Geological Survey 82F/3E

Deer Nos. 5 to 30 inclusive

Double B and Double B No. 1 Fraction

On Sheep Creek - 7 miles from Salmo, B. C.

Lat. 49° Long. 118° SE Quadrant

W. T. Irvine 49° 117° SE

August 1st to December 1st, 1951

0063

The Consolidated Mining and Smelting Company of Canada Limited

63

# GEOLOGICAL REPORT ON THE DEER GROUP CLAIMS

## NELSON MINING DIVISION

S.E. Quadrant Long. 117°W, Lat. 49° N.

## DEER GROUP CLAIMS

| | |
|---|---|
| Deer 5 M.C. | Deer 18 M.C. |
| Deer 6 M.C. | Deer 19 Fractional M.C. |
| Deer 7 M.C. | Deer 20 M.C. |
| Deer 8 M.C. | Deer 21 M.C. |
| Deer 9 M.C. | Deer 22 M.C. |
| Deer 10 M.C. | Deer 23 M.C. |
| Deer 11 M.C. | Deer 24 M.C. |
| Deer 12 M.C. | Deer 25 M.C. |
| Deer 13 M.C. | Deer 26 M.C. |
| Deer 14 M.C. | Deer 27 M.C. |
| Deer 15 Fractional M.C. | Deer 28 M.C. |
| Deer 16 Fractional M.C. | Deer 29 M.C. |
| Deer 17 Fractional M.C. | Deer 30 M.C. |
| Double B | Double B No. 1 Fraction |

by

W.T. IRVINE

PROGESSIONAL ENGINEER

THE CONSOLIDATED MINING AND SMELTING COMPANY OF CANADA LIMITED

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1" = 400'

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The Consolidated Mining and Smelting Company of Canada Limited

# GEOLOGICAL REPORT ON THE DEER GROUP CLAIMS

## INTRODUCTION

A program of geological mapping was undertaken on the 26 claims of the Deer Group, which adjoin the H.B. Mine in the Salmo Area, for the purpose of delimiting and studying structures which might act as controls for commercial mineralization of the H.B. type. The work occupied 80 days, from 25th August, 1951 to 17th November, 1951, and was done by J. Richardson, B.A. who was assisted by D. Heddle, M.A.Sc., both graduate geologists. W.T. Irvine, B.A.Sc., P.Eng., acted as consultant and went over the ground with the man doing the mapping.

## LOCATION OF CLAIMS

The group lies about five miles S.E. of Salmo, B.C., near the junction of Aspen and Sheep Creek. The claims are traversed by the Sheep Creek road which leads from the Provincial highway south of Salmo to Sheep Creek Camp.

## TOPOGRAPHY

The general surrounding topography is that of mature, generally rounded hills and ridges which have been dissected by numerous streams. The resulting relief is about 3000 feet. The group of claims is traversed by Sheep Creek, and two of its north branches, Aspen and Hedgehog Creeks. Sheep Creek is now near grade, but Aspen and Hedgehog Creeks are not to grade and are still cutting down rapidly. Sheep Creek valley is a deep east-west trending "U" shaped feature whose facetted spurs indicate a past history of glacial erosion. The walls of the north-south valleys of Aspen and Hedgehog Creeks have by contrast the convex upward profile of rapidly downcutting streams.

Secondary erosional features are steep draws which occur along the sides of the main ridges. Between these are hogsbacks along which rock outcrops occur. Other outcrop areas are located just below the crests of the ridges, where small cliffs are apt to be prominent, possibly marking the break-over from erosional slopes to original upland surfaces.

A bench of fluvial material, of sand and gravel dimensions, once covered the area at the junctions of Sheep Creek with Aspen and Hedgehog Creek. The surface of the bench was at an average elevation of 3300 feet but it has been deeply incised by all three creeks, which in places have cut down to bedrock, exposing gravel banks up to 300 ft. high. The bench seems related chiefly to Aspen Creek valley, and probably resulted from ponding of Aspen Creek due to a blockage in Sheep Creek valley. At present about 35% of the Deer Group area is covered by this fluvial material, which effectively masks all outcrops.

## GENERAL GEOLOGY

The claims are underlain by sedimentary rocks of the Laib group. These are now considered by Little * to be Lower Cambrian in age. The Laib group overlies the Reno Quartzite, also of Lower Cambrian age, and is overlain in turn, although not in this immediate area, by the Middle Cambrian Nelway sediments.

* G.S.C. Paper 50-19 Salmo Map Area, B.C. by H.W. Little

GENERAL GEOLOGY - Continued

Rocks of the Laib group are widely distributed in the Salmo Map Area, extending as a broad band down the centre of the area, then swinging west to cross the Pend Oreille river at the Reeves MacDonald mine.

The Laib group divides naturally into a lower calcareous formation and an upper argillaceous formation. The calcareous lower portion consists of massive and banded limestones with numerous argillaceous interbeds. In the southern part of the area at least two distinct relatively thick limestone members occur, but at the H.B. only one main limestone layer is present. This is several hundred feet thick, but may be thickened or squeezed by close folding, so that is exact true thickness is difficult to measure. The upper argillaceous portion of the Laib is composed of dark grey to black slaty rocks, and at this locality has an approximate thickness of 1500 feet. Alternate layers of silty and relatively non-silty types of argillite up to several hundred feet in thickness occur, and there is as well at least one fairly thick layer of quite calcareous argillite.

GENERAL STRUCTURE

The main structural features in the area immediately surrounding the Deer Group are a series of North-South trending folds which involve all of the sedimentary rocks. On his sections Little shows these as relatively open folds, but our more detailed investigations at the H.B. Mine and on the Deer Group have shown that tight isoclinal folding is important, at least locally, and that the open syncline shown by Little to occur just east of the H.B. Mine is more correctly a synclinorium composed of a number of isoclinal folds.

Failure by faulting has occurred throughout the whole Salmo Area on a more or less predictable basis. The east-west compressive forces which produced the main folding has also caused thrust faulting striking normal to the direction of these forces, and right hand transcurrent faults striking at a relatively small angle to the direction of application of the forces. A later period of pressure is suggested by the occurrence of steep drag folds along north-south striking shears in the H.B. mine, and the direction of application would be necessarily rotated more north south than that of the earlier forces. This later period of compressive stress may have resulted in the east striking thrust fault which occurs west of the Reeves MacDonald mine in the southern part of the area. Some normal faults are present, and these have undoubtedly resulted from relaxed conditions which may have followed either or both periods of compression. Little has mapped a north striking fault on Canadian Exploration Company property to the south, and this, since it parallels the trend of the folding, is most probably a thrust fault. On strike this fault should pass just east of the H.B. Mine.

ECONOMIC GEOLOGY

Commercial base metal deposits in the Salmo area are confined to the calcareous lower member of the Laib group. Mineralization occurs within folds in the limestone, and may be locallized along the strike of thrust faults associated with the folding.

The H.B. ore occurs in two parallel steeply dipping mineralized zones which lie within, and follow the gentle south plunge of isoclinal folds on the west limb of the "Deer synclinorium". These zones lie within an area of dolomitized limestone whose rough outline agrees with the controlling folds within the main limestone layer. Surrounding the dolomitized area is a thin layer of silicified limestone, which in general marks the contact between dolomitized and undolomitized limestone. Tremolite is often conspicuous in this contact zone. Within the mineralized zones there are individual, highly irregular and erratic stringers, and shoots apparently following steep north striking shears. These relatively small shoots

ECONOMIC GEOLOGY - Continued

may be grouped within simple outlines to give stringer lode ore bodies which can be mined at an economic grade.

GEOLOGY OF THE DEER GROUP CLAIMS

Our mapping of the Deer Group claims has shown that they are underlain almost entirely by argillaceous rocks belonging to the upper portion of the Laib group. The lower calcareous member is known to outcrop in only one place, on the Deer 8 mineral claim.

Four types of argillaceous rocks have been recognized. All are black to dark grey in color. One is a phyllitic type, schistose and micaceous, with some silty phases. This is a weak rock which is generally cremulated and shredded. Bedding has not been recognized.

The above type contrasts with a thin bedded, highly silty argillite, which although it has fair cleavage, presents generally solid unbroken surfaces in outcrops. The bedding commonly shows well marked drag folding which provides excellent diagnostic features in determining tops and bottoms of folded beds.

An intermediate type to the preceding two occurs less frequently, and is a silty argillite with good slaty cleavage but no recognizable bedding. Although this does not present the solid appearance of the highly silty type, it is a much stronger rock than the phyllitic argillite and is easily recognized in the field.

