

## REPORT ON COPPER

## GEOCHEMICAL SOIL SURVEY

JEAN 1-16, GRO 1-18, ROG 1-21, WOW 1-16 MINERAL CLAIMS

NORTH GUICHON CREEK AREA

KAMLOOPS MINING DIVISION, B.C.

120° 48\* W., 50° 30' N.

by:

Alfred A. Burgoyne, M.Sc.

Crest Laboratories (B.C.) Ltd.

1068 - Homer Street

Vancouver 3, B.C.

Telephone: 688-8586

February 13, 1970

## COPPER GEOCHESTICAL SOIL SURVEY

## MINERAL CLAIMS

JEAN	1	GRO	1	ROG	1	WOW	1
JEAN	2	GRO	2	ROG	2	HON	2
	3	GRO	3	ROG	3	WOW	
			7				Ta.
and an distance of	4	GRO	4	HOG	4	MOM	4
JEAN	5	GRO	5	rog	3	HOW	5
Jran	6	CHO	6	ROG	6	MOM	6
Jean	7	GRO	7	ROG	7	MOM	7
JEAN	8	CRO	8	ROG	8	MOM	8
JEAN	9	GRO	9	ROG	9	WOW	9
JEAN	10	CR()	10	rog	10	MOH	10
JEAN	11	GRO	11	ROG	11	MOM	11
JEAN	12	GRO	12	ROG	12	MOM	12
JEAN	13	CRO	13	ROG	13	MOM	13
Jean	14	GRO	14	ROG	14	WOW	14
JEAN	15	GRO	15	ROG	15	MOM	15
JEAN	16	GRO	16	ROG	16	WOW	15
		GRO	17	ROG	17		
		GRO	18	ROG	18		•
	•			ROG	19		
			•	ROG	20		
	•			ROG	21		

JEAN, GRO, ROG, WOW Group of Claims North Guichon Creek Area Kanloops Mining Division, B.C. Claims Jean 1-16, Gro 1-18, Rog 1-21, Now 1-16.

by: Alfred A. Burgoyne, M.Sc.

Coner: Work By: Work Dates: Alter Mines Ltd. (N.P.L.) 575 Howe Street, Vancouver, B.C.

Crest Laboratories (B.C.) Ltd.

Copper Gaochemical Soil Survey, January 19-31, 1970

Analytical Work, January 26-February 6, 1970.

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Department of Mines and Petroleum Resources ASSESSMENT REPORT NO. 23/2 MAP End Pocket

#2 Figure 3 Soil Geochemical Survey for Copper

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### SUMMARY:

A soil geochemical survey for copper was completed on the Jean 1-16, Gro 1-18, Rog 1-21, and Wow 1-16 mineral claims from January 19-31, 1970. The analytical laboratory work was completed from January 26 to February 6, 1970. Soil samplings were completed on cut lines placed on the property by Emery Mining Services of Remloops, B.C. The grid was established by utilization of the natural gas pipeline as a north-south baseline; cross lines were placed in an dest-west direction every 800 feet apart as measured on the baseline. Soil sampling was restricted to the B and A, soil horizons on cross lines at 200 foot intervals. Approximately 38.2 line miles or 1.020 soil samples were collected and analyzed for copper content. The soil samples were dryad, siewed, weighed, and digested by a hot concentrated perchloric-nitric acid mixture and subsequently analysed by atomic absorption. The copper values were plotted and statistical calculations completed for the data for A, solls. Mean and standard deviation calculations were completed for B soils. For B soils, a possible copper anomaly is defined as +50 parts per million while a distinct enomaly is +100 parts per million. For A. soils, a possible copper anomaly is defined as +60 parts per million and a distinct copper enemaly as +120 parts per million. Three anomalous copper areas designated I, II, and III have been obtained from the geochemical soil survey. Areas I gid II are low order possible anomalies and of restricted areal extent. Area III is a possible to distinct copper anomaly which is centered essentially on Guichon Creek on the western parts of the Jean claim group and is outlined by the 50 part per million contour in Figure 3. The enomaly is approximately 4,000 feet long and varies from 600 to 1,800 feet wide. The anomaly is in part over the quartz diorite border phase of the Guichon Creek Batholith and in part over Triassic Nicola Volcanics. The geologic environment is believed to be extremely favourable for location of copper mineralization. A series of detailed exploratory steps are recommended.

