite of "A" samples
Sample crushed to 6 mm x 0
Analysis Report No. 71-71963 - 71967

June, 1981

FLOAT & SINK ANALYSIS

SPECIFIC GRAVITY			FRACTION ANALYSIS, DRY BASIS				
SINK	FLOAT	%WT.	%ASH	%SUL.	BTU	%VOL.	%F.C.
--	1.40	51.6	5.22	1.59	13236	41.63	53.15
1.40	1.50	11.4	16.69	2.85	11439	38.38	44.93
1.50	1.60	6.1	27.35	3.12	9800	34.53	38.12
1.60	1.70	4.9	36.26	2.83	8425	31.68	32.06
1.70		26.0	64.97	1.46	3421	27.23	7.80
			CUMULATIVE RECOVERY (FLOAT)				
—	1.40	51.6	5.22	1.59	13236	41.63	53.15
1.40	1.50	63.0	7.30	1.82	12911	41.04	51.66
1.50	1.60	69.1	9.07	1.93	12636	40.47	50.46
1.60	1.70	74.0	10.87	1.99	12357	39.89	49.24
1.70		100.0	24.93	1.85	10034	36.59	38.48
			CUMULATIVE REJECT (SINK)				
--	1.40	100.0	24.93	1.85	10034	36.59	38.48
1.40	1.50	48.4	45.95	2.14	6620	31.23	22.82
1.50	1.60	37.0	54.97	1.92	5135	29.02	16.01
1.60	1.70	30.9	60.42	1.68	4215	27.94	11.64
1.70		26.0	64.97	1.46	3421	27.23	7.80

Respectfully submitted,

COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser, Manager,
Midwest Division

RAH/dh

F-462

COMMERCIAL TESTING & ENGINEERING CO.

GENERAL OFFICES: 228 NORTH LA SALLE STREET, CHICAGO, ILLINOIS 60601 · AREA CODE 312 726-8434

PLEASE ADDRESS ALL CORRESPONDENCE TO:
16130 VAN DRUNEN RD., P.O. BOX 127
SOUTH HOLLAND, IL 60473
OFFICE TEL. (312) 264-1173

NORCO RESOURCES LTD.
412-200 Granville Street
Vancouver, B.C., Canada
V7C 1S4

June 11, 1981

Sample identification by Norco Resources Ltd.

Kind of sample reported to us	Coal from D.H. #4
Sample taken at	Norco Resources Ltd.
Sample taken by	Norco Resources Ltd.
Date sampled	-----
Date received	-----

Composite of "B" samples.
Samples crushed to 6 mm x 0.

Analysis of Raw Coal Head Sample.

Analysis report no. 71-71968

PROXIMATE ANALYSIS

	As Received	Dry Basis
% Moisture	3.06	xxxxx
% Ash	34.06	35.14
% Volatile	28.26	29.15
% Fixed Carbon	34.62	35.71
	100.00	100.00
Btu/lb.	8375	8639
% Sulfur	1.04	1.07

FUSION TEMPERATURE OF ASH

	Reducing	Oxidizing
Initial Deformation	xxxx °F	xxxx °F
Softening (H = W)	xxxx °F	xxxx °F
Softening (H = ½W)	xxxx °F	xxxx °F
Fluid	xxxx °F	xxxx °F

H = Cone Height
W = Cone Width

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

R. A. HOUSER, Manager, Midwest Division

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Charter Member

NORCO RESOURCES LTD.
Vancouver, B.C.

D.H. #4
Composite of "B" samples
Sample crushed to 6 mm x 0
Analysis Report No. 71-71969 - 71973 June, 1981

FLOAT & SINK ANALYSIS

SPECIFIC GRAVITY			FRACTION ANALYSIS, DRY BASIS				
SINK	FLOAT	%WT.	%ASH	%SUL.	BTU	%VOL.	%F.C.
--	1.40	45.1	4.54	1.26	13189	40.48	54.98
1.40	1.50	9.1	16.29	2.67	11376	37.75	45.96
1.50	1.60	3.2	28.41	1.78	9568	33.24	41.35
1.60	1.70	2.3	37.95	1.38	8140	30.15	31.90
1.70		40.3	78.85	0.45	1842	17.63	3.52
			CUMULATIVE RECOVERY (FLOAT)				
--	1.40	45.1	4.54	1.26	13189	40.48	54.98
1.40	1.50	54.2	6.51	1.50	12885	40.02	53.47
1.50	1.60	57.4	7.73	1.51	12700	39.64	52.63
1.60	1.70	59.7	8.90	1.51	12524	39.28	51.82
1.70		100.0	37.09	1.08	8219	30.55	32.36
			CUMULATIVE REJECT (SINK)				
--	1.40	100.0	37.09	1.08	8219	30.55	32.36
1.40	1.50	54.9	63.83	0.93	4136	22.40	13.77
1.50	1.60	45.8	73.27	0.59	2698	19.35	7.38
1.60	1.70	42.6	76.64	0.50	2182	18.31	5.05
1.70		40.3	78.85	0.45	1842	17.63	3.52

Respectfully submitted,

COMMERCIAL TESTING & ENGINEERING CO.

R. A. Houser, Manager,
Midwest Division

RAH/dh

CLIENT : NORCO RESOURCES LIMITED

PROJECT: DRILLHOLE CORE 81-22 COMPOSITE OF 13 INTERVALS from 1171.27 to 1183.35 = 12.0

LAB NO.: 8310

HEAD RAW ANALYSIS

MOIST%	ASH%	VOL%	F.C.%	S%	CALC. BASIS
0.9	55.0	22.1	22.0	0.67	a.d.b.
	55.5	22.3	22.2	0.68	d.b.

SIZE CONSIST: RAW COAL CRUSHED TO - 1 1/2"

SIZE FRACTION	WT%	CUM WT%
1 1/2" x 3/8 "	88.1	88.1
3/8 " x 28M	11.3	99.4
28M x 0	0.6	100.0

SINK-FLOAT ANALYSIS,adb: 1 1/2"x0

SG FRACTION	WT%	RM%	ASH%	VOL%	F.C.%	S%	C.V. Cal/gm	CUMULATIVE WT%	CUMULATIVE ASH%
- 1.40	23.7	1.5	7.9	39.1	51.5	1.07	7245	23.7	7.9
1.40- 1.50	4.7	1.5	23.9	33.4	41.2	1.13	5842	28.4	10.5
1.50- 1.60	5.5	1.2	30.9	31.3	36.6	0.88	5202	33.9	13.8
1.60- 1.70	5.5	1.2	40.4	26.5	31.9	1.30	4415	39.4	17.6
+1.70	60.6	0.6	79.4	-	-	-	-	100.0	55.0

ANALYSIS OF COMPOSITE FLOATS @ 1.60 S.G.

ULTIMATE ANALYSIS,adb							
H20%	C%	H%	N%	S%	ASH%	0(by dif	HGI
1.50	69.16	4.28	1.30	1.02	13.74	9.00	53

ASH FUSION TEMPERATURES(°F)				
ATMOSPHERE	I.D.T.	S.T.	H.T.	F.T.
OXIDIZING	2120	2280	2320	2400
REDUCING	2040	2140	2220	2340

Birtley Coal
& Minerals Testing

APPENDIX II

BULK SAMPLING ANALYTICAL RESULTS

NORCO RESOURCES LTD.

Bowron River Mines

TABLE 1. ANALYSIS OF FEED SAMPLE

PROXIMATE ANALYSIS:

Ash %	36.10
R.M. %	2.24
V.M. %	30.99
F.C. %	30.67

ULTIMATE ANALYSIS:

Ash %	36.10
Carbon %	48.59
Hydrogen %	3.75
Nitrogen %	0.90
Sulphur %	0.97
Oxygen % (by difference)	9.69
TOTAL	100.00

NORCO RESOURCES LTD.

Bowron River Mines

TABLE 1. ANALYSIS OF FEED SAMPLE continued

MINERAL ANALYSIS OF ASH:

SiO_2	%	63.76
Al_2O_3	%	18.88
CaO	%	1.92
MgO	%	1.18
Fe_2O_3	%	5.49
Na_2O	%	1.33
K_2O	%	0.53
TiO_2	%	0.56
P_2O_5	%	0.33
SO_3	%	1.67

ASH FUSIBILITY:

	Oxidizing Atmosphere	Reducing Atmosphere
Initial Deformation Temperature	2320°F.	2400°F.
Softening Temperature (Spherical)	2480°F.	2560°F.
Softening Temperature (Hemispherical)	2540°F.	2600°F.
Fluid Temperature	2700°F	2800°F.

OTHER TESTS:

Calorific Value	8,310 BTU/lb.
FSI	N.A.
HGI	58.0

NORCO RESOURCES LTD.
Bowron River Mines

TABLE 2. ANALYSIS OF PRODUCTS AFTER WASHING AT EMR PILOT PLANT

A. CLEAN COAL AND MIDDLING

PROXIMATE ANALYSIS:

	Clean Coal	Middling
Ash %	9.79	35.00
R.M. %	2.54	2.11
V.M. %	34.93	26.99
F.C. %	52.74	35.90

ULTIMATE ANALYSIS:

Ash %	9.79	35.00
Carbon %	67.89	47.48
Hydrogen %	4.91	3.66
Nitrogen %	1.15	0.87
Sulphur %	0.90	0.87
Oxygen % (by difference)	15.36	12.12
TOTAL	100.00	100.00

NORCO RESOURCES LTD.

Bowron Mines Ltd.

TABLE 2. ANALYSIS OF PRODUCTS AFTER WASHING AT EMR PILOT PLANT continued

MINERAL ANALYSIS OF ASH:

	Clean Coal	Middling
SiO_2 %	58.60	65.76
Al_2O_3 %	16.98	18.96
CaO %	5.77	1.37
MgO %	1.78	1.18
Fe_2O_3 %	6.23	5.37
Na_2O %	1.35	1.37
K_2O %	0.66	0.53
TiO_2 %	0.51	0.55
P_2O_5 %	0.26	0.31
SO_3 %	4.26	1.12

ASH FUSIBILITY:

	CLEAN COAL		MIDDLING	
	Reducing Atmosphere	Oxidizing Atmosphere	Reducing Atmosphere	Oxidizing Atmosphere
Initial Deformation Temp.	2140°F	2260°F	2320°F	2480°F
Softening Temp. (Spherical)	2260°F	2340°F	2520°F	2600°F
Softening Temp. (Hemispherical)	2340°F	2400°F	2600°F	2660°F
Fluid Temperature.	2600°F	2700°F	2720°F	2760°F

OTHER TESTS:	CLEAN COAL	MIDDLING
Calorific Value (BTU/lb)	12,360	8,630
FSI	1/2	N.A.

NORCO RESOURCES LTD.

Bowron River Mines

TABLE 2. ANALYSIS OF PRODUCTS AFTER WASHING AT EMR PILOT PLANT continued

B. REJECTS:

	Coarse Reject	Fine Reject
Ash %	68.67	37.40
Calorific Value (BTU/lb.)	4,580	8,050

TABLE 3. SIZE CONSIST OF PRODUCTS

SIZE	WT. %			
	Clean Coal	Middling	Coarse Reject	Fine Reject
+ 3/8"	.00	1.42	1.32	0.00
3/8" x 28 mesh	49.85	94.76	89.46	15.18
28 m x 150 mesh	42.90	3.56	8.95	74.96
150 m x 0	7.25	0.26	0.27	9.86
TOTAL	100.00	100.00	100.00	100.00

NORCO RESOURCES LTD.

Bowron River Mines

TABLE 4. FLOAT-SINK ANALYSIS OF + 28 MESH FRACTIONS OF PRODUCTS

	WT. %			
SP. GR.	CLEAN COAL	MIDDLING	COARSE REJECT	FINE REJECT
- 1.25	0.44 (1.16)	--	--	0.19 (1.16)
1.25 - 1.30	18.07	22.71	3.23	2.40
1.30 - 1.35	63.51	15.91	4.32	15.92
1.35 - 1.40	7.42	0.31	5.53	6.32
1.40 - 1.50	5.67	7.28	0.47	9.16
1.50 - 1.60	1.87	2.14	3.36	9.41
1.60 - 1.80	1.28	5.04	6.78	16.68
1.80 - 2.00	0.62	7.35	7.90	15.66
+ 2.00	1.12 (2.33)	39.26 (2.44)	68.41 (2.38)	24.26 (2.34)
TOTAL	100.00	100.00	100.00	100.00

Figures in Parenthesis are the Sp.Gr. of the fractions.

