

MAR 19770016: OLD FORT RIVER

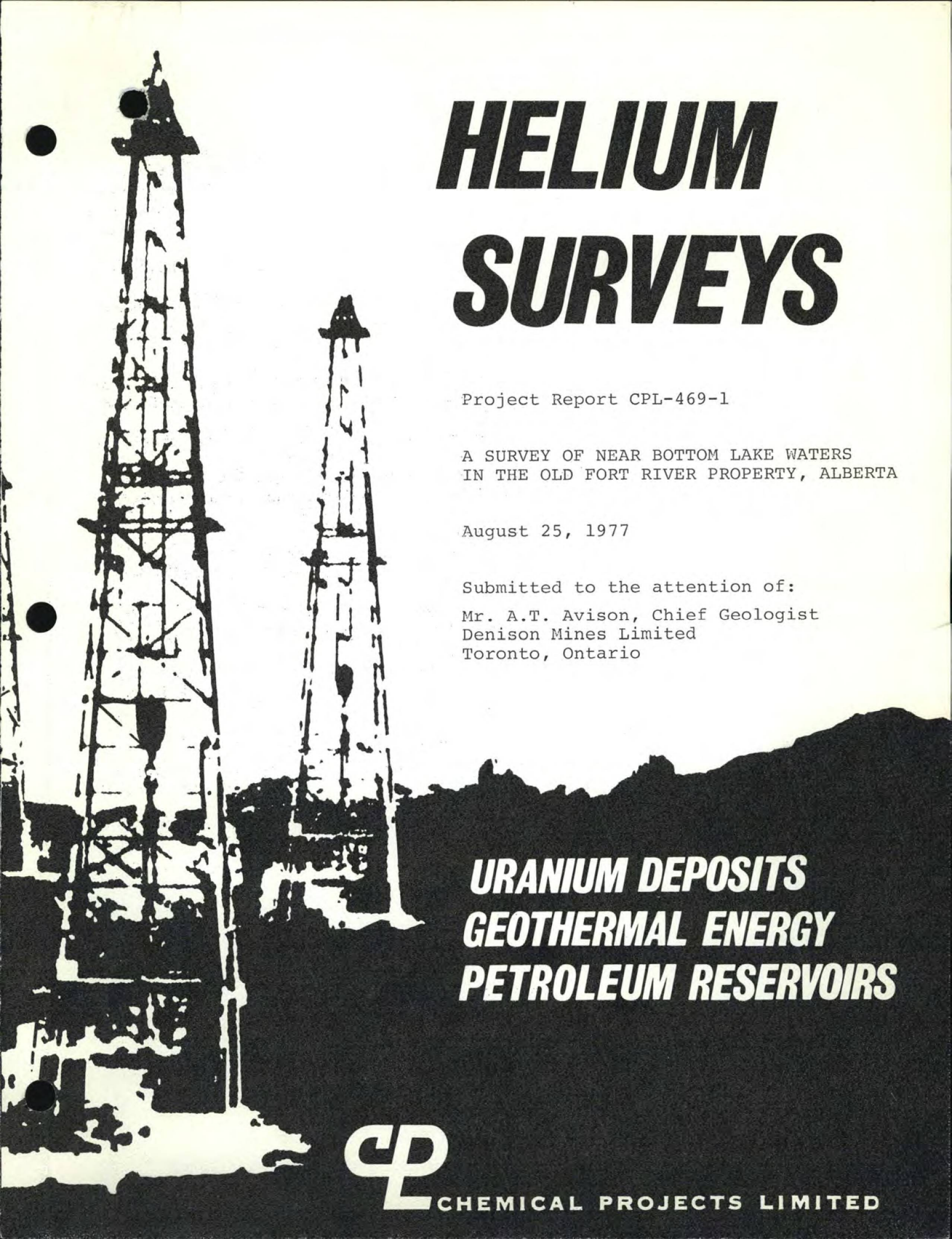
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HELIUM SURVEYS

Project Report CPL-469-1

A SURVEY OF NEAR BOTTOM LAKE WATERS
IN THE OLD FORT RIVER PROPERTY, ALBERTA

August 25, 1977

Submitted to the attention of:

Mr. A.T. Avison, Chief Geologist
Denison Mines Limited
Toronto, Ontario

***URANIUM DEPOSITS
GEOHERMAL ENERGY
PETROLEUM RESERVOIRS***



CHEMICAL PROJECTS LIMITED

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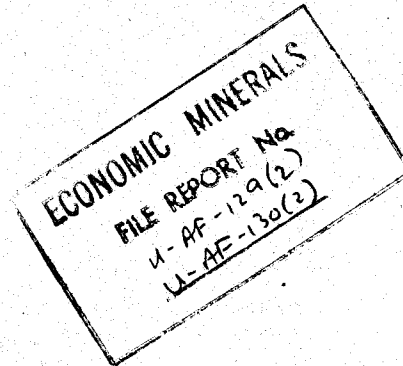


Table 1 Helium Results from the Old Fort River Prospect, Alberta - Water Samples DEN-(1-217)	4
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Table 1A Uranium Results from Selected Water Samples	15
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Figure 1 Helium Lake Water Survey, Sampling Locations and Results, Old Fort River, Alberta	Map Envelope
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Figure 2 Histogram of Old Fort River Helium Results	Map Envelope
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3. RESULTS

3.1 Data Tables

The helium data obtained from the analyses of the water samples are listed in Table 1. The nomenclature employed in Table 1 is the following:

Sample Number = The number that was assigned to each sample by Denison Mines Limited. The prefix "Den" was added by Chemical Projects Limited.

Helium = The concentration of helium dissolved in the water which is expressed as: $(\text{cm}^3 \text{ He at NTP}/\text{cm}^3 \text{ H}_2\text{O}) \times 10^8$; that is, each value has been multiplied by a factor of 10^8 .

The uranium results obtained by Bondar-Clegg in analyzing selected water samples for this radioactive element are given in Table 1A. The uranium concentration is given in parts per billion by weight.

3.2 Statistical Analysis of the Data

The histogram for the 217 water samples collected from the Old Fort River prospect is given in Figure 2. In this figure each of the helium values has been rounded off to the nearest integer.

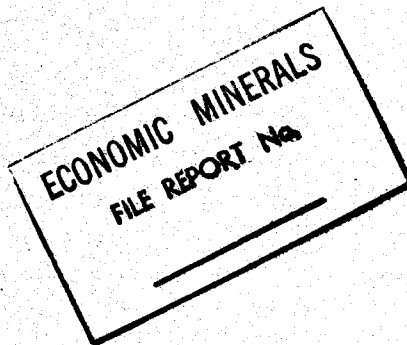
The population has only one mode as almost all of the helium concentrations seem to be representative of background dissolved helium levels in water. The mean with standard deviation for the total population is $6.98 \pm 2.23 \times 10^{-8} \text{ cm}^3 \text{ He at NTP}/\text{cm}^3 \text{ H}_2\text{O}$. Therefore only those water samples which have helium concentrations exceeding $9.21 (= 6.98 + 2.23) \times 10^{-8} \text{ cm}^3 \text{ He at NTP}/\text{cm}^3 \text{ H}_2\text{O}$ are considered to be anomalous.