## INTRODUCTION:

A copper geochemical soil survey was completed in the period of January 19-31, 1970, on the Jean, Gro, Rog, and Wow claim groups. These groups of claims are situated for the most part adjacent and east of Guichon Creek, approximately 25 miles by road south of Savona, B.C. The claim group is generally considered to be within the Highland Valley. The claims groups cover smooth rolling topography which varies from 3,500 to 4,000 feet altitude. The area varies legally from rangeland to moderately wooded terrain and has been partially logged. The natural gas pipeline traverses in a north-south direction through mearly the geographical centre of the property and provides ready access in conjunction with other bush roads.

## GENERAL GEOLOGY:

The claim groups lies on the eastern margin of the Guichen Greek Batholith (Note Figure 1) and covers in part the quartz diorite of the Highland Valley, hybrid phase; the Upper Triangle Nicola Volcanics; the Miocene Kamloops Group composed of basalt, andesite, and rhylolite; and the post Miocene valley and plateau basalts. The general geology map of the area as illustrated in Figure 1 has been compiled from different sources (1,2,3).

The area is covered, for the most part, by a veneer of glacial overburden, the composition of which varies from boulder clay till to glaciofluvial sand and gravel deposits. The boulders in the till vary from 1-2 inches to 16 inches diameter and compose from 5 to 50% of the till. The exact thickness of the till could not be calculated; however, on the road on the east bank of Guichon Creek, gravel and till exposures in some banks exceeded 20 feet in thickness. The glacial overburden thickness decreases in thickness toward the east and uphill from the above mentioned road.

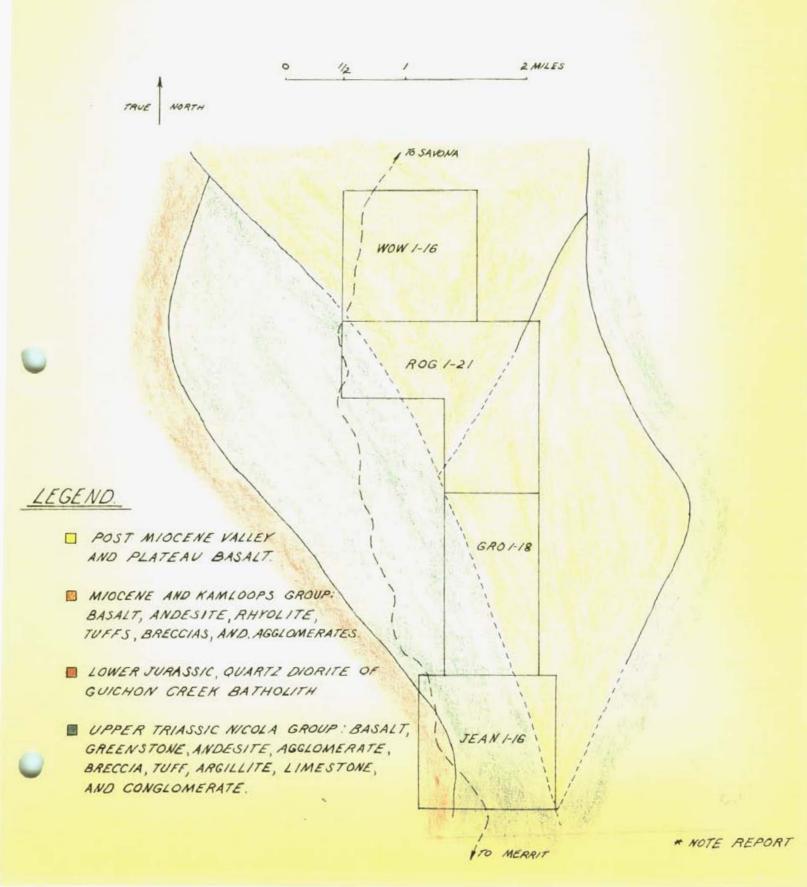
## SOIL COLLECTION AND CLASSIFICATION:

Cut grid lines were placed on the property by Emery Mining Services Ltd. of Kamloops, B.C. The grid was established by utilization of the natural gas pipeline as a north-south baseline in which cross lines were indicated by their respectively numbered footage on pickets or stakes. The cross lines were cut by axe 800 feet apart in east-west directions and located by chain and compass and were marked by stakes at 100 foot intervals.

