



Crows Nest Resources

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February 13, 1990

Ministry of Energy, Mines and
Petroleum Resources
525 Superior Street
Victoria, B.C.
V8V 1X4

Dear Sirs:

Enclosed please find our report on the MSA North Project.

This report has been prepared by Mr. A. Sharma and Mr. T. Hannah, both of whom are employed by Crows Nest Resources Limited as geologists.

Mr. A Sharma, B.Sc., graduated in Geophysics from the University of Calgary in 1989. Prior to his graduation, Mr. Sharma worked as an assistant for a major coal company in the Crows Nest coalfields. Mr. Sharma has been employed by Crows Nest Resources Limited as a Project Geologist since May 1989.

Mr. T. Hannah, B.Sc. P.Geol., graduated in Geology from the University of New Brunswick in 1973. Since graduation, Mr. Hannah has spent 17 years working for Shell Canada Ltd. and Crows Nest Resources on a wide variety of coal exploration projects in B.C. and Alberta. His present position is that of Senior Geologist, Development Engineering Group, Line Creek Mine.

In my opinion, these personnel are fully qualified, by training and experience to prepare this report.

Yours truly,

CROWS NEST RESOURCES LTD.

R. Williams, P. Eng
Chief Engineer

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MINE SERVICES AREA NORTH
SOUTHEASTERN BRITISH COLUMBIA
1989 GEOLOGICAL REPORT

BRITISH COLUMBIA COAL LICENCES
291 AND 292

HELD BY
SHELL CANADA RESOURCES LIMITED

OPERATED BY:
CROW'S NEST RESOURCES LIMITED

KOOTENAY LAND DISTRICT

NTS 82G/15

LATITUDE: 49° 57' NORTH

LONGITUDE: 114° 45'30" WEST

ANIL SHARMA
FEBRUARY 1990

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1.0 SUMMARY

The Mine Services Area North (M.S.A.N.) Project is part of the Upper Elk Coal Field in the Rocky Mountains of southeastern British Columbia. It is located on the southeastern slope of Mount Michael, between the Horseshoe Ridge Project and the Mount Michael Project. Mine Services Area North is encompassed by British Columbia coal licences 291 and 292. It is 1.5 kilometres north of the Mine Services Building of the Line Creek Mine, and 12.5 kilometres away from the preparation plant at this mine.

In regional geological terms, Mine Services Area North is contained in the footwall of the Ewin Thrust Fault which causes a repeat of the lower section of the Mist Mountain Formation that is contained in the eastern limb of the Alexander Creek Syncline. The Main Pit of the Line Creek Mine is located in the western limb of this syncline. Mine Services Area North is expected to be contiguous with the seams of the Horseshoe Ridge Project. Geological structure dips into the topographic slope and a dip slope situation is not prevalent within the proposed pit area. However, thick seams outcrop on a relatively flat portion of this slope. The proposed pit area contains three prominent seams averaging 28 metres in aggregate thickness within a 90 metre stratigraphic succession.

The 1989 geological program entailed geological mapping on a 1:2000 scale. A section of road was constructed to provide access to four drill sites. Coal intersections in the drill holes were sampled and geophysical logging consisted of gamma ray and deviation. Initial analytical results of these samples indicate a medium volatile bituminous coal of metallurgical quality. Estimated reserves stand at 463,058 tonnes in place at a 3.08 bcm

waste/tonne coal strip ratio. Total cost for the Mine Services Area North project was \$51,644.

2.0 INTRODUCTION

2.1 LOCATION AND PHYSIOGRAPHY

Enclosure 1: Index

Enclosure 2: Location Map

Enclosure 3: Coal Licences

The Mine Services Area North coal licences are located 14 kilometres southeast of Elkford, British Columbia, in the front ranges of the Rocky Mountains in southeastern British Columbia. These licences consist of CL 291 and 292 and are centred at approximately:

Latitude 49° 57' North

Longitude 114° 45' West

These coordinates are located on NTS map sheet 82G/15 Tornado Mountain. CL 291 and 292 cover an area of approximately 216 hectares.

The Mine Services Area North property is on the southern, east facing slope of Mount Michael; elevation varies from 1810 metres - 1700 metres. Outcrop is fairly abundant and the Mist Mountain Formation/Morrissey Formation contact can be traced the length of the property.

2.2 ACCESS

Enclosure 4: Access Map

Vehicular access is via a road that runs north from the Mine Services Building. This road is above the Ewin Pass road and below the Mount Michael road.

3.0 SUMMARY OF WORK DONE

3.1 PREVIOUS WORK

Prior to 1978 Crows Nest Industries explored this area by bulldozer trenching while in the process of building the Ewin Pass exploration road.

The 1982 Mount Michael Geological Report by Alan White covered the northcentral area of Mount Michael and some of his findings were extrapolated into the Mine Services Area North Project area.

3.2 WORK DONE IN 1989

Field operations were supervised by Ted Hannah and Anil Sharma of Crows Nest Resources Ltd. Exploration included:

- geological mapping (1:2000)
- four rotary drill holes
- backhoe trenching
- road construction

An area of 0.06 km² has been outlined and found to contain three seams. Various cross sections were made through the area interpreting drill hole data. A preliminary pit outline has also been constructed. The contact between the coal bearing Mist Mountain Formation and the

basal sandstone of the Moose Mountain Formation has been established throughout the project area.

4.0 GEOLOGY

4.1 REGIONAL STRATIGRAPHY

Figure 1: Table of Formations

The Mist Mountain Formation of the Kootenay Group of Upper Jurassic-Lower Cretaceous age is the coal bearing sequence in southeastern British Columbia. It is a thick sequence of clastic sediments representing delta progradation over marine shales, siltstones and sandstones of the Jurassic Fernie Formation.

Withdrawal of the Fernie Sea northeastward and an epeirogenic uplift of the source area in the southwest initiated deposition of Kootenay Group strata.

The Kootenay Group has been subdivided into three formations; the lower Morrissey Formation, consisting of Moose Mountain and Weary Ridge Members; the Mist Mountain Formation, and the uppermost Elk Formation.

The ***Moose Mountain Member*** is a resistant, generally cliff forming unit comprised of massive, medium to coarse grained, medium gray weathering sandstone. There are commonly two coal horizons within this sandstone, but their small thickness (rarely over one metre) and the overlying massive sandstone make them unattractive for economic consideration. The distinctive nature and prominence of this unit makes it

an easily traceable marker horizon throughout the Crows Nest Coal Field of southeastern British Columbia.

The ***Mist Mountain Formation*** is the main coal bearing unit of the Kootenay Group. It overlies conformably but abruptly the Moose Mountain Member.

It is comprised of a generally recessive, interbedded sequence of brownish tinted sandstones, gray to brown siltstones, gray and black shales, gray mudstones and coal seams. In the Elk Coal Field this formation ranges in thickness between 400 metres and 660 metres. The coal seams attain a thickness of up to 10 metres and a lateral extent of several kilometres.

The ***Elk Formation*** lies conformably but abruptly over the Mist Mountain Formation. It consists of an interbedded sequence of cliff forming sandstones, shales and siltstones and thin (less than one metre), sporadic coal seams.

The exact base of the Elk Formation is somewhat arbitrary as it is defined as being "the base of the first major sandstone or conglomerate above the uppermost major coal seam in the Mist Mountain Formation" (Gibson, 1979). Therefore the stratigraphic position of the Mist Mountain-Elk formational contact may vary slightly from project to project.

TABLE OF FORMATIONS

Nomenclature of the Kootenay Group (after Gibson, 1979)

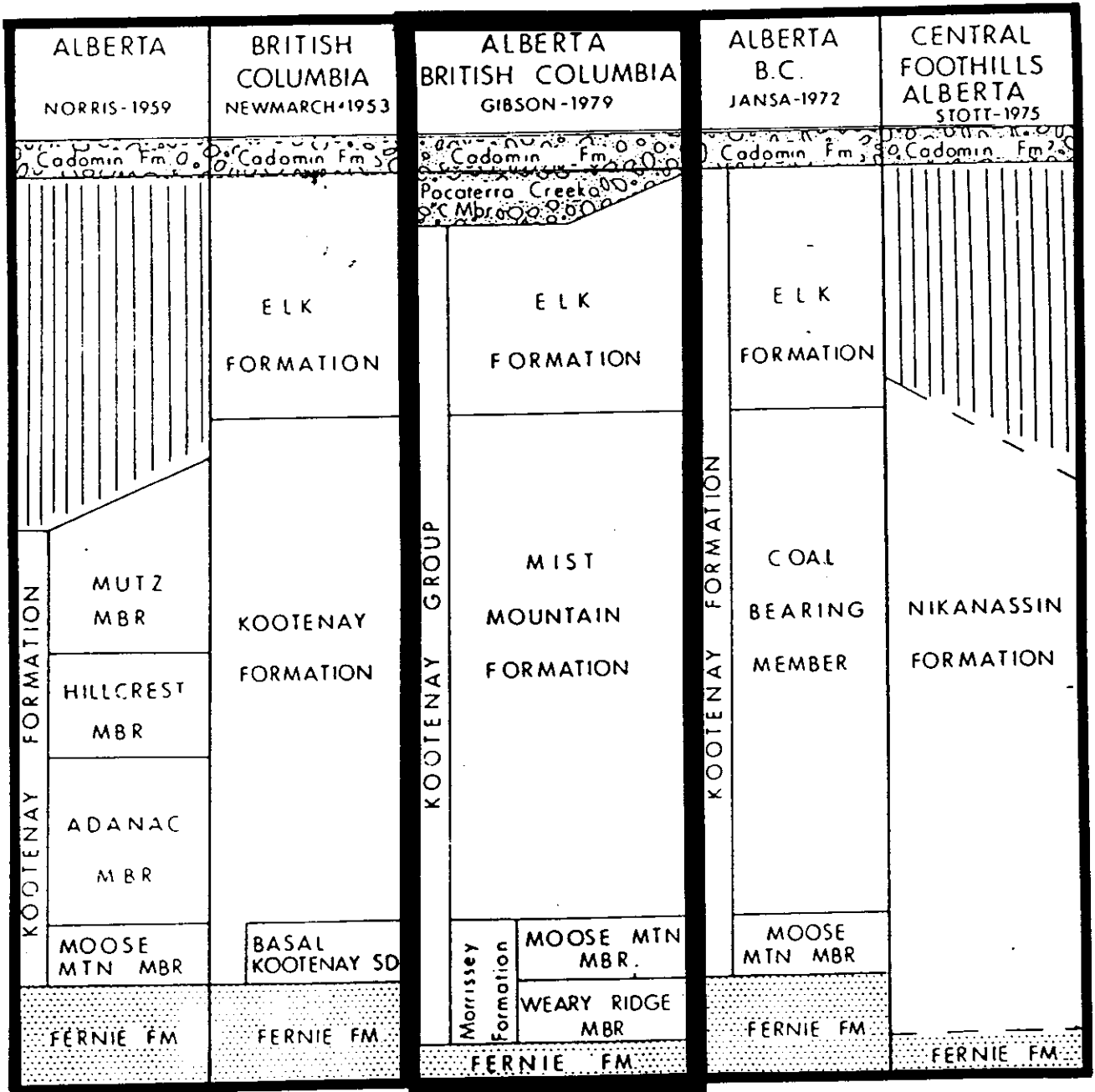


FIGURE 1

4.2 REGIONAL STRUCTURE

Coal bearing Mist Mountain Formation occurrences in the front ranges of southeast British Columbia are preserved in north/south trending synclines referred to as the Crowsnest Coal Field. The structure within the synclines is complicated to varying degrees by thrust faults, and to a lesser extent normal faults.