The anomalies are graded and color coded, as indicated in the map legend of Figure 1, according to the following scheme:

1. INTRODUCTION

During the period from May 22 to May 27, 1977, a reconnaissance helium survey was carried out in the Old Fort River Prospect, Alberta. Some 217 near bottom lake water samples were collected by members of the exploration department of Denison Mines Limited, Toronto, Ontario.

The analyses of these samples and the interpretation of the resulting data were performed at the geochemical laboratories of Chemical Projects Limited in Toronto, Ontario. Uranium determinations were also performed on some of these water specimens by Bondar-Clegg & Company, Ottawa, Ontario.



2. SURVEY TECHNIQUE

2.1 Sampling Methods

In undertaking this project a total of 217 near bottom lake water samples were collected. The locations at which the samples were taken are plotted in Figure 1 of this report.

The sampling was carried out from a helicopter. Each water specimen was collected with a 1.2 liters Kemerrer-type water sampling bottle. Approximately 185 cm³ of this water was preserved for helium determination by hermetically sealing it in an aluminum sample container developed by Chemical Projects Limited. An additional 120 cm³ aliquot of the sample water was retained in a plastic sampling bottle for uranium analysis by the fission track method.

A log of the sample water temperatures and the sampling depths was kept.

2.2 Analytical Procedures

When the water samples were received at the laboratory, a known amount of air was injected into each of the sample containers. The water samples were then subjected to a period of equilibration at constant temperature after which two gas samples were extracted from each container and stored in Bistable gas samplers.

The gaseous contents of one set of these Bistables were analyzed, employing Chemical Projects' helium analyzer, in order to determine the helium concentration in each sample. During each analysis the concentration of helium in the sample was compared with that of an air standard which has a helium concentration of 5.20 parts per million (by volume). The detection limit for helium is 10 ppb (by volume).

As the helium dissolved in the water samples is a function of the air thermodynamic and water parameters, these were also determined for each sample. These data were used to correct the laboratory conditions back to the field conditions at the time of sample collection.

COMPANY : DENISON MINES
DATE : JULY 5, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-06)

SAMPLE NUMBER	HELIUM
DEN-1	7.72
DEN-2	5.54
DEN-3	2.58
DEN-4	4.64
DEN-5	6.33
DEN-6	4.44
DEN-7	5.55
DEN-8	1.81
DEN-9	5.20
DEN-10	5.19
DEN-11	4.97
DEN-12	4.20
DEN-13	5.00
DEN-14	3.90
DEN-15	4.34
DEN-16	4.70
DEN-17	4.63
DEN-18	4.68
DEN-19	5.37
DEN-20	3.70
DEN-21	5.34

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINING
DATE : JULY 8, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-22	5.54
DEN-23	4.80
DEN-24	5.22
DEN-25	4.50
DEN-26	5.33
DEN-27	5.46
DEN-28	5.31
DEN-29	5.24
DEN-30	5.15
DEN-31	5.11
DEN-32	5.07
DEN-33	5.11
DEN-34	4.99
DEN-35	3.62
DEN-36	4.21
DEN-37	5.37
DEN-38	6.25
DEN-39	5.20
DEN-40	5.93
DEN-41	4.94
DEN-42	5.54

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINES
DATE : JULY 5, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-43	3.73
DEN-44	2.90
DEN-45	5.48
DEN-46	5.80
DEN-47	4.60
DEN-48	4.42
DEN-49	5.29
DEN-50	5.59
DEN-51	6.24
DEN-52	5.19
DEN-53	4.55
DEN-54	5.48
DEN-55	5.08
DEN-56	4.77
DEN-57	5.33
DEN-58	5.30
DEN-59	6.07
DEN-60	5.48
DEN-61	5.02
DEN-62	5.45
DEN-63	5.16

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINES
DATE : JULY 5, 1977

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TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * F-08)

SAMPLE NUMBER	HELIUM
DEN-64	5.86
DEN-65	7.73
DEN-66	6.93
DEN-66A	7.02
DEN-67	6.58
DEN-68	7.15
DEN-69	8.05
DEN-70	6.77
DEN-71	8.21
DEN-72	6.61
DEN-73	6.66
DEN-74	9.62
DEN-75	6.38
DEN-76	8.13
DEN-77	7.22
DEN-78	7.35
DEN-79	7.26
DEN-80	6.83
DEN-81	7.47
DEN-82	8.19
DEN-83	7.22

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINES
DATE : JULY 5, 1977

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TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-84	11.3
DEN-85	7.29
DEN-86	6.24
DEN-87	8.59
DEN-88	8.45
DEN-88A	9.71
DEN-89	7.13
DEN-90	9.85
DEN-91	7.29
DEN-92	5.92
DEN-93	9.81
DEN-93W	7.21
DEN 93X	10.0
DEN 93Y	6.99
DEN-93Z	7.71
DEN-94	7.34
DEN-95	7.71
DEN-96	7.86
DEN-97	6.75
DEN-98	5.99
DEN-99	7.23

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINE
DATE : JULY 5, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-100	7.06
DEN-101	6.58
DEN-102	7.87
DEN-103	8.20
DEN-104	7.29
DEN-105	6.57
DEN-106	22.1
DEN-107	7.94
DEN-108	7.93
DEN-109	6.88
DEN-110	6.59
DEN-111	7.29
DEN-112	7.98
DEN-113	5.96
DEN-114	8.11
DEN-115	10.9
DEN-116	9.64
DEN-117	15.6
DEN-118	8.79
DEN-119	5.70
DEN-120	7.14

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COMPANY : DENISON MINES
DATE : JULY 5, 1977

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TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-121	7.17
DEN-122	6.57
DEN-123	7.36
DEN-124	8.47
DEN-125	7.02
DEN-126	6.26
DEN-127	6.74
DEN-128	7.93
DEN-129	7.32
DEN-130	3.37
DEN-131	6.41
DEN-132	7.82
DEN-133	7.23
DEN-134	5.97
DEN-135	6.72
DEN-136	6.19
DEN-137	4.93
DEN-138	8.08
DEN-139	4.58
DEN-140	8.47
DEN-141	7.84

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COMPANY : DENISON MINES
DATE : JULY 5, 1977

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TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-142	4.99
DEN-143	7.07
DEN-144	8.37
DEN-145	6.19
DEN-146	10.1
DEN-147	7.21
DEN-148	7.90
DEN-149	7.11
DEN-150	8.57
DEN-151	7.82
DEN-152	13.9
DEN-153	7.15
DEN-154	7.45
DEN-155	9.90
DEN-156	7.25
DEN-157	7.75
DEN-158	8.95
DEN-159	7.34
DEN-160	8.21
DEN-161	8.04
DEN-162	8.81