Soil sampling as restricted to crosslines 800 feet apart was performed at 200 foot intervals. Approximately 38.2 line miles or 1,020 soil samples

## FIGURE 1

GENERAL GEOLOGY OF THE WOW, ROG, GRO, AND JEAN CLAIM GROUPS AND ADJACENT AREA COMPILED FROM DIFFERENT SOURCES.\*



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were collected. At each soil sample site a hole or pit was dug to a depth of 8-12 inches depending on the soil development and the nature of the underlying drift. At each sample site, 4 to 6 ounces of a B soil sample was placed in a kraft soil sample bag and its grid number marked on the exterior of the bag.

For the most part the soils are developed on transported glacial overburden which for the most part is a boulder clay till in composition with lesser amounts of hand and gravel deposits. The soil thickness is generally less than 24 inches, and immature in development. The soil development for the area is:

Ao: Organic liter, undecayed leaves, twigs, generally 1-2 inches thick but increasing to several inches in the Guichon Valley.

A1: Organic debris, partially decomposed organic rich humas horizon, black in colour, 0-1 inch thick but also increasing to several inches in the Guichon Valley.

B: Light brown in colour, accumulation of clay and iron oxides of organic matter; immature, 1-8 inches thick.

C: Weathered glasial drift:, depth and degree of weathering highly variable, thickness generally less than 20 inches.

In some parts of the Guichon Creek valley and other small valleys, where the A<sub>1</sub> soil horizon was very thick, it was sampled because of the physical difficulty in obtaining a B soil sample. On the natural gas pipeline any soil development has been highly modified by the location of the pipeline and as such soils collected over the pipeline are mostly of a weathered drift or C soil horizon.

The collection of soil samples was done by B. Needham and C. Blakey under the supervision of this writer during the period of January 19-31, 1970.

## ANALYTICAL TREADMENT OF SOIL SAMPLES:

The samples were analysed by Crest Laboratories (B.C.) Ltd. and the analyst was chemical technologist, Herold Coughlan, supervised by this writer. The analytical work was done on January 26 to February 6, 1970. The samples were dried in their respective sample bags at a temperature of 150°F and then sieved to -80 mesh through a stainless steel screen. One half gram portions of these acreened soils were placed in 25 x 200 millimeter culture tubes and then digested in a mixture of perchloric and nitric acids at 425°F for a period of three hours. The resulting digested residues were then made up to 25 milliliters volume in 10 percent perchloric acid. The respective sample

solutions were asparated into a Techtron Atomic Absorption Spectrophotometer Model 5 and absorption readings were recorded for copper. The absorption readings were than transformed into parts per million copper. Calibration of the atomic absorption spectrophotometer is effected by preparation and analyses of copper standards each day.

### RESULTS:

## A. Statistical Treatment of Data for B Soils:

From inspection of the data the majority of the results fall into a background of 12 to 40 ppm copper. A mean background for the B soils is calculated to be 22.4 ppm copper and these values are expressed by one log normal distributed population. The standard deviation is calculated to be plus or minus 7 ppm. A possible angually or threshold value was calculated to be four standard deviation plus the mean background value which in this case is +50 ppm. A distinct copper anomaly is considered to be +100 ppm.

## B. Statistical Treatment of Data for A. (organic) Soils:

The geographical distribution of A<sub>1</sub> soils is illustrated in Figure 3.
Essentially all A<sub>1</sub> soils are restricted to the lowland and valley bottom of Guichon Creek; occasionally an organic soil was taken from where a line c crossed a bog or swamp outside of the Guichon Creek Valley. The copper values for A<sub>1</sub> soils were treated statistically separate from B Soils. A cumulative percent (frequency)-concentration graph was constructed for A<sub>1</sub> soils and this plot is illustrated in Figure 2. It is apparent from this plot that unlike B soils, two distinct log normally distributed populations are present. One population from 18 to 44 ppm copper is representative of A<sub>1</sub> soil in the Guichon Creek Valley from Line 184 to 232 and a second population from 60 to 112 ppm copper that is mainly representative of A<sub>1</sub> soils in the Guichon Creek Valley from Line 00 to Line 32 (Note Figure 3). A possible copper anomaly is represented by the values of this second population, i.e, a copper content of +60 ppm. A distinct copper anomaly in A<sub>1</sub> soil is represented by values in excess of 120 ppm.