NORCO RESOURCES LTD.

Bowron River Mines

TABLE 5. FLOAT-SINK ANALYSIS OF 28 MESH x 150 MESH FRACTIONS OF PRODUCTS

SP. GR.	WT.%			
	CLEAN COAL	MIDDLING	COARSE COAL	FINE COAL
- 1.25	0.49 (1.15)	0.73 (1.20)	0.33 (1.14)	0.35 (1.14)
1.25 - 1.30	29.45	24.78	10.03	2.59
1.30 - 1.35	43.66	24.49	14.45	21.82
1.35 - 1.40	8.84	5.83	2.17	8.20
1.40 - 1.50	5.33	4.37	2.17	6.64
1.50 - 1.60	3.89	3.50	2.34	8.59
1.60 - 1.80	2.36	4.66	3.68	8.16
1.80 - 2.00	1.56	4.96	5.68	7.17
+ 2.00	4.42 (2.45)	26.68 (2.34)	59.15 (2.23)	36.48 (2.34)
TOTAL	100.00	100.00	100.00	100.00

Figures in Parenthesis are the Sp. Gr. of the fractions.

TABLE 6. ASHES OF 150 M x 0 FRACTIONS OF PRODUCTS

	CLEAN COAL	MIDDLING	COARSE REJECT	FINE REJECT
ASH %	30.12	22.29	38.94	33.87

9.0 RECOMMENDATIONS

9.1 Borehole Drilling

Figure 8 shows the location of proposed drill holes. The proposed drilling programme has the following objectives:

(a) to verify specific structural interpretations.
(b) to extend the presently known reserves.
(c) to identify other areas for more detailed drilling.

9.2 Bulk Sampling

Bulk samples should be taken either from old adits or from a new adit to provide sufficient material for the following tests:

(a) pilot plant washability
(b) combustion (clean coal)
(c) attrition (raw coal and rock)

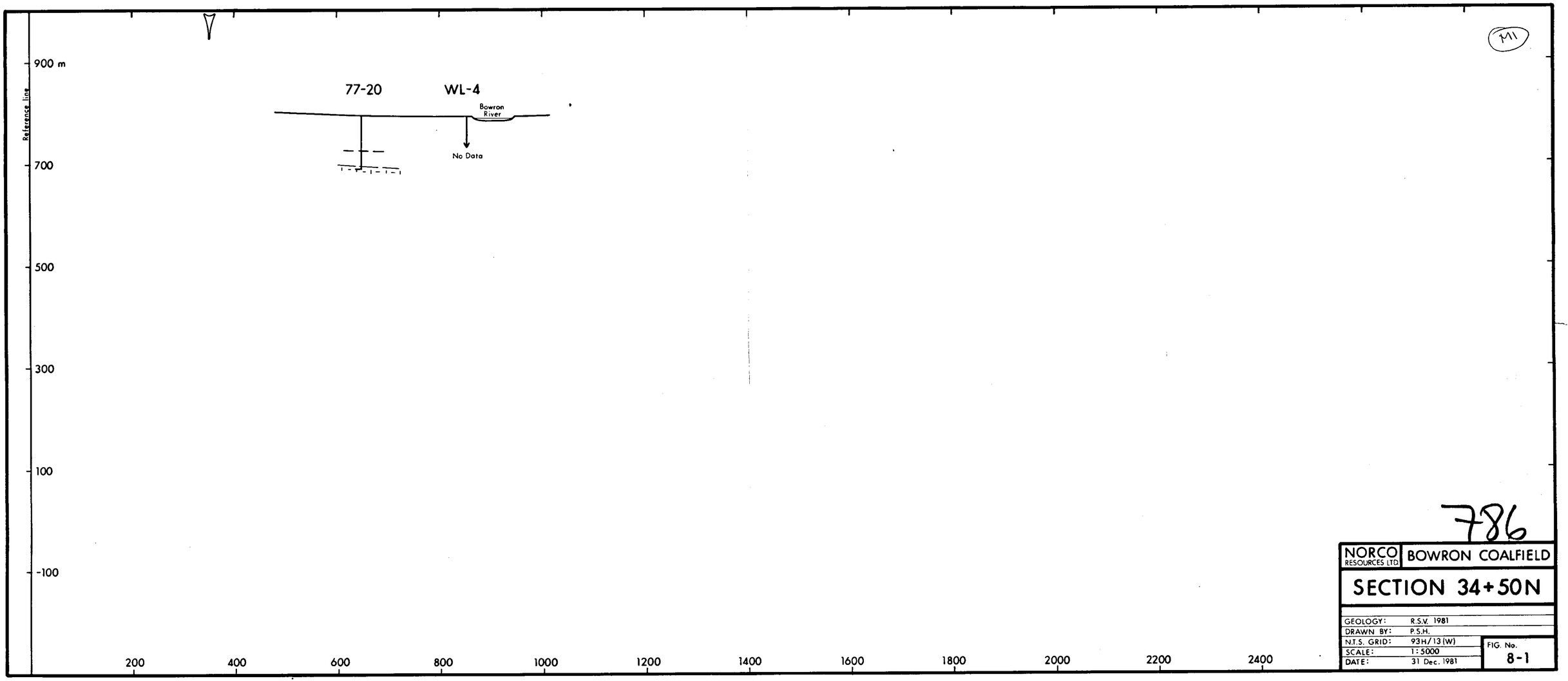
9.3 Coal Seam Logging, Sampling and Analysis

In the event that a core drilling programme is initiated, a comprehensive procedure should be drawn on coal seam logging, sampling, and laboratory analysis. Washability tests should be included where core recoveries are high and the flow sheet should be designed to ultimately provide simulated plant yields.

December 31, 1982

R. S. Verzosa

Ruben Verzosa, P. Eng.



M1

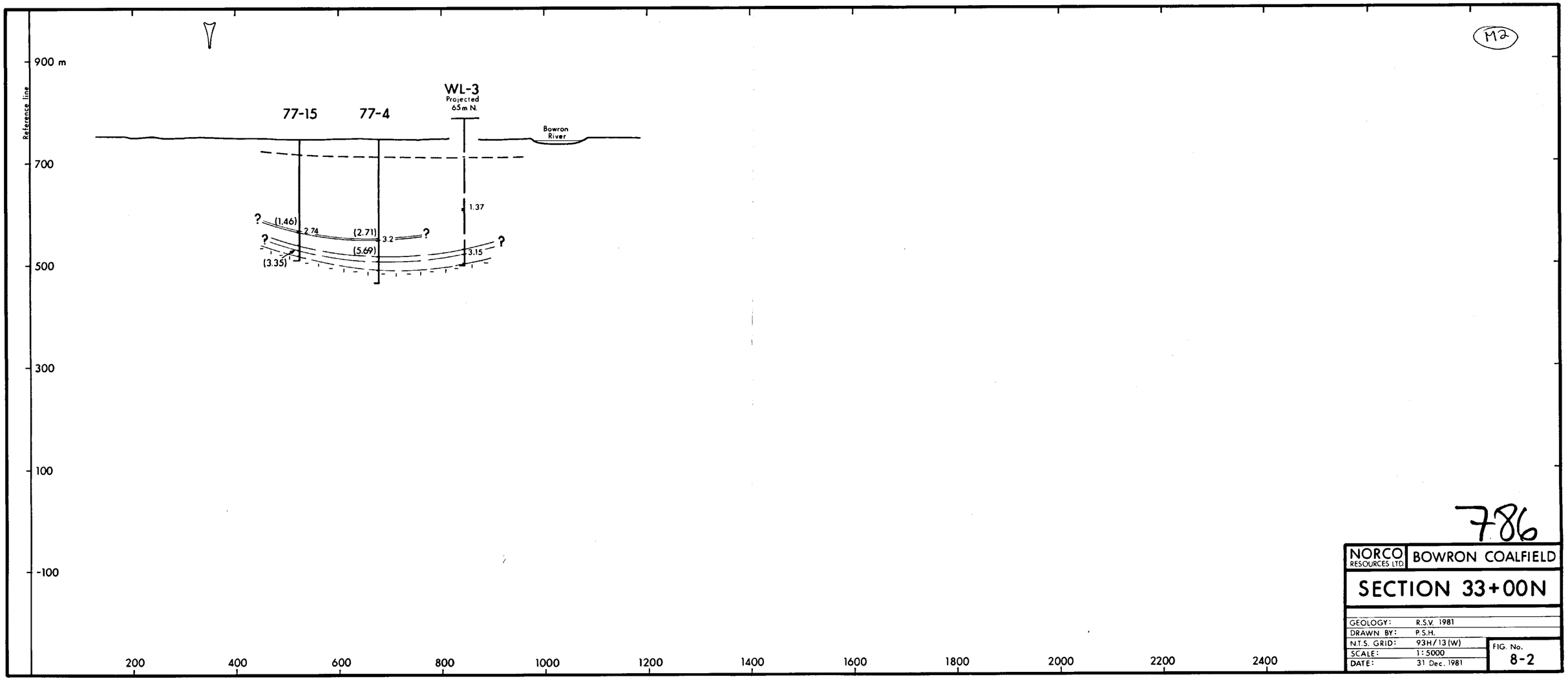
786

NORCO RESOURCES LTD | BOWRON COALFIELD

SECTION 34+50N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:5000
DATE:	31 Dec. 1981

FIG. No. 8-1



M2

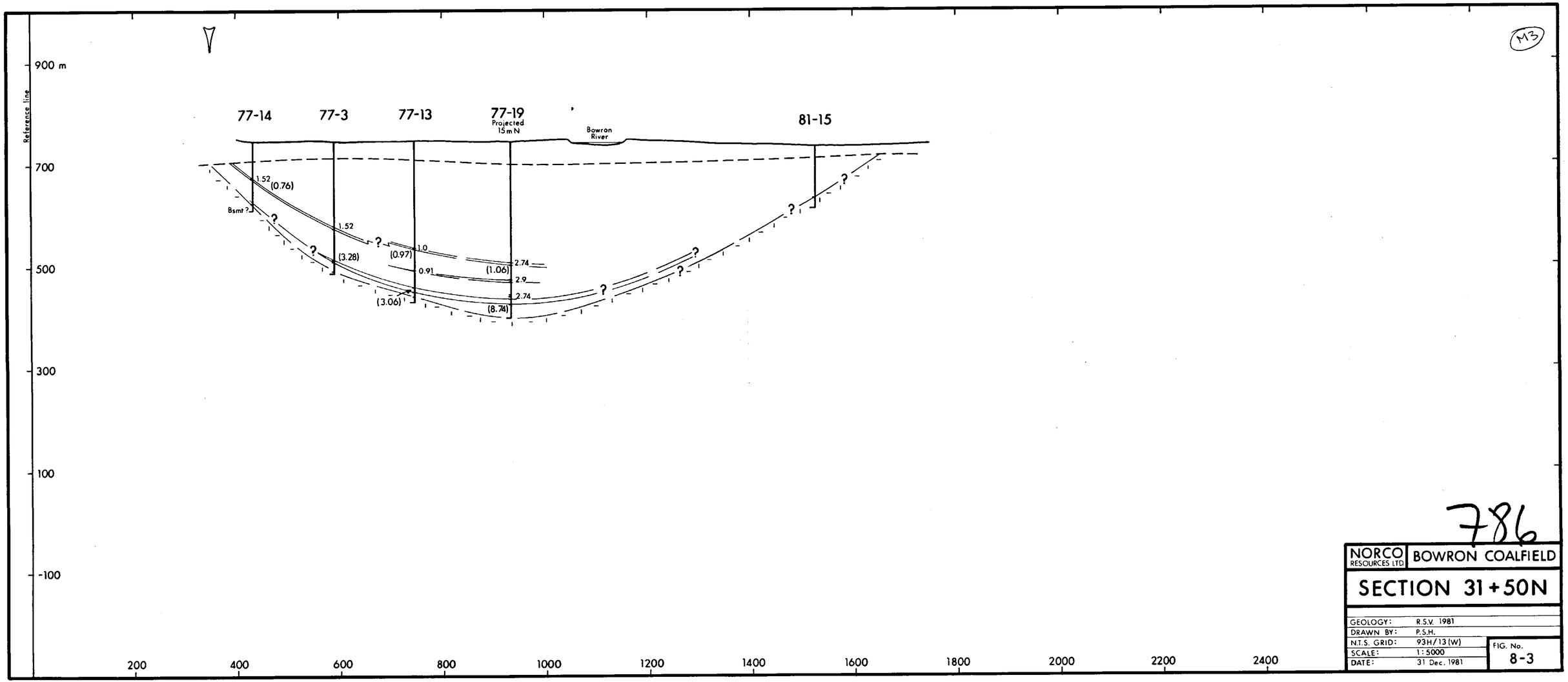
786

NORCO RESOURCES LTD | BOWRON COALFIELD

SECTION 33+00N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:5000
DATE:	31 Dec. 1981