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COMPANY : DENISON MINES
DATE : JULY 5, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * F-08)

SAMPLE NUMBER	HELIUM
DEN-163	8.42
DEN-164	7.10
DEN-165	9.38
DEN-166	6.96
DEN-167	8.00
DEN-168	7.66
DEN-169	7.71
DEN-170	7.33
DEN-171	8.83
DEN-172	7.46
DEN-173	7.95
DEN-174	6.43
DEN-175	6.04
DEN-176	6.09
DEN-177	7.75
DEN-178	7.23
DEN-179	7.47
DEN-180	6.60
DEN-181	7.03
DEN-182	7.79
DEN-183	7.70

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COMPANY : DENISON MIN.
DATE : JULY 5, 1977

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TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-184	19.6
DEN-185	6.37
DEN-186	4.47
DEN-187	7.23
DEN-188	8.34
DEN-189	7.06
DEN-190	8.21
DEN-191	8.65
DEN-192	7.01
DEN-193	7.55
DEN-194	6.93
DEN-195	6.94
DEN-196	7.23
DEN-197	7.10
DEN-198	7.75
DEN-199	8.97
DEN-200	6.54
DEN-201	6.76
DEN-202	7.07
DEN-203	2.32
DEN-204	7.29

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

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DATE : JULY 5, 1977

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TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-205	7.46
DEN-206	7.13
DEN-207	8.00
DEN-208	7.69
DEN-209	8.55
DEN-210	6.87
DEN-211	8.34
DEN-212	7.77
DEN-213	8.54
DEN-214	9.93
DEN-215	9.27
DEN-216	10.5
DEN-217	10.2



Geochemical Lab Report

Extraction U Report No. 580-7

Method F.T. From Chemical Projects Limited

Fraction Used as received Purchase Order #49977
Date _____ 19__

Table 1A

SAMPLE NO.	U ppb	SAMPLE NO.	U ppb
04	ND	128	ND
09	ND	130	ND
15	ND	139	0.19
19	ND	143	0.18
27	0.03	143	0.33
32	ND	153	ND
43	ND	160	ND
45	ND	162	ND
47	ND	165	0.10
49	ND	169	0.03
54	ND	175	ND
60	ND	179	ND
61	ND	180	ND
65	0.005	187	ND
70	ND	192	0.14
75	ND	194	ND
79	ND	195	ND
84	0.09	204	0.12
85	0.04	206	0.48
86	ND	209	0.23
82A	ND	211	0.09
91	ND		
93	ND		
97	ND		
104	0.06		
106	0.64		
107	0.01		
115	ND		
117	0.08		
120	ND		
123	0.24		

NB Means not detectable

UN

<u>Anomaly Range</u> (cm^3 He at NTP/ cm^3 H ₂ O x 10 ⁻⁸)	<u>Color Code</u>
9.22 - 11.44	Yellow
11.45 - 13.67	Orange
13.68 - 15.90	Pink
> 15.90	Red

3.3 Figures

The helium data listed in Table 1 are plotted in Figure 1. This map has a scale of 1 inch = 31,680 inches and has been enlarged from the base map provided by Denison Mines.

The water sampling sites are designated by squares. The number of each sampling location is plotted within the appropriate square while the helium results are marked in heavy bold numbers adjacent to them. It should be noted that the data for the second set of samples collected at points 1, 2 and 3 are given in the map legend.

4. COMMENTS

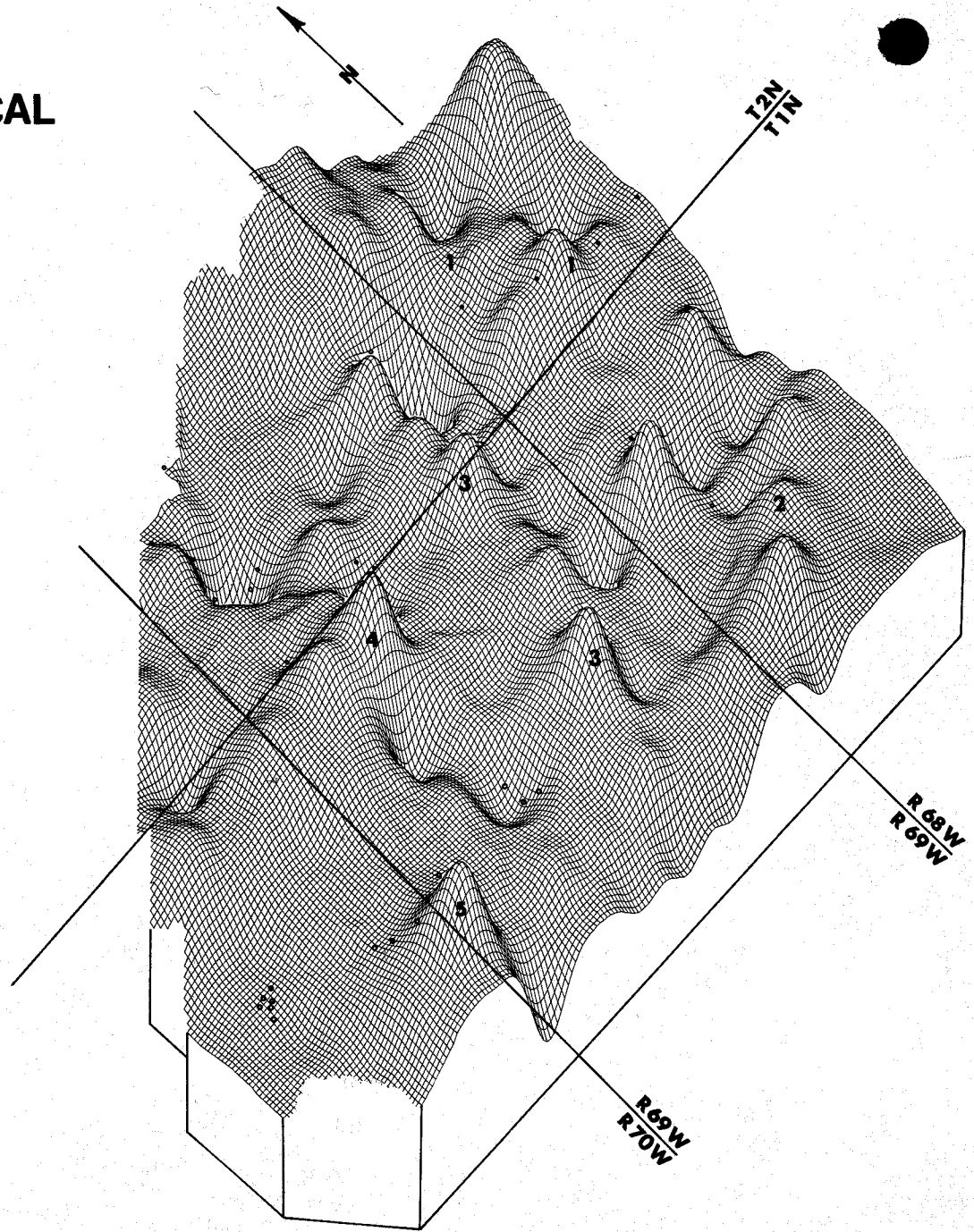
The background helium level for this prospect ($6.98 \times 10^{-8} \text{ cm}^3 \text{ He at NTP/cm}^3 \text{ H}_2\text{O}$) is very low. While it would seem that most of the dissolved helium concentrations in the water samples are representative of this background value, a few of them are anomalous.