### C. C Soils (Weathered Glacial Drift):

No statistical treatment was attempted for the C soil samples, or weathered glacial drift, collected over the natural gas pipeline or baseline. This population of 33 samples is too small for meaningfull statistical appraial; furthermore, the values are not considered anomalous. The mean

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copper content for these samples is 37.6 ppm.

## D. Distribution and Interpretation of Possible and Distinct Copper Angualies:

Three distinct areas are expressed by possible and distinct copper anomalies and are labelled I. II. III on Figure 3. In addition, there are approximately seven other single possible anomalous sample locations distributed randomly over the area covered by the geochemical survey. These single possible anomalous sample locations are mostly of a low order in copper content and probably do not represent copper mineralization. Their cause can be explained by geologic considerations; that is, the variability in the depth (proximity of bedrock to ground surface), composition of the overburden, and the degree of alteration and weathering of the overburden.

Area I, on line 32, 10-14 East, is a low order possible copper anomaly in B soils consisting of 2 samples. The cause of this possible anomaly is not known but may be caused by the proximity of bedrock. As this anomaly is of a low order and its distribution quite restricted, it is not considered a significant anomaly.

Area II, on line 224, 44-50 West, is a possible to distinct low order copper anomaly in B soils just east of Guichon Creek. The anomaly is underlain by a considerable thickness of everburden. The source and cause of this anomaly is not known at this time and it should be investigated further to determine areal extent and cause. This anomaly, although distinct is of low order and may, in fact, be caused by a few pieces of copper mineralized float within the glaciofluvial debris; the source of which may be miles distant. The anomaly is also very close to the western boundry of the claim block.

Area III, located on line 60, 12-30 West, to line 40, 30-44 West, is centered essentially on the Guichon Creek Valley. The widest portion of the anomaly is 1,800 feet while the narrowest portion is 600 feet. The anomaly is approximately 4,000 feet in length. The anomaly is confined largely to A<sub>1</sub> or organic soils; however, on line 40 north the anomaly is represented by B soils. This anomaly is represented by the 50 ppm contour as illustrated in Figure 3. The anomaly has been defined by statistical analysis as in part "possible" and in part "distinct". In order to determine the significance of this anomaly, the cause and source of the copper must be determined. The following possibilities for explanation are given:

- 1. There is absorption of copper to the organic soils in the anomaly from "background concentrated" waters draining rocks of "background" copper content. This process has been well documented by numerous geochemical soil surveys and occurs in swampy areas of low pH.
- 2. There is absorption of copper to organic soils from "relatively high concentrated" copper-bearing waters which may drain a copper mineralized area from:
  - a) The immediated vicinity as outlined by Area III.
  - b) Outside the anomalous area and outside the boundaries of the property.
  - c) Copper bearing tailings or dumps outside Area III.
- 3. The copper anomaly of Area III is represented in part by inorganic B soil and this anomaly would logically be caused by copper mineralization; however, the source may be either 2a or 2b as outlined above.
- 4. A combination of two or more of the three above possibilities.

I feel that the anomalous copper Area III is in fact caused by possibilities 2 and 3 above. Possibility 1 is discounted because if organic material is absorbing copper from natural "background concentrated" waters, then the organic soils in Guichon Creek over lines 164 to 232 north should be similarly anomalous to Area III which they are not. The possibility of changes in pH, humic acid content, and nature of the organic material may concievably explain the differences; however, this can not be verified unless further field work in the spring is completed.

If, in fact, copper mineralization is the cause of copper anomaly III then the nature and location of the source of the mineralization and its grade and size remain unenswered from the results of this survey. If the source of copper mineralization is outside the boundaries of the claims, then the problem is of no longer any concern. If copper mineralization is within the claim boundaries; however, then the problem becomes one of pinpointing the exact location and nature of the source. Three distinct possibilities arise: Firstly, the source is low grade copper mineralization close to or at bedrock surface. Secondly, the source is copper mineralization at depth. Thirdly, the source is erratically dispersed copper mineralized float within the underlying gravels and glaciofluvial debris of the Guichen Creek Valley.

### CONCLUSIONS AND RECOMMENDATIONS:

Three anomalous copper ereas designated I, II, III, as illustrated in Figure 3 have been obtained from the geochemical soil survey. Areas I is a low order possible copper anomaly of small area. Its cause is probably due to the nature and thickness of the overburden. No follow-up work is recommended.