A fourth type is highly calcareous, and might be described as a calcareous sand having thin banded limestone layers. The limestone layers are composed of medium coarse grained, dark blue grey weathering calcite, and vary in thickness from one half inch to three or four inches. The banding is generally highly distorted within these layers with a pattern which suggests flowage under pressure. This type is sufficiently distinctive to be used as a marker.

The various types occur in well defined separate layers up to several hundred feet in thickness. These have been involved in tight, flat plunging isoclinal folds which have been slightly overturned to the west. Due to the complexity of folding it has not been possible to give a satisfactory stratigraphic succession of the rock types. Some repetition by folding has been recognized in purely local areas, but the gaps in outcrops and the paucity of diagnostic features have made it difficult to account always for the apparent stratigraphic position of the various types.

STRUCTURAL GEOLOGY

The major synclinorium underlying the Deer Group claims has an amplitude of 9000 feet. Within this main structure there are four component synclines with amplitudes ranging from 200 feet to 2500 feet each. The folding is isoclinal and is slightly overturned to the west, the axial plane dipping east at $60^{o}$ to $70^{o}$. The axial plane strikes at about N$15^{o}$W, and the folds plunge south at $20^{o}$.

No field evidence was encountered to substantiate the northward extension of the Emerald thrust fault which should stike through these claims. Only one fault was recognized, and this was an east striking left hand transcurrent fault with small movement which occurs on Deer 21 claim.

STRUCTURAL GEOLOGY - continued

The principal component structure is a broad overturned anticline which occurs more or less centrally in the mapped area. This is flanked on the west by a syncline of moderate width. The other folds are much smaller, in fact as a generality it may be stated that the closest folding occurs near the flanks of the main synclinorium, with more broad folds in the central portion.

Drag folds, which plunge in agreement with larger structures, occur commonly along the limbs of the component folds, and serve as diagnostic features which determine that some beds are overturned while others are in normal position. Since all dip uniformly east, this is proof of isoclinal folding.

In addition to these south plunging drag folds, and less frequent in occurrence, are steep, north plunging drag folds. These probably have a common origin to be steep north plunging drag folds which occur along steep, north striking, right hand shears in the H.B. Mine, and indicate that these shears persist east of the mine, on the Deer claims.

South of Sheep Creek drag folding was noted, plunging $40^{o}$ north. It has not been possible to determine whether these particular drag folds are those associated with the primary folding, or whether they are related to shears, and for this reason no adequate explanation can be made for their anomalous plunge.

The component isoclinal folds which have been worked out show that the lower calcareous formation of the Laib group should approach the surface in several anticlinal areas. The most easterly of these underlies the boundary between the Double and the Double No. 1 Fractional mineral claims, and is substantiated by the occurrence of very coarse limestone float. The float lies in a drift covered area, along a belt which roughly parallels the surrounding structures. It is so located that it could not have reached its present position by creep or gravity from any limestone outcrops in the area. These facts strongly suggest that limestone may be in place directly beneath the surface limestone float.

The underlying limestone should also be at a relatively shallow depth near the axial plane of the broad central anticline below the west boundary of the Double claim. The limestone exposed on the Deer 8 claim south of Sheep Creek may line up with this anticline, but the broad gravel bench which overlies this area prevents us from tracing the structures across the creek with accuracy. In general the underlying limestone should have the best chance of reaching the surface where anticlinal structures cross the area of deepest erosion in Sheep Creek valley. Because of the gravel cover here, actual exposures of limestone are predictably few.

CONCLUSIONS

Mapping and study of the rock formations exposed on the Deer Group claims have shown that the ground is underlain by a broad synclinorium whose component folds are isoclinal. It can be predicted, and there is some confirming evidence, that the productive limestone of the Laib group, which underlies argillite over almost the whole mapped area, should be near the surface in two anticlinal areas within the main structure. Commercial mineralization at the H.B. mine is locallized in isoclinally folded limestone.

CONCLUSIONS - continued

It is inferred that isoclinal folds in the limestone underlying the Deer group are similar to the productive folds in the mine. For these reasons, these structures should be drilled order to test for mineralized bodies of the H.B. type.