FIG. No. 8-2



M3

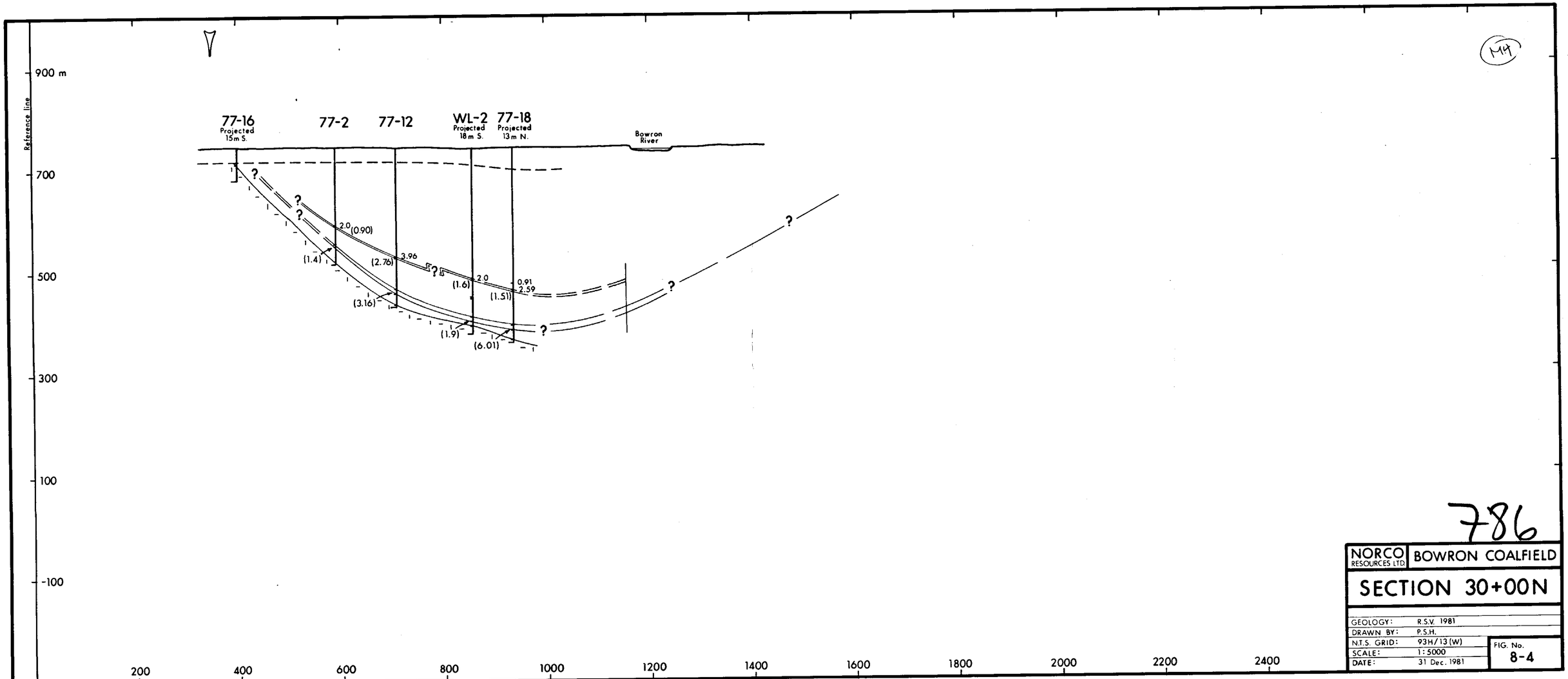
786

NORCO RESOURCES LTD.	BOWRON COALFIELD

SECTION 31+50N

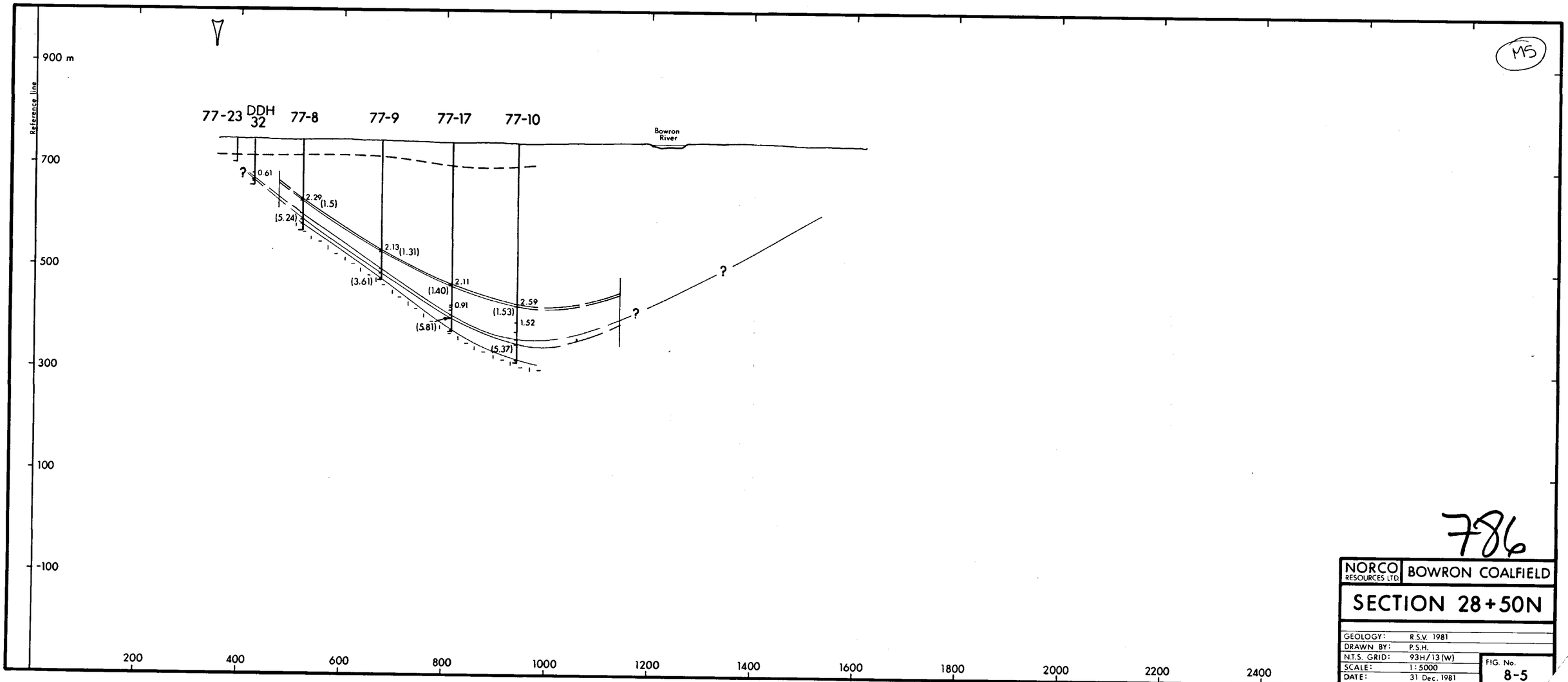
GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:5000
DATE:	31 Dec. 1981

FIG. No. 8-3



786

NORCO RESOURCES LTD.	BOWRON COALFIELD
SECTION 30+00N	
GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:5000
DATE:	31 Dec. 1981
FIG. No.	8-4