Area II is a possible to distinct anomaly of restricted areal extent that occurs in excessively thick overburden. A minimum amount of follow-up work consisting of prospecting and soil sampling should be expended to ascertain its cause.

Area III is a possible to distinct copper anomaly which is centered essentially on the Guichon Creek Valley and outlined by the 50 ppm contour in Figure 3. The anomaly is represented by A<sub>1</sub> (organic) and B soils and is approximately 4,000 feet in length and varies from 600 to 1,800 feet wide. The anomaly is in part over the quartz diorite border phase of the Guichon Creek Batholith and in part over Triassic Nicola Volcanics (Note Figure 1). As such, the anomaly straddles in part the contact of these two rock types. This geologic environment is believed to be extremely favourable for copper mineralization and is in fact a criterion given for location of finding copper deposits in the Highland Valley.

This anomalous Area III is considered to be very significant and should be subjected to a series of exploratory steps consisting of:

1. The source of the copper anomaly must be determined for if the source is outside the claim boundaries no further follow-up work is necessary. The source would best be determined by geochemical soil and sediment sampling techniques.

- 2. If the source is determined to be within the claim boundaries or partly within the claim boundaries then a detailed series of exploration steps should be performed in order to determine if the source has economic potential. The tentative order of detailed exploration being:
- a) Detailed geologic mapping of anomalous Area III and adjacent areas.
- b) Detailed geochemical and geophysical studies consisting of soil sampling, magnetometer and induced polarization surveys.

Respectfully submitted,
CREST LABORATORIES (B.C.) LTD.

Alfred A. Burgoyne, M.Sc. Geologist-Geochemist

AAB/seb

## REFERENCES

- 1. Cockfield, W.B., 1961, Geology and Mineral Deposits of Nicola Map-Area, British Columbia: Geological Survey of Canada, Memoir 249.
- 2. Northcote, K.E., 1969, Geology and Geochronology of the Guichon Creek
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- Guidebook for Geological Field trips in Southwestern British Columbia:
   Prepared by Geological Discussion Club, Vancouver, B.C., March, 1960.
- 4. Rennie, C.C., 1962, Copper deposits in the Nicola Rocks, Craigmont Mine:

  A paper presented at the 50th Anniversary Meeting, B.C., Yukon

  Chamber of Mines, Victoria, February 16, 1962.

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## Appendix I

Altex Mines Ltd. (N.P.L.) 575 - Howe Street VANCOUVER, B.C.

Cost of soil geochemical survey for copper on WOW 1-16, ROG 1-21, GRO 1-18, and JEAN 1-16 Mineral Claims, Guichon Creek Area, Kamloops Mining Division B.C. Survey performed during January 19-31, 1970. Analytical work performed January 26 to February 6, 1970. residente in the second of the

## FIELD TIME:

20 304.04	- ** ***	
2 Soil samplers (Needham & Blakey) for 13 days @ \$60 per day per man.	).00	1,560.00
Burgoyne for 2 days @ \$120.00 per day.		240.00
OFFICE TIME:		•
Burgoyne, Interpretation, Preparation of Report, Dradays @ \$120.00 per day.	ifting, 74	900.06
Needham, Drafting, Statistical Calculations, 5 days per day.	@ \$60.00	300.00
ANALYTICAL:		
1,020 soil samples analysed for copper Q \$1.20 per s	ample	1,224.00
DISBURSEMENTS:		•
Rental of 4 wheel drive vehicle for duration of survey, and rental of car from Kamloops for 2 days		
for Burgoyne.	362.15	
Motel at Savana for Needham and Blakey, 12 nights		
and motel at Kamloops for 2 days for Burgoyne. Airline tickets for Burgoyne, Vancouver to Kamloops	151.80	
ratura.	38.00	
Groceries, meals, gasoline, miscellaneous	215.00	
Reproduction Costs of meroning maps.	5.85	
	772.80	
10% Disbursement Fee	77.28	<u>850.08</u>
Total		\$5.074.08

CREST LABORATORIES (B.C.) LTD.

Olfred a. Burgoyne Alfred A. Burgoyne Geologist-Geochemist

(see over)

TIL PTO TAKE NEW The William Control

Declared before me at the City

of

Province of British Columbia, this 9-day of Tylasch, 1970

A Commission of taking Affidavits within British Columbia or
A Notary Public in and for the Province of British Columbia.

