

REPORT ON GEOPHYSICAL EXPLORATION

DEPARTMENT OF NORTHERN AFFAIRS & NATIONAL RESOURCES

PETROLEUM & NATURAL GAS

PERMIT NO. 227

for the period

AUGUST 4, 1955 to AUGUST 4, 1956

CALGARY, ALBERTA
NOVEMBER 15, 1956.

by: W.L. Irwin,
Superintendent, N.F.A.

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INTRODUCTION

This report discusses all phases of a geophysical exploration program carried out in those crown lands granted to and jointly held by Texaco Exploration Company (Operator of N.F.A.), Mobil Oil of Canada, Ltd., Shell Oil Company and British American Oil Company Limited.

The subject permit is in the Northwest Territories and extends approximately from $60^{\circ}00'$ to $60^{\circ}10'$ North Latitude and from $122^{\circ}52'$ to $123^{\circ}06'$ West Longitude. The center of the permit block is about twelve miles south and twelve miles east of Fort Liard, N.W.T.

ENCLOSURES

- (1) A complete Mississippian time map of Crown Permit No. 227.
- (2) A complete Topographic map of Crown Permit No. 227.
- (3) A tabulation of all shotholes drilled in the area during the period under report giving the shotpoint number, the total depth and the shothole drill log.

GENERAL DISCUSSION OF THE AREA

The Bovie Lake South Project (Permit No. 227) is in

an area of generally flat, featureless terrain and encompasses only one major topographical feature. This is a high ridge extending in a north-south direction from the middle of the southern boundary to the middle of the north boundary of the permit block. Aside from this feature the area is quite flat and covered with patches of muskeg. The muskeg made it necessary to cut all roads and trails in the winter months when the muskeg was frozen and would support heavy bulldozers.

Reflection and refraction seismograph operations were begun by Universal Seismic Surveys Ltd. (TTCo. Party No. 369) on or about January 21, 1956, and continued to March 15, 1956. Additional work was done from May 1 to 3, 1956. The purpose of this survey was to determine the magnitude of any subsurface structure coincident with the surface feature discussed previously and to evaluate the subsurface grain of the area.

All seismograph recording and drilling equipment was mounted on track equipped vehicles which have been found to be the only type of vehicle which is capable of operating efficiently in this region in both winter and summer months.

One drill was used for the entire operation. This was a small portable auger type drill which is very light and quite capable of drilling shot holes to a depth of 45 feet, which was about the average hole depth used.

The recording equipment used was Southwestern Industrial Electronic throughout. Amplifiers were S.I.E. GA-7H8's, utilizing a 20% bilateral mix, filter settings of

1-28-62 for reflection records and 1-out-37 for refraction records and a rapid decay A.G.C. Oscillographs used were S.I.E. SGO-2's and the geophones were S.I.E. S-16's peaked at 28 cycles.

The reflection seismograph work was done by the split spread method of continuous profiling. The standard shothole spacing was 1320 feet and the standard set-up had twenty-four groups with four geophones per group. There were twelve groups on each side of the shotpoint stretching to the next shotpoint and to the previous shothole. Results obtained with this set-up were generally satisfactory, however, a shorter spread might have improved results in parts of the area. The average explosive charge used for reflection records was 5 pounds.

The standard spread length for the refraction shooting was 6900 feet with a 300 foot separation between the twenty-four geophone stations. The maximum range for the work done was approximately 30,000 feet. The average explosive charge for refraction work was 10 lbs.

Surveying was done by Plane Table and Alidade and elevations were taken at all shotpoints and most geophone stations. The survey was tied to all known points of control and is accurate to within three feet vertically. Shotpoints and spreads were laid out by means of a surveyor's chain.

WEATHERING CONDITIONS

Raw seismic times were reduced to a datum plane of

1200 feet above sea level by means of a rectilinear type correction. The entire permit area is overlain with a thick mantle of unconsolidated low velocity material which varied in thickness from 300 feet to 1000 feet, and after some experimenting it was found that the rectilinear type of correction was best for these conditions.

SEISMIC RESULTS

Record quality was generally good with each individual reflection record being good but displaying a lack of continuity from record to record which made correlation difficult. The interpretation of subsurface conditions below the large surface ridge is a combination of both reflection and refraction information because the reflection data is not useable in the vicinity of the crest of the ridge. The quality of the refraction records is only fair with some of the records shot at long range being unusable. The scarcity of well information in the area makes it difficult to identify any reflecting event accurately. However, the major reflecting event present on most records has been tentatively identified as Mississippian Limestone.

STRUCTURAL RESULTS

The control established to date has revealed a subsurface anticlinal structure of considerable magnitude coincident with the surface ridge which traverses the permit block from north to south. Though the results do not definitely indicate it there is a possibility that the structure is faulted near

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the crest. However, it would have to be a high angle fault of only minor displacement. This agrees well with the general geologic concept that the feature is the result of basement faulting and is not associated with the Rocky Mountains, and therefore the result of transverse forces. Additional seismic work is not planned in the area.

Respectfully submitted,



W. L. Irwin, Superintendent,
NORTHERN FOOTHILLS AGREEMENT

CALGARY, Alberta
NOVEMBER 15, 1956.

BOVIE LAKE SOUTH

RESERVATION NO. 227

SHOT HOLE DRILLING LOG

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
R 17A	0-40 Cl. & Gr.	40
R 17B	0-10 Sdy. Br. Cl. 10-30 Sd. & Blds. 30-40 Cl.	40
R 17C	0-15 Sdy. Br. Cl. 15-18 Sd. 18-40 Cl. & Blds.	40
Skid	0-40 Sdy. Cl., Gr. & Blds.	40
R 18A	0-20 Sdy. Cl., Gr. & Blds. 20-25 Rock	25
R 18B	0-40 Cl., Gr. & Blds.	40
R 18C	0-40 Cl., Gr. & Blds.	40
R 19A	0-20 Cl. 20-40 Sh., S. S. ledge	40
R 19B	0-20 Cl. 20-40 Sh., S. S. streak	40
R 19C	0-20 Cl. 20-40 Sh.	40
R 20A	0-20 S. S. 20-37 limestone Very rough hole	37
Skid	0-40 Cl. & Blds.	40
R 21A	0-25 Cl. & Blds.	25
R 21B	0-40 Cl. & Blds.	40
R 21C	0-40 Sdy. Cl. & Blds.	40
R 22A	0-20 Sdy. Cl. & Blds. 20-40 Hd. Sh.	40
R 22B	0-20 Sdy. Cl. & Blds. 20-40 Hd. Sh.	40
R 22C	0-20 Sdy. Cl. & Blds. 20-40 Hd. Sh.	40
R 23B	0-23 S. S.	23
R 30A	0-10 Sdy. Cl. & Blds. 10-30 Hd. Sh. 30-40 Soft S. S.	40
R 30B	0-10 Sdy. Cl. & Blds. 10-20 Sh. 20-40 Soft S. S.	40

Note: Blds. - Boulders
Br. - Brown
Cl. - Clay
Gr. - Gravel
Hd. - Hard
Sd. - Sand
Sdy. - Sandy
Sh. - Shale
S. S. - Sandstone