W. T. Irvine
Professional Engineer

WTI:ms
Geological Division
November 28, 1951

Distribution:

C.O.S.
Mines Division (2)
✓Legal Division (2)
Western Expl'n (1)

Attachments:
Maps & Sections

## SYMBOLS

- BOUNDARY OF ROCK OUTCROP
- APPROXIMATE BOUNDARY OF DRIFT COVERED AREAS
- ALTITUDE OF BEDDING AND/OR SCHISTOSITY
- PLUNGE OF DRAG FOLDS
- GEOLOGICAL CONTACT - DEFINED
- GEOLOGICAL CONTACT - APPROXIMATE
- FAULT
- BOUNDARY OF SURVEYED CLAIM
- BOUNDARY OF LOCATED CLAIM
- BOUNDARY OF DEER GROUP

N

GOLDEN
LEADVILLE
ROSS
H.B.
ZINCTON
CANYON
BENSON FR.
GARNET
LILLY B. FR.
LEGAL TENDER
EASTER
ADA
ADA 2 FR.
DEER I FR.
DEER 19 FR.
DEER 18
DEER 15 FR.
DEER 20
DEER 21
DEER 29
DEER 30
DEER 27
DEER 28
DEER 25
Fir Bush
DEER 26
MAYFLOWER
DEER 13
DEER 14
DEER 22
DEER 12
DEER 11
DEER 16 FR.
DEER 23
DEER 24
DOUBLE B
DOUBLE B FR.
SITTING BULL
HATTIE B
DEER 9
DEER 10
DEER 17 FR.
ALICE
BIG DULUTH
DEER 7
DEER 8
DEER 5
DEER 6
ASPEN CREEK
HEDGEHOG CREEK
SHEEP CREEK
W.K. POWER LINE
← TO SALMO
Limestone Blocks

14000 N
12,500N
12000 N
10000 N
8000 N
7000N
6000 N
5000N
4000 N
8000 E
10000 E
12000 E
14000 E
16000 E
18000E

Department of Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 63 MAP #1

## LEGEND

NELSON INTRUSIVES
- APLITE DIKES
- HORNBLENDE GRANITE

LAIB GROUP
- ARGILLITE ; SOME SILTY ARGILLITE (PHYLLITE)
- SILTY ARGILLITE (SLATY)
- SILTSTONE ; ARGILLACEOUS SILTSTONE
- LIMESTONE & SANDY ARGILLITE (INTERBANDED & THIN-BEDDED)
- LIMESTONE & DOLOMITE