M5

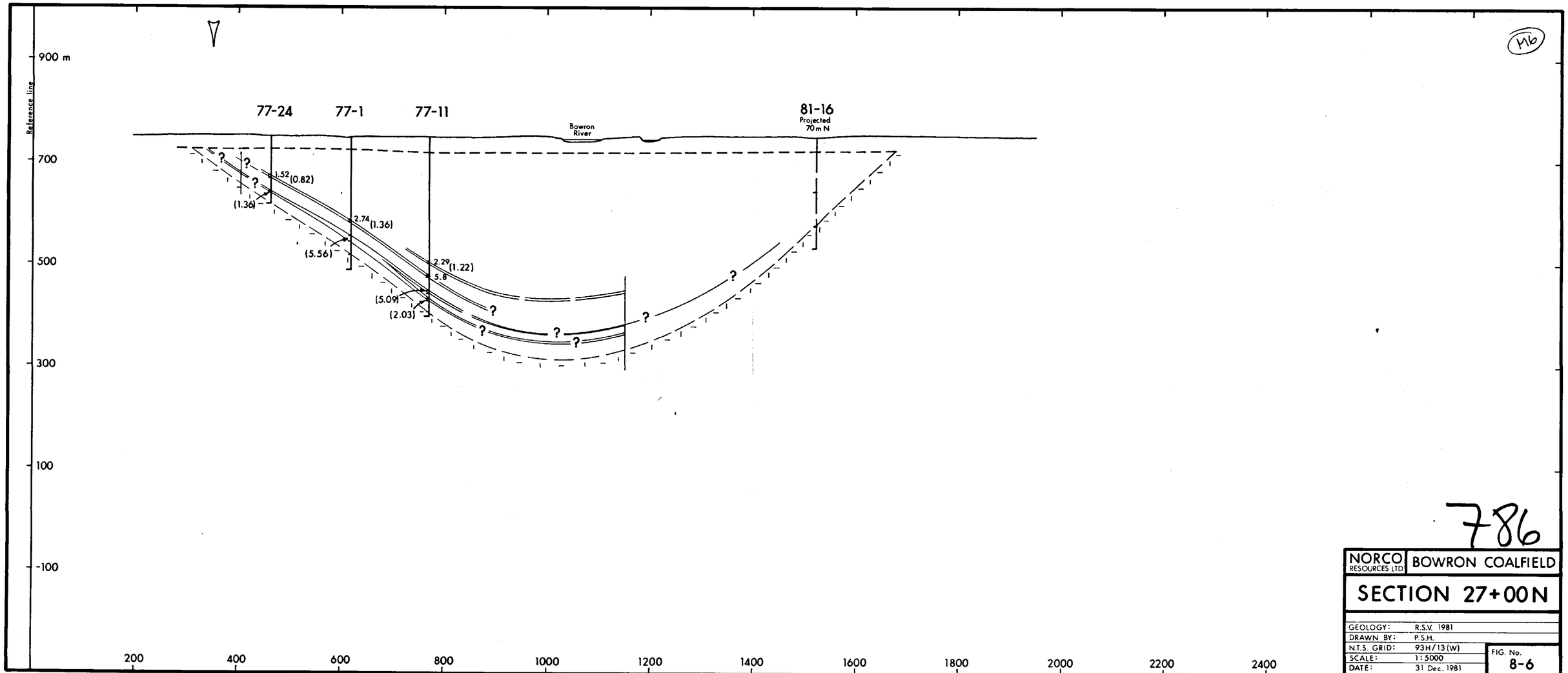
786

NORCO RESOURCES LTD | BOWRON COALFIELD

SECTION 28+50N

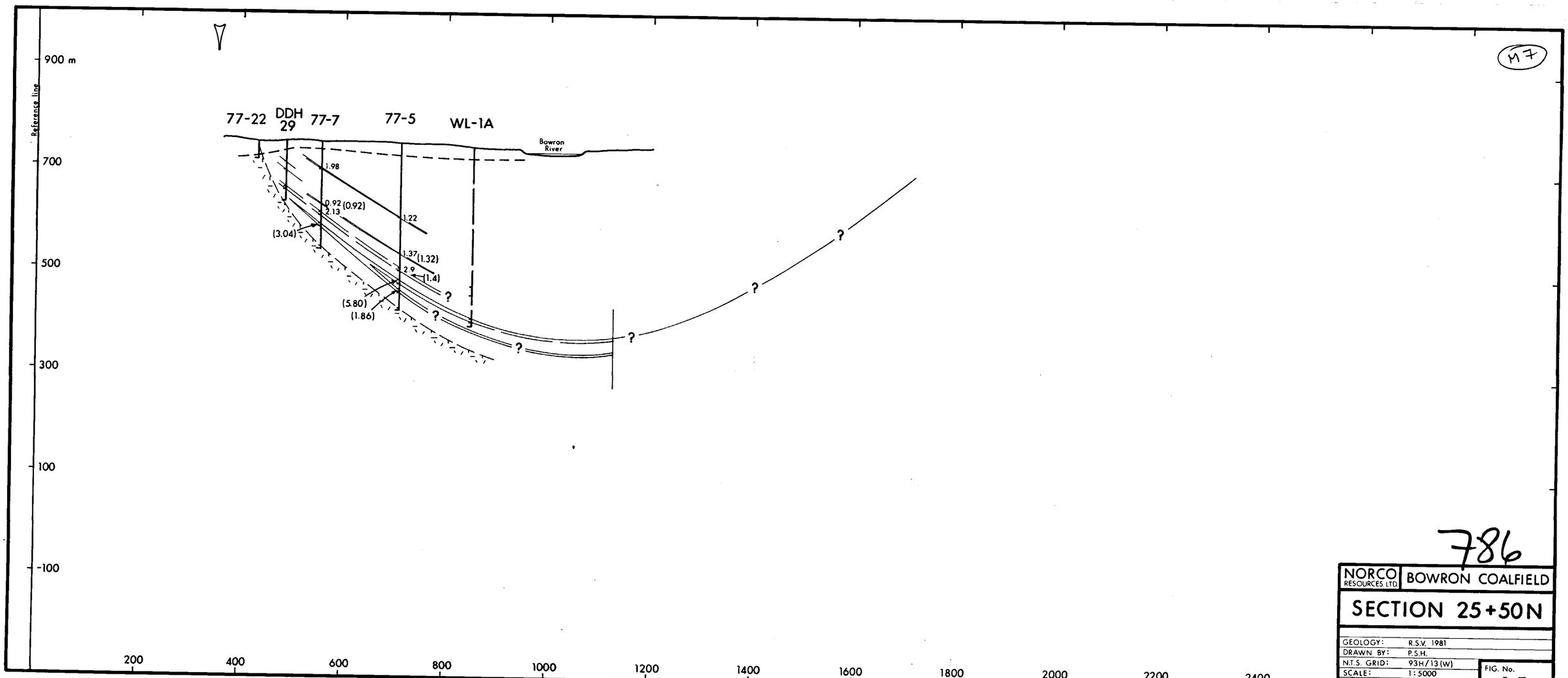
GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:5000
DATE:	31 Dec. 1981

FIG. No. 8-5



786

NORCO RESOURCES LTD.	BOWRON COALFIELD
SECTION 27+00N	
GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:5000
DATE:	31 Dec. 1981
FIG. No.	8-6



M7

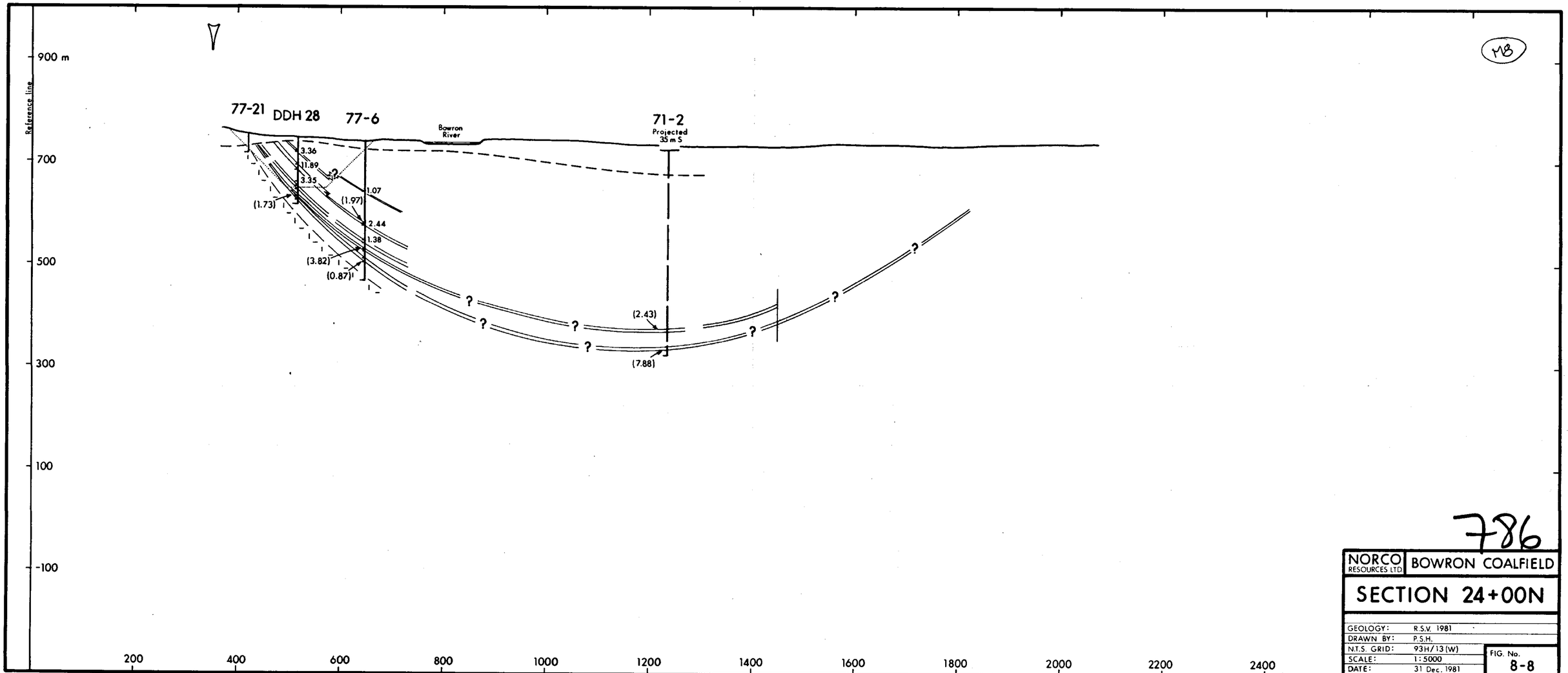
786

NORCO RESOURCES LTD.	BOWRON COALFIELD

SECTION 25+50N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13 (W)
SCALE:	1:5000
DATE:	31 Dec. 1981

FIG. No. 8-7



MB

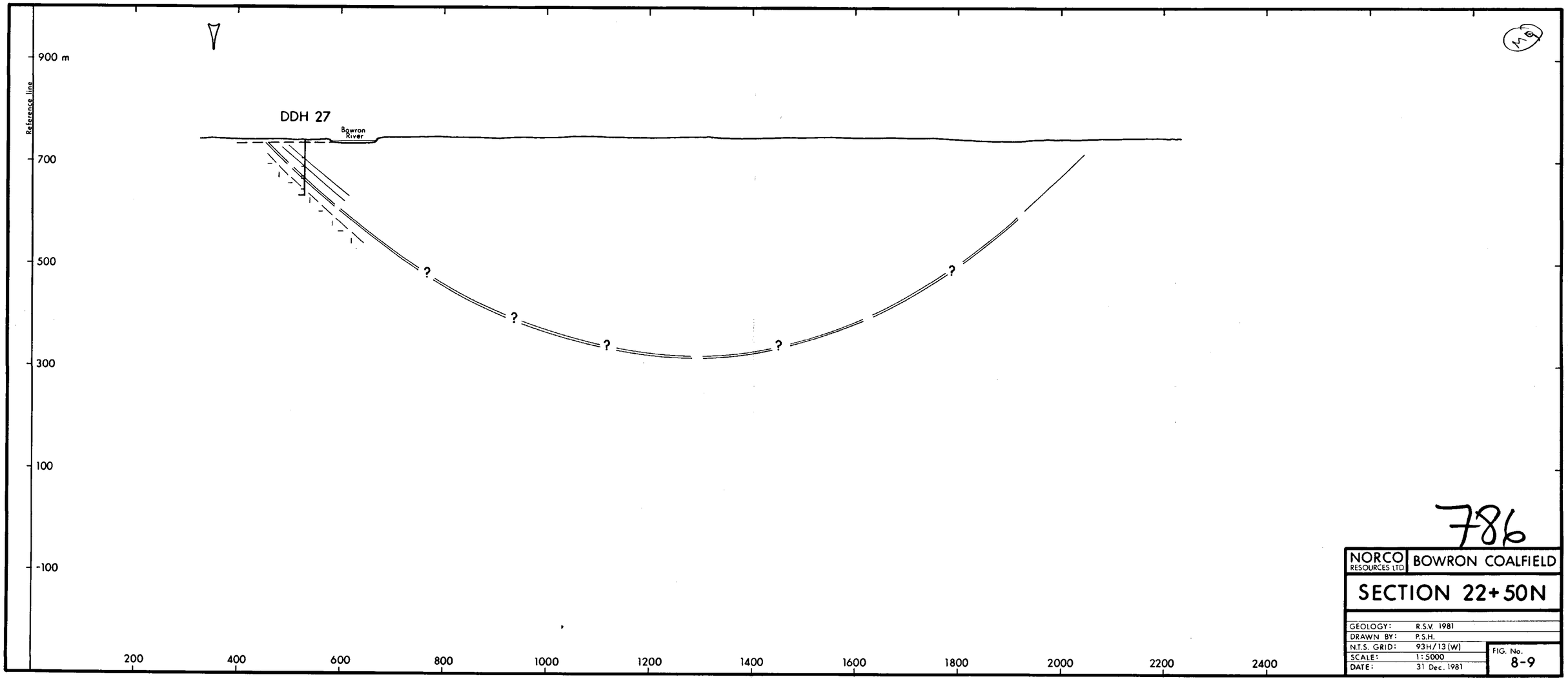
786

NORCO RESOURCES LTD | BOWRON COALFIELD

SECTION 24+00N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:5000
DATE:	31 Dec. 1981

FIG. No. 8-8



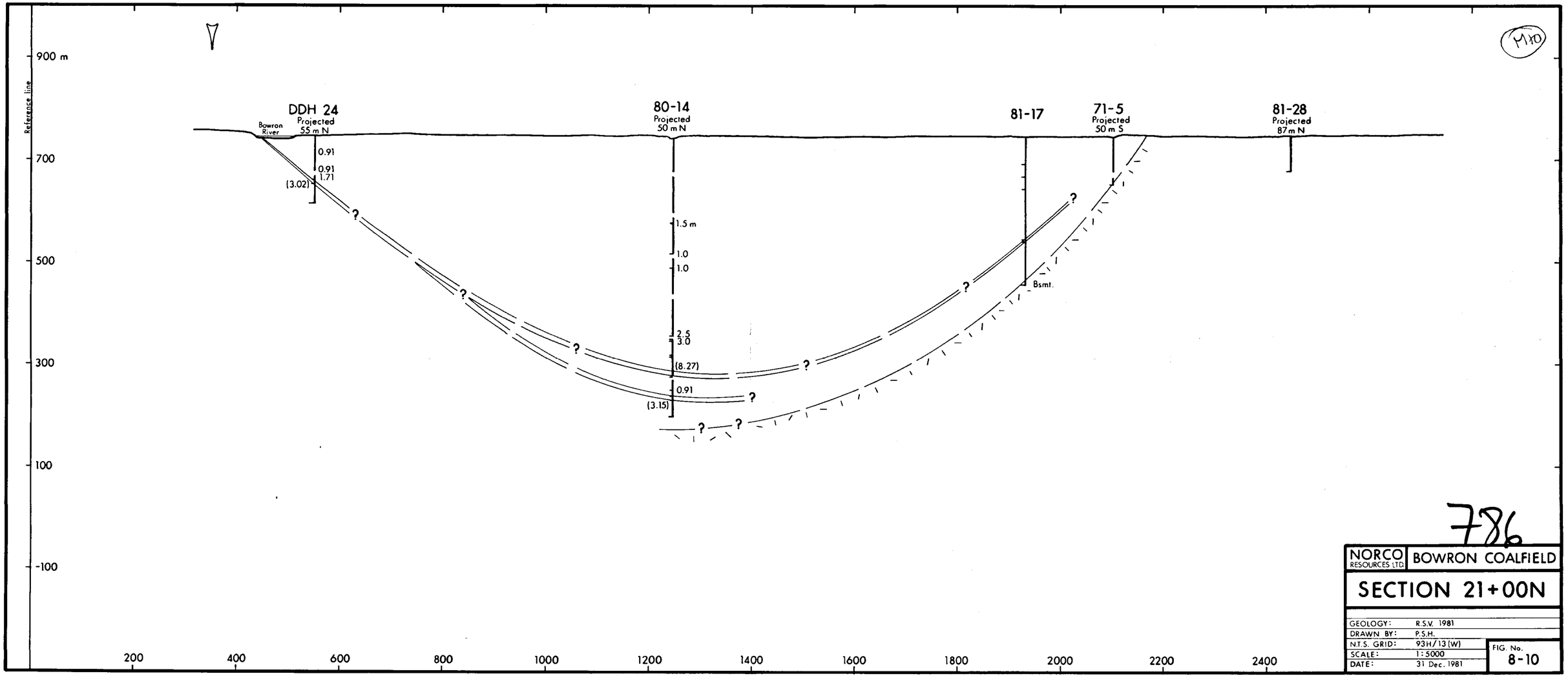
786

NORCO RESOURCES LTD | BOWRON COALFIELD

SECTION 22+50N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:5000
DATE:	31 Dec. 1981