BOVIE LAKE PROJECT
SOUTH PART PROJECT NO. 2408
SHOT HOLE DRILLING LOGS

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
U- 58	0-40 Cl. & Blds.	40
59	0-40 Cl., Sd. & Gr.	40
60	0-40 Cl. & Blds.	40
61	0-40 Cl. & Blds.	40
62	0-40 Cl. & Blds.	40
63	0-10 Mus. 10-30 Cl. 30-40 Sd.	40
64	0-40 Cl. & Blds.	40
65	0-40 Sdy. Cl. & Blds.	40
66	0-40 Sdy. Cl. & Blds.	40
395	0-40 Cl., Gr. & Blds.	40
396	0-40 Cl. & Blds.	40
397	0-40 Cl. & Blds.	40
398	0-20 Cl. & Sd. 20-40 S. S.	40
399	0-40 Cl. & Blds.	40
400	0-40 Cl. & Blds.	40

Note:

Blds.	- Boulders
Bl.	- Blue
Br.	- Brown
Cl.	- Clay
Gr.	- Gravel
Mus.	- Muskeg
Sd.	- Sand
Sdy.	- Sandy
Sh.	- Shale
S. S.	- Sandstone

BOVIE LAKE PROJECT

SOUTH PART PROJECT NO. 2408

SHOT HOLE DRILLING LOGS

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
U- 392	0-40 Cl. & Blds.	40
393	0-40 Cl. & Blds.	40
394	0-40 Cl. & Blds.	40

Note: Blds. - Boulders
Cl. - Clay

BOVIE LAKE PROJECT
SOUTH PART PROJECT NO. 2408
SHOT HOLE DRILLING LOGS

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
U- 1A	0-10 Rocky Br. Cl. 10-80 Rocky Bl. Cl.	80
1B	0-8 Br. Cl. & Blds. 8-60 Bl. Cl. & Blds.	60
1C	0-8 Br. Cl. & Blds. 8-60 Bl. Cl. & Blds.	60
1D	0-10 Br. Cl. & Blds. 10-60 Bl. Cl. & Blds.	60
2A	0-12 Br. Cl. & Blds. 12-60 Bl. Cl. & Blds.	60
2B	0-12 Br. Cl. & Rocks 12-60 Bl. Cl. & Rocks	60
2C	0-10 Br. Cl. & Rocks 10-60 Bl. Cl. & Rocks	60
2D	0-60 washed out	60
7A	0-35 Cl. & Blds. 35-50 Hd. sandrock	50
7B	0-25 Cl. & Blds. 25-50 Hd. sandrock	50
7C	0-30 Rocky Br. Cl. 30-60 S.S.	60
7D	0-20 Rocky Br. Cl. 20-60 S. S.	60
9A	0-20 Rocky Br. Cl. 20-50 Rocky Bl. Cl. 50-60 S. S.	60
9B	0-60 Sdy. Rocky Br. Cl.	60
10A	0-60 Br. Cl., Rocks & Gr.	60
10B	0-12 Br. Cl. & Blds. 12-60 Bl. Cl. & Blds.	60
11A	(Skid) 0-20 Br. Cl. & Blds. 20-35 Gr. 35-60 Bl. Cl. & Rocks	60
11B	0-20 Rocky Br. Cl. 20-30 Gr. 30-60 Rocky Bl. Cl.	60
11C	0-20 Rocky Br. Cl. 20-25 Gr. 25-60 Rocky Bl. Cl.	60
12A	0-25 Br. Cl. & Sd. 25-60 Bl. Cl. & Blds.	60
12B	0-15 Br. Cl. & Blds. 15-60 Bl. Cl. & Blds.	60
13A	0-12 Br. Cl. & Blds. 12-60 Bl. Cl. & Blds.	60
13B	0-12 Br. Cl. & Blds. 12-60 Bl. Cl. & Blds.	60
13C	0-12 Mus. 12-40 Rocky Bl. Cl.	40
23	0-60 washed out	60
26	0-10 Br. Cl. & Rocks 10-60 Bl. Cl. & Rocks	60
66	0-10 Rocky Br. Cl. 10-60 Rocky Bl. Cl.	60
67	0-12 Br. Cl. & Gr. 12-60 Bl. Cl. & Rocks	60
68	0-10 Rocky Br. Cl. 10-40 Bl. Cl. & Blds.	40
69	0-6 Mus. 6-40 Bl. Cl. & Blds. at 28'	40

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
U- 70	0-10 Rocky Br. Cl. 10-40 Rocky Bl. Cl.	40
71	0-10 Br. Cl. & Rocks 10-80 Bl. Cl. & Rocks at 79'	80
72	0-10 Rocky Br. Cl. 10-40 Rocky Bl. Cl.	40
73	0-8 Br. Cl. & Blds. 8-40 Bl. Cl. & Gr.	40
74	0-10 Rocky Br. Cl. 10-40 Rocky Bl. Cl.	40
75	0-8 Br. Cl. & Blds. 8-40 Bl. Cl. & Rocks	40
76	0-8 Sdy. Br. Cl. & Rocks 8-80 Bl. Cl.	80
77	0-25 Gr. & Blds. 25-80 Cl. & Blds.	80
79	0-10 Rocky Br. Cl. 10-18 Rocky Bl. Cl. 18-40 Sd. & Gr.	40
80	0-15 Rocky Br. Cl. 15-40 Rocky Bl. Cl.	40
146	0-10 Br. Cl. & Rocks 10-40 Bl. Cl. & Rocks	40
164A	0-15 Br. Cl. & Blds. 15-40 Bl. Cl. & Rocks	40
203	(Redrill) 0-10 Br. Cl. 10-40 Bl. Cl. & Blds.	40
208	(Redrill) 0-10 Br. Cl. 10-40 Bl. Cl. & Rocks	40
323	0-15 Rocky Br. Cl. 15-40 Rocky Bl. Cl.	40
336	0-10 Rocky Br. Cl. 10-30 Rocky Bl. Cl. 30-40 Sh.	40
337	0-10 Rocky Br. Cl. 10-40 Rocky Bl. Cl.	40
338	0-15 Rocky Br. Cl. 15-40 Rocky Bl. Cl.	40
339	0-5 Mus. 5-40 Bl. Cl.	40
340	0-12 Rocky Br. Cl. 12-40 S. S.	40
341	0-10 Rocky Br. Cl. 10-40 Rocky Bl. Cl.	40
342	0-8 Mus. 8-40 Rocky Bl. Cl.	40
343	0-8 Mus. 8-15 Sdy. Bl. Cl. 15-40 S. S.	40
344	0-12 Br. Cl. & Gr. 12-40 S. S.	40
345	0-15 Sd. & Gr. 15-40 Bl. Cl.	40
346	0-12 Br. Cl. 12-40 Rocky Bl. Cl.	40
347	0-10 Br. Cl. 10-40 Rocky Bl. Cl.	40
348	0-10 Br. Cl. 10-80 Rocky Bl. Cl.	80
349	0-15 Br. Cl. 15-40 Bl. Cl.	40
351	0-10 Br. Cl. 10-40 Bl. Cl.	40
352	0-10 Mus. 10-40 Bl. Cl.	40
353	0-55 Bl. Cl. 55-75 S. S.	75
354	0-10 Br. Cl. 10-40 Bl. Cl.	40
355	0-5 Cl. 5-40 S. S.	40
356	0-20 Sdy. Br. Cl. 20-40 Bl. Cl.	40
357	0-10 Mus. 10-30 Sd. 30-40 Bl. Cl.	40
358	0-5 Mus. 5-40 Cl. & Gr.	40
359	0-10 Br. Cl. & Gr. 10-40 Rocky Bl. Cl.	40
360	0-12 Br. Cl. & Rocks 12-40 Bl. Cl. & Rocks	40