The Crowsnest Coal Field can be subdivided into three coal bearing areas. From south to north they are the Flathead Coal Field, the Fernie Coal Field and the Upper Elk Coal Field (where Line Creek is located).

Upper Elk Coal Field

The Upper Elk Coal Field is an elongate basin composed of two major synclines (Greenhills and Alexander Creek) separated by an anticline and the northern extension of the Erickson Normal Fault. Line Creek is located at the southern end of the northerly plunging Alexander Creek syncline. The Ewin Thrust Fault causes a repeat of the east limb of this syncline. The Mine Services Area North Project is located in the footwall of this thrust fault.

Enclosure 5 shows the regional stratigraphic and structural feature.

4.3 MINE SERVICES AREA NORTH

The Mine Services Area North Project is contained in 0.06 km² area on the lower southeast slope of Mount Michael. The area is located in a erosional gully which is relatively flat due to the coal seams that outcrop here. The Moose Mountain sandstone outcrops to the east and defines the eastern

limit of the project area. Topographic constraints outline the other three sides of the area.

Three seams have been identified, they average 28 metres in aggregate thickness within a 90 metre stratigraphic succession. These coal seams have been designated #10, 9 and 8 in ascending order, this correlates with Mount Michael seam nomenclature. The Mine Services Area North seam nomenclature is based on a stratigraphic model, i.e. the lowermost 10 seam is pinched out by a thick sandstone. Enclosure 7 contains four cross sections of the stratigraphic model. Cross sections A-B, C-D, illustrates how this sandstone pinches out seam 10 and then merges with the Moose Mountain sandstone towards the northwest. Cross sections were also made based on structural models and these are contained in Enclosure 8. In this case a thrust fault repeats seam 9, more drilling and detailed geological mapping will be needed to confirm which model is the more representative.

For the present time the stratigraphic model seems to be the more accurate of the two since quality data and geophysical log correlation seem to better support this model. Also, this model is very plausible in a sedimentary environment where it is common to see lateral facies changes.

4.4 SEAM STRATIGRAPHY

Seam 10

In the proposed pit area it averages 11 metres in thickness, contains two minor shale splits (<0.5 metres) and a larger split which varies between 1.0 and 2.0 metres.

Seam 9

Varies in thickness from 10 metres near the topographic surface to 16 metres further down dip. There is a large variance because of a split which gradually thickens down dip. Stratigraphic interval between seam 10 and 9 is approximately 15 to 20 metres.

Seam 8

Average thickness of this seam is 9 metres. Stratigraphic interval between seam 8 and seam 9 is approximately 24 - 26 metres.

There are two minor coal seams each about one metre thick that lie above and below seam 8. They were only intersected in drill hole MSAN 4 and the continuity and orientation of these seams are questionable.

There is also another seam about 1.5 metres thick which lies two to three metres below seam 9. This is was intersected in drill holes MSAN 4, 3 and 2 and serves as an excellent marker horizon.

5.0 MINEABILITY AND COAL RESERVES

Coal reserves were estimated using four cross sections that were drawn (Enclosure 7). Mineable reserves stand at 463,058 tonnes in place at a strip ratio of 3.08 bcm waste/one tonne coal.

This reserve estimate refers to the coal that is within the pit boundary which is located on each cross section. Although the coal reserves are relatively small, the accessibility to Mine Services Area North and its close location to the plant makes it a feasible operation.

6.0 COAL QUALITY

In 1989 coal samples were obtained from rotary drill holes and analyzed for ash and FSI. Average seam results are:

SEAM	ASH	FSI
10	24.8	2.5
9	21.5	2.0
8	31.0	4.0

Complete proximate analysis and a washability test on bulk samples are scheduled for 1990. Generally coal quality can be expected to be medium volatile bituminous (ASTM) of metallurgical rank.

7.0 RECOMMENDATIONS FOR FUTURE WORK

Detailed studies to determine the exact outcrop trace of these seams to Horseshoe Ridge. These studies would include trenching on Mine Services Area North and Horseshoe Ridge, and further drilling to the south of Mine Services Area North. This information will be vital to the development of the Horseshoe Ridge Project

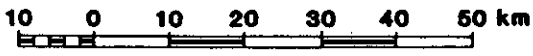
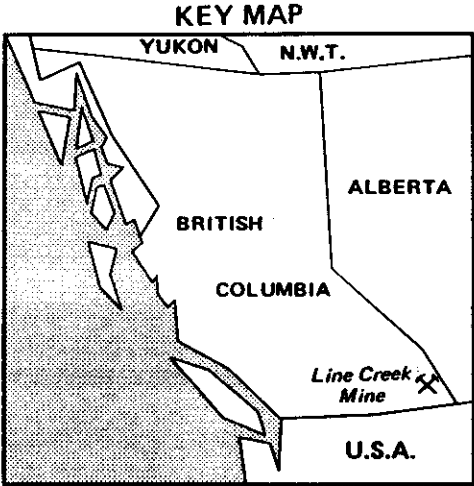
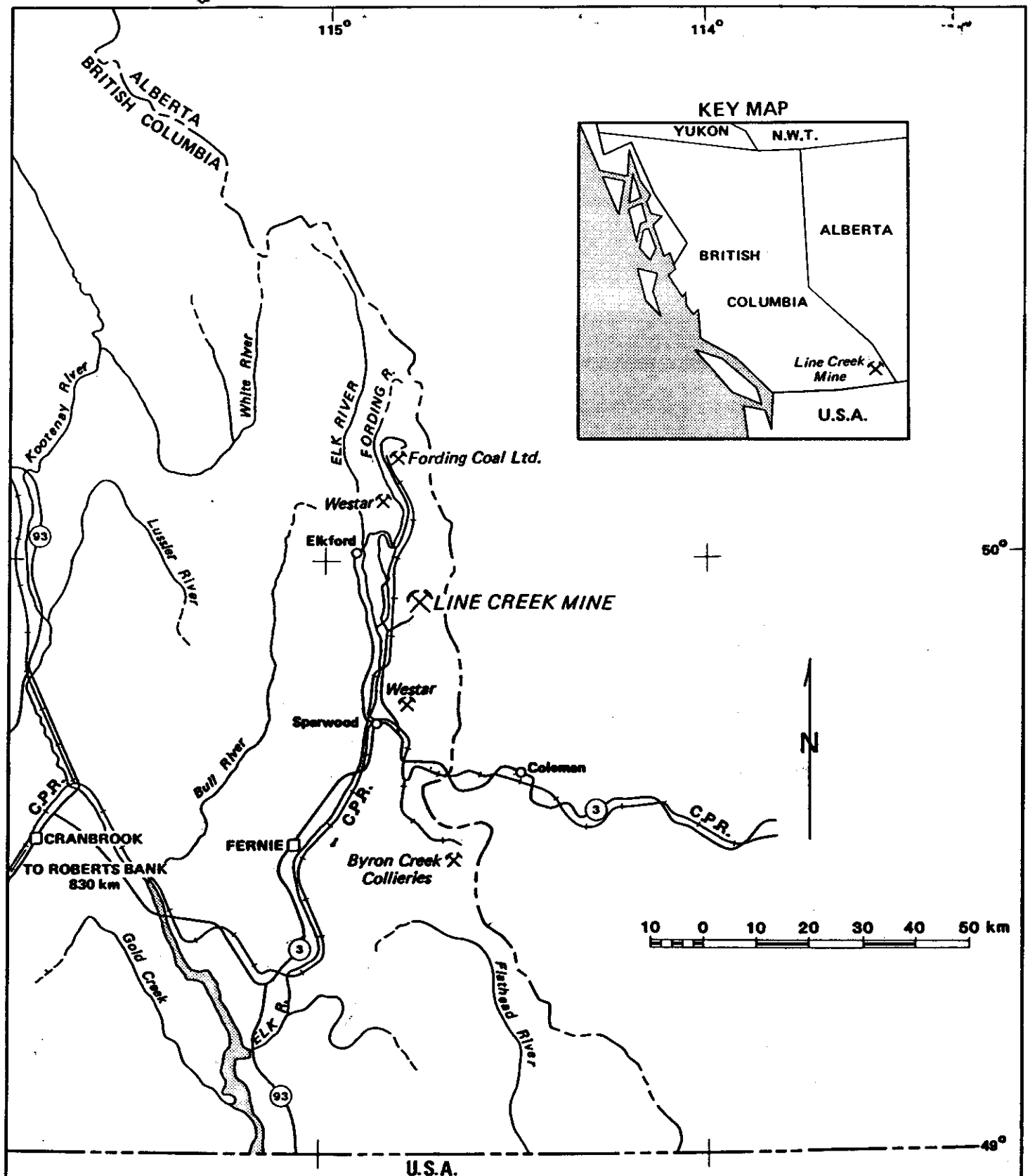
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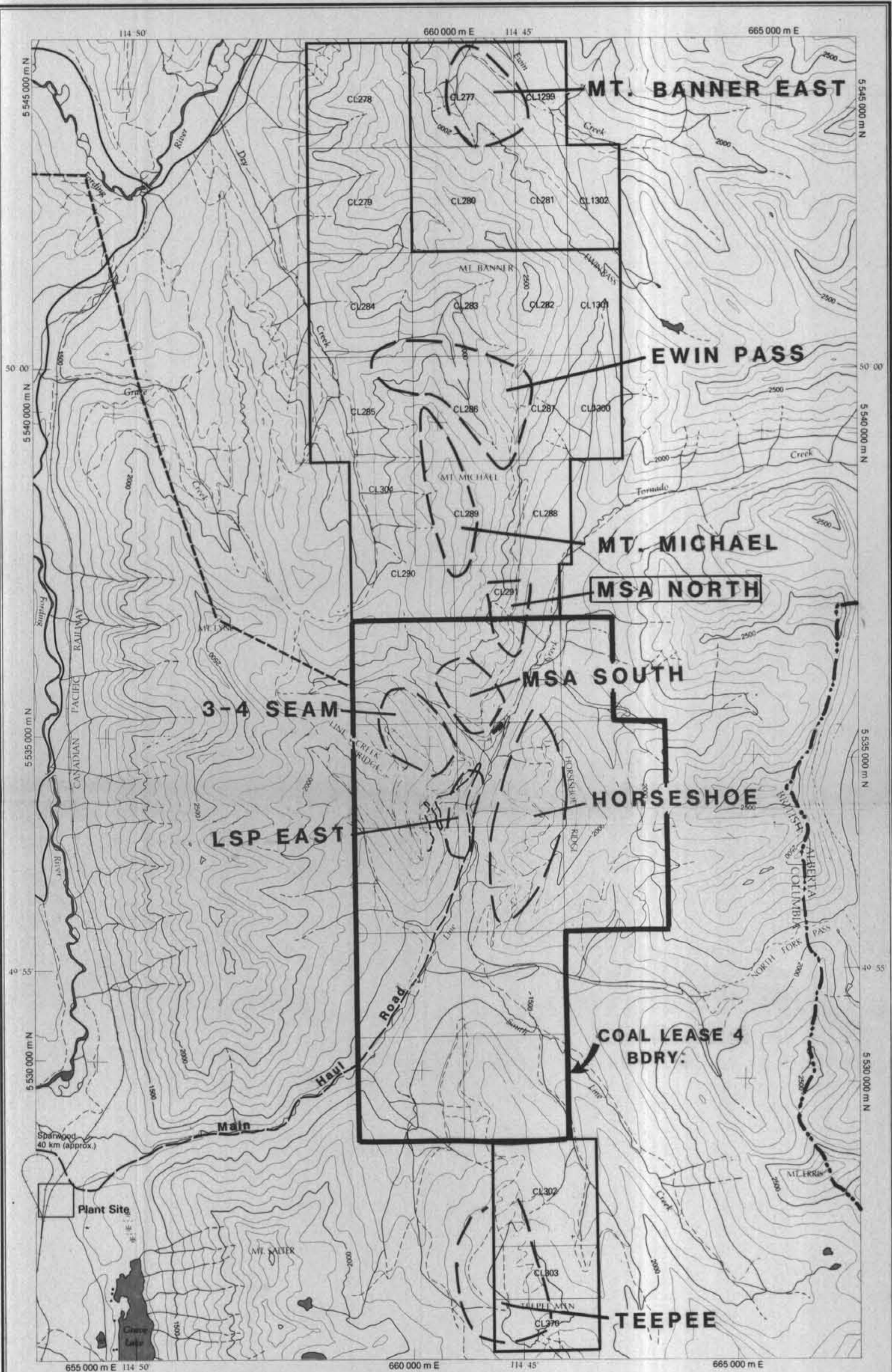
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 Crows Nest Resources Limited