FIG. No. 8-9



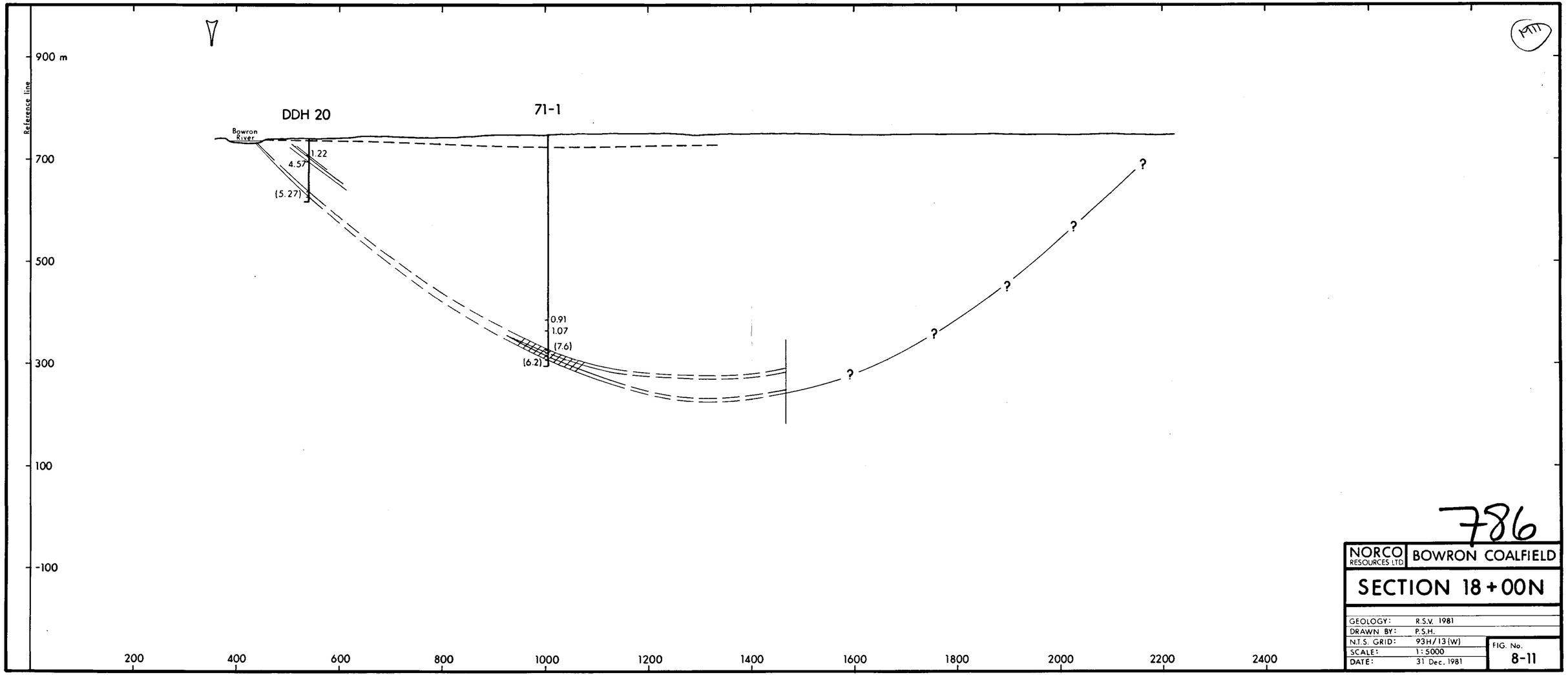
786

NORCO RESOURCES LTD | BOWRON COALFIELD

SECTION 21+00N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:5000
DATE:	31 Dec. 1981

FIG. No. 8-10



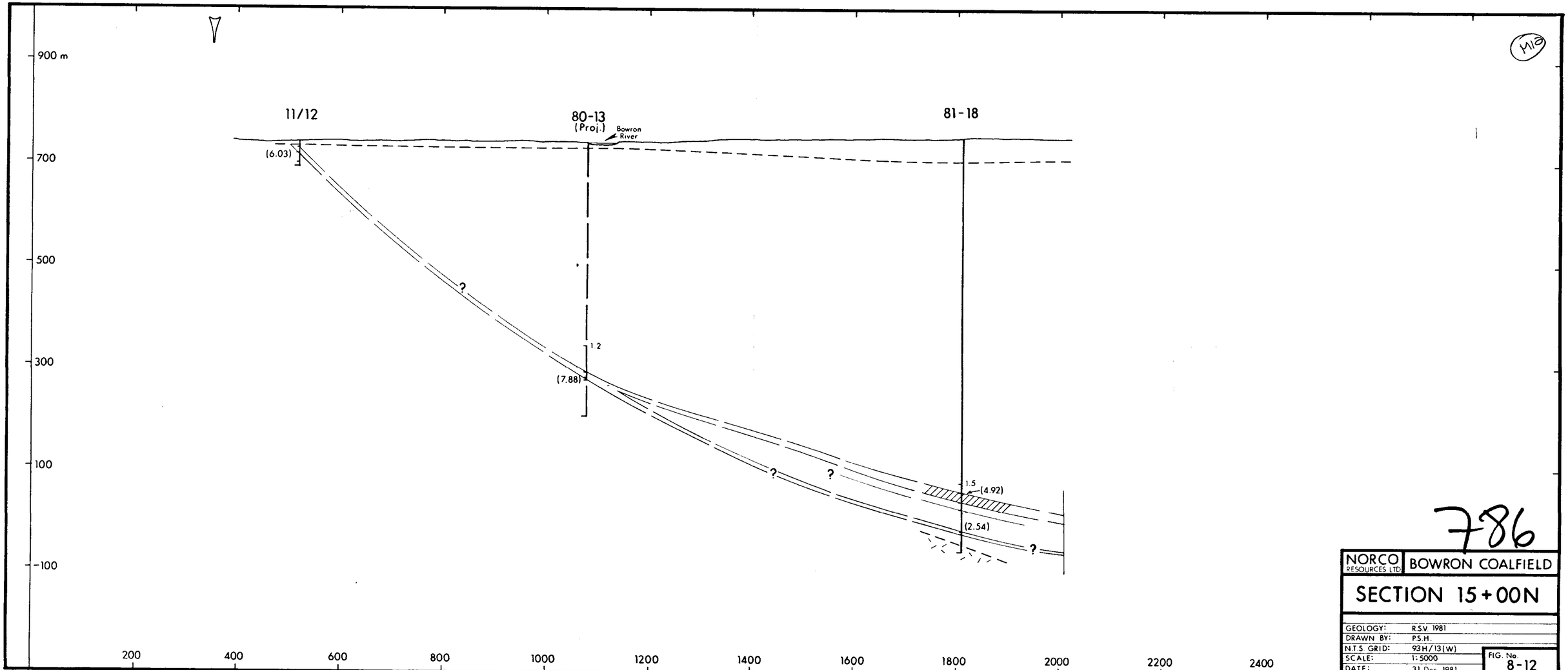
786

NORCO RESOURCES LTD | BOWRON COALFIELD

SECTION 18+00N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:5000
DATE:	31 Dec. 1981

FIG. No. 8-11



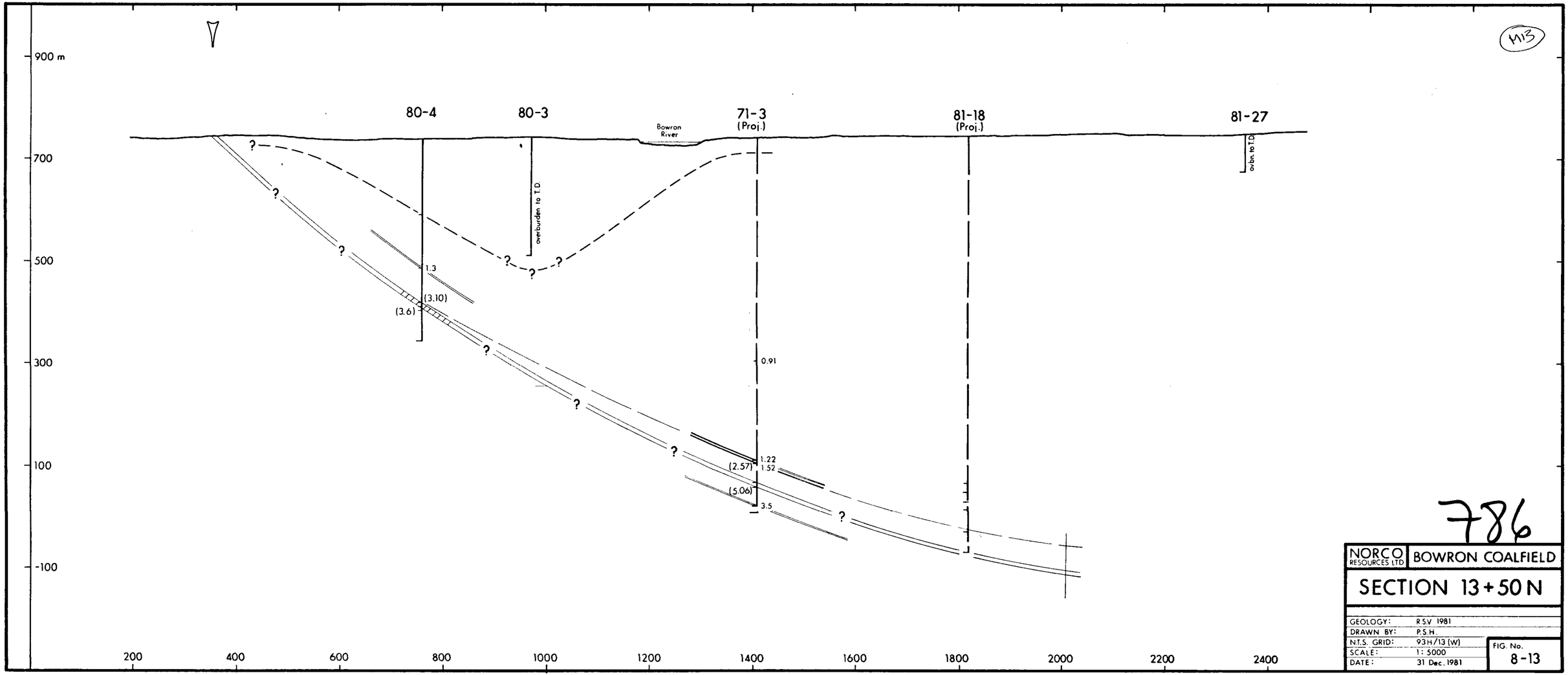
786

NORCO RESOURCES LTD. BOWRON COALFIELD

SECTION 15+00N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:5000
DATE:	31 Dec. 1981