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
U- 361	0-20 Rocky br. Cl. 20-30 Rocky Bl. Cl. 30-57 Sh.	57
362	0-8 Mus. 8-40 Cl. & Rocks	40
363	0-15 Rocky Br. Cl. 15-40 Rocky Bl. Cl.	40
364	0-15 Br. Cl. & Rocks 15-40 Bl. Cl. & Blds.	40
365	0-10 Rocky Br. Cl. 10-40 Rocky Bl. Cl.	40
366	0-15 Br. Cl. & Blds. 15-40 S.S. & Sh.	40
367	0-10 Rocky Br. Cl. 10-40 Sh.	40
368	0-15 Cl. & Rocks 15-70 Sh.	70
369	0-15 Rocky Br. Cl. 15-40 Sh.	40
370	0-10 Mus. 10-30 Sd. & Gr. 30-40 Sh.	40
371	0-30 Gr.	30
372	0-10 Br. Cl. 10-40 Bl. Cl. & Blds.	40
373	0-10 Br. Cl. & Blds. 10-40 Bl. Cl. & Blds.	40
374	0-10 Br. Cl. 10-40 Rocky Bl. Cl.	40
375	0-5 Mus. 5-40 Cl. & Blds.	40
376	0-12 Br. Cl. & Rocks 12-40 Bl. Cl. & Blds.	40
377	0-15 Br. Cl. & Rocks 15-40 Rocky Bl. Cl.	40
378	0-5 Mus. 5-40 Cl. & Rocks	40
379	0-15 Rocky Br. Cl. 15-40 Rocky Bl. Cl.	40
380	0-10 Br. Cl. & Rocks 10-40 Bl. Cl. & Rocks	40
381	0-10 Rocky Br. Cl. 10-40 Rocky Bl. Cl.	40
382	0-10 Br. Cl. 10-40 Bl. Cl.	40
383	0-10 Br. Cl. 10-40 Bl. Cl.	40
384	0-10 Br. Cl. 10-40 Bl. Cl.	40
385	0-12 Bl. Cl. & Blds. 12-40 Bl. Cl. & Rocks	40
386	0-10 Br. Cl. & Rocks 10-40 Bl. Cl. & Rocks	40
387	0-15 Br. Cl. & Blds. 15-40 Bl. Cl. & Blds.	40
388	0-15 Br. Cl. & Rocks 15-40 Bl. Cl. & Rocks	40
389	0-15 Br. Cl. & Blds. 15-40 Bl. Cl. & Blds.	40
390	0-5 Mus. 5-40 Cl. & Rocks	40
391	0-15 Rocky Br. Cl. 15-50 Bl. Cl. & Rocks	50

Note: Blds. - Boulders
 Bl. - Blue
 Br. - Brown
 Cl. - Clay
 Gr. - Gravel
 Mus. - Muskeg
 Sd. - Sand
 Sdy. - Sandy
 Sh. - Shale
 S. S. - Sandstone

BOVIE LAKE PROJECTSOUTH PART PROJECT NO. 2408SHOT HOLE DRILLING LOGS

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
U- 20	0-15 Br.Cl. & Blds. 15-60 Sh.	60
77A	0-10 Gr. & Blds.	10
77	0-15 Gr. & Blds. 15-30 Cl. & Blds.	30
88	0-6 Mus. 6-48 Cl. & rocks 48-55 Sd. 55-80 Cl. & Blds.	80
89	0-10 Br. Cl. & Blds. 10-80 Bl. Cl. & Blds.	80
90	0-15 Br.Cl. & rocks 15-25 Gr. 25-60 Bl.Cl. & Blds.	60
91	0-10 Br.Cl. & Blds. 10-80 Bl.Cl. & rocks	80
92	0-14 Br.Cl. & Blds. 14-80 Bl.Cl. & Blds.	80
93	(Skid 55' south) 0-10 Br.Cl. 10-60 Bl.Cl. & rocks 60-80 Sh.	80
94	0-20 Cl. & Blds. 20-64 Sh. 64-80 S.S.	80
95	0-10 Br.Cl. & Blds. 10-30 Bl.Cl. & rocks 30-80 Sh.	80
96	0-4 Mus. 4-25 Cl. & rocks 25-60 Sh.	60
97	0-16 Cl. & rocks 16-50 Sh. 50-60 SS	60
98	0-28 Cl. & rocks 28-80 SS & Sh.	80
99	0-12 Br.Cl. & rocks 12-80 Bl.Cl. & Blds.	80
100	0-65 Cl. & Blds. 65-80 Sd.	80
101	0-38 Cl. & Blds. 38-80 Sh.	80
102	0-15 Cl. & rocks 15-60 Sh.	60
103	0-10 Br. 10-35 Bl.Cl. 35-60 Sh.	60
104	0-25 Cl. & rocks 25-80 Sh.	80
105	0-10 Br.Cl. & Blds. 10-80 Bl.Cl. & rocks	80
106	0-10 Cl. & Blds. (Skid)	10
106A	0-8 Cl. & Blds. 8-20 Sd. & Gr. 20-60 Cl. & Blds.	60
107	0-10 Br. Cl. & Blds. 10-55 Bl.Cl. & Blds. 55-80 Sh.	80
108	0-24 Cl. & Blds. 24-80 Sh.	80
109	0-20 Br.Cl. & Blds. 20-60 Sh.	60
110	0-10 Br.Cl. 10-50 Sh.	50
111	0-16 Cl. & rocks 16-60 Sh.	60
112	0-24 Cl. & rocks 24-80 Sh.	80
113	0-27 Cl. & rocks 27-80 Sh. & SS	80
114	0-10 Br.Cl. & Blds. 10-75 Bl.Cl. & Blds.	75
115	0-12 Br.Cl. & rocks 12-60 Bl.Cl. & blds.	60
116	0-10 Br.Cl. 10-70 Bl.Cl. & Blds. 70-75 Gr.	75
117	0-10 Br.Cl. & Blds. 10-80 Bl.Cl. & rocks	80
118	0-60 Sdy. Cl. & Blds.	60
119	0-20 Cl. & Blds. (Skid)	20
119A	0-8 Br.Cl. & Blds. 8-80 Bl.Cl. & Blds.	80
121	0-15 Bl.Cl. & Blds. 15-60 Sh.	60
122	0-50 Cl. & Blds. 50-70 SS	70
123	0-50 Bl.Cl. & Blds. 50-70 Sd. & Gr.	70
124A	0-10 Br. Cl. & Blds.	10
124B	0-8 Br.Cl. 8-50 Br.Cl. & Blds.	50
125	0-9 Br.Cl. & Blds. 9-70 Bl.Cl. & Blds.	70
126	0-80 Bl.Cl. & Blds.	80
127	0-14 Cl. & rocks 14-60 SS	60

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
146	0-15 Br.Cl. & Blds. 15-60 Bl.Cl. & rocks	Skidded 100' 60
147	0-55 Cl. & rocks 55-90 Sd.	90
148	0-10 Br.Cl. & Blds. 10-40 Bl.Cl. & rocks	
	40-50 Gr. 50-60 Bl.Cl.	60
149	0-7 Br.Cl. & rocks 7-100 Bl.Cl. & Blds.	100
150	0-10 Br.Cl. & blds. 10-50 Bl.Cl. & rocks	50
151	0-35 Cl. & Blds. 35-50 Sd. & Gr.	50
152	0-15 Br.Cl. & Blds. 15-45 Sdy.Cl. & rocks 45-65 Sh.	65
153	0-50 SS	50
154	0-10 Br.Cl. 10-43 SS 43-60 Sh.	60
155A	0-10 Br.Cl. 10-40 Bl.Cl.	40
155B9	0-25 Br.Cl. & Blds. 25-60 Hd.Sh.	60
156	0-10 Br.Cl. 10-40 Bl.Cl.	40
157	0-10 Br.Cl. 10-40 Bl.Cl.	40
158	0-10 Br.Cl. 10-40 Bl.Cl.	40
159	0-20 Permafrost 20-50 Bl.Cl.	50
160	0-10 Br.Cl. 10-45 Bl.Cl.	45
161	0-10 Br.Cl. 10-80 Bl.Cl.	80
162	0-10 Br.Cl. 10-40 Bl.Cl.	40
163	0-65 Sd. 65-80 Sdy.Cl. 80-90 Sd. & Gr.	90
164	0-15 Br.Cl. 15-40 Bl.Cl.	40
165A	0-10 Gr. 10-40 Bl.Cl.	40
165B	Skidded 30' South 0-10 Gr. 10-40 Bl.Cl.	40
166	0-27 Cl. & Gr. 27-40 SS	40
167	0-16 Cl. & Gr. 16-40 Sh.	40
168	0-30 Hd. SS and rocks	30
169	0-15 Br.Cl. & rocks 15-40 Bl.Cl. & rocks	40
170	0-10 Br.Cl. & Blds. 10-40 Bl. Cl. & Blds.	40
171	0-10 Br.Cl. & Blds. 10-40 Bl.Cl. & Blds.	40
172	0-8 Br.Cl. & Gr. 8-40 Bl.Cl. & rocks	40
173	0-10 Br.Cl. & Gr. 10-40 Bl.Cl. & rocks	40
174A	0-10 Cl. & Blds. Skid	10
174	0-12 Br.Cl. & Gr. 12-40 Bl.Cl. & rocks	40
175	0-12 Br.Cl. & Gr. 12-40 Bl.Cl. & Gr.	40
176	0-14 Br.Cl. & Gr. 14-40 Bl.Cl. & rocks	40
177	0-10 Br.Cl. & rocks 10-40 Bl.Cl. & rocks	40
178	0-15 Br.Cl. & Gr. 15-40 Bl.&Cl. & Gr.	40
179	0-8 Mus. 8-40 Cl. & rocks	40
180	0-15 Br.Cl. & rocks 15-40 Bl.Cl. & rocks	40
181	0-4 Mus. 4-40 Cl. & rocks	40
182	0-8 Mus. 8-40 Cl. & rocks	40
183	0-10 Br.Cl. & Blds. 10-40 Bl.Cl. & Blds.	40
184	0-10 Br.Cl. 10-40 Bl.Cl.	40
185	0-15 Br.Cl. 15-40 Bl.Cl.	40
186	0-15 Br.Cl. & Blds. 15-40 Bl.Cl. & rocks	40
187	0-10 Br.Cl. 10-40 Bl.Cl.	40
188	0-10 Br.Cl. 10-40 Bl.Cl.	40
189	0-30 Gr. & Sd.	30
190	0-10 Br.Cl. 10-40 Bl.Cl.	40
191	0-24 Br.Cl. & Sd. 24-40 Bl.Cl. & rocks	40
192	0-10 Br.Cl. 10-40 Bl.Cl.	40
193	0-8 Br.Cl. & rocks 8-40 Bl.Cl. & rocks	40
194	0-10 Br.Cl. & rocks 10-40 Bl.Cl. & rocks	40

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
195	0-10 Br.Cl. & Blds. 10-40 Bl.Cl. & Blds.	40
196	0-6 Br.Cl. & rocks 6-40 Bl.Cl. & Blds.	40
197	0-10 Br.Cl. 10-40 Bl.Cl.	40
198	0-10 Br.Cl. 10-40 Bl.Cl.	40
199	0-6 Mus. 6-40 Bl.Cl. & rocks	40
200	0-10 Br.Cl. & Blds. 10-40 Bl.Cl. & Blds.	40
201	0-12 Br.Cl. & rocks 12-40 Bl.Cl. & Blds.	40
202	0-10 Br.Cl. & rocks 10-40 Bl.Cl. & Blds.	40
203	0-10 Br.Cl. 10-40 Bl.Cl.	40
204	0-8 Br.Cl. & Sd. 8-40 Bl.Cl. & rocks	40
205	0-30 Skid	30
205A	0-40 Sd. & Gr.	40
206	0-15 Sd. & Gr. 15-40 Cl. & Gr.	40
207	0-10 Br.Cl. 10-40 Bl.Cl.	40
208	0-12 Br.Cl. & rocks 12-40 Bl.Cl. & Gr.	40
208A	0-12 Br.Cl. & rocks 12-40 Bl.Cl. & Gr.	40
209	0-10 Br.Cl. 10-40 Bl.Cl.	40
210	0-10 Br.Cl. & rocks 10-40 Bl.Cl. & rocks	40
211	0-10 Br.Cl. 10-40 Bl.Cl.	40
212	0-8 Br.Cl. & Gr. 8-40 Bl.Cl. & rocks	40
213	0-10 Br.Cl. 10-40 Bl.Cl. & Blds.	40
214	0-7 Br.Cl. & rocks 7-40 Bl.Cl. & rocks	40
215	0-10 Br.Cl. 10-40 Bl.Cl. & Blds.	40
216	0-8 Br.Cl. & rocks 8-40 Bl.Cl. & Gr.	40
217	0-10 Br.Cl. 10-40 Bl.Cl.	40
218	0-10 Br.Cl. 10-40 Bl.Cl.	40
219	0-10 Br.Cl. 10-40 Bl.Cl.	40
220	0-20 Sh. & rock 20-40 Very hd. Sh. & rock	40
221	0-30 Hd. Sh.	30
222	0-16 Cl. & Blds. 16-40 SS	40
223A	0-7 Sd. & Gr. 7-40 Bl.Cl. & Blds.	40
223B	Br.Cl. 14-40 Bl.Cl.	40
224A	0-10 Br.Cl. 10-40 Bl.Cl.	40
224B	0-16 Br.Cl. 16-40 Bl.Cl.	40
225A	0-8 Br.Cl. & Gr. 8-40 Bl.Cl. & rocks	40
225B	0-12 Br.Cl. 12-40 Bl.Cl.	40
226A	0-10 Br.Cl. & Blds. 10-40 Bl.Cl. & rocks	40
226B	0-10 Br.Cl. 10-40 Bl.Cl.	40
227A	0-17 Cl. & Blds. 17-40 SS	40
227B	0-12 Br.Cl. 12-40 Bl.Cl.	40
228	0-20 Br.Cl. 20-40 Shale	40
229	0-10 Br.Cl. 10-40 Sh.	40
230	0-25 Br.Cl. 25-40 SS	40
231	0-15 Br.Cl. 15-40 Sh.	40
232	0-15 Cl. & rocks 15-40 Sh.	40
233	0-20 Br.Cl. 20-40 SS	40
234	0-15 Sd. & Gr. 15-40 SS	40
235	0-20 SS 20-40 Shale	40
236	0-12 Cl. & Gr. 12-40 SS	40
237	0-40 SS	40
238	0-8 Cl. & Sd. 8-40 SS	40
239	0-17 Cl. & rocks 17-40 SS	40
240	0-25 Cl. & Gr. 25-40 SS	40
241	0-20 Br.Cl. 20-40 SS	40