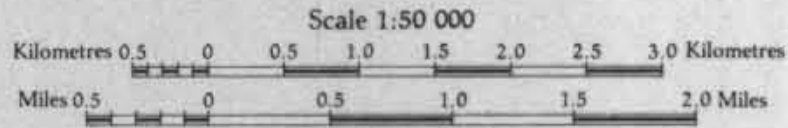
LINE CREEK EXPANSION

INDEX MAP

Fig. 1.1



Reference map produced by the Surveying and Mapping Branch, Department of Energy, Mines and Resources in 1975 and updated from 1979 Province of British Columbia 1:100,000 mapping. Metric contours were manually interpolated.



Contour Interval 100m
 Transverse Mercator Projection
 Universal Transverse Mercator Grid Zone II

- Legend**
- Road: Highway, Main road
 - Road: Loose surface, Dry weather
 - Track or trail
 - Railway
 - River
 - Stream
 - Contours
 - Licence boundary
 - Licence group boundary

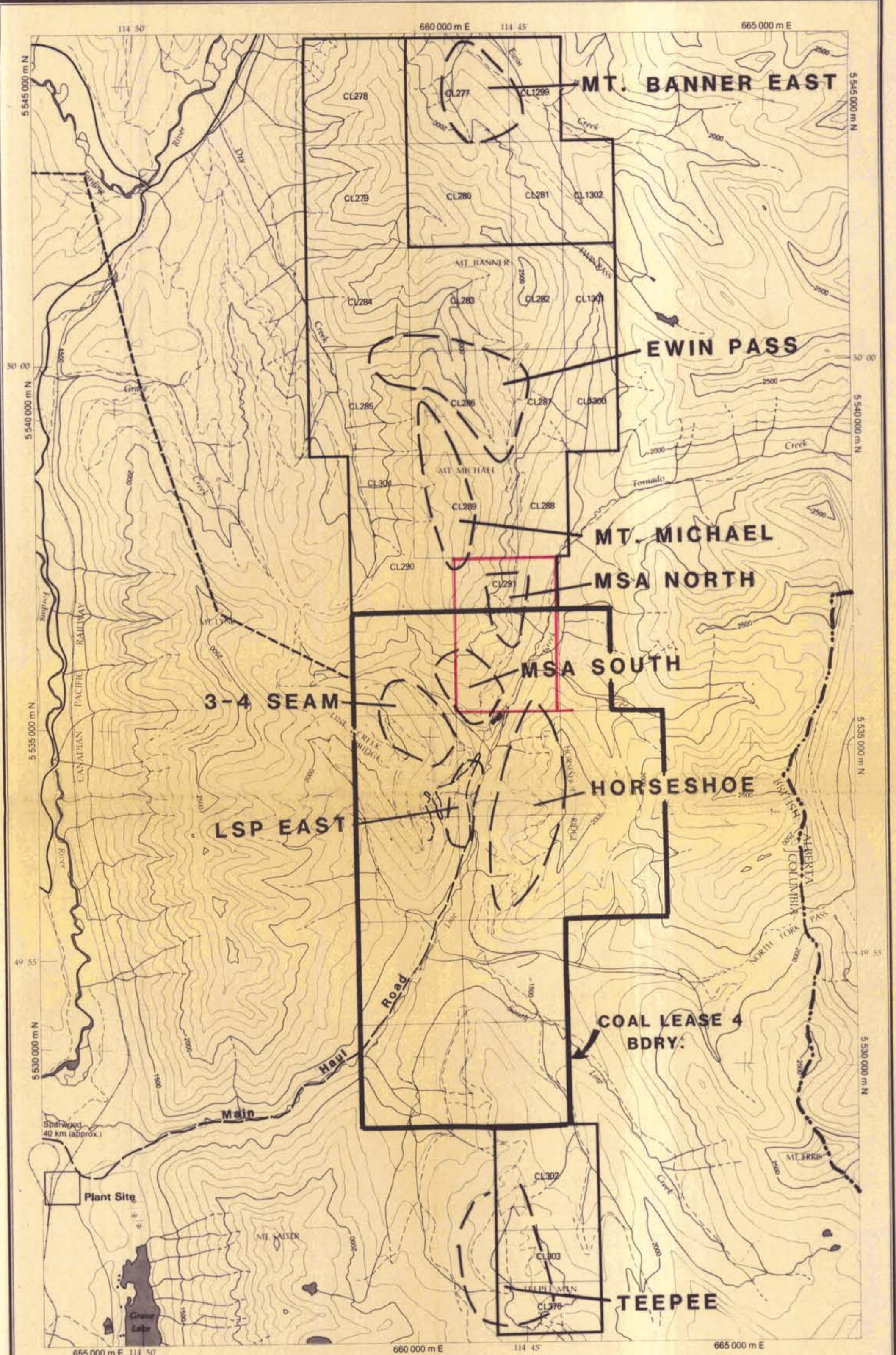


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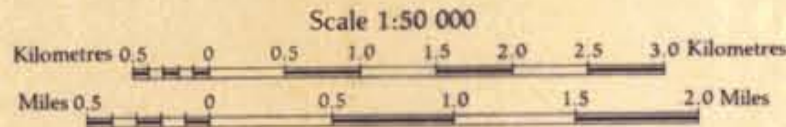
Crows Nest Resources Limited

ENCL 2
 LOCATION MAP

AUTHOR: JAS M	SCALE: 1:50,000	ENCLOSURE NO.
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T/A: 400/2000		

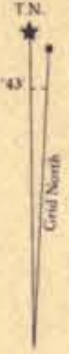


Reference map produced by the Survey and Mapping Branch, Department of Energy, Mines and Resources in 1975 and updated from 1979 Province of British Columbia 1:100 000 mapping. Metric contours were manually interpolated.



Contour Interval 100m
 Transverse Mercator Projection
 Universal Transverse Mercator Grid Zone II

- Legend**
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 - Road: Loose surface, Dry weather
 - Track or trail
 - Railway
 - River
 - Stream
 - Contours
 - Licence boundary
 - Licence group boundary

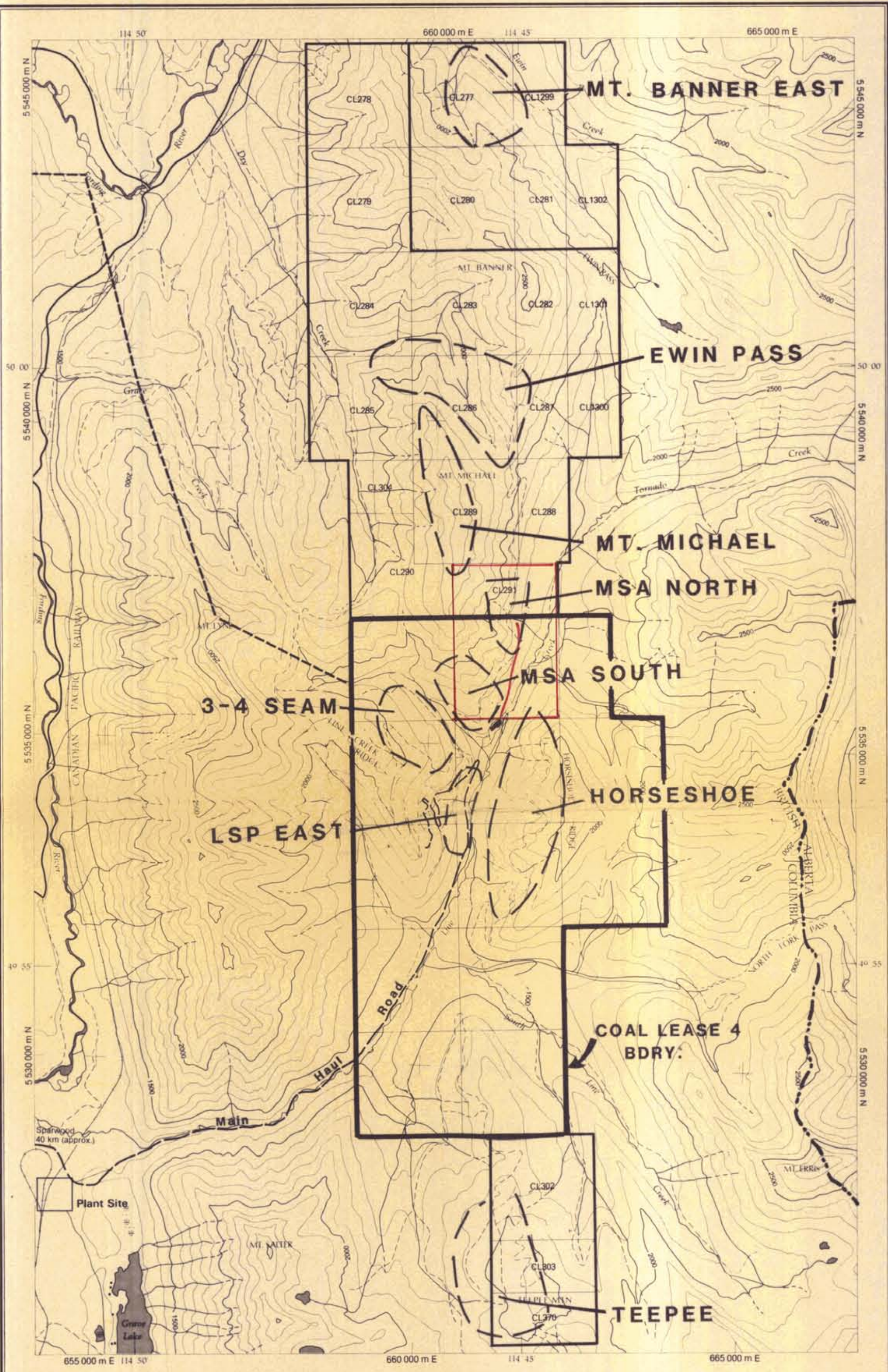


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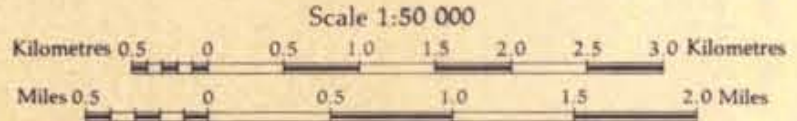
Crows Nest Resources Limited

COAL LICENSE ENCL 3 MAP

AUTHOR: JAS W.	SCALE: 1:50 000	ENCLOSURE NO.
DATE: APRIL 97	REVISED:	NTS: 800-958612
Copyright		

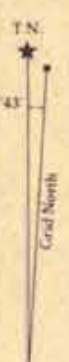


Reference map produced by the Survey and Mapping Branch, Department of Energy, Mines and Resources, in 1973 and updated from 1970 Province of British Columbia 1:100 000 mapping. Metric contours were manually interpolated.



Scale 1:50 000
 Contour Interval 100m
 Transverse Mercator Projection
 Universal Transverse Mercator Grid Zone II

- Legend**
- Road; Highway. Main road
 - Road; Loose surface. Dry weather
 - Track or trail
 - Railway
 - River
 - Stream
 - Contours
 - Licence boundary
 - Licence group boundary

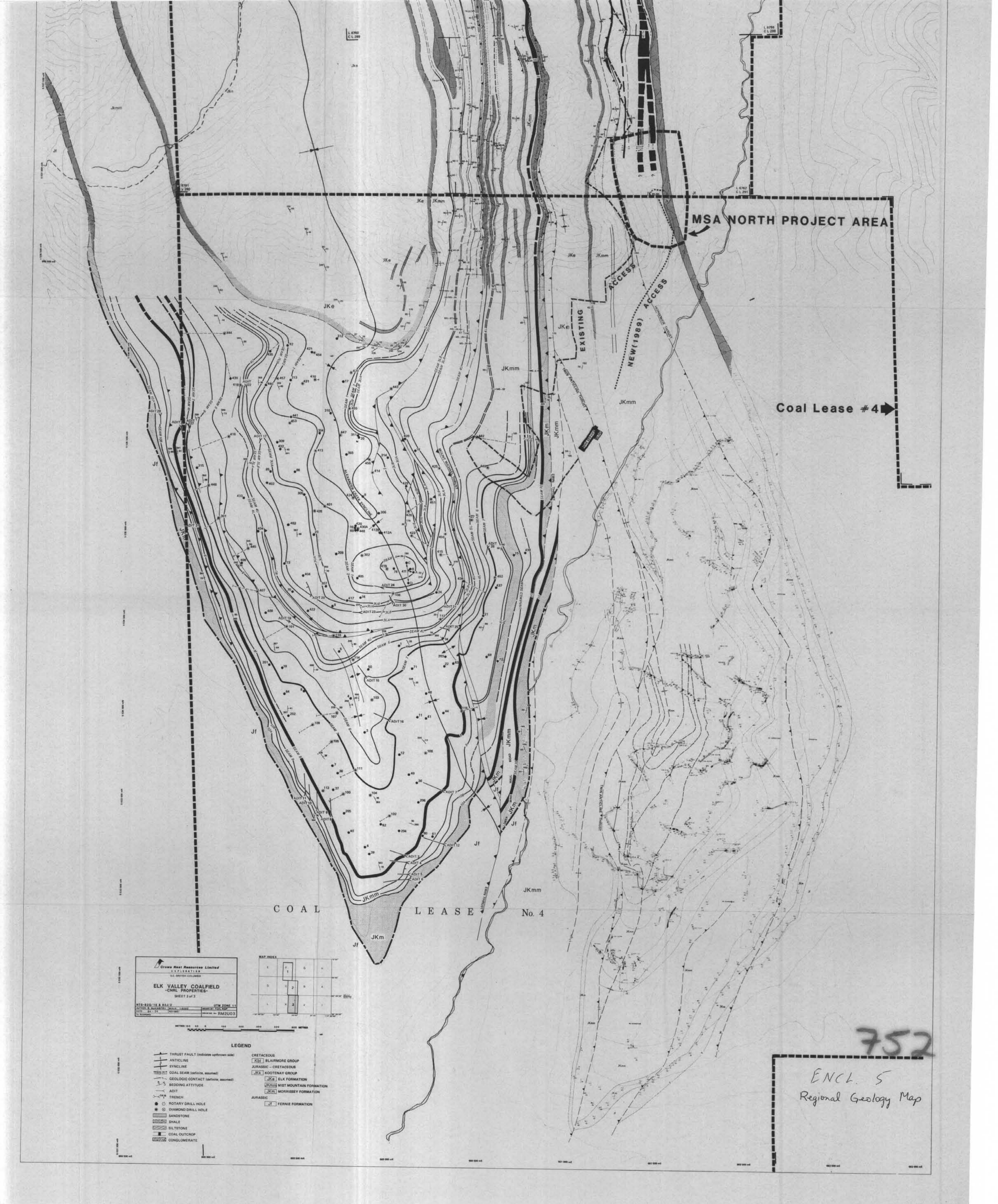


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Crows Nest Resources Limited

ENCL 4
 ACCESS MAP

AUTHOR: J.S.W.	SCALE: 1:50,000	ENCLOSURE NO.
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TO: Accounting		

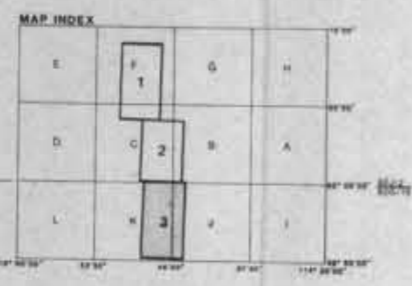


MSA NORTH PROJECT AREA

Coal Lease #4

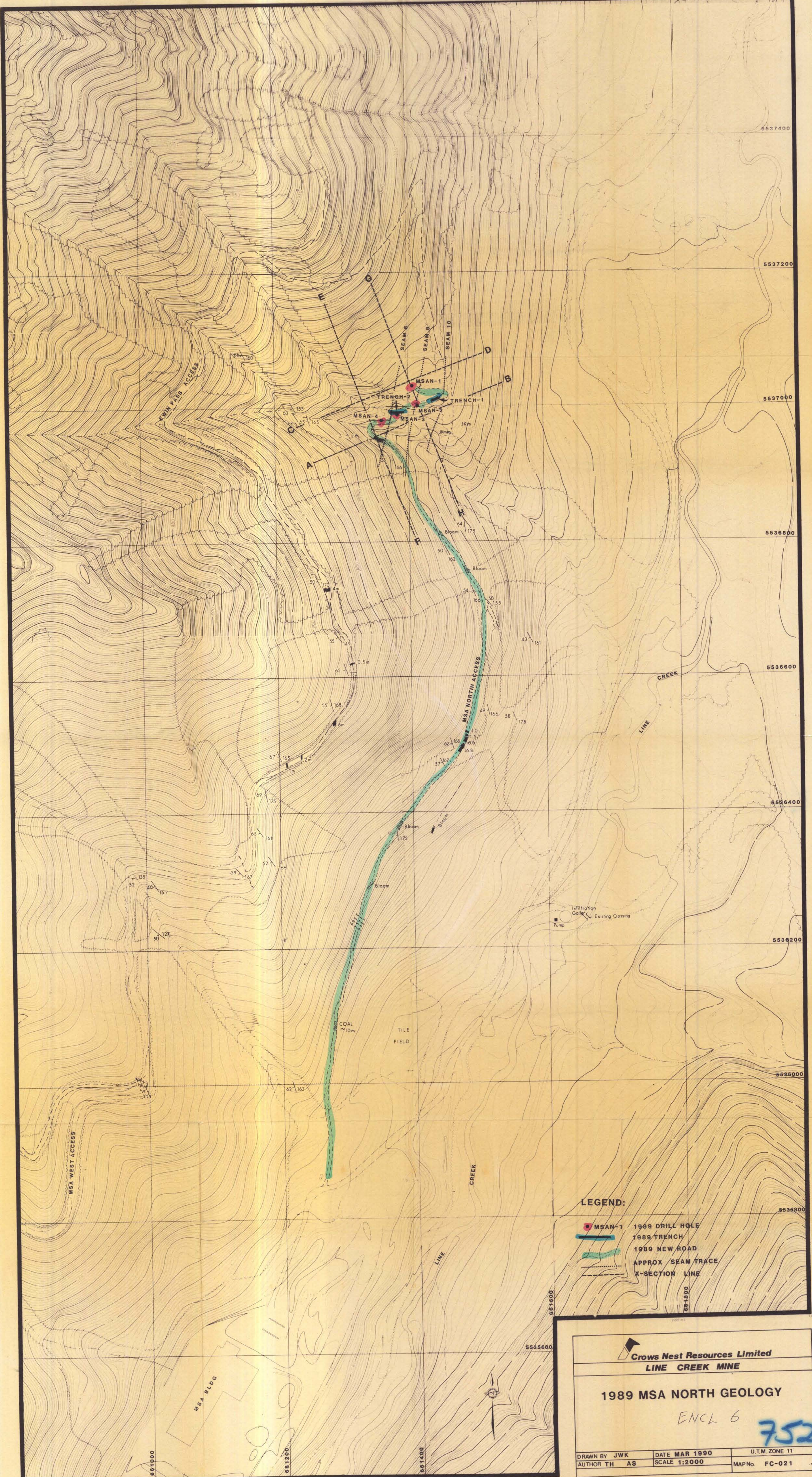
COAL LEASE No. 4

Crows Nest Resources Limited
 ELK VALLEY COALFIELD
 -CNRL PROPERTIES-
 SHEET 3 of 3
 NTS-820/13 & 824/7 UTM ZONE 11
 LOT 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000