FIG. No. 8-12



113

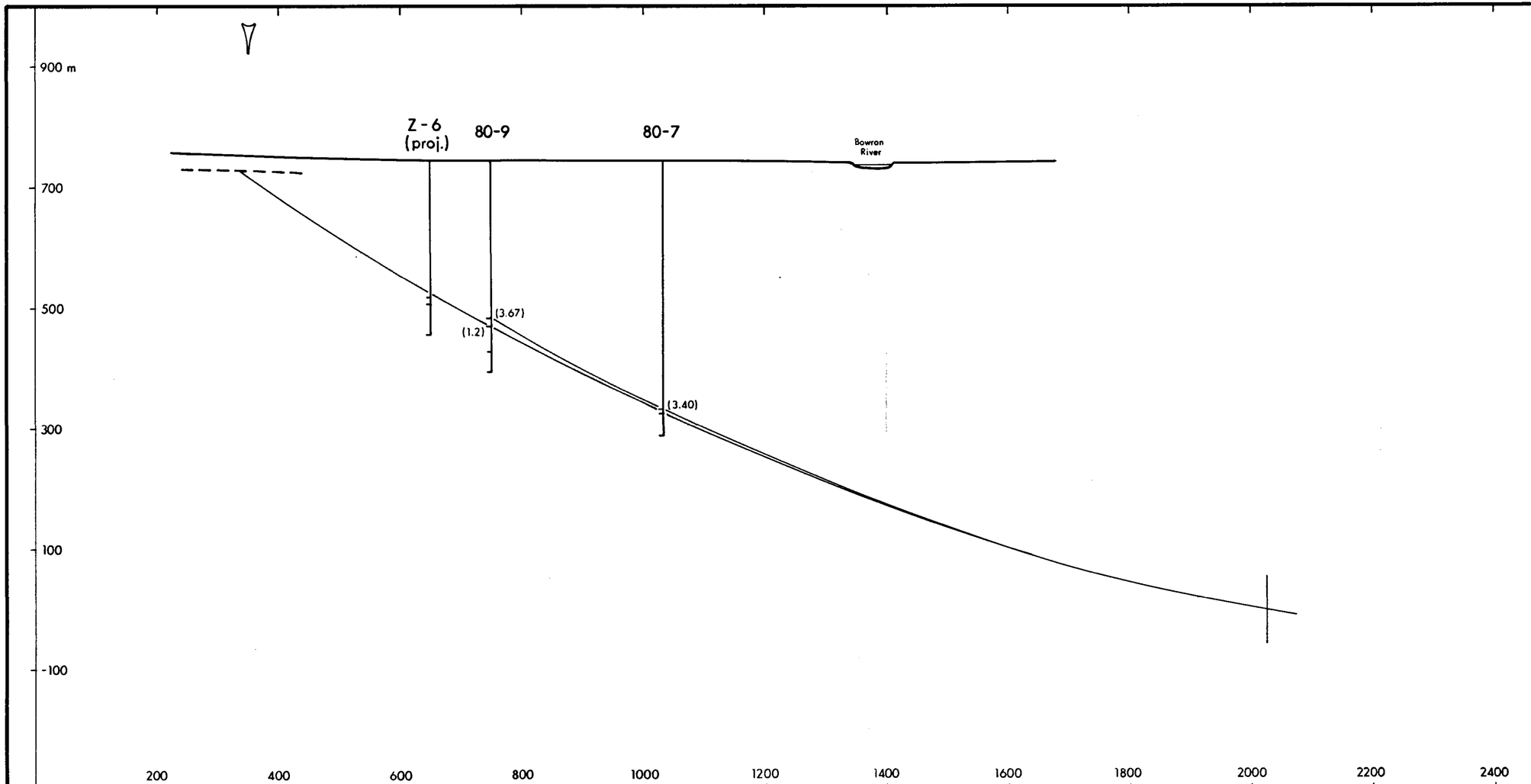
786

NORCO RESOURCES LTD. | BOWRON COALFIELD

SECTION 13+50 N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13 (W)
SCALE:	1: 5000
DATE:	31 Dec. 1981

FIG. No. 8-13



M14

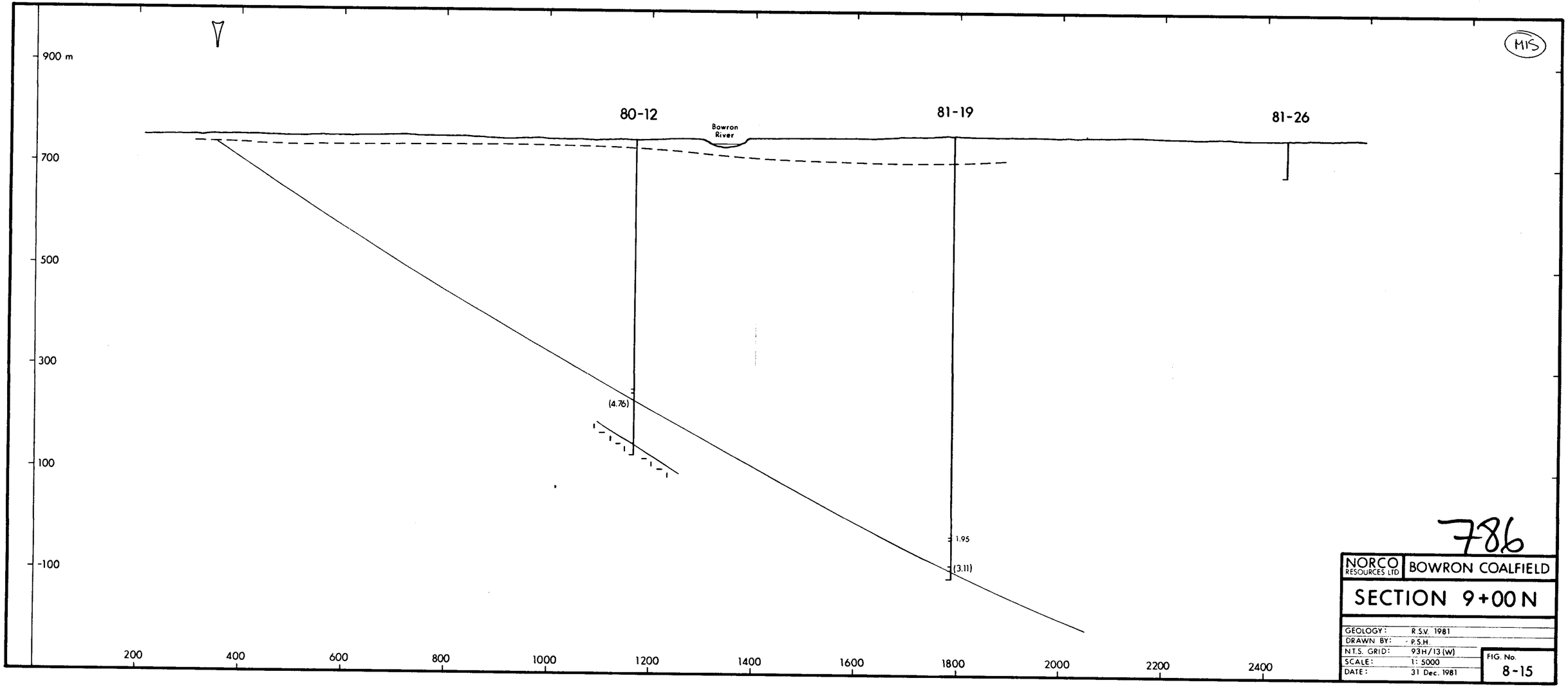
786

NORCO RESOURCES LTD.	BOWRON COALFIELD

SECTION 12+00 N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13 (W)
SCALE:	1: 5000
DATE:	31 Dec. 1981

FIG. No. 8-14



MIS

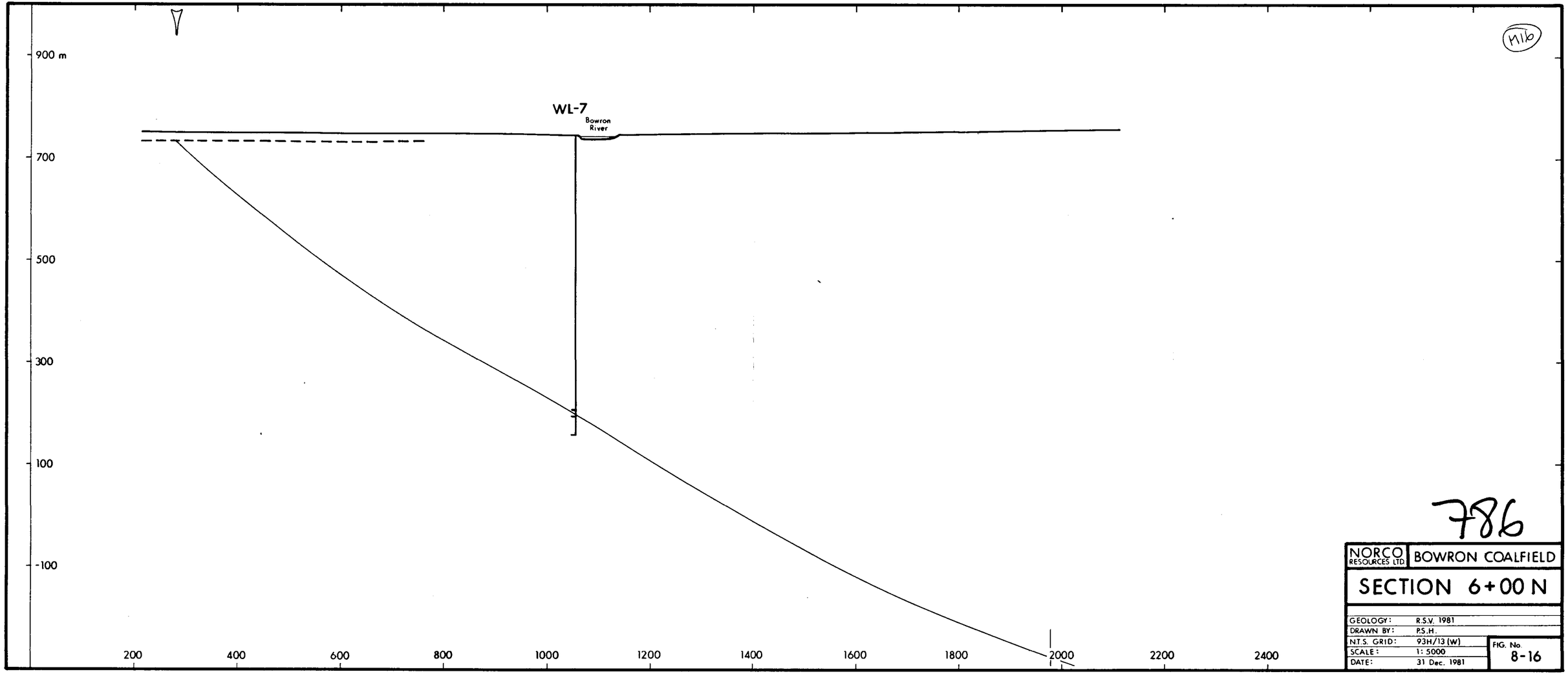
786

NORCO RESOURCES LTD | BOWRON COALFIELD

SECTION 9+00 N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1: 5000
DATE:	31 Dec. 1981

FIG. No. 8-15



H16

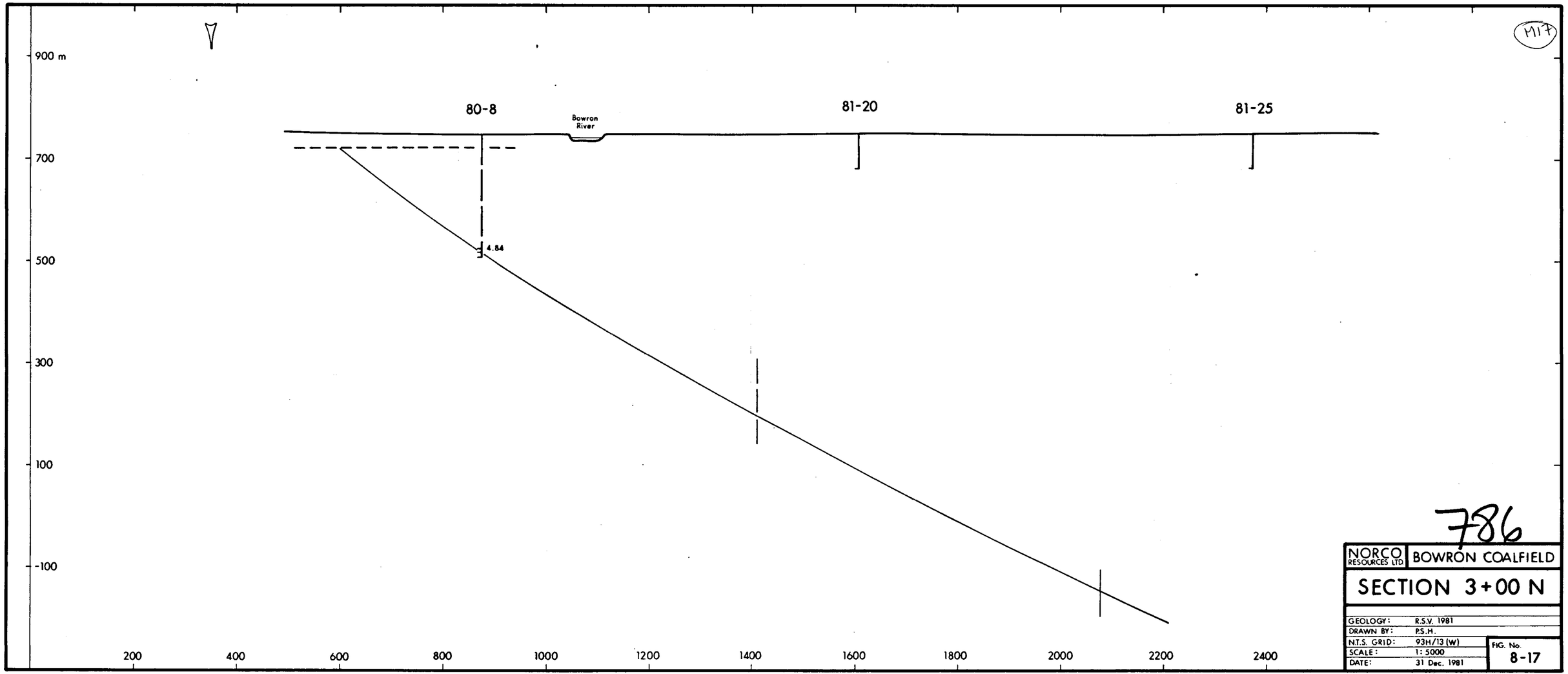
786

NORCO RESOURCES LTD. BOWRON COALFIELD

SECTION 6+00 N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13 (W)
SCALE:	1: 5000
DATE:	31 Dec. 1981