RENO FORMATION
- SILTY ARGILLITE ; QUARTZITE

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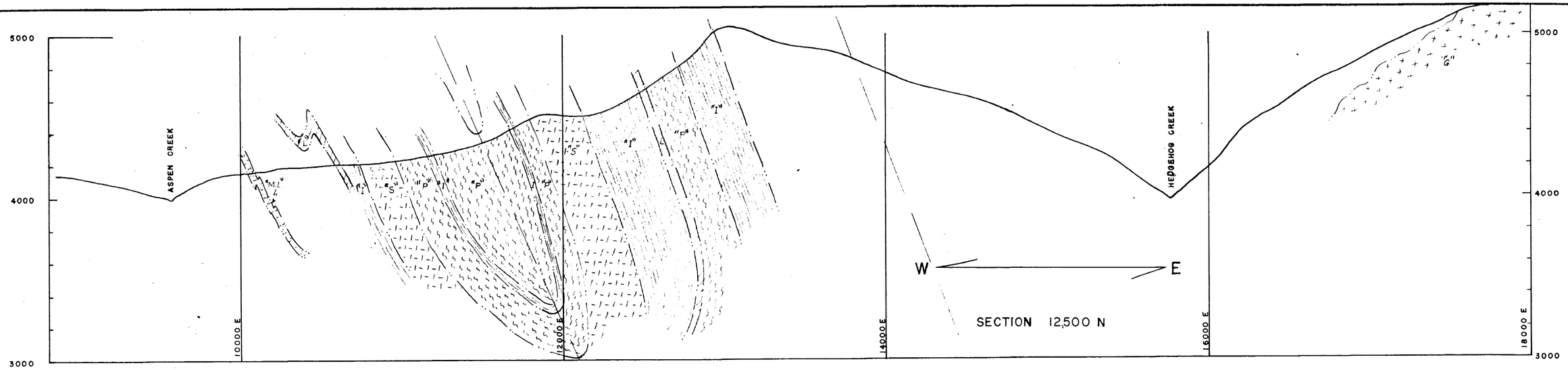
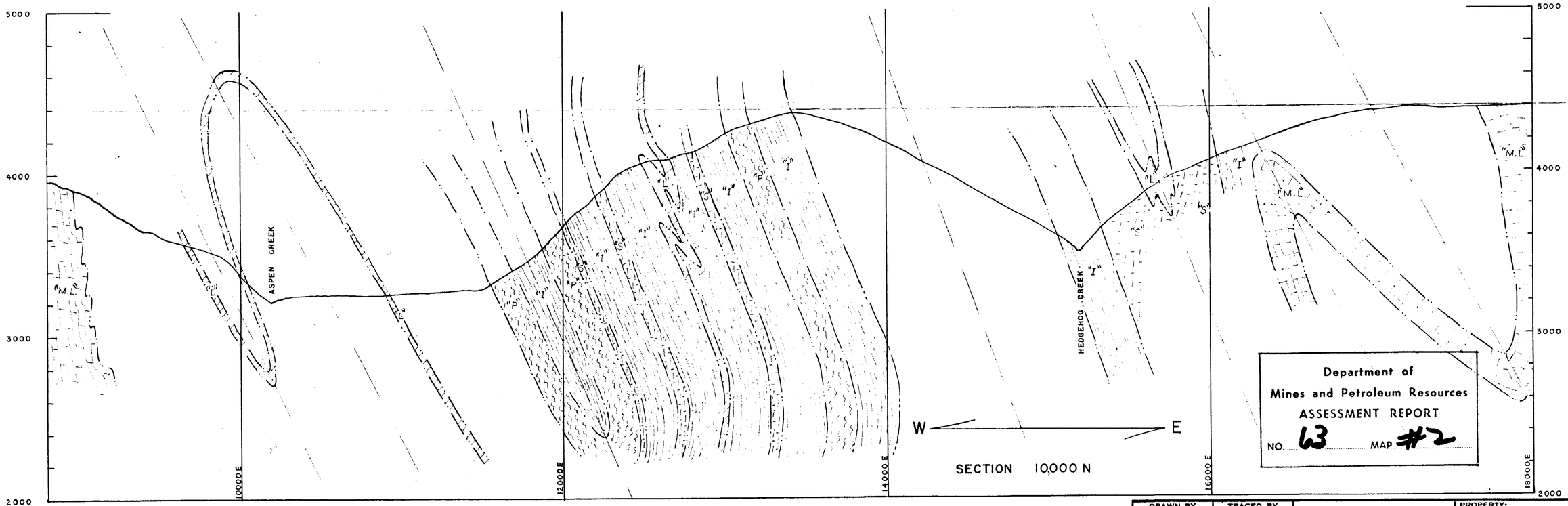
| REVISED BY | | | |
| DATE | | | |

THE CONSOLIDATED MINING & SMELTING CO. OF CANADA LTD.

PROPERTY: DEER GROUP
SURFACE GEOLOGY
SCALE 1 IN.= 400 FT.

AREA: NELSON M.D.
DATE: NOV/51
PLATE No. D-1




Department of
Mines and Petroleum Resources
ASSESSMENT REPORT
NO. 63 MAP #2

SEE PLATE D-1 (PLAN) FOR LEGEND

| DRAWN BY | | TRACED BY | |
|---|---|---|---|
| J.R. ; D.W.H. | | J.R. ; D.W.H. | |
| REVISED BY | DATE | REVISED BY | DATE |
| | | | |

THE CONSOLIDATED MINING & SMELTING CO. OF CANADA LTD.