- LEGEND**
- THRUST FAULT (indicates upthrown side)
 - ANTICLINE
 - SYNCLINE
 - COAL SEAM (surface, assumed)
 - GEOLOGIC CONTACT (surface, assumed)
 - BEDDING ATTITUDE
 - ADIT
 - TRENCH
 - ROTARY DRILL HOLE
 - DIAMOND DRILL HOLE
 - SANDSTONE
 - SHALE
 - SILTSTONE
 - COAL OUTCROP
 - CONGLOMERATE
 - CRETACEOUS
 - [Kb] BLAIRMORE GROUP
 - JURASSIC - CRETACEOUS
 - [JK] KOOTENAY GROUP
 - [Jk] ELK FORMATION
 - [Jm] MIST MOUNTAIN FORMATION
 - [Jm] MORRISSEY FORMATION
 - JURASSIC
 - [Jf] FERNIE FORMATION

752
 ENCL. 5
 Regional Geology Map



LEGEND:

- MSAN-1 1989 DRILL HOLE
- 1989 TRENCH
- 1989 NEW ROAD
- APPROX SEAM TRACE
- X-SECTION LINE

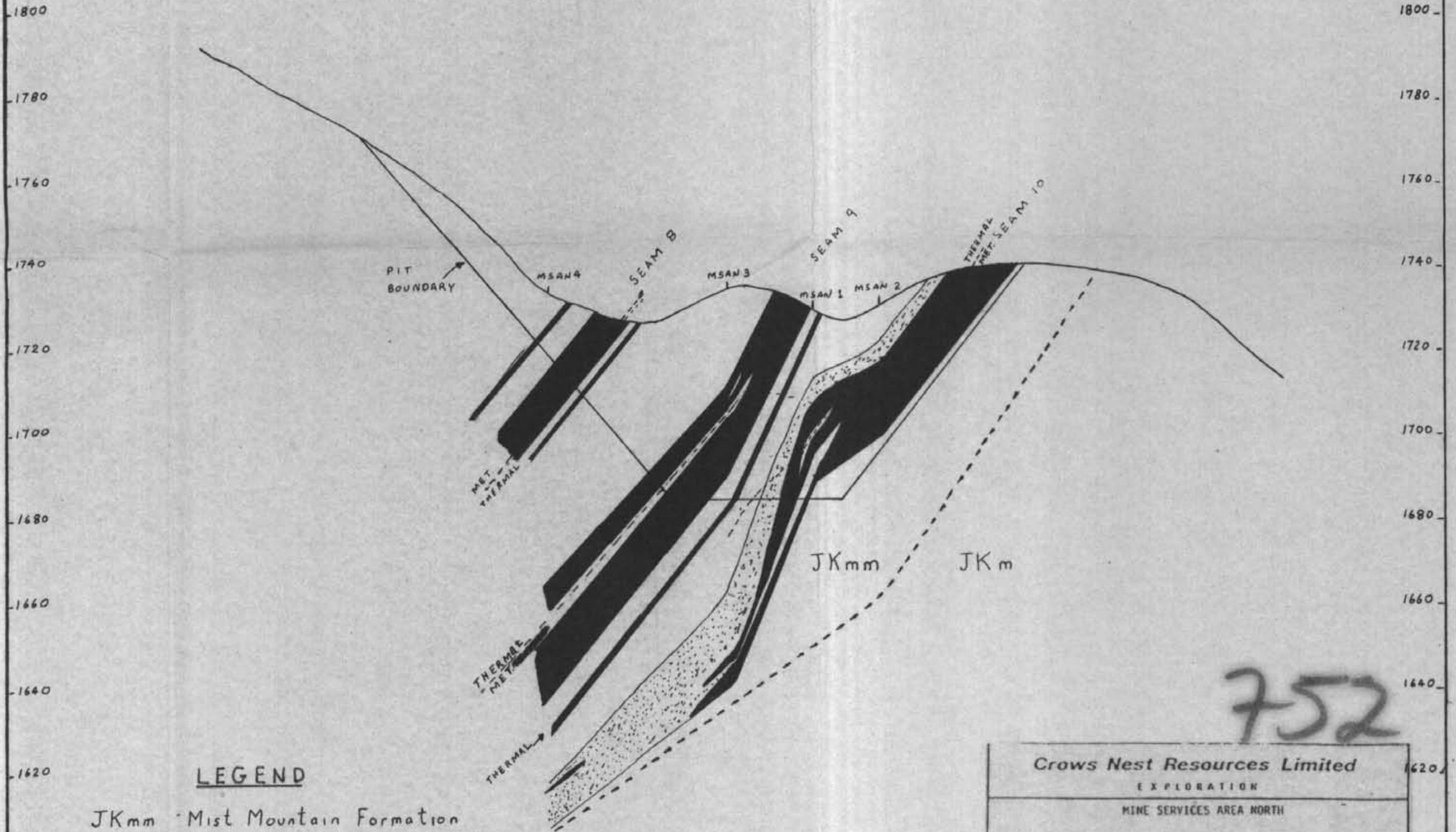
Crows Nest Resources Limited
LINE CREEK MINE

1989 MSA NORTH GEOLOGY
ENCL 6 752

DRAWN BY JWK	DATE MAR 1990	U.T.M. ZONE 11
AUTHOR TH AG	SCALE 1:2000	MAP No FC-021

A

B

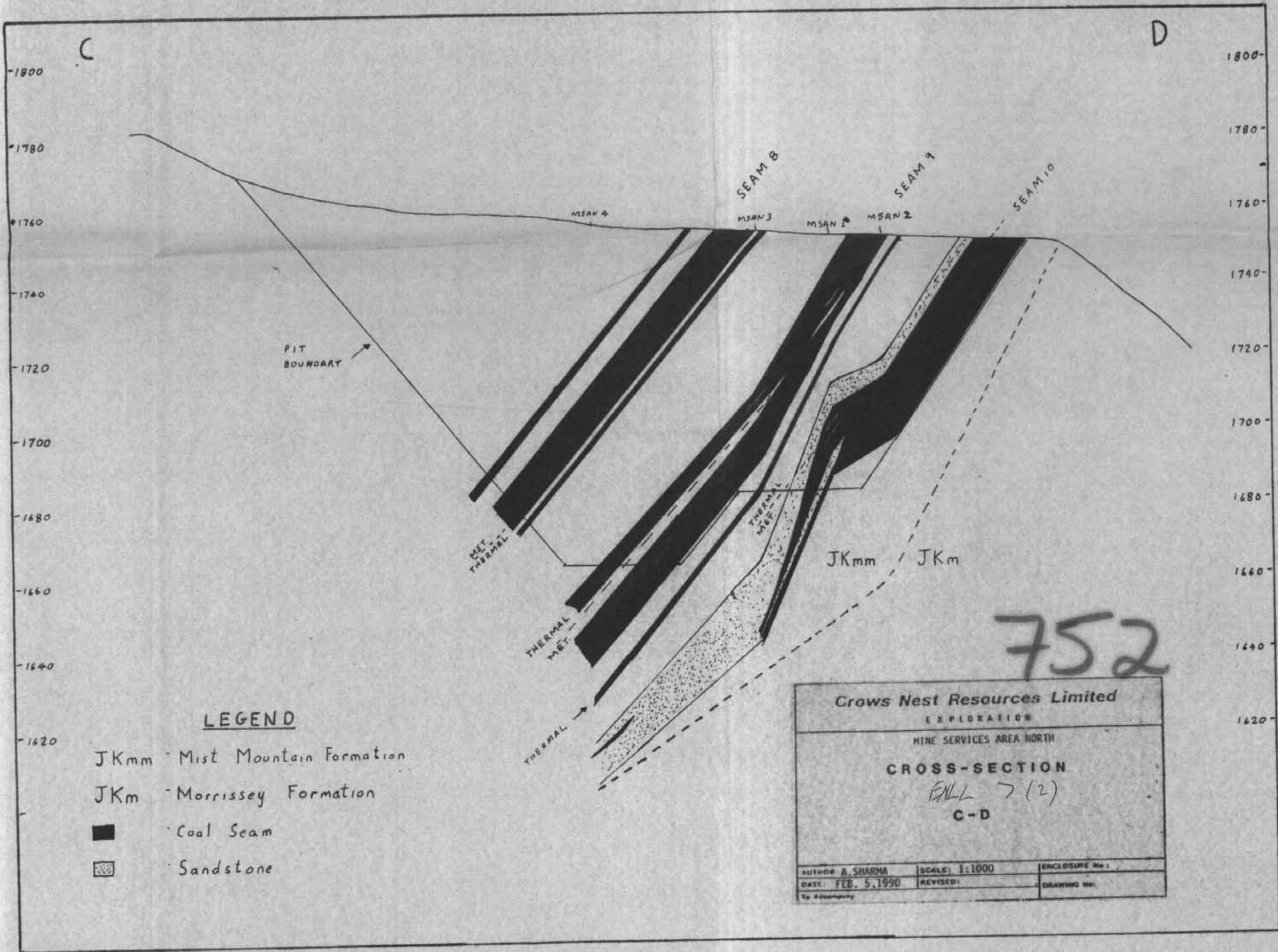


752

LEGEND

- JKmm - Mist Mountain Formation
- JKm - Morrison Formation
- - Coal Seam
- ▨ - Sandstone