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
242	0-20 Br.Cl. 20-40 SS	40
243	0-15 Cl. & Gr. 15-40 Sh.	40
244	0-10 Br.Cl. 10-40 Sd.	40
245	0-18 Sd. 18-40 Cl.	40
246	0-10 Br.Cl. 10-40 Bl.Cl. & rocks	40
247	0-10 Br.Cl. & Gr. 10-40 Bl.Cl. & rocks	40
248	0-12 Br.Cl. & rocks 12-40 Bl.Cl. & rocks	40
249	0-10 Br.Cl. 10-40 Bl.Cl. & rocks	40
250	0-10 Br.Cl. 10-40 Bl.Cl. & rocks	40
251	0-18 Sd. & Gr. 18-40 Cl. & rocks	40
252	0-12 Br.Cl. & rocks 12-40 Bl.Cl. & rocks	40
253	0-16 Br.Cl. & rocks 16-40 Bl.Cl. & rocks	40
254	0-14 Br.Cl. & rocks 14-40 Bl.Cl. & rocks	40
255	0-15 Br.Cl. & rocks 15-40 Bl.Cl. & Gr.	40
256	0-14 Br.Cl. & Sd. 14-40 Bl.Cl. & Gr.	40
257	0-10 Br.Cl. & rocks 10-40 Bl.Cl. & rocks	40
258	0-12 Br.Cl. & Gr. 12-40 Bl.Cl. & rocks	40
259	0-14 Br.Cl. & rocks 14-40 Bl.Cl. & Gr.	40
260	0-18 Br.Cl. & Sd. 18-40 Bl.Cl. & rocks	40
261	0-6 Br.Cl. & rocks 6-40 Bl.Cl. & rocks	40
262	0-15 Br.Cl. & rocks 15-40 Bl.Cl. & rocks	40
263	0-14 Br.Cl. & Sd. 14-40 Bl.Cl. & rocks	40
264	0-8 Br.Cl. & rocks 8-40 Bl.Cl. & rocks	40
265	0-10 Br.Cl. & rocks 10-40 Bl.Cl. & Blds.	40
266	0-10 Br.Cl. & rocks 10-40 Bl.Cl. & rocks	40
267	0-10 Br.Cl. & Blds. 10-40 Bl.Cl. & Blds.	40
268	0-10 Br.Cl. & Blds. 10-40 Bl.Cl. & rocks	40
269	0-40 Br.Cl. & rocks	40
270	0-10 Br.Cl. 10-15 Sd. & Gr. 15-30 Bl.Cl. 30-40 Hd.Cl. & Gr.	40
271A	0-14 Br.Cl. & Gr. 14-40 SS & Sh.	40
271B	0-10 Br.Cl. & Blds.	10
272	0-5 Br.Cl. 5-30 Sd. & Gr.	30
273	0-8 Mus. 8-40 Sdy. Bl.Cl.	40
274	0-15 Br.Cl. & Gr. 15-40 Bl.Cl. & Blds.	40
275	0-10 Br.Cl. & Blds. 10-40 Bl.Cl.	40
276	0-10 Br.Cl. 10-60 Bl.Cl.	60
277	0-10 Br.Cl. & Blds. 10-40 Br.Cl. & Gr.	40
278	0-10 Br.Cl. & Blds. 10-40 Cl. & rocks	40
279	0-10 Br.Cl. & Blds. 10-40 Bl.Cl. & rocks	40
280	0-40 Rocky Br. Cl.	40
281	0-15 Br.Cl. & Blds. 15-40 Bl.Cl. & rocks	40
282	0-10 Br.Cl. & rocks 10-40 Bl.Cl. & Gr.	40
283	0-10 Br.Cl. 10-40 Bl.Cl. & rocks	40
284	0-8 Mus. 8-20 Br.Cl. & Gr. 20-40 Bl.Cl. & Blds.	40
285	0-10 Br.Cl. 10-20 Bl.Cl. 20-25 Sd. & Gr. 25-40 Bl.Cl.	40
286	0-15 Br.Cl. 15-40 Bl.Cl. & rocks	40
287	0-10 Br.Cl. 10-40 Bl.Cl. & Gr.	40
288	0-20 Mus. 20-40 Br.Cl. & Gr.	40
289	0-10 Mus. 10-40 Bl.Cl. & rocks	40
290	0-15 Mus. 15-40 Bl.Cl. & rocks	40
291	0-20 Sdy. Bl.Cl. 20-40 Bl.Cl.	40
292	0-15 Mus. 15-40 Rocky Bl.Cl.	40
293A	0-10 Cl. & Blds.	10
293B	0-10 Rocky Br.Cl. 10-40 Rocky Bl.Cl.	40

Shot Hole No.

Formation Log

Total Depth

294	0-10 Rocky Br.Cl. 10-40 Rocky Bl.Cl.	40
295	0-20 Rocky Br.Cl. 20-40 Rocky Bl.Cl.	40
296	0-15 Rocky Br.Cl. 15-40 Rocky Bl.Cl.	40
297	0-10 Rocky Br.Cl. 10-40 Rocky Bl.Cl.	40
298	0-10 Br.Cl. 10-60 Bl.Cl.	60
299	0-10 Rocky Br.Cl. 10-25 Rocky Bl.Cl. 25-30 Sd. & Gr. 30-40 Bl.Cl.	40
300	0-10 Br.Cl. 10-40 Bl.Cl.	40
301	0-10 Br.Cl. 10-40 Bl.Cl.	40
302	0-10 Br.Cl. 10-40 Bl.Cl.	40.
303	0-10 Br.Cl. 10-40 Bl.Cl. & rocks	40
304	0-10 Rocky Br.Cl. 10-40 Bl.Cl.	40
305	0-15 Rocky Br.Cl. 15-40 Rocky Bl.Cl.	40
306	0-15 Rocky Br.Cl. 15-40 Bl.Cl.	40
307	0-10 Rocky Br.Cl. 10-40 Bl.Cl.	40
308	0-15 Rocky Br.Cl. 15-40 Bl.Cl.	40
309	0-10 Br.Cl. 10-40 Bl.Cl.	40
310	0-10 Br.Cl. 10-40 Soft Bl.Cl.	40
311	0-20 Soft Br.Cl. 20-40 Rocky Bl.Cl.	40
312	0-10 Sdy. Br.Cl. 10-30 Bl.Cl. 30-40 Soft SS	40
313	0-20 Br.Cl. & Gr. 20-40 Sh.	40
314	0-10 Gr. 10-40 Bl.Cl. & rocks	40
315	0-10 Gr. 10-40 SS	40
316	0-10 Br.Cl. 10-40 SS	40
317	0-30 Hd. SS	30
318	0-15 Br.Cl. 15-40 SS	40
319	0-10 Br.Cl. 10-40 SS	40
320	0-10 Br.Cl. 10-15 Gr. 15-40 SS	40
321	0-10 Br.Cl. 10-25 SS 25-40 Sh.	40
322	0-10 Br.Cl. 10-40 Bl.Cl.	40
328	0-5 Mus. 5-80 Rocky Bl.Cl.	80
329	0-4 Mus. 4-40 Rocky Bl.Cl.	40
330	0-10 Br.Cl. 10-40 Bl.Cl.	40
331	0-10 Br.Cl. 10-40 Bl.Cl.	40
332	0-10 Sdy. Cl. 10-20 Gr.	20
333	0-10 Rocky Br.Cl. 10-40 Rocky Bl.Cl.	40
334	0-25 Sd. & Gr. 25-40 SS	40
335	0-15 Br.Cl. & Blds. 15-40 Bl.Cl. & Gr.	40