Samples 106 and 152, 184, and 115 and 117 are quite strongly anomalous in that their helium concentrations exceed the background mean by at least 2 standard deviations (95% confidence for normally distributed results). The helium values for samples 106 and 184 are in the range $20\text{-}30 \times 10^{-8} \text{ cm}^3 \text{ He at NTP/cm}^3 \text{ H}_2\text{O}$ that has been found in near bottom lake waters in close proximity to known uranium orebodies. The highest uranium concentration was also found in sample 106 which reinforces the helium data. No uranium determination was made on sample 184.

The same lakes in which samples 106, 152 and 184 were taken should be investigated further. Similarly, the lake from which samples 115, 116 and 117 were collected would seem to warrant further more detailed sampling as all of the samples taken from it had higher dissolved helium concentrations. The two individual samples 74 and 146 are weakly anomalous and may be of slight interest.

Samples 214-215, 216-217 and 155 are weakly anomalous which may result from the fact that they are close to sampling locations 106 and 152. The discrepancy between sample 1 and 216-217, sample 2 and 214-215 and sample 3 and 212-213 may be due to convective overturning in the lake. Although samples 84, 90, 93 and 93X are weakly anomalous, this is probably not significant as higher helium values were not determined in other samples from the same lakes.

**A TYPICAL
HELIUM
SURFACE
BLOCK
DIAGRAM**



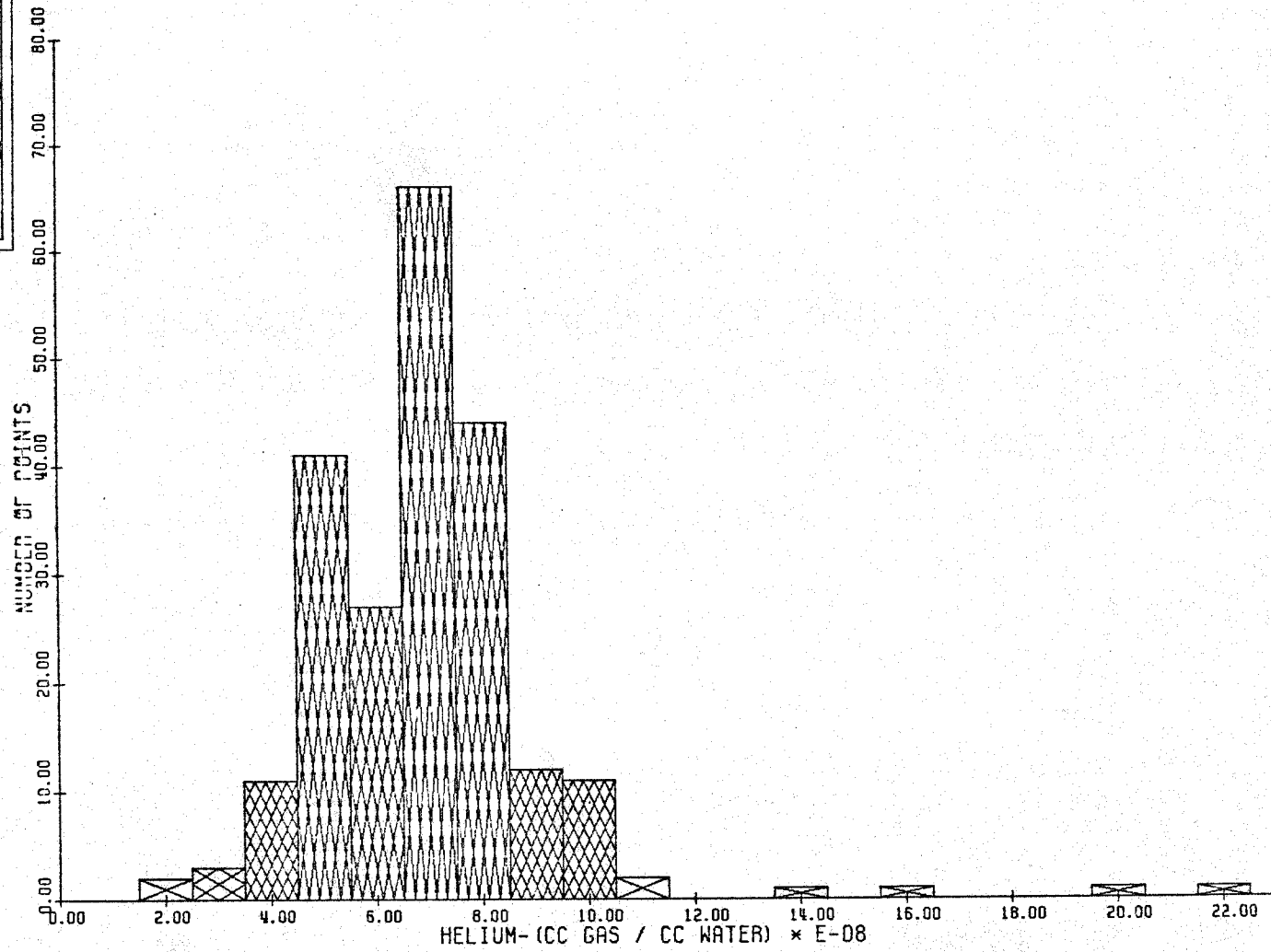
CHEMICAL PROJECTS LIMITED

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64 RACINE ROAD, REXDALE (TORONTO), ONTARIO, M9W 2Z7, CANADA · (416) 745-6024

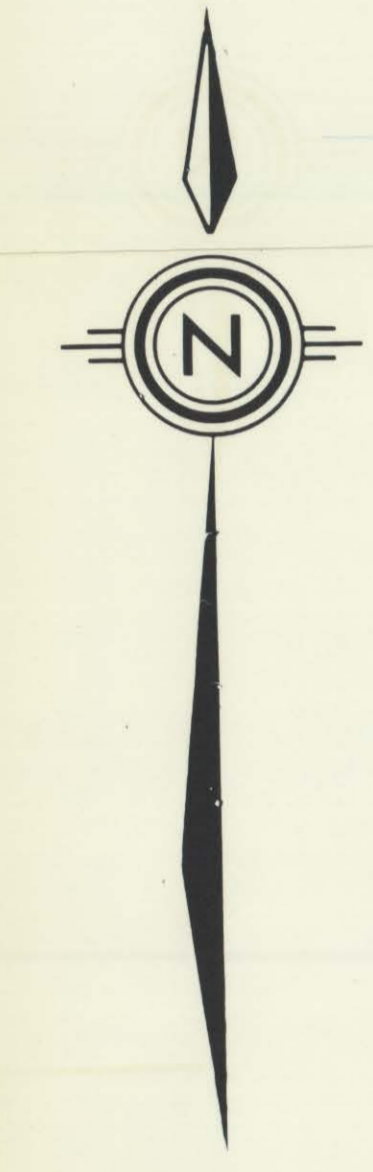
Figure 2

HELIUM HISTOGRAM
DENISON MINES
DEN- (1-217)
CHEMICAL PROJECTS LIMITED



1977016

28th Base Line

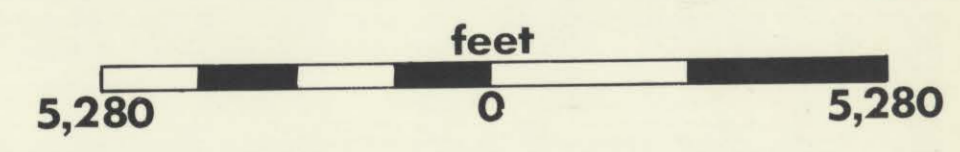


110° 30' 58" 15'

Figure 1

Helium Lake-water Survey
Sampling Locations and
Results
Old Fort River,
Alberta

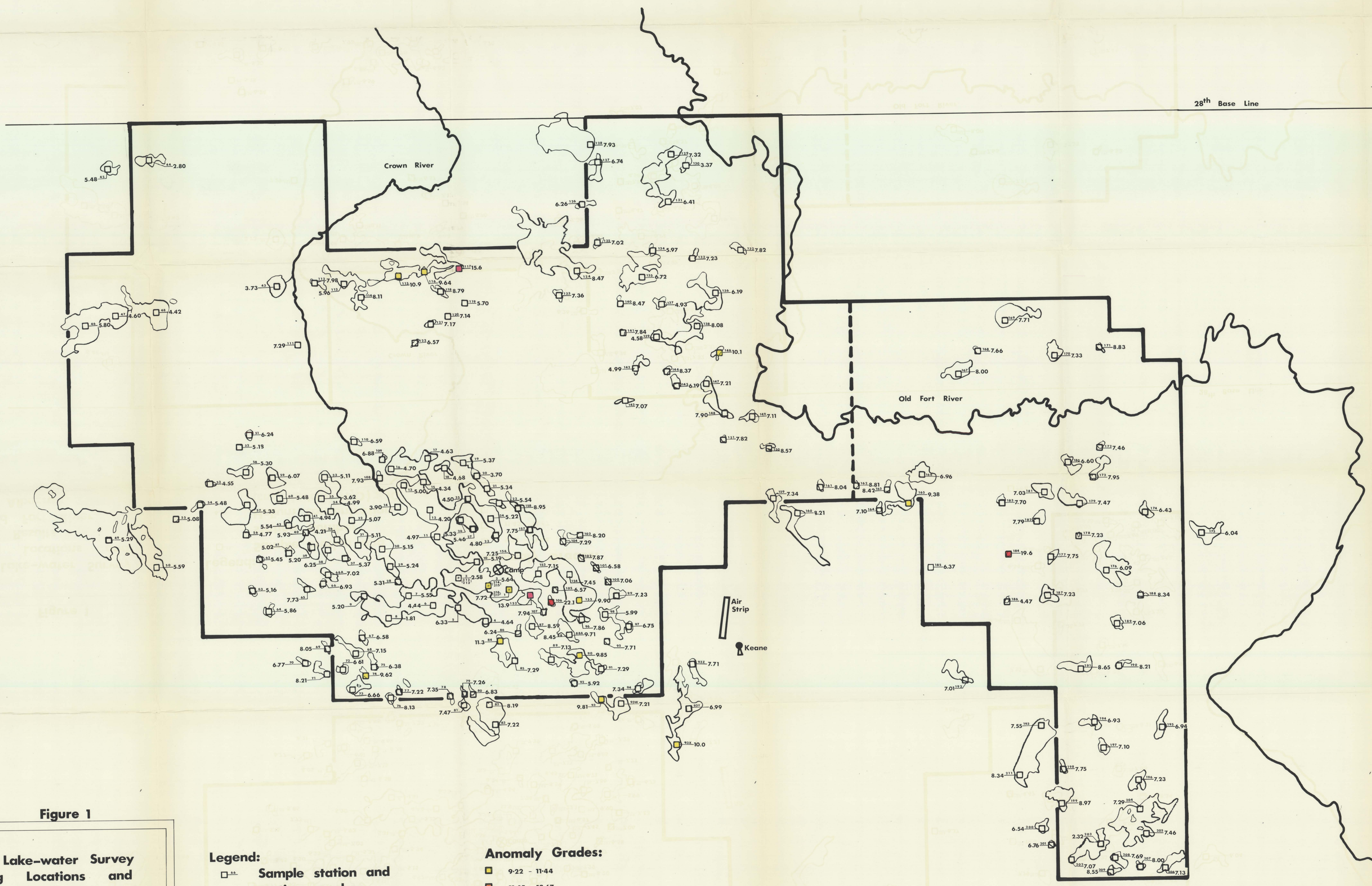
Scale: 1:31,680



Chemical Projects Ltd., Rexdale, Ontario

- Legend:**
- Sample station and station number
 - 6.93 Helium concentration (cm³ He/cm³ H₂O) x 10⁸
 - ☁ Lake
- | | |
|-------------|-------------|
| □--117.77 | □--111.9.27 |
| □--111.8.54 | □--111.10.5 |
| □--111.9.93 | □--117.10.2 |

- Anomaly Grades:**
- 9-22 - 11-44
 - 11-45 - 13-67
 - 13-68 - 15-90
 - :15-90



19770016

HELIUM SURVEYS

Project Report CPL-469-1

A SURVEY OF NEAR BOTTOM LAKE WATERS
IN THE OLD FORT RIVER PROPERTY, ALBERTA

August 25, 1977

Submitted to the attention of:
Mr. A.T. Avison, Chief Geologist
Denison Mines Limited
Toronto, Ontario

**URANIUM DEPOSITS
GEOTHERMAL ENERGY
PETROLEUM RESERVOIRS**

COPY #2



CHE

TED

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ECONOMIC MINERALS
FILE REPORT No
U-AF-129(2)
U-AF-129(1)

Table 1 Helium Results from the Old Fort River Prospect, Alberta - Water Samples DEN-(1-217)	4
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Table 1A Uranium Results from Selected Water Samples	15
--	----

Figure 1 Helium Lake Water Survey, Sampling Locations and Results, Old Fort River, Alberta	Map Envelope
---	--------------

Figure 2 Histogram of Old Fort River Helium Results	Map Envelope
---	--------------

1. INTRODUCTION

During the period from May 22 to May 27, 1977, a reconnaissance helium survey was carried out in the Old Fort River Prospect, Alberta. Some 217 near bottom lake water samples were collected by members of the exploration department of Denison Mines Limited, Toronto, Ontario.

The analyses of these samples and the interpretation of the resulting data were performed at the geochemical laboratories of Chemical Projects Limited in Toronto, Ontario. Uranium determinations were also performed on some of these water specimens by Bondar-Clegg & Company, Ottawa, Ontario.

2. SURVEY TECHNIQUE

2.1 Sampling Methods

In undertaking this project a total of 217 near bottom lake water samples were collected. The locations at which the samples were taken are plotted in Figure 1 of this report.

The sampling was carried out from a helicopter. Each water specimen was collected with a 1.2 liters Kemerrer-type water sampling bottle. Approximately 185 cm³ of this water was preserved for helium determination by hermetically sealing it in an aluminum sample container developed by Chemical Projects Limited. An additional 120 cm³ aliquot of the sample water was retained in a plastic sampling bottle for uranium analysis by the fission track method.

A log of the sample water temperatures and the sampling depths was kept.

2.2 Analytical Procedures

When the water samples were received at the laboratory, a known amount of air was injected into each of the sample containers. The water samples were then subjected to a period of equilibration at constant temperature after which two gas samples were extracted from each container and stored in Bistable gas samplers.

The gaseous contents of one set of these Bistables were analyzed, employing Chemical Projects' helium analyzer, in order to determine the helium concentration in each sample. During each analysis the concentration of helium in the sample was compared with that of an air standard which has a helium concentration of 5.20 parts per million (by volume). The detection limit for helium is 10 ppb (by volume).

As the helium dissolved in the water samples is a function of the air thermodynamic and water parameters, these were also determined for each sample. These data were used to correct the laboratory conditions back to the field conditions at the time of sample collection.

3. RESULTS

3.1 Data Tables

The helium data obtained from the analyses of the water samples are listed in Table 1. The nomenclature employed in Table 1 is the following:

Sample Number = The number that was assigned to each sample by Denison Mines Limited. The prefix "Den" was added by Chemical Projects Limited.

Helium = The concentration of helium dissolved in the water which is expressed as: $(\text{cm}^3 \text{ He at NTP}/\text{cm}^3 \text{ H}_2\text{O}) \times 10^8$; that is, each value has been multiplied by a factor of 10^8 .

The uranium results obtained by Bondar-Clegg in analyzing selected water samples for this radioactive element are given in Table 1A. The uranium concentration is given in parts per billion by weight.

3.2 Statistical Analysis of the Data

The histogram for the 217 water samples collected from the Old Fort River prospect is given in Figure 2. In this figure each of the helium values has been rounded off to the nearest integer.

The population has only one mode as almost all of the helium concentrations seem to be representative of background dissolved helium levels in water. The mean with standard deviation for the total population is $6.98 \pm 2.23 \times 10^{-8} \text{ cm}^3 \text{ He at NTP}/\text{cm}^3 \text{ H}_2\text{O}$. Therefore only those water samples which have helium concentrations exceeding $9.21 (= 6.98 + 2.23) \times 10^{-8} \text{ cm}^3 \text{ He at NTP}/\text{cm}^3 \text{ H}_2\text{O}$ are considered to be anomalous.

The anomalies are graded and color coded, as indicated in the map legend of Figure 1, according to the following scheme:

COMPANY : DENISON MINES
DATE : JULY 8, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-06)

SAMPLE NUMBER	HELIUM
DEN-1	7.72
DEN-2	5.64
DEN-3	2.58
DEN-4	4.64
DEN-5	6.33
DEN-6	4.44
DEN-7	5.55
DEN-8	1.81
DEN-9	5.20
DEN-10	5.19
DEN-11	4.97
DEN-12	4.20
DEN-13	5.00
DEN-14	3.90
DEN-15	4.34
DEN-16	4.70
DEN-17	4.63
DEN-18	4.68
DEN-19	5.37
DEN-20	3.70
DEN-21	5.34

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINING
DATE : JULY 8, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-22	5.54
DEN-23	4.80
DEN-24	5.22
DEN-25	4.50
DEN-26	5.33
DEN-27	5.46
DEN-28	5.31
DEN-29	5.24
DEN-30	5.15
DEN-31	5.11
DEN-32	5.07
DEN-33	5.11
DEN-34	4.99
DEN-35	3.62
DEN-36	4.21
DEN-37	5.37
DEN-38	6.25
DEN-39	5.20
DEN-40	5.93
DEN-41	4.94
DEN-42	5.54

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-43	3.73
DEN-44	2.90
DEN-45	5.48
DEN-46	5.80
DEN-47	4.60
DEN-48	4.42
DEN-49	5.29
DEN-50	5.59
DEN-51	6.24
DEN-52	5.19
DEN-53	4.55
DEN-54	5.48
DEN-55	5.08
DEN-56	4.77
DEN-57	5.33
DEN-58	5.30
DEN-59	6.07
DEN-60	5.48
DEN-61	5.02
DEN-62	5.45
DEN-63	5.16

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINES
DATE : JULY 5, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * F-08)

SAMPLE NUMBER	HELIUM
DEN-64	5.86
DEN-65	7.73
DEN-66	6.93
DEN-66A	7.02
DEN-67	6.58
DEN-68	7.15
DEN-69	8.05
DEN-70	6.77
DEN-71	8.21
DEN-72	6.61
DEN-73	6.66
DEN-74	9.62
DEN-75	6.38
DEN-76	8.13
DEN-77	7.22
DEN-78	7.35
DEN-79	7.26
DEN-80	6.83
DEN-81	7.47
DEN-82	8.19
DEN-83	7.22

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINE
DATE : JULY 5, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-84	11.3
DEN-85	7.29
DEN-86	6.24
DEN-87	8.59
DEN-88	8.45
DEN-88A	9.71
DEN-89	7.13
DEN-90	9.85
DEN-91	7.29
DEN-92	5.92
DEN-93	9.81
DEN-93W	7.21
DEN 93X	10.0
DEN 93Y	6.99
DEN-93Z	7.71
DEN-94	7.34
DEN-95	7.71
DEN-96	7.86
DEN-97	6.75
DEN-98	5.99
DEN-99	7.23

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINES
DATE : JULY 5, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-100	7.06
DEN-101	6.58
DEN-102	7.87
DEN-103	8.20
DEN-104	7.29
DEN-105	6.57
DEN-106	22.1
DEN-107	7.94
DEN-108	7.93
DEN-109	6.88
DEN-110	6.59
DEN-111	7.29
DEN-112	7.98
DEN-113	5.96
DEN-114	8.11
DEN-115	10.9
DEN-116	9.64
DEN-117	15.6
DEN-118	8.79
DEN-119	5.70
DEN-120	7.14

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINES
DATE : JULY 6, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-121	7.17
DEN-122	6.57
DEN-123	7.36
DEN-124	8.47
DEN-125	7.02
DEN-126	6.26
DEN-127	6.74
DEN-128	7.93
DEN-129	7.32
DEN-130	3.37
DEN-131	6.41
DEN-132	7.82
DEN-133	7.23
DEN-134	5.97
DEN-135	6.72
DEN-136	6.19
DEN-137	4.93
DEN-138	8.08
DEN-139	4.58
DEN-140	8.47
DEN-141	7.84

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINES
DATE : JULY 5, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-142	4.99
DEN-143	7.07
DEN-144	8.37
DEN-145	6.19
DEN-146	10.1
DEN-147	7.21
DEN-148	7.90
DEN-149	7.11
DEN-150	8.57
DEN-151	7.82
DEN-152	13.9
DEN-153	7.15
DEN-154	7.45
DEN-155	9.90
DEN-156	7.25
DEN-157	7.75
DEN-158	8.95
DEN-159	7.34
DEN-160	8.21
DEN-161	8.04
DEN-162	8.81

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MINES
DATE : JULY 5, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * F-08)

SAMPLE NUMBER	HELIUM
DEN-163	8.42
DEN-164	7.10
DEN-165	9.38
DEN-166	6.96
DEN-167	8.00
DEN-168	7.66
DEN-169	7.71
DEN-170	7.33
DEN-171	8.83
DEN-172	7.46
DEN-173	7.95
DEN-174	6.43
DEN-175	6.04
DEN-176	6.09
DEN-177	7.75
DEN-178	7.23
DEN-179	7.47
DEN-180	6.60
DEN-181	7.03
DEN-182	7.79
DEN-183	7.70

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISON MIN
DATE : JULY 5, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-184	19.6
DEN-185	6.37
DEN-186	4.47
DEN-187	7.23
DEN-188	8.34
DEN-189	7.06
DEN-190	8.21
DEN-191	8.65
DEN-192	7.01
DEN-193	7.55
DEN-194	6.93
DEN-195	6.94
DEN-196	7.23
DEN-197	7.10
DEN-198	7.75
DEN-199	8.97
DEN-200	6.54
DEN-201	6.76
DEN-202	7.07
DEN-203	2.32
DEN-204	7.29

(*) THIS VALUE IS GREATER THAN THE PRINTED VALUE

COMPANY : DENISEN MINES
DATE : JULY 5, 1977

CHEMICAL PROJECTS LTD.

TABLE NUMBER 1

WATER SAMPLE NUMBERS DEN-(1-217)
(CONCENTRATIONS OF GASES IN (CC GAS AT STP/CC WATER) * E-08)

SAMPLE NUMBER	HELIUM
DEN-205	7.46
DEN-206	7.13
DEN-207	8.00
DEN-208	7.69
DEN-209	8.55
DEN-210	6.87
DEN-211	8.34
DEN-212	7.77
DEN-213	8.54
DEN-214	9.93
DEN-215	9.27
DEN-216	10.5
DEN-217	10.2



Geochemical Lab Report

Extraction U Report No. 580-7

Method F.T. From Chemical Projects Limited

Fraction Used as received Purchase Order #49977

Date _____ 19__

Table 1A

SAMPLE NO.	U ppb	SAMPLE NO.	U ppb
04	ND	128	ND
09	ND	130	ND
15	ND	139	0.19
19	ND	143	0.18
27	0.03	148	0.33
32	ND	158	ND
43	ND	160	ND
45	ND	162	ND
47	ND	165	0.10
49	ND	169	0.03
54	ND	175	ND
60	ND	179	ND
61	ND	180	ND
65	0.005	187	ND
70	ND	192	0.14
75	ND	194	ND
79	ND	195	ND
84	0.09	204	0.12
85	0.04	206	0.48
86	ND	209	0.23
88A	ND	211	0.09
91	ND		
93	ND		ND Means not detectable
97	ND		
104	0.06		
106	0.64		
107	0.01		
115	ND		
117	0.08		
120	ND		
123	0.24		

W

<u>Anomaly Range</u> (cm^3 He at NTP/ cm^3 H ₂ O x 10 ⁻⁸)	<u>Color Code</u>
9.22 - 11.44	Yellow
11.45 - 13.67	Orange
13.68 - 15.90	Pink
> 15.90	Red

3.3 Figures

The helium data listed in Table 1 are plotted in Figure 1. This map has a scale of 1 inch = 31,680 inches and has been enlarged from the base map provided by Denison Mines.

The water sampling sites are designated by squares. The number of each sampling location is plotted within the appropriate square while the helium results are marked in heavy bold numbers adjacent to them. It should be noted that the data for the second set of samples collected at points 1, 2 and 3 are given in the map legend.

4. COMMENTS

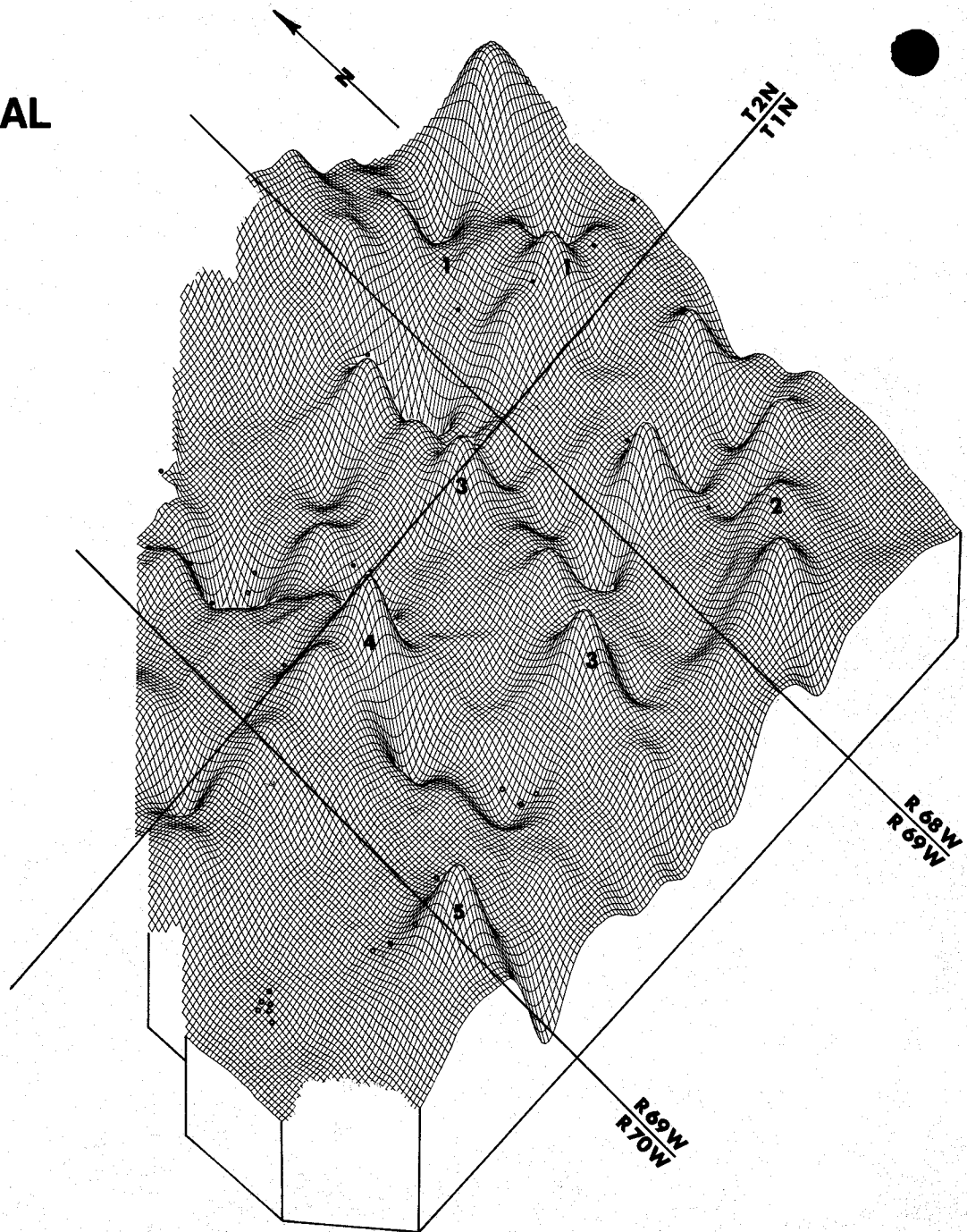
The background helium level for this prospect ($6.98 \times 10^{-8} \text{ cm}^3 \text{ He at NTP/cm}^3 \text{ H}_2\text{O}$) is very low. While it would seem that most of the dissolved helium concentrations in the water samples are representative of this background value, a few of them are anomalous.