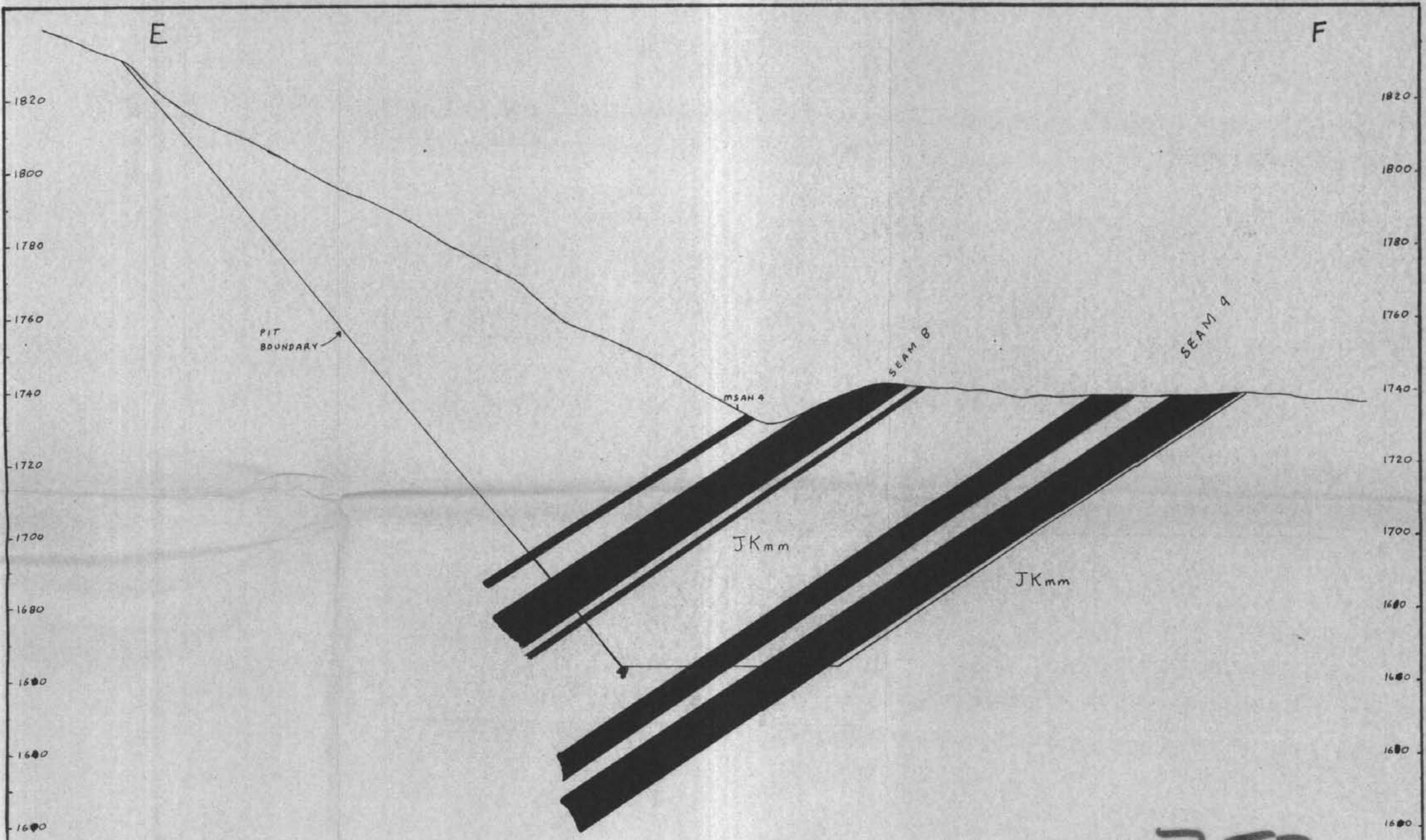
Crows Nest Resources Limited		
EXPLORATION		
MINE SERVICES AREA NORTH		
CROSS-SECTION		
ENCL 7 (1)		
A-B		
AUTHOR: A. SHARMA	SCALE: 1:1000	ENCLOSURE No:
DATE: FEB. 5, 1990	REVISED:	DRAWING No:
To Accompany		



LEGEND

- JKmm - Mist Mountain Formation
- JKm - Morrissey Formation
- - Coal Seam
- ▨ - Sandstone

Crows Nest Resources Limited		
EXPLORATION		
MINE SERVICES AREA NORTH		
CROSS-SECTION		
ENL 7 (2)		
C-D		
AUTHOR: A. SHARMA	SCALE: 1:1000	ENCLOSURE No: 1
DATE: FEB. 5, 1990	REVISED:	DRAWING No:
To Accompany		



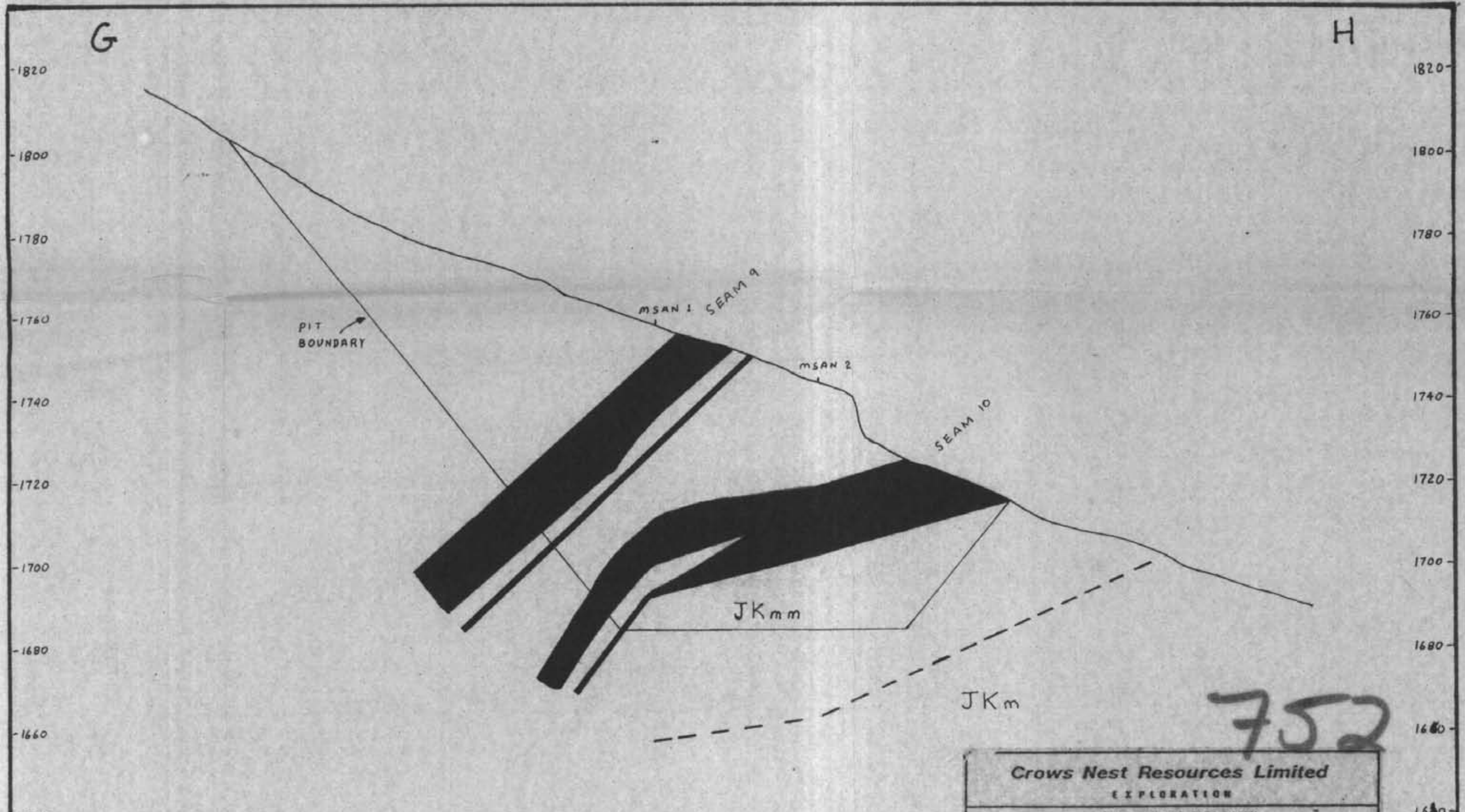
LEGEND

JKmm - Mist Mountain Formation

■ - Coal Seam

752

Crows Nest Resources Limited		
EXPLORATION		
MINE SERVICES AREA NORTH		
CROSS-SECTION		
ENCL 7 (3)		
E-F		
AUTHOR: A. SHARMA	SCALE: 1:1000	ENCLOSURE No:
DATE: FEB. 5, 1990	REVISED:	DRAWING No:
To:		

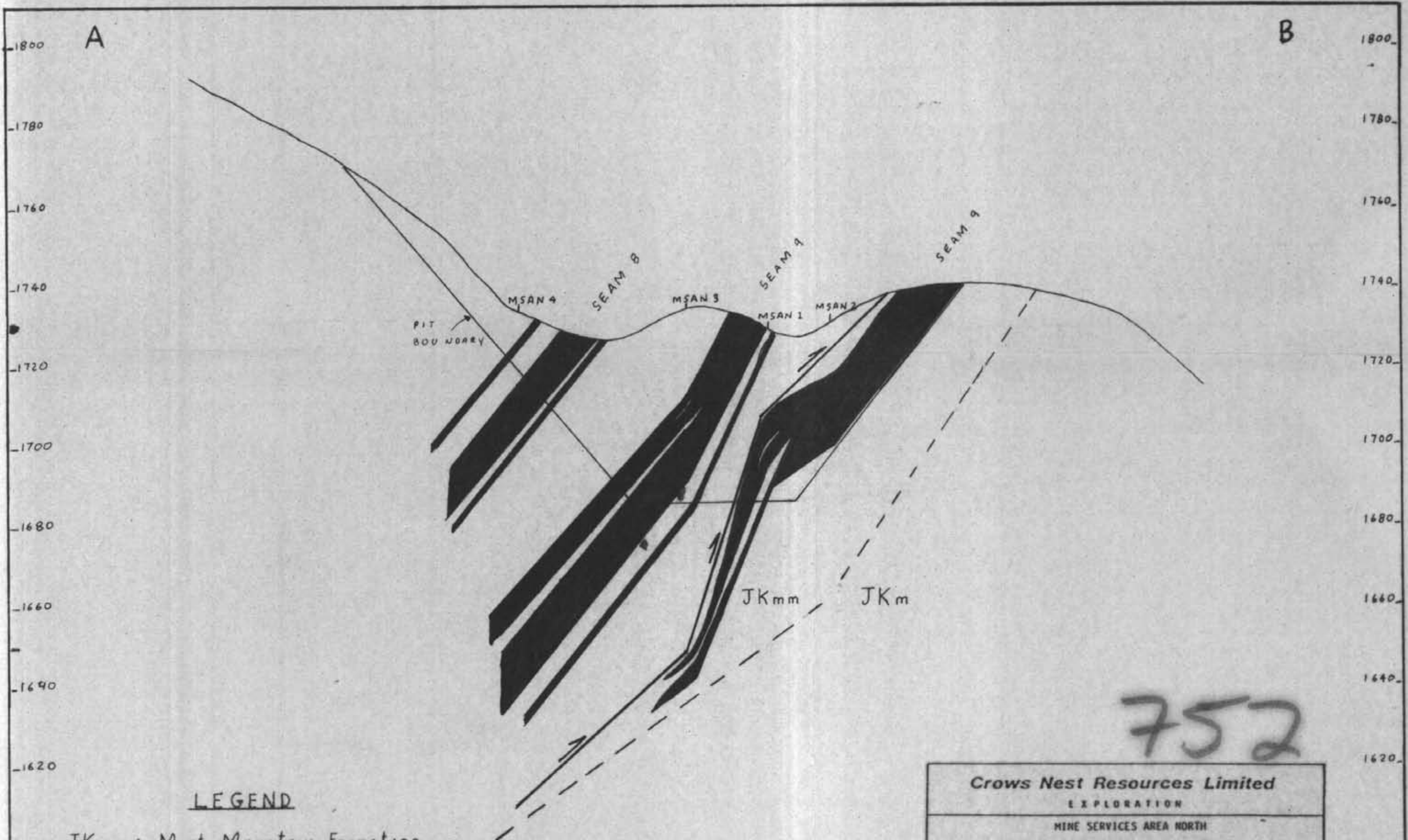


LEGEND

- JKmm - Mist Mountain Formation
- JKm - Morrissey Formation
- - Coal Seam

752

Crows Nest Resources Limited		
EXPLORATION		
MINE SERVICES AREA NORTH		
CROSS-SECTION		
ENCL 7 (4)		
G-H		
AUTHOR: A. SHARMA	SCALE: 1:1000	ENCLOSURE No.:
DATE: FEB. 5, 1990	REVISED:	DRAWING No.:
To Accompany		



LEGEND

- JKmm - Mist Mountain Formation
- JKm - Morrissey Formation
- Thrust Fault
- Coal Seam

752

Crows Nest Resources Limited		
EXPLORATION		
MINE SERVICES AREA NORTH		
CROSS SECTION		
ENCLOSURE A-B		
AUTHOR: A. SHARMA	SCALE: 1:1000	ENCLOSURE No: 1
DATE: FEB. 5, 1990	REVISED:	DRAWING No:
To Accompany:		

CROWS NEST RESOURCES LTD.

5/12/89
 #1, ~~MISAN~~ MISAN
 open hole
 Logged up

DRILL HOLE SUMMARY

HOLE NBR. MISAN-1
 TYPE: CSR
 DATE DRILLED: Nov. 30/89.
 WATER LEVEL: 12m
 LOCATION: 5537031.79 661405.09
 GROUND ELEVATION: 1753.84
 HOLE DIRECTION: VERT. → 141/81
 LOGS RUN: GAM / DEV THRU RODS.

BEARING 289.5
 HORIZ DIST 1.6
 VERT DEPTH 0.1

DEPTH	INCLN	DIR
16	1.2	199
50	0.7	121
100	0.6	45
150	0.7	05
200	0.5	125
250	1.7	158
300	3.1	151
350	3.6	134
400	4.2	125
450	4.8	107
500	4.1	110
550	5.2	130
600	6.0	135
650	6.5	141
700	5.6	114
750	6.2	136
800	6.7	132
850	7.6	136
900	8.2	141
950	8.9	141

SEAM NBR.	GEOPHYSICAL		DRILLED THICKNESS	TRUE THICKNESS	REI
	TOP	BOTTOM			
	7.0	18.3			
	18.8	20.2			
	22.0	23.1			
	29.6	30.2			
		?			
	47.0	50.2			
	50.2	51.9			
	51.9	52.6			
	53.3	59.0			
	64.5	65.5			
	80.6	81.5			
	81.5	85.5			
	85.5	86.5			
TD	95.5				

BEARING 130.9
 HORIZ DIST 67.9
 VERT DEPTH 930.9

DEPTH INCLN DIR



HOLE NO. MSAN-1

AREA MSANGETH

DATE Nov. 30/89

GROUND LEVEL VERT.

TOTAL DEPTH 95.5

CASING

BIT SIZES 1
2

CASING SIZE

WATER LEVEL

LOG TYPE

LOG CAM/DEV THEN RODS

PROBE NO.

CHART RATIO

CPS

FIRST READING

LAST READING

INTERVAL LOGGED

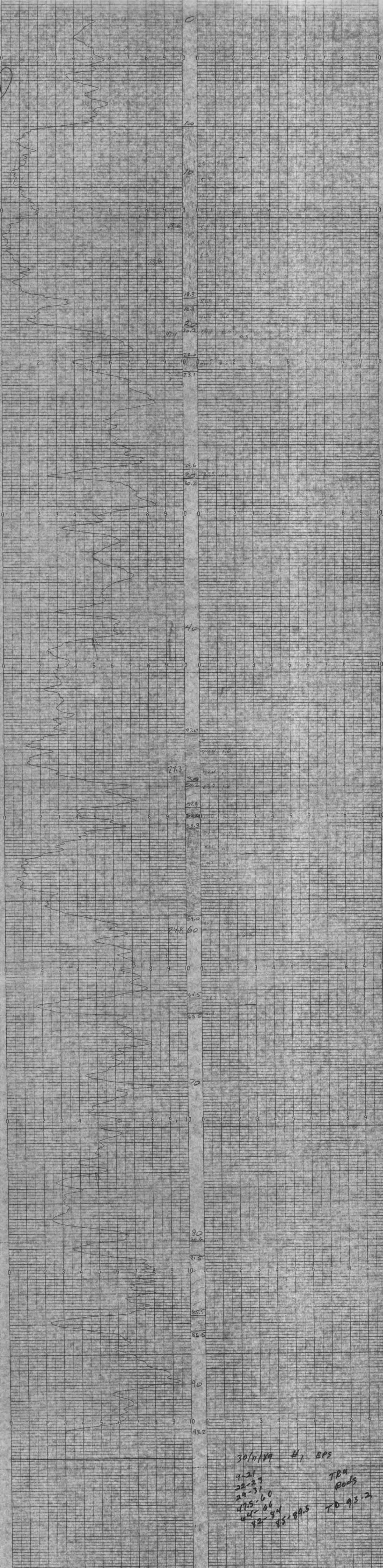
ENGINEER TB

SEAM DEPTHS

DEPTHS FROM TO

752

COLORADO WELL LOGGING, INC. GOLDEN, COLORADO, U.S.A. CHART NO. MET-2



M.S.A. NORTH (EPS) ROTARY SAMPLES

MSAN-1

900130

FIELD #	LAB #	SEAM	TOP	BASE	ASH (ADB)	FSI
928	1355		9	10	25.1	0.0
	1356		10	11	15.5	0.0
	1357		11	12	19.1	0.5
	1358		12	13	22.1	1.0
	1359		13	14	5.9	3.0
	1360		14	15	4.5	4.5
	1361		15	16	8.5	0.5
	1362		16	17	10.5	0.5
	1363		17	18	9.8	2.5
	1364		18	19	41.0	0.5
	1365		19	20	24.4	1.0
	1366		20	21	54.7	0.0
		1367		22	23	46.5
926	1368		29	31	66.9	1.0
927	1369		47.5	49	24.4	1.0
	1370		49	50	31.4	1.0
	1371		50	51	63.2	1.0
	1372		52	53	55.0	0.5
	1373		53	54	57.0	0.5
	1374		54	55	44.1	1.0
	1375		55	56	15.2	2.0
	1376		56	57	15.8	2.5
	1377		57	58	19.6	5.5
	1378		58	59	29.2	1.0
	1379		59	60	38.1	4.0
	1380		64	65	28.2	5.0
	1381		65	66	41.8	2.0
928	1382		82	83	75.0	0.5
	1383		83	84	82.0	0.0
	1384		85	86	66.5	0.5
	1385		86	87	65.3	1.0
	1386		87	88	68.4	1.0
	1387		88	89	73.9	0.0
	1388		89.5	90	87.3	0.0

1.5
1.0
1.5

1.0

3.5

13.8
7.3

42.4

27.3

24.8

CROWS NEST RESOURCES LTD.

BEARING 48.7
 HORIZ DIST 75.6
 VERT DEPTH 892.2

DRILL HOLE SUMMARY

HOLE NBR. **MSAN-2**
 TYPE: **CSIR**
 DATE DRILLED: **DEC 4 / 89.**
 WATER LEVEL: **10m.**
 LOCATION: **5537000.11 661418.39**
 GROUND ELEVATION: **1739.68**
 HOLE DIRECTION: **VERT. → 140 / 82**
 LOGS RUN: **GAM / DEV THRU RODS.**

AZIMUTH DEVIA
 ASSUMED TO
 SIMILAR TO
 EPS-1

DEPTH	INCLN	DIR
960	7.6	246
950✓	7.5	141
900	7.0	53
850	101.1	50
800	5.5	20
750✓	6.3	138
700	6.1	96
650	5.2	34
600✓	5.0	133
550	4.5	14
500	3.9	227
450	2.9	02
400✓	2.1	108
350	1.0	275
300	0.7	75
250	1.1	116
200	1.2	122
150	1.7	91
100	1.6	194
50✓	1.2	180
6	1.4	298

SEAM NBR.	GEOPHYSICAL		DRILLED THICKNESS	TRUE THICKNESS	REC
	TOP	BOTTOM			
TD	24.6	42.2			
	96.2				

DECLINATION E 18.0
 PRESET DEPTH 6.0
 DEPTH INCLN DIR

DECLINATION E 18.0
 PRESET DEPTH 6.0

11/4/89 **USE NOS. WITH ✓**
~~MSAN-2~~
MSAN-2
TD 97.4
TRU RODS



HOLE NO. MSAN-2

AREA MSA NORTH

DATE DEC 4/89

VERT

GROUND LEVEL

TOTAL DEPTH 97.0

CASING

BIT SIZES 1
2

CASING SIZE

WATER LEVEL 10

LOG TYPE

LOG GARY/DEV THRU BOSS

PROBE NO.

CHART RATIO

CPS

FIRST READING

LAST READING

INTERVAL LOGGED

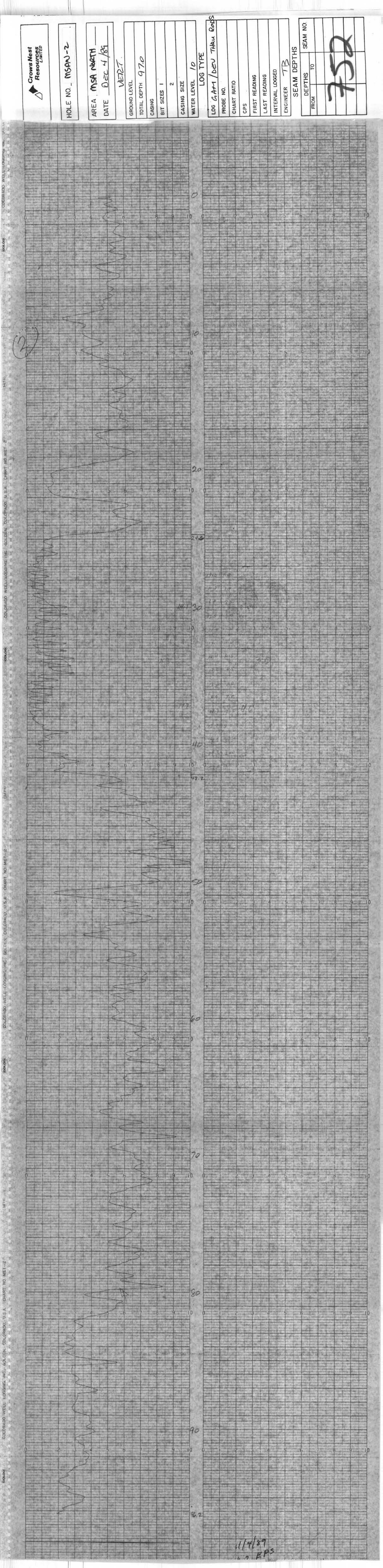
ENGINEER TB

SEAM DEPTHS

FROM

TO

752



11/9/89
4.2 FPS

CROWS NEST RESOURCES LTD.