SUB-MINING RECORDER

## Appendix II

## CERTIFICATE

I, Alfred A. Burgoyne, of Burnaby, British Columbia, do hereby certify that:

- 1) I am a geologist-geochemist employed by Crest Laboratories (B.C.) Ltd., 1068 - Homer Street, Vancouver 3, B.C.
- 2) I am a graduate of the University of British Columbia (B.Sc. Geology and Chemistry, 1962), and of the University of New Mexico, (M.Sc., Geology, 1967).
- 3) I have practised my profession as a geologist-geochemist since 1962.
- 4) I personally have examined the property as described in this report.

alfred a. Burgoyne

Alfred A. Burgoyne, M.Sc. Geologist-Geochemist

Dated: February 13, 1970

# Emery Mining Services Ltd.

706 DOUGLAS STREET, KAMLOOPS, B.C. 372-9616

22 Jan., 1970

INVOICE # 2018

our project # 15

To: Altex Mines Ltd.,

re Highland Valley

575 Howe St., Vancouver, B.C.

claims

Re line outting work as nart of geochem survey Now 1-16, Rob 1-21,
GRO 1-18, AND JEAN 1-16 MINERAL CLAIMS, GUICHON CREEK, AREANS. TO. JAY.22
KAMLOUPS MINING DIVISION. B.C. LINE CUTTING PERFORMED JAY 5. TO. JAY.22 Grid lines completed - 38.9423 miles @ \$ 85 per line mile .. \$ 2715.1870.

THIS IS OUR A

E.&O.E/

B2715:10

Note: This job is now completed by us and Crest Labs are in process of doing the sampling.

As this invoice together with our invoice # 2011 is mostly

for wages, we will need prompt payment in order to pay the men.

Declared before me at the

, in the

Province of Eritish Columbia, this

SUB-MINING RECORDER

SEE NEXT PAGE

# Emery Mining Services Ltd.

706 DOUGLAS STREET, KAMLOOPS, B.C. 372-9616

12 Jan., 1970

INVOICE # 2011

our project # 15

To: Altex Mines Ltd. 575 Howe St., Vencouver, B.C.

re Highland Valley claims

Re line cutting work as part of geochem survey on Wowl-16, Rob 1-21, GRO 1-18, AND JEAN 1-16 MINERAL CLAIMS, GUICHON CREEK AREA, KAMLOOPS MINING DIVISION. B.C. LINE CUTTING PERFORMED JANS. TO JAM: Base line completed - 5 miles @ \$100 per line mile ... \$ 500.00 1970

Grid lines

7 miles @ \$ 85 per line mile ...

595.00

TOTAL

who ta Flere

<u>\$1095.00</u>

THIS IS OUR ACCOUNT

E.&O.E

Declared before me at the Lity

Province of British Columbia, this

March, 1970

within British Columbia or Province of British Columbia.

SUB-MINING RECORDER

## JEAN, GRO, ROG, WOW MINERAL CLAIM GROUPS, NORTH GUICHON CREEK AREA, KAMLOOPS MINING DIVISION, B.C.,

SOIL GEO-CHEMICAL SURVEY FOR COPPER.

(TO ACCOMPANY REPORT ON COPPER GEOCHEMICAL SOIL SURVEY OF JEAN 1-16, GRO 1-18, ROG 1-21, WOW 1-16 MINERAL CLAIMS.)

O 200 400 600 800 1600 FEET

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1224 - 50W		
L2/6-48W	\\ \( \chi \chi \chi \chi \chi \chi \chi \chi	
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<u>ND</u>	L/36-20W 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
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B SOIL HORIZON SAMPLE WITH COPPL	GRO 9   GRO 14   GRO 14	
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+120 PPM DISTINCTLY ANOMALOUS	136-206	
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	3/2	
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	248-34W  00000000000000000000000000000000000	
	140-44W  640 86 46 64 58 68 64 52 32 32 28 24 20 24 22 28 38 30 42 18 34 32 46 40 16 24 20 18 20 22 22 20  1EAN 2  JEAN 3  JEAN 6  7  1EAN 7	
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JANUARY 17-31, 1970.	Olfred a. Burgoyne February 13, 1970  LO-52W  O O O O O O O O O O O O O O O O O O O	
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