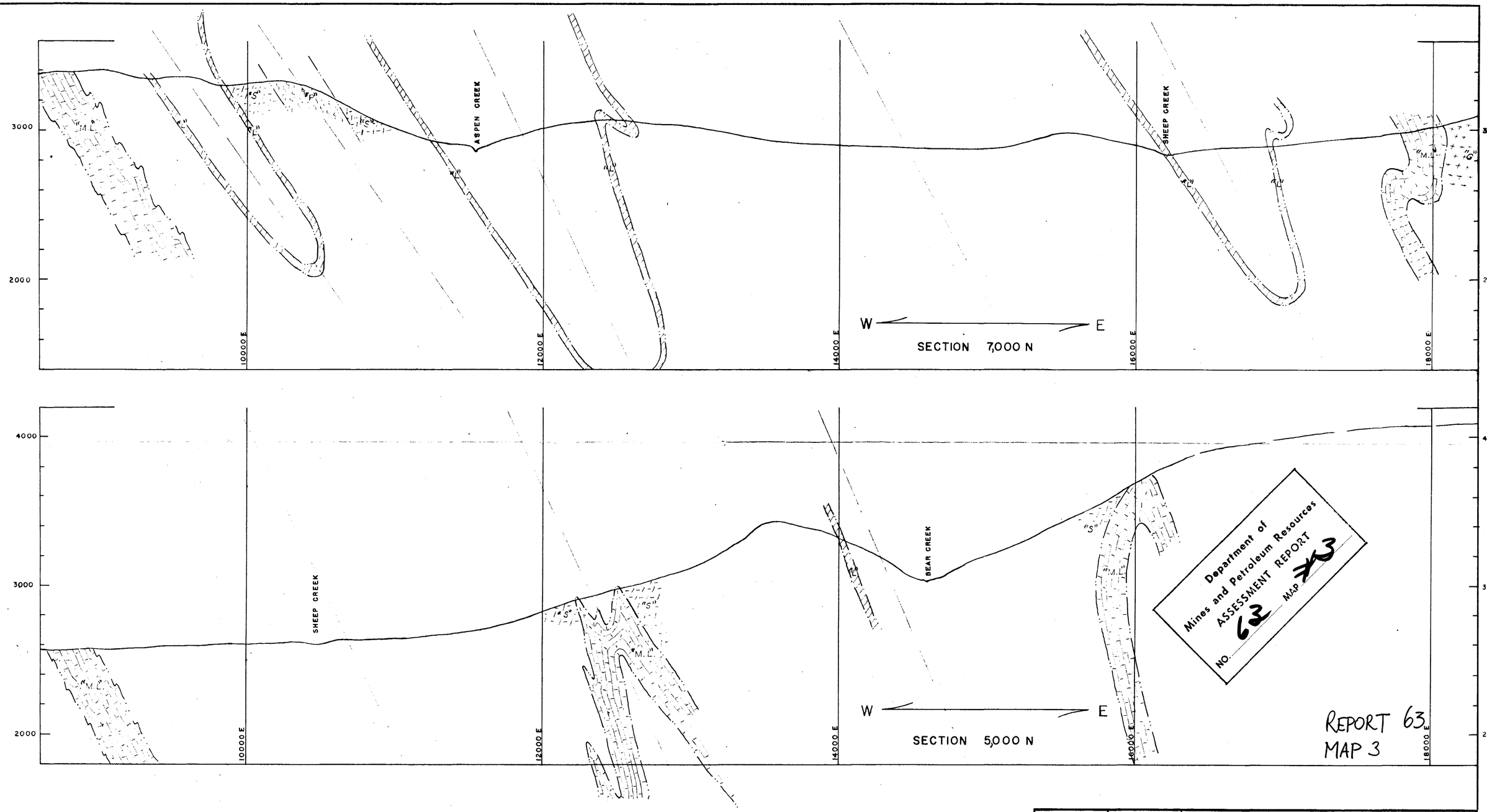
PROPERTY: DEER GROUP
SECTION 12,500 N
SECTION 10,000 N
SCALE 1 IN.=400 FT.

AREA: NELSON M.D.

DATE: NOV./51

PLATE NO. D-2

Form 699






REPORT 63
MAP 3

SEE PLATE D-1 (PLAN) FOR LEGEND

| DRAWN BY J.R., D.W.H. | | TRACED BY J.R., D.W.H. | | THE CONSOLIDATED MINING & SMELTING CO. OF CANADA LTD. | PROPERTY: DEER GROUP<br>SECTION 7,000 N<br>SECTION 5,000 N<br>SCALE 1 IN. = 400 FT. | |
|---|---|---|---|---|---|---|
| REVISED BY | DATE | REVISED BY | DATE | | | |
| | | | | AREA: NELSON M.D. | DATE: NOV. 51 | PLATE NO. D-3 |

Form 699