BEARING 324.3
 HORIZ DIST 2.7
 VERT DEPTH 1134.4

DRILL HOLE SUMMARY

HOLE NBR. **MSAN-3**
 TYPE: **CR**
 DATE DRILLED: **DEC. 3/89**
 WATER LEVEL:
 LOCATION: **5536989.78 661385.03**
 GROUND ELEVATION: **1737.55**
 HOLE DIRECTION:
 LOGS RUN: **GAM/DEV TITRUM**

DEPTH	INCLN	DIR
1146	8.4	231
1100	8.1	114
1050	7.1	332
1000	8.2	300
950	7.4	134
900	5.0	190
850	8.7	184
800	8.4	13
750	8.3	277
700	7.8	62
650	7.1	23
600	5.3	63
550	5.9	234
500	5.2	146
450	4.5	249
400	3.5	331
350	2.2	303
300	1.2	305
250	0.8	119
200	0.7	170
150	0.9	120
100	0.9	167
50	0.9	66
-6	0.5	357

SEAM NBR.	GEOPHYSICAL		DRILLED THICKNESS	TRUE THICKNESS
	TOP	BOTTOM		
	26.2	28.1		
	29.0	31.3		
	34.4	45.5		
	45.5	47.6		
	53.3	54.0		
	90.4	91.1		
	92.4	95.7		
TD	115			

DECLINATION E 18.0
 PRESET DEPTH 6.0
 DEPTH INCLN DIR
 DECLINATION E 18.0
 PRESET DEPTH 6.0

6/12/8
#3 ~~MSAN~~ MSAN
TD 115
TRU Rods
logged down

M.S.A. NORTH ROTARY SAMPLES

MSAN-3

900130

FIELD #	LAB #	SEAM	TOP	BASE	ASH (ADB)	FSI
931	1404		27	28	8.5	2.0
	1405		28	29	46.4	1.0
	1406		29	30	29.5	1.0
	1407		30	31	12.5	1.0
	1408		31	32	45.0	1.0
	1409		32	33	62.2	1.0
932	1410		35	36	17.9	1.5
	1411		36	37	13.8	3.0
	1412		37	38	21.0	1.0
	1413		38	39	18.7	2.5
	1414		39	40	7.7	5.5
	1415		40	41	13.3	6.0
	1416		41	42	17.3	2.0
	1417		42	43	10.1	1.5
	1418		43	44	19.6	4.0
	1419		44	45	33.3	1.0
	1420		45	46	65.8	0.0
933	1421		47	48	64.4	0.0
	1422		90.5	91	39.5	3.5
	1423		92.5	93	40.8	1.0
	1424		93	94	28.8	1.0
	1425		94	95	28.1	1.0
934	1426		95	95.5	38.7	1.0
	1427		104	105	61.1	1.0
	1428		105	106	22.7	3.5

30.0

17.6

14.6

33.5

1.0

3.0

3.5

1.5

CROWS NEST RESOURCES LTD.

DRILL HOLE SUMMARY

HOLE NBR. **MSAN-A**
 TYPE: **C&R**
 DATE DRILLED: **DEC 7/89**
 WATER LEVEL:
 LOCATION: **5536972.13 661356.71**
 GROUND ELEVATION: **1733.00**
 HOLE DIRECTION: **VERT.**
 LOGS RUN: **GAM / DEV THRU RODS**

7/12/89
#4 REELS MSAN
TD 136
Logged up
TRU RODS

BEARING 48.9
 HORIZ DIST 20.5
 VERT DEPTH 1352.2

DEPTH	INCLN	DIR
1360	5.6	107
1350	5.7	21
1300	5.3	109
1250	4.8	65
1200	4.3	105
1150	3.2	335
1100	4.0	331
1050	3.7	150
1000	3.8	04
950	3.8	133
900	3.8	21
850	3.6	207
800	3.3	22
750	2.9	182
700	2.5	104
650	1.9	333
600	1.6	261
550	1.2	257
500	1.4	27
450	1.6	281
400	1.8	295
350	1.9	350
300	1.6	52
250	1.4	67
200	0.8	30
150	888.8	8888
100	0.7	61
50	0.8	06
6	0.7	357
DEPTH	INCLN	DIR

SEAM NBR.	GEOPHYSICAL		DRILLED THICKNESS	TRUE THICKNESS	REC.
	TOP	BOTTOM			
	7.8	10.0			
	18.8	31.7			
	33.4	34.8			
	67.2	75.0			
	80.0	94.5			
	102.4	103.6			
	114.0	114.6			
TD	136				



HOLE NO. MSAN-3

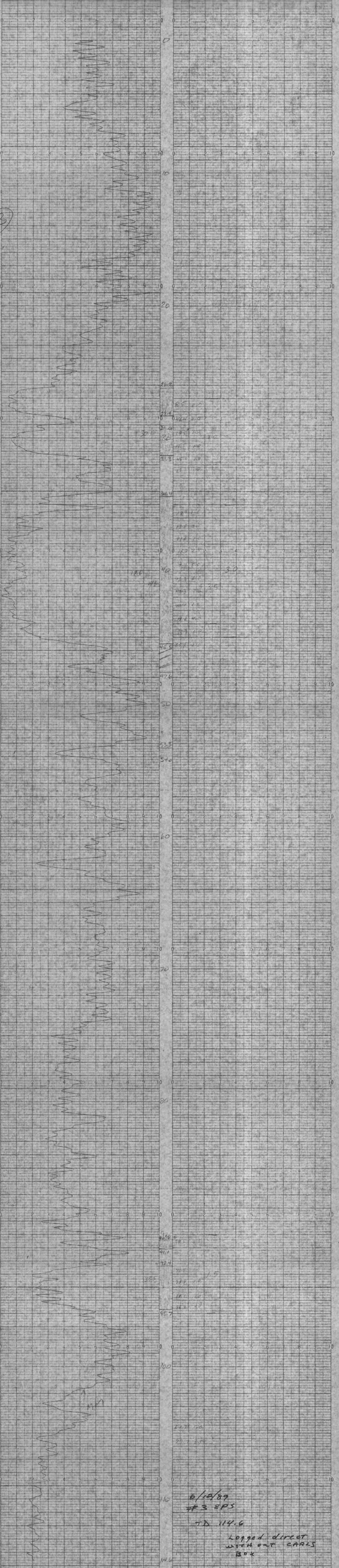
AREA - MSA NORTH
DATE DEC. 6 / 89

GROUND LEVEL
TOTAL DEPTH 115
CASING
BIT SIZES 1
2
CASING SIZE
WATER LEVEL

LOG TYPE
LOG CATH / DEV THEN ROSS
PROBE NO.
CHART RATIO
CPS
FIRST READING 114.6
LAST READING
INTERVAL LOGGED
ENGINEER TB

SEAM DEPTHS
FROM TO SEAM NO.
752

COLORADO WELL LOGGING INC. GOLDEN, COLORADO, U.S.A. CHART NO. MET-2





HOLE NO. EPS-4

AREA EPS

DATE DEC. 7/89

VERT.

GROUND LEVEL

TOTAL DEPTH 136

CASING

BIT SIZES 1
2

CASING SIZE

WATER LEVEL

LOG TYPE

LOG GAM/DEU THERM RES

PROBE NO.

CHART RATIO

CPS

FIRST READING

LAST READING

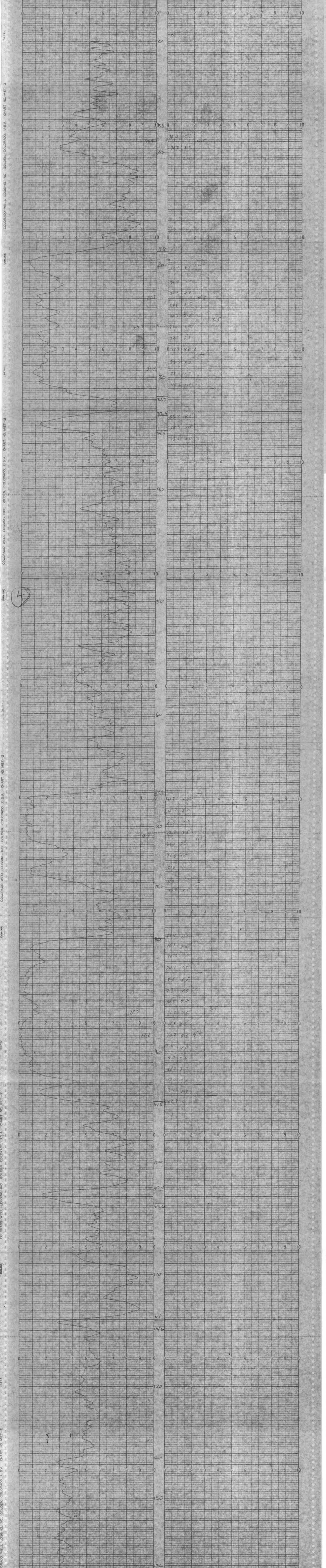
INTERVAL LOGGED

ENGINEER TB

SEAM DEPTHS

DEPTHS FROM TO

752



COLORADO WELL LOGGING INC. GOLDEN, COLORADO, U.S.A. CHART NO. MET-2

COLORADO WELL LOGGING INC. GOLDEN, COLORADO, U.S.A. CHART NO. MET-2

M.S.A. NORTH ROTARY SAMPLES

MSAN-4

900130

FIELD #	LAB #	SEAM	TOP	BASE	ASH (ADB)	FSI
935	1429		8	9	38.0	5.5
	1430		9	10	31.7	3.0
	1431		19.5	21	10.4	8.5
	1432		21	22	39.4	1.0
	1433		22	23	21.1	4.0
	1434		23	24	28.5	6.5
	1435		24	25	30.7	2.5
	1436		25	26	20.1	1.0
	1437		26	27	22.2	6.5
	1438		27	28	32.9	4.0
	1439		28	29	23.3	1.0
	1440		29	30	25.2	1.0
1441		30	31	45.2	1.0	
936	1442		33	34	33.7	4.0
	1443		34	35	58.3	1.5
	1444		35	36	73.6	0.0
	1445		67	68	11.3	1.0
	1446		68	69	12.2	2.0
	1447		69	70	8.3	1.0
	1448		70	71	12.9	3.5
	1449		71	72	36.0	2.0
	1450		72	73	26.6	1.5
	1451		73	74	21.9	1.5
	1452		74	75	11.9	1.0
	1453		75	76	43.7	2.5
937	1454		79	80	29.4	1.0
	1455		80	81	16.1	2.5
	1456		81	82	30.3	2.0
	1457		82	83	24.1	1.5
	1458		83	84	5.6	6.5
	1459		84	85	7.3	7.5
	1460		85	86	10.5	7.0
	1461		86	87	20.2	2.5
	1462		87	87.5	10.8	2.5
	937	1463		88	89	10.2
1464			89	90	7.6	4.0
1465			90	91	9.0	3.0
1466			91	92	28.2	3.5
1467			92	93	12.5	3.0
1468			93	94	31.3	1.5
1469			94	95	69.3	0.0