FIG. No 8-16



M17

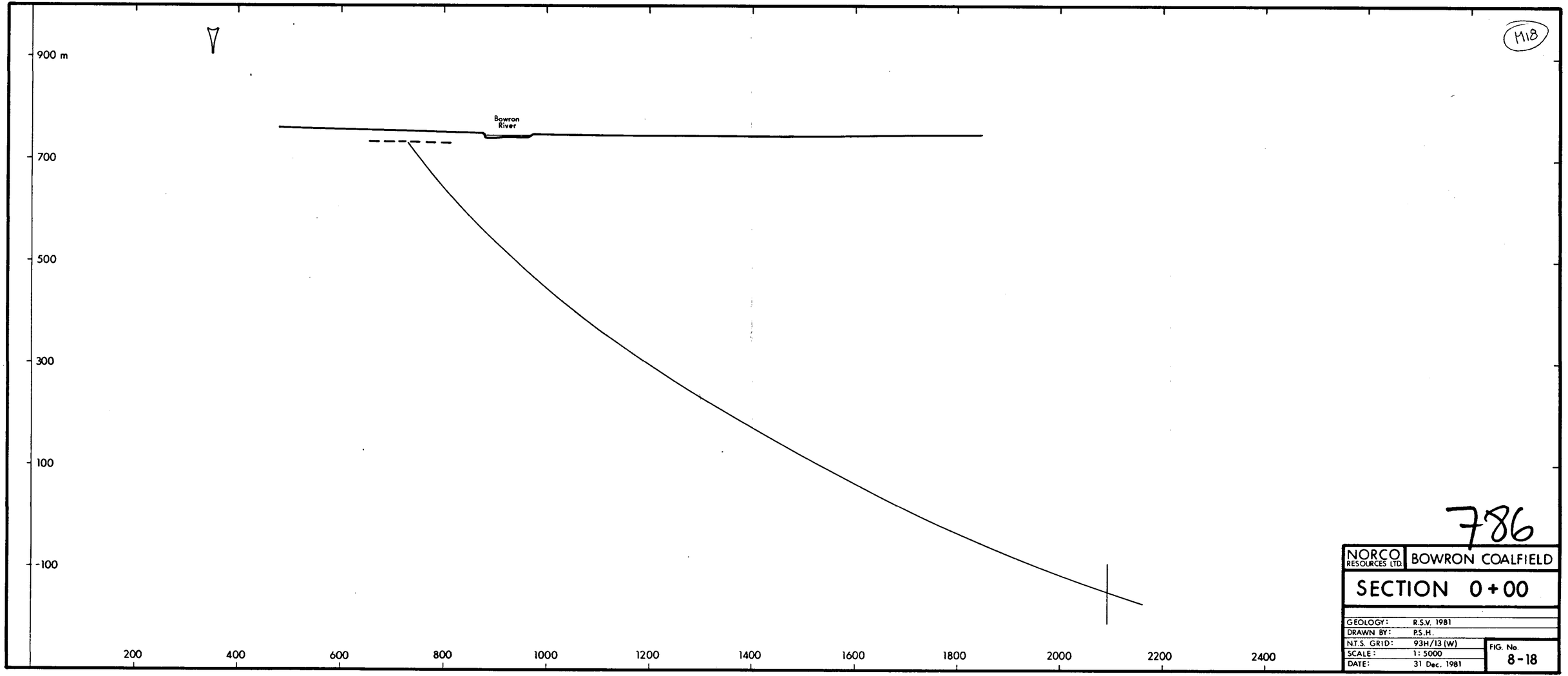
786

NORCO RESOURCES LTD. BOWRON COALFIELD

SECTION 3+00 N

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13 (W)
SCALE:	1: 5000
DATE:	31 Dec. 1981

FIG. No. 8-17



M18

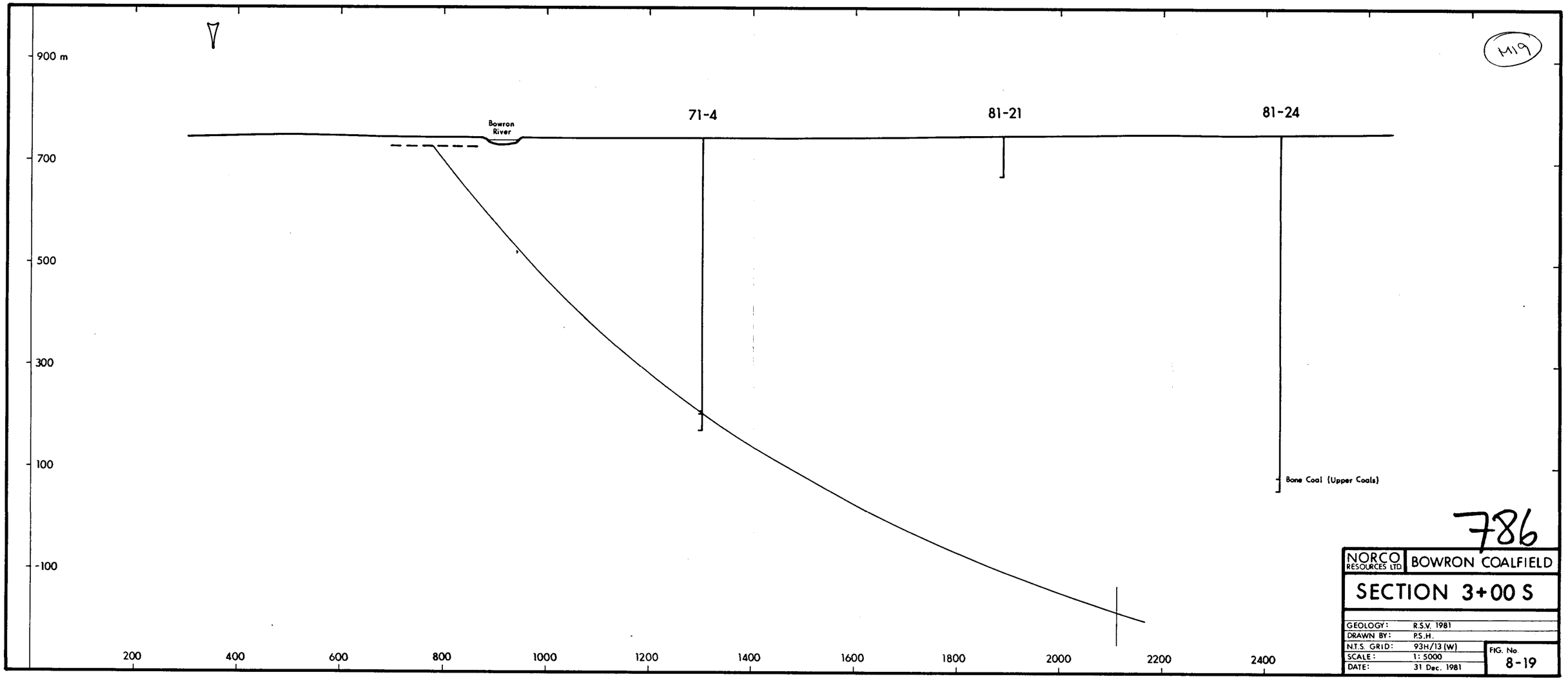
786

NORCO RESOURCES LTD. BOWRON COALFIELD

SECTION 0+00

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13 (W)
SCALE:	1: 5000
DATE:	31 Dec. 1981

FIG. No. 8-18



M19

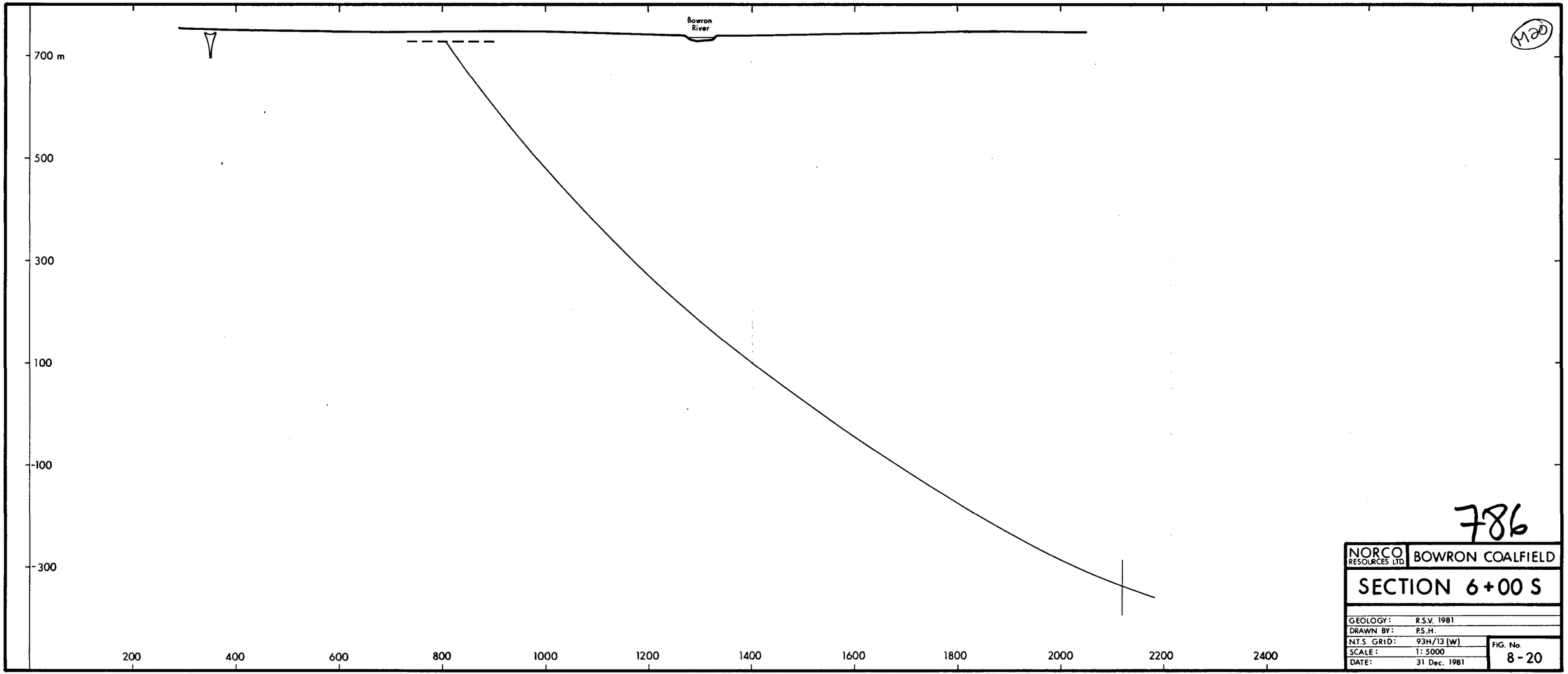
786

NORCO RESOURCES LTD. BOWRON COALFIELD

SECTION 3+00 S

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13 (W)
SCALE:	1: 5000
DATE:	31 Dec. 1981