Samples 106 and 152, 184, and 115 and 117 are quite strongly anomalous in that their helium concentrations exceed the background mean by at least 2 standard deviations (95% confidence for normally distributed results). The helium values for samples 106 and 184 are in the range $20\text{-}30 \times 10^{-8} \text{ cm}^3 \text{ He at NTP/cm}^3 \text{ H}_2\text{O}$ that has been found in near bottom lake waters in close proximity to known uranium orebodies. The highest uranium concentration was also found in sample 106 which reinforces the helium data. No uranium determination was made on sample 184.

The same lakes in which samples 106, 152 and 184 were taken should be investigated further. Similarly, the lake from which samples 115, 116 and 117 were collected would seem to warrant further more detailed sampling as all of the samples taken from it had higher dissolved helium concentrations. The two individual samples 74 and 146 are weakly anomalous and may be of slight interest.

Samples 214-215, 216-217 and 155 are weakly anomalous which may result from the fact that they are close to sampling locations 106 and 152. The discrepancy between sample 1 and 216-217, sample 2 and 214-215 and sample 3 and 212-213 may be due to convective overturning in the lake. Although samples 84, 90, 93 and 93X are weakly anomalous, this is probably not significant as higher helium values were not determined in other samples from the same lakes.

**A TYPICAL
HELIUM
SURFACE
BLOCK
DIAGRAM**



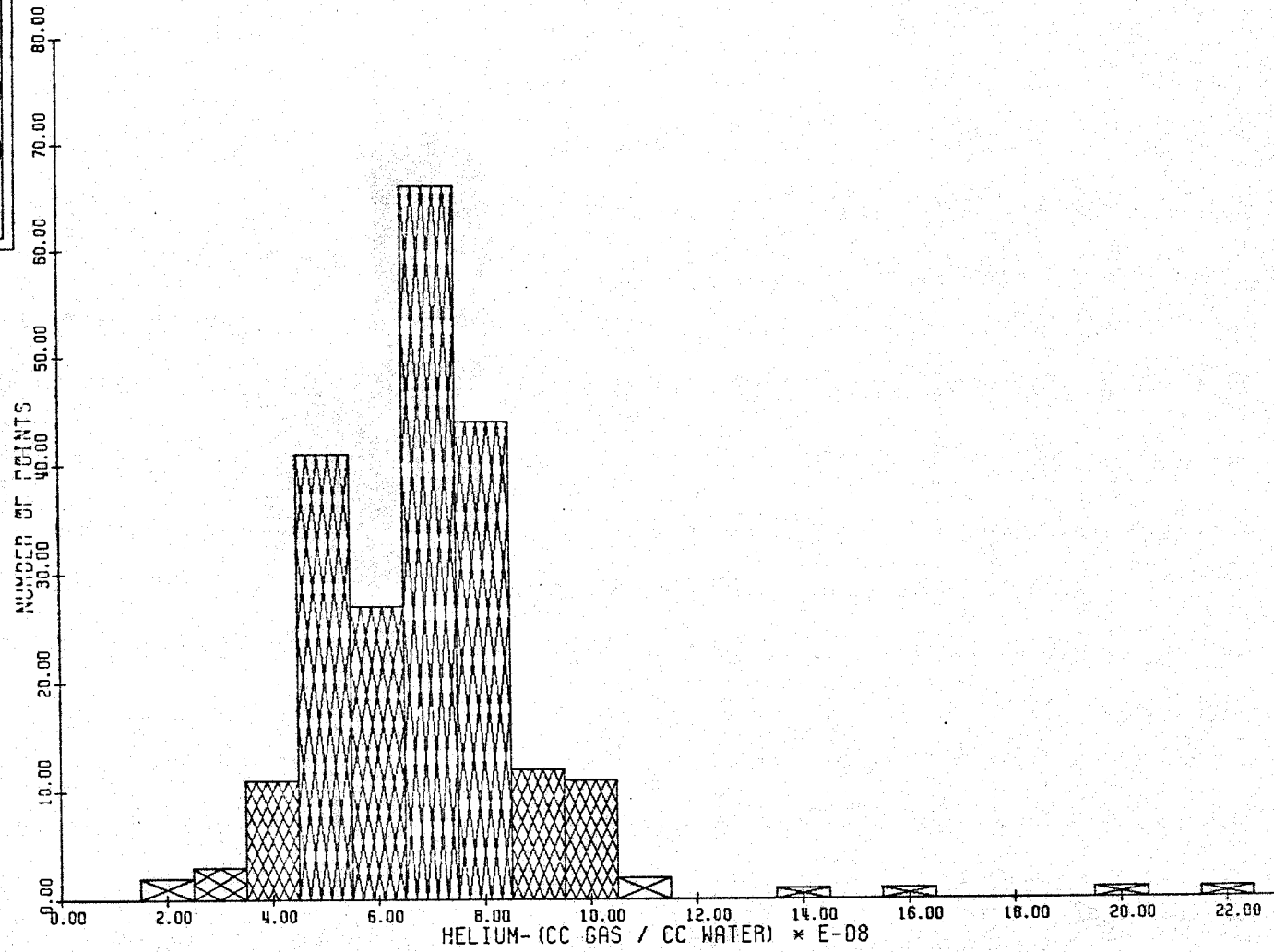
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Figure 2

HELIUM HISTOGRAM
DENISON MINES
DEN-(1-217)
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