BOVIE LAKE PROJECT NOS. 2407 & 2408

NORTH WEST TERRITORIES, CANADA

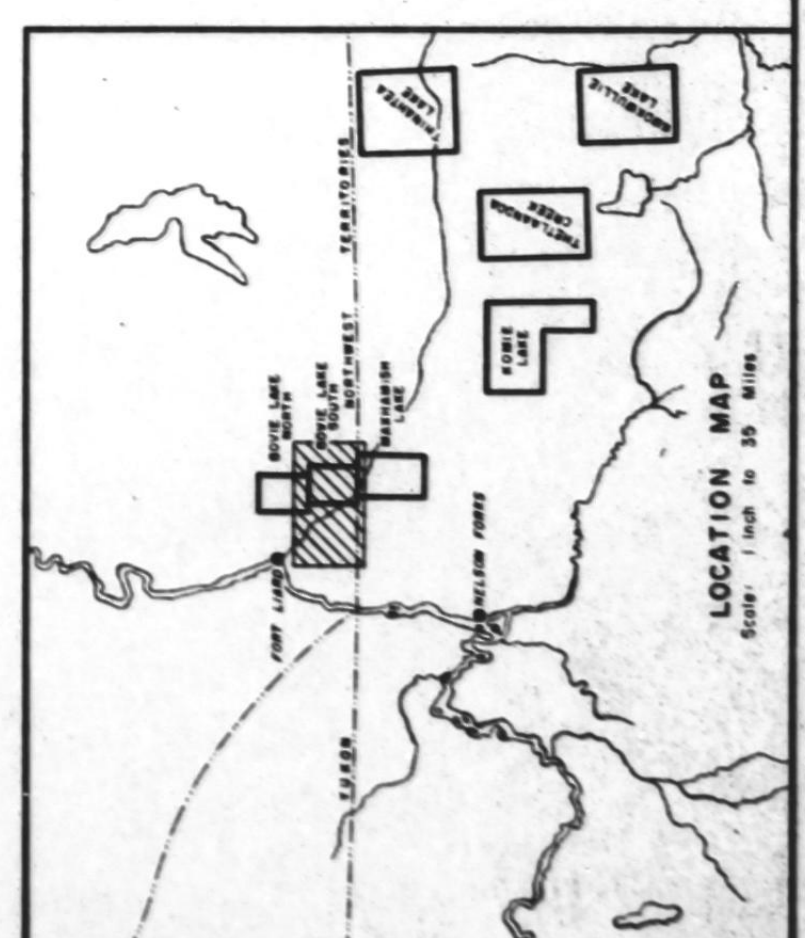
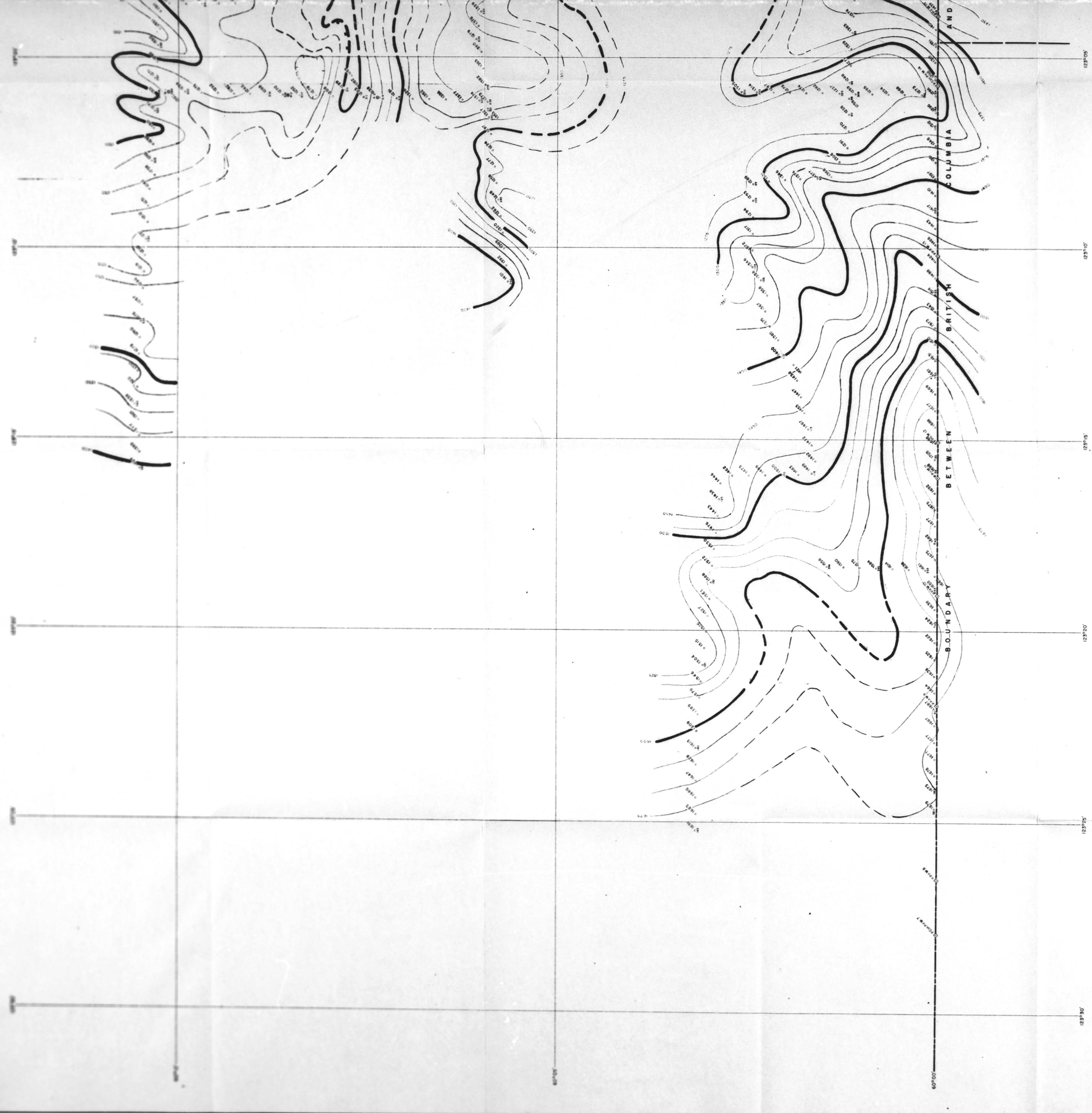
SHOT HOLE DRILLING LOG

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
1	0-10 Br. Cl. 10-65 Bl. Cl. & Rocks 65-75 Gr. 75-120 Hd. Bl. Cl. & SS ledges	120
1A	0-15 Br.Cl. 15-70 Bl.Cl. & rocks 70-75 Gr.	75
2	0-5 Br.Cl. 5-25 Hd. S.S.	25
2A	0-6 Br.Cl. & rocks 6-50 Bl.Cl. & blds.	50
3	0-10 Br.Cl. 10-45 Hd.Bl.Cl. 45-60 SS	60
4	0-20 Br.Cl. (Skid)	20
4A	0-15 Sdy.Br.Cl.& Gr. 15-35 Bl.Cl.& Blds. streaks of Gr. 35-60 S.S.	60
5	0-40 S.S. (Blind)	40
6	0-8 (Skid)	8
6A	0-15 Br.Cl. & Blds.	15
6B	0-12 Br.Cl. & Blds. (Skid) 12-40 Bl.Cl. & Blds. 40-60 Br.Cl. layers of S.S.	60
7	0-7 Br.Cl. & Blds. 7-32 Bl.Cl. & Blds., streaks of Gr. 32-60 S.S.	60
8	0-7 Br.Cl. 7-38 Bl.Cl. & Blds. 38-120 S.S.	120
9	0-15 Br.Cl. & Blds. 15-62 Bl.Cl. & rocks	62
10	0-12 Br.Cl. 12-60 Bl.Cl. & Blds.	60
11	0-10 Br.Cl. 10-60 Bl.Cl. & rocks	60
12	0-8 Br.Cl. 8-15 Sd. & Gr. 15-25 Bl.Cl. 25-60 Sd.	60
13	0-15 Br.Cl. & S.S. 15-80 Bl.Cl. & Blds.	80
14	0-12 Br.Cl. & S.S. 12-80 Bl.Cl. & Blds.	80
15	0-10 Br.Cl. 10-80 Bl.Cl. & rocks	80
16	0-9 Br.Cl. & rocks 9-80 Bl.Cl. & Blds.	80
17	0-10 Br.Cl. 10-80 Bl.Cl. & rocks 80-85 Gr.	85
18	0-6 Br.Cl. 6-55 Bl.Cl. & Blds. 55-60 Gr.	60
19	0-10 Mus. 10-85 Bl.Cl. & rocks	85
20	0-10 Fr.Cl. 10-25 Bl.Cl. & Blds. 25-80 Sd.	80
21	0-25 Bl.Cl. & rocks 25-85 Sh.	85
22	0-15 Cl.& Blds. 15-60 Sh.	60
23	0-15 Sd. & Gr. 15-80 Bl.Cl.	80
24	0-12 Br.Cl. 12-80 Bl.Cl. streaks of Gr.	80
25	0-15 Br.Cl. 15-80 Bl.Cl.	80
26	0-16 Br.Cl. & Blds. 16-80 Sh.	80
27	0-15 Br.Cl. & Blds. 15-60 Sh.	60
28	0-14 Br.Cl. & Blds. 14-80 Sh.	80
29	0-15 Br.Cl. & Blds. 15-70 Sh.	70
30	0-14 Br.Cl. & Blds. 14-80 Sh.	80
31	0-12 Br.Cl. & Blds. 12-80 Sh.	80
32	0-15 Br.Cl. 15-80 Sh.	80

<u>Shot Hole No.</u>	<u>Formation Log</u>	<u>Total Depth</u>
33	0-18 Cl. & Blds. 18-80 Sh.	80
34	0-20 Br.Cl. 20-80 Sh.	80
35	0-25 Cl. & Blds. 25-80 Sh.	80
36	0-35 Bl.Cl. & rocks 35-80 Sh.	80
37	0-8 Br.Cl. 8-60 Bl.Cl. & Blds.	60
38	0-10 Br.Cl. 10-80 Bl.Cl.	80
39	0-10 Br.Cl. 10-65 Bl.Cl. & rocks	65
40	0-8 Br.Cl. & Blds. 8-70 Bl.Cl. & Blds. 70-80 S.S.	80
41	0-10 Br.Cl. 10-70 Bl.Cl. 70-80 S.S.	80
42	0-9 Br.Cl. & Blds. 9-45 Bl.Cl. & Blds. 45-60 Sh.	60
43	0-10 Br.Cl. 10-65 Bl.Cl. 65-80 Sh.	80
44	0-15 Br.Cl. & Sd. 15-80 Bl.Cl. & Blds.	80
45	0-10 Mus. 10-50 Bl.Cl. & rocks	50
46	0-12 Br.Cl. 12-80 Bl.Cl. & Blds.	80
47	0-35 Cl. & Blds. 35-80 Sh.	80
48	0-30 Bl.Cl. & Blds. 30-60 Sh.	60
49	0-30 Bl.Cl. & Blds. 30-60 Sh.	60
49	0-14 Cl. & Blds. 14-80 Sh.	80
50	0-22 Cl. & Blds. 22-60 Sh.	60
51	0-16 Cl. & Blds. 16-80 Sh.	80
52	0-30 Bl.Cl. & rocks. 30-60 Sh.	60
53	0-10 Br.Cl. 10-25 Bl.Cl. 25-80 Sh.	80
54	0-26 Cl. & Blds. 26-30 Gr. 30-80 Sh.	80
55	0-45 Cl. & Blds. streaks of Gr. 45-80 Sh.	80
56	0-25 Cl. & Blds. 25-80 S.S.	80
57	0-7 Mus. 7-32 Cl. 32-37 Sd. & Gr. 37-60 Cl. & Blds.	60
67A	A-0-10 Br.Cl. & Blds. 10-90 Bl.Cl. & Blds.	90
68	0-10 Br.Cl. (Skid) 10-80 Bl.Cl. & Blds.	80
69	0-4 Mus. 4-12 Br.Cl. & Blds. 12-80 Bl.Cl. & Blds.	80
70A	0-10 Br.Cl. & Blds. 10-80 Bl.Cl.	80
71A	0-15 Br.Cl. & Blds. 15-80 Bl.Cl. & Blds.	80
72	0-6 Br.Cl. 6-80 Bl.Cl. & Blds.	80
73A	0-15 Br.Cl. & Blds. 15-70 Bl.Cl. & rocks	70
74	0-30 Sd. & Gr. (Skidded 10')	30
74A	0-15 Br.Cl. & Gr. 15-45 Sd. 45-80 Bl.Cl. & Blds.	80
75	0-30 Sd. & Gr. (Skidded 60')	30
75A	0-15 Br.Cl. Sd. & Blds. 15-80 Bl.Cl. & Blds.	80
76	0-5 Gr. & Blds. (Skidded 150' NE)	5
76A	0-10 Sd. & Blds. 10-80 Bl.Cl. & Blds.	80
78	0-30 Br.Cl. & Blds. 30-80 Bl.Cl. & Blds.	80
79	0-10 Br.Cl. & Blds. 10-60 Fine Gr. & Sd.	60
80	0-20 Br.Cl. & Blds. 20-60 Bl.Cl. & Blds. 68-80 Sh.	80
82	0-10 Br.Cl. & Blds. 10-80 Bl.Cl. & rocks	80
82A	0-40 Cl. & Blds. 40-52 Sd. 52-80 Bl.Cl. & Blds.	80
83	0-25 Cl. & Gr. 25-65 S.S.	65
84	0-12 Br.Cl. & Blds. 12-35 Bl.Cl. & Blds. 35-60 S.S.	60
85	0-8 Br.Cl. & Blds. 8-70 Bl.Cl. & Blds.	70
86	0-10 Br.Cl. & Blds. 10-15 Gr. 15-80 Bl.Cl. & rocks	80
87	0-35 Cl. & Blds. 35-45 Sd. 45-60 S.S.	60

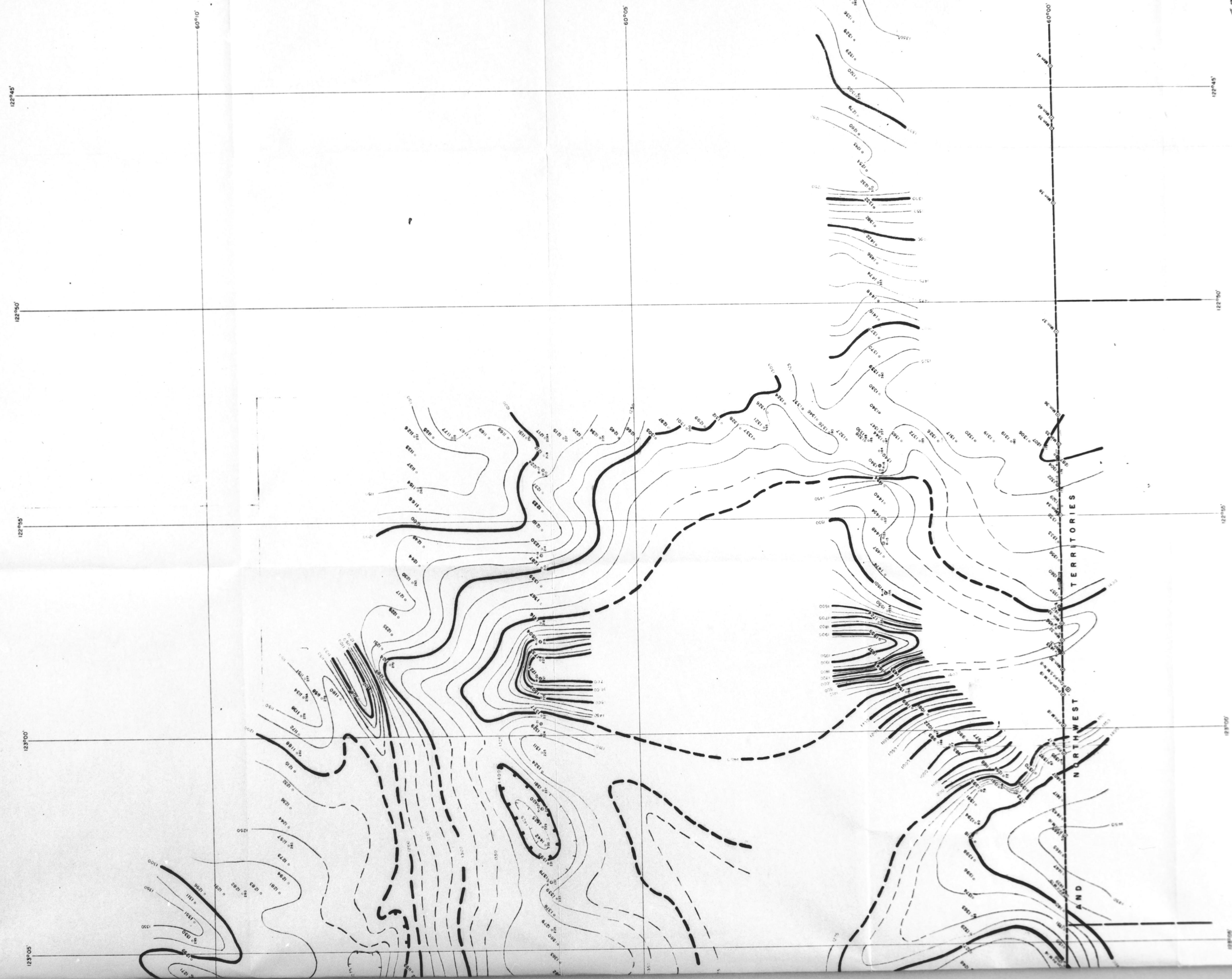
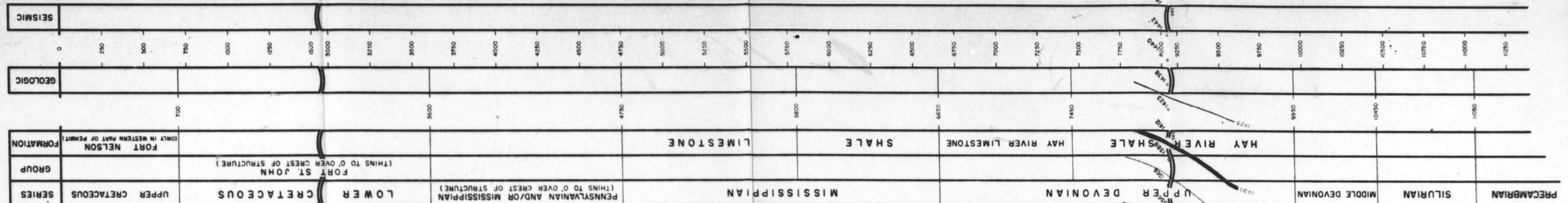
Note: Abbreviations used in the Report

blde.	Boulders
Bl.	Blue
Br.	Brown
Cl.	Clay
Gr.	Gravel
Hd.	Hard
Mus.	Mussel
Sc.	Sand
Sdy.	Sandy
Sh.	Shale
S.S.	Sandstone



COLUMNAR SECTIONS

VERTICAL SCALE: 1 INCH TO 500 FEET



GENERALIZED SECTION 3

N.F.A. 203
PETROLEUM & NATURAL GAS
CROWN PERMIT NO.227

NORTHERN FOOTHILLS AGREEMENT
TEXACO EXPLORATION COMPANY, OPERATOR
PROGRESS MAP
BOVIE LAKE SOUTH PROJECT
NORTHWEST TERRITORIES, CANADA

SURFACE TOPOGRAPHY

LEGEND
Elev. in feet above sea level
Spot height
Current mapping
Shaded area
Proposed work

DATE: Nov. 18, 1966
UNIVERSAL SURVEYING SERVICES LIMITED
CALGARY, ALBERTA

Signature: [Handwritten Signature]
Approved: [Handwritten Signature]
Accompanying Report dated Nov. 20, 1966