FIG. No. 8-19



M20

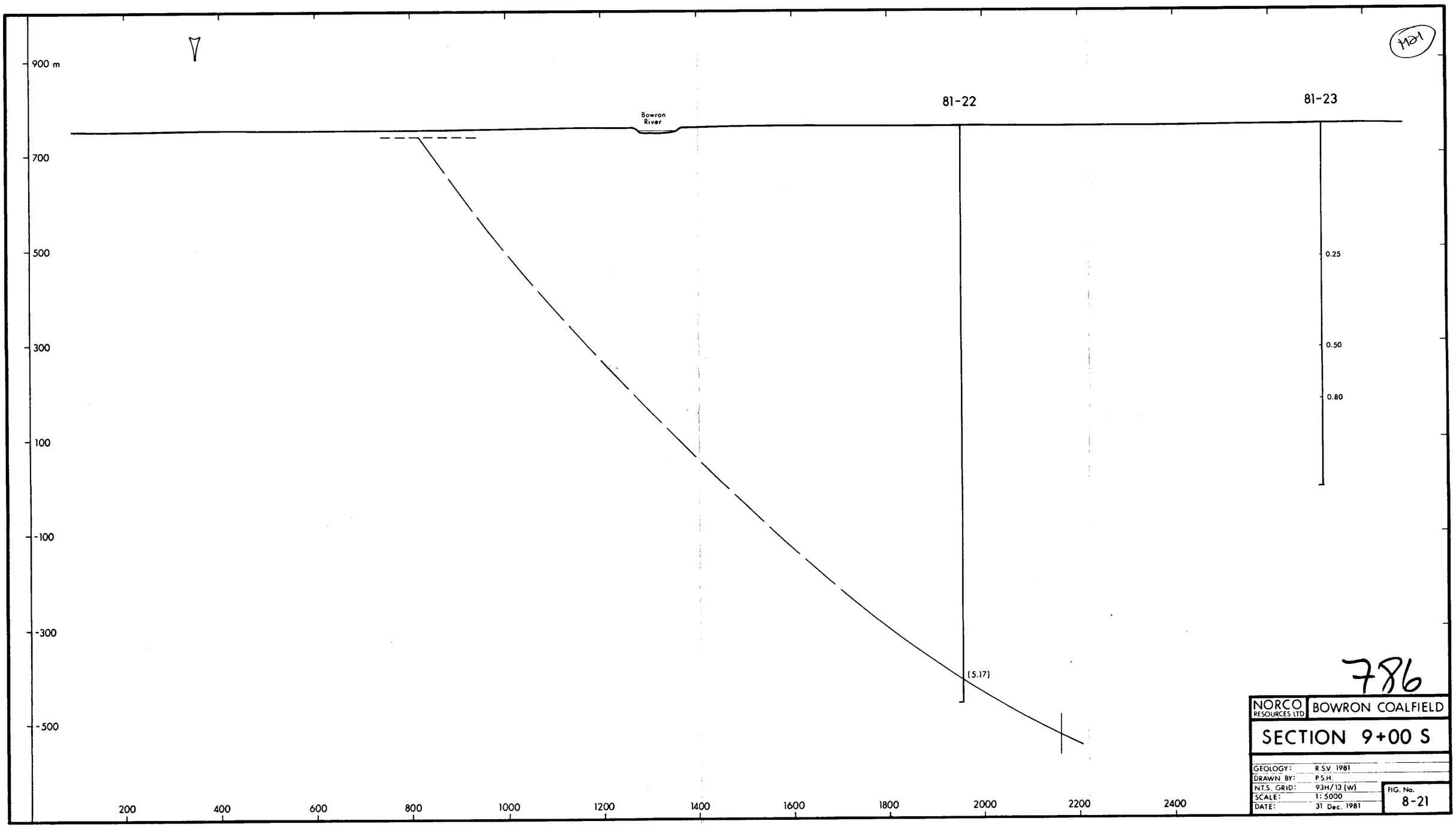
786

NORCO RESOURCES LTD. BOWRON COALFIELD

SECTION 6+00 S

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13 (W)
SCALE:	1: 5000
DATE:	31 Dec. 1981

FIG. No. 8-20


786
900 m
700
500
300
100
-100
-300
-500
Bowron River
81-22
81-23
0.25
0.50
0.80
(5.17)
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
786
NORCO RESOURCES LTD.
BOWRON COALFIELD
SECTION 9+00 S
GEOLOGY: R.S.V. 1981
DRAWN BY: P.S.H.
N.T.S. GRID: 93H/13 (W)
SCALE: 1: 5000
DATE: 31 Dec. 1981
FIG. No.
8-21

568 000 E 569 000 E 570 000 E 571 000 E 572 000 E 573 000 E 574 000 E 575 000 E 576 000 E 577 000 E 578 000 E 579 000 E

5 968 000 N
5 967 000 N
5 966 000 N
5 965 000 N
5 964 000 N
5 963 000 N
5 962 000 N
5 961 000 N
5 960 000 N

C.L. 4727
C.L. 4726
C.L. 6043
C.L. 6044
C.L. 6565
C.L. 6564
C.L. 6563
C.L. 4461
C.L. 148
C.L. 162
C.L. 4463
C.L. 6555
C.L. 4462
C.L. 4460
C.L. 163
C.L. 6554
C.L. 4464
C.L. 4459
C.L. 4458
C.L. 6557
C.L. 6553
C.L. 4723
C.L. 4725
C.L. 4724
C.L. 6552

L.57+00N L.54+00N L.51+00N L.48+00N L.45+00N L.42+00N L.39+00N L.36+00N L.33+00N L.30+00N L.27+00N L.24+00 L.21+00N L.18+00N L.15+00N L.12+00N L.9+00N L.6+00N L.3+00N L.0+00N L.3+00S L.6+00S L.9+00S L.12+00S L.15+00S L.18+00S L.21+00S L.24+00S L.27+00S L.30+00S L.33+00S L.36+00S

330° Az

CAMPSITE

Bowron Forest Development Road

Buckhorn Forest Development Road

BOWRON RIVER

LEGEND

- 1971 AND EARLIER DRILLING
- 1977 DRILLING
- 1980 DRILLING
- 1981 DRILLING
- OLD ADITS
- TRACTOR ROAD
- C.L.162 COAL LICENCE NUMBER

0 0.5 1 km

NORCO RESOURCES LTD.

BOWRON COALFIELD

DRILLHOLE LOCATIONS CENTRAL LICENCE AREA

786

Consulting Firm:	IGNA Engineering & Consulting Ltd.
Drawn by:	P. Hall
N.T.S. Grid:	93H/13 (W)
Scale:	1:10,000
Date:	23 June 1981

FIG. No. 3

M23

53° 55' 00" N

53° 50' 00" N

53° 45' 00" N

122° 00' 00" W.

121° 52' 30" W.

C.L. 6572 C.L. 6571 C.L. 6569 C.L. 6570 C.L. 6568 C.L. 6567 C.L. 6562 C.L. 6566 C.L. 6561 C.L. 6559 C.L. 6560 C.L. 6558 C.L. 6343 C.L. 4727 C.L. 4726 C.L. 6043 C.L. 6044 C.L. 6565 C.L. 6564 C.L. 6563 C.L. 148 C.L. 162 C.L. 4463 C.L. 4461 C.L. 4462 C.L. 4460 C.L. 6555 C.L. 6554 C.L. 163 C.L. 4459 C.L. 4464 C.L. 4458 C.L. 6557 C.L. 6556 C.L. 4725 C.L. 4724 C.L. 4723 C.L. 6552 C.L. 6551 C.L. 6548 C.L. 6550 C.L. 6549 C.L. 6547 C.L. 6546 C.L. 6545 C.L. 6544 C.L. 6543 C.L. 6542 C.L. 6541 C.L. 6540

PURDEN LAKE

Sow Creek

Taspai Creek

BOWRON RIVER

Tsus Ck.

Camp Buildings

KT

Ma

16

20°

38°

50°

55°

60°

LEGEND

KT Bowron River Coal Measures

Ma Antler Formation

SOURCE OF INFORMATION

1. G.S.C. Map 1356A, Geology - McBride
2. G.S.C. Map 49-1960, Geology - Prince George
3. G.S.C. Map 1543G, Aeromagnetic - Wansa Creek
4. G.S.C. Mapsheet 93H/13, Geophysic Paper 1535G
5. Borehole data from Norco Resources Ltd.

KILOMETRES

0 1 2 3 4 5

786

NORCO RESOURCES LTD.

BOWRON COALFIELD

INTERPRETIVE GEOLOGY OF THE BOWRON RIVER COAL PROPERTY

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:50,000
DATE:	31 Dec. 1981

FIG. No. 4

570 000 E | 571 000 E | 572 000 E | 573 000 E | 574 000 E | 575 000 E

5 967 000 N | 5 966 000 N | 5 965 000 N | 5 964 000 N | 5 963 000 N

Bowron 10.6

304 Az

34+50 N | 33+00 N | 31+50 N | 30+00 N | 28+50 N | 27+00 N | 25+50 N | 24+00 N | 22+50 N | 21+00 N | 19+50 N | 18+00 N | 16+50 N | 15+00 N | 13+50 N | 12+00 N | 9+00 N | 6+00 N | 3+00 S | 0+00

WL-4 | 77-20 | 77-4 | WL-3 | 77-19 | 77-15 | 77-13 | 77-3 | WL-2 | 77-18 | 77-14 | 77-12 | 77-2 | 77-10 | 77-17 | 77-16 | 77-9 | 77-8 | 77-11 | 77-23 | 77-1 | WL-1A | 77-24 | 77-5 | 77-7 | 77-22 | 77-6 | 77-25 | 77-21 | Camp Area | 71-1 | 71-3 | 71-5 | 71-2 | 71-4 | 80-14 | 80-13 | 80-3 | 80-4 | 80-7 | 80-12 | 80-9 | 80-2 | 80-8 | EX-4 | EX-5 | WL-5 | WL-7 | 81-15 | 81-16 | 81-28 | 81-17 | 81-27 | 81-18 | 81-26 | 81-19 | 81-25 | 81-20 | 81-24 | 81-21 | 81-23 | 81-22

700 | 650 | 600 | 550 | 500 | 450 | 400 | 350 | 300 | 250 | 200 | 150 | 100 | 50 | 0 | -50 | -100 | -150 | -200 | -300 | -350 | -400 | -450 | -500

Dip Unknown | Dip Unknown | BOWRON RIVER

0 100 200 300 400 500 m

NORCO RESOURCES LTD. | BOWRON COALFIELD

STRUCTURE CONTOURS TOP OF LOWER SEAM

GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
CONTOUR INT:	50 m
N.T.S. GRID:	93H/13(W)
SCALE:	1 : 5000
DATE:	31 December 1981

FIG. No. 6

786

— 53° 55' 00" N —

— 53° 50' 00" N —

— 53° 45' 00" N —

— 122° 00' 00" W.

— 121° 52' 30" W.

C.L. 6572 | C.L. 6571 | C.L. 6569 | C.L. 6570 | C.L. 6568 | C.L. 6567 | C.L. 6562 | C.L. 6566 | C.L. 6561 | C.L. 6559 | C.L. 6560 | C.L. 6558 | C.L. 6343 | C.L. 4727 | C.L. 4726 | C.L. 6043 | C.L 6044 | C.L. 6565 | C.L. 6564 | C.L. 6563 | C.L. 148 | C.L. 162 | C.L. 4463 | C.L. 4461 | C.L. 6555 | C.L. 4462 | C.L. 4460 | C.L. 6554 | C.L. 163 | C.L. 4464 | C.L. 4459 | C.L. 4458 | C.L. 6557 | C.L. 4723 | C.L. 4725 | C.L. 4724 | C.L. 6556 | C.L. 6552 | C.L. 6551 | C.L. 6548 | C.L. 6550 | C.L. 6549 | C.L. 6547 | C.L. 6546 | C.L. 6545 | C.L. 6544 | C.L. 6543 | C.L. 6542 | C.L. 6541 | C.L. 6540

PURDEN LAKE

Sow Creek

Taspai Creek

Basin. Boundary

Camp Buildings

BOWRON RIVER

Tsus Ck.

16

N

LEGEND

- Bowron River Coal Measures
- Drillhole
- ⊙ Proposed Drill Hole

KILOMETRES

0 1 2 3 4 5

786

NORCO RESOURCES LTD.	BOWRON COALFIELD
LOCATION MAP OF PROPOSED BOREHOLES	
GEOLOGY:	R.S.V. 1981
DRAWN BY:	P.S.H.
N.T.S. GRID:	93H/13(W)
SCALE:	1:50,000
DATE:	31 Dec. 1981
FIG. No.	7