

INVESTIGATION OF PHOSPHATE MINERALIZATION

ON THE

CABIN CREEK CLAIMS #1-45

And On The

Zip #1 Claim

NTS 82 G2 and G7

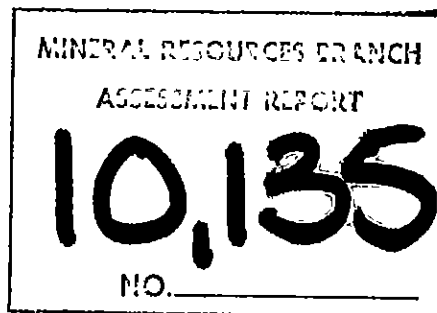
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For

First Nuclear Corporation Ltd.

Edmonton

part 1 of 2



By

Glenn S. Hartley, P. Geol.

January 1982

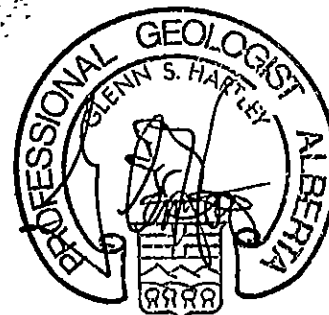


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#### LOCATION AND SETTING

The Cabin Creek phosphate prospect is located 85 km (52 miles) from Fernie, B.C. on map sheet NTS 82/G/2. The property is accessible by a major logging road from Fernie and by forestry access road from Corbin, B.C. and is approximately 5 km from a major coal mine operated by Rio Algom and whose initial production is scheduled for 1985.

The area is already "industry orientated" with heavy equipment and experienced personnel are readily available in the environs of the prospect.

#### PHYSIOGRAPHY AND COVER

Elevations on the property range from 1370 m to 2000 m (4,500 to 6,500 ft) above sea level. The lower elevations are covered by an indeterminate thickness of overburden, whilst outcrop at the upper elevations is usually good. Vegetation in the area is predominantly immature pine and spruce.

#### CLIMATE

The area receives an estimated 380 mm (15 - 20 inches) of precipitation per year. The operational exploration season is 7 months, from May 1 to October 31. Coal-mining operations in the area operate on a year-round basis.

## HISTORY OF THE PROPERTY

Phosphate mineralization in the Fernie area has been recognized since the early geological surveys. Sporadic exploration programs over the last 30 years have generally returned negative results in that the phosphate exposure investigated yield low-grade mineralization over uneconomic widths. First Nuclear Corporation has been active in the area since July 1980.

## MINERALIZATION

Phosphate-bearing sedimentary rocks occur at several horizons in the succession of the Flathead area. Pits and prospect trenches were found in various places and are mostly the result of a regional phosphate exploration program conducted by Cominco Ltd., prior to 1935. Phosphatic mineralization was noted by Price (1965) in the following stratigraphic positions:

1. Lower part of the Banff-Exshaw sequence
2. Upper Rocky Mountain Formation
3. Base of the Spray River Formation
4. Lower Fernie Formation (Rock Creek member)
5. Base of the Fernie Formation

## SUMMARY OF WORK

The Cab claims group was staked in early 1981 to cover the southern extension of a geologically favourable sedimentary sequence, following a limited 1980 program of prospection and caterpillar trenching that yielded encouraging grades of phosphate



mineralization associated with the basal portion of the Jurassic Fernie Formation near the junction of Harvey Creek and the Flathead River (B.C. assessment report #81301).

A program of airborne and carborne radiometrics followed by field prospection and caterpillar trenching was instituted June 1, 1981 to rapidly assess the surface exposure of the favourable sediments exposed along the erosional edge of the Fernie basin some 45 miles (72 km) in length.

A program of more detailed investigation was undertaken on the Zip #1 Claim where a grid of approximately 12 line kilometers was cut. The grid was geologically mapped and a magnetometer survey carried out. The Zip Claims were prospected in detail and a further trenching was carried out.

#### SUMMARY OF RESULTS ON THE CAB CLAIMS

##### Airborne Radiometric Survey

The airborne survey indicated areas of interest, however the rugged terrain and variable overburden cover combined to reduce the effectiveness of evaluation by this method. As a general rule the underlying carbonate strata was very weakly radioactive in comparison to the background radioactivity level of the Fernie Shale.

##### Carborne Radiometric Survey

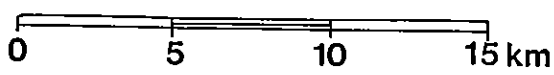
The excellent property access afforded by logging roads contributed immensely to the overall effectiveness of this method.

Zip claims  
(12 units)

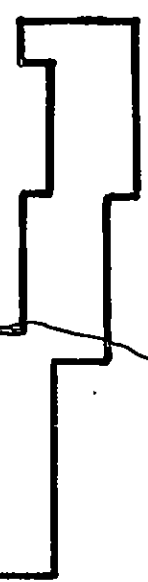


Fernie 60 Km

Scale 1:250,000



Cab claims  
(459 units)



YUKON TERRITORY

MALTON LAKE

FORT NELSON

FORT McLEOD

BRITISH COLUMBIA

PRINCE GEORGE

ALBERTA

PROPERTY  
K67 2005

VICTORIA

TRAIL

U.S.A.



FIRST NUCLEAR CORPORATION

PROJECT:

**PHOSPHATE**

Dwg. No. |

Scale:

Drawn By:

N.T.S. 82 G2/7

Date:

81

Checked By: GH

The airborne survey gave instant evaluation of the immediate areas. The relative anomaly position was absolute and these positively located anomalies were valuable as "take off points" for field prospecting teams. In several instances radioactivity associated with minor phosphate horizons located stratigraphically below the zone of interest were detected.

#### PROSPECTING

Prospecting crews consisting of 2 to 4 man parties equipped with UG-135 scintillometers and large scale airphoto mosaics were extremely effective in delineating the surface expression of the favourable horizon. The radioactive phosphatic zones once located, were hand pitted to a discretionary depth and sampled.

#### TRENCHING

Several easily assessable (i.e. in road cuts) showings were hand trenched, mapped and sampled. Widely spaced representative sites along the delineated favourable horizon were selected for trenching by D7 caterpillar.

#### ASSAY RESULTS FROM TRENCHING

A total of 18 sections through the phosphatic zone were described, photographed and sampled by continuous chip method over 25 cm intervals. The tabulation of individual assay results is shown in Table 3.



Plate I Trenching the Phosphatic Zone

### ASSAY RESULTS FROM PROSPECTING

A total of 165 grab samples were assayed for  $P_2O_5$ ,  $U_3O_8$  and vanadium. The relative position and tenor of  $P_2O_5$  and  $U_3O_8$  values is shown on maps 1 and 2.

### SUMMARY OF RESULTS ON THE ZIP CLAIMS

Two new phosphatic zones were trenched and the existing trench dug in 1980 was cleaned out and deepened by approximately 3 meters.

The results indicate that the mineralized zone is extremely structurally complex.

In the 1980 trench, further work indicated that 3 phosphatic zones each 1.5 m thick overlying a basal limestone unit. These three zones are separated by one to two meters of black shale.

The trench also indicated that sampling in 1980 had been approximately parallel to the structurally distorted attitude.

The Zip trench sketches show the relationship of mineralization and the strong structural controls.

Economic thickness may exist on the Zip Claims, however, they must be considered to be the product of tectonic thickening rather than primary deposition as had been previously thought.

### GENERAL GEOLOGY OF THE AREA

The rocks of the Flathead region comprise essentially unmetamorphosed sequence ranging in age from Precambrian to late

Table of Formations

Era	Period or Epoch	Group Formation	Lithology	Thickness (feet)	
Cenozoic	Pleistocene and Recent		Till, gravel, sand, silt		
		Unconformity			
	Eocene and Oligocene	Kishenehn Formation	Conglomerate		
Unconformity					
Mesozoic	Upper Cretaceous	Belly River Formation	Green and grey sandstone; mudstone and shale	1,500	
		Alberta Group			
		Wapiabi Formation	Dark grey shale, silty shale, sandstone	1,800	
		Cardium Formation	Dark grey sandstone, siltstone, silty shale	125	
		Blackstone Formation	Dark grey shale, silty shale, siltstone	300	
	Disconformity				
	Lower Cretaceous	Crowsnest Formation	Trachyte agglomerate, tuff, volcanic-rich sandstone, mudstone, conglomerate	500	
		Lower Cretaceous, may be younger		Trachyte, syenite, volcanic breccia	
	Lower Cretaceous	Blairmore Group	Grey and greenish grey sandstone, arkosic sandstone, green and red mudstone; minor brown limestone	1,800-3,750	
	Disconformity?				
Jurassic and (?) Cretaceous	Kootenay Formation	Dark grey, carbonaceous sandstone and conglomeratic sandstone, siltstone, shale; coal	500-1,700		
Jurassic	Fernie Group	Grey calcareous shale, shaly limestone, silty limestone; dark grey shale, limestone; sandstone	1,250		
Disconformity					
Triassic	Spray River Formation	Grey dolomitic siltstone and sandstone; brown siltstone and silty shale	300'		

FERNIE GROUP (1236.0 ft)

Passage Beds (307.0 ft)

	Thickness (feet)
Sandstone, quartz-chert arenite, medium grey-brown, medium-grained, flecked with limonite, beds 1 inch to 18 inches thick, in part platy and coarsely crossbedded, fine colour lamination in platy beds; becomes more thickly bedded toward top; weathers light greyish brown, platy to blocky ..	83.0
Sandstone, dark greyish brown, fine-grained, beds ½ to 1 inch thick, coarse crossbedding; weathers light brown, platy .....	48.0
Shale, non-calcareous, black, with 1- to 2-inch interbeds of siltstone and very fine grained sandstone, which have fine, brown and grey laminations; sandstone interbeds increase in thickness and abundance toward top .....	44.0
Shale, non-calcareous, black and brownish black, a few ball-like calcareous and sideritic concretions locally; weathers dark grey, rubbly, recessive .....	132.0

Grey Beds (641.0 ft)

Limestone, silty and sandy (quartz), light grey, fine-crystalline, nodular to platy, gradational locally into zones of calcareous shale, siltstone, and very fine grained sandstone, delicate crossbeds are commonly etched into relief on weathered surfaces; weathers light greyish yellow .....	178.0
Limestone, shaly and silty, light grey, fine-crystalline, beds poorly defined, weathers light greyish yellow, rubbly to platy .....	123.0
Shale, calcareous, medium grey, platy to rubbly; weathers light greyish yellow, recessive .....	52.0
Limestone, silty and sandy (quartz), light grey, fine-crystalline, nodular with calcareous shale partings locally, in part delicately crossbedded; weathers light yellowish grey .....	44.0
Limestone, shaly and silty, light grey, fine-crystalline, beds poorly defined; weathers light yellow with orange patches, platy to rubbly, gradational in zones to platy calcareous shale (forms the lower prominent light band in Pl.V) .....	200.0
Shale, calcareous, medium yellowish grey, fissile; grades downward through medium grey calcareous shale with silty bands into noncalcareous, medium yellowish brown shale; weathers light yellowish grey to medium grey .....	44.0

Middle Fernie (Rock Creek Member?)

Shale, non-calcareous, dark greyish brown, with fine colour lamination, gradational downward into highly fissile, brownish black shale; weathers dark grey .....	62.0
Measured thickness of middle Fernie .....	62.0
Covered (no apparent discordance in attitude of bedding across covered interval) .....	223.0
Phosphate rock, pelletoidal and granular, black, medium-grained, becomes nodular, silty and platy toward base (exposure limited to a prospect trench) .....	3.0
Contact with light grey dolomitic siltstone of upper part of Spray River Formation sharp without apparent discordance	

(Price 1965)

TABLE 3

Section	Dip	P <sub>2</sub> O <sub>5</sub> %/True Width	Uranium ppm/True Width	Vanadium ppm/True Width
TB	75°	29.73/1.9 m	97 ppm/2.6 m	100 ppm/7.4 m
CS	90°*	19.27/1.5 m	68 ppm/1.5 m	200 ppm/3.5 m
JB-33	45°*	12.39/1.75	30 ppm/2.5 m	120 ppm/2.75 m
STS	60°*	18.29/1.5 m	51 ppm/2.25 m	180 ppm/2.5 m
WE	30°*	21.00/1 m	45 ppm/1 m	133 ppm/1.5 m
RAM "A"	18°*	18.32/1.5 m	45 ppm/1.5 m	166 ppm/1.5 m
RAM "B"	25°*	22.96/1.5 m	50.7/1.75 m	183 ppm/3 m
MS	90°*	12.66/1.25 m	43 ppm/1.25 m	136 ppm/2.75 m
STN	40°*	21.3/1.5 m	51.5 ppm/1.5 m	150 ppm/2 m
JH 226	50°	25.8/1.34 m	58.8 ppm/1.1 m	100 ppm/1.5 m
AB	65°	20.97/2 m	79.8 ppm/2.26 m	200 ppm/2.7 m
BA	75°	21.46/.96 m	43.6 ppm/1.2 m	166 ppm/2.17 m
OT	30°	21.00/.5 m	45.6 ppm/.5 m	133 ppm/.75 m
SPB	25°*	26.04/1 m	48 ppm/1 m	100 ppm/1 m
SQ	90°*	16.55/1.25	47 ppm/1 m	140 ppm/1.25 m
DS	45°	17.83/1 m	143 ppm/5.6 m *This interval averages 7% P <sub>2</sub> O <sub>5</sub> and 471 ppm V	409 ppm/7.4 m
LT	45°*	13.68/2.5 m	53.9 ppm/2.5 m	160 ppm/2.5 m
SCI	25°	32.3/.25 m (This zone is severely deformed)	60 ppm/.25 m	200 ppm/1.75 m

\* Mineralized zone sampled at true width



Cretaceous.

This stratigraphic succession is characterized by carbonate rocks and mineralogically mature non-carbonate sediments.

Concordant intrusive rocks of Precambrian age and discordant bodies of Cretaceous and Tertiary age also occur but are uncommon.

The Cab claims are underlain by rocks ranging in age from Devonian to Cretaceous. Table 1 shows the stratigraphic column. The Jurassic Fernie group is the most important lithology and is described in Table 2 (Price, 1965).

#### STRATIGRAPHY OF THE AREA

##### PENNSYLVANIAN PERMIAN

###### Rocky Mountain Formation

On the Cab property the Rocky Mountain formation was observed to consist of light gray to buff quartzitic and dolomitic sandstone becoming increasingly cherty and dolomitic. Up section near the top of the formation, minor chert and quartz pebble conglomeratic units were also observed.

The uppermost member of this formation exhibits a hackley weathering pattern and is for the most part, phosphatic to some degree. The phosphate commonly occurs as a dense black matrix in a siliceous quartz chert pebble conglomeratic unit, varying from 10 to 50 cm in thickness and usually exhibiting strong radioactivity. This phosphatic conglomerate varies along strike to sandy oolitic phosphate

and phosphatic nodules in a sandy matrix, and may be transitional to the overlying Spray River formation. In locality D-3 the section exhibits a cherty conglomeratic unit overlain by an excess of 1 meter of oolitic phosphate and dark shale. Incomplete exposure complicated the interpretation of this location.

## TRIASSIC

### Spray River Formation

This formation was observed in numerous locations on the Cab property. The Spray River formation is divisible into two distinctive units. The lower unit comprising the bulk of the formation, consists of a recessive thin bedded dark brown platy siltstone. The recessive nature and the overall weathering characteristics of this unit combines to produce surface exposures that may easily be confused with the middle to upper portion of the overlying Fernie formation, by the casual observer. In the weathered surface, distinction from the Fernie is accomplished by careful observation of the platy nature and by a typically higher radiometric background.

The upper portion of the Spray River may be expressed either as a massive to thick bedded buff brown sandstone 0.5 to 2 meters in thickness or as a repetitive series of dolomitic siltstone and interbedded thin shale sequence up to 10 meters in thickness. The uppermost unit in this series, or perhaps lowermost unit of the overlying Fernie group is a massive to faintly laminated silty limestone to silty dolomitic limestone that in some instances was very

pyritic. Field observation suggested an intertidal to brackish water depositional environment.

## JURASSIC

### Fernie Formation

This formation comprises most of the exposed surface of Cab claims. The basal portion consists of 1-2 meters of dense black and sandy, poorly cemented, oolitic phosphate overlain by .5 to 2 meters of chocolate colored shale overlain by thin bedded calcareous black shales and massive black shales of undetermined thickness. In general the unit becomes progressively lighter in color up section.

The Fernie is generally recessive and has been subjected to considerable structural deformation during thrust faulting.

## CRETACEOUS

### Kootenay Formation

The Kootenay Formation occurs in two minor localities on the Cab claims. It is comprised of gray to black carbonaceous siltstones and sandstones. It is easily distinguishable by the sharp color contrast between it and the yellowish-gray mudstones of the upper Fernie.

## INTRUSIVES

Several relatively small bodies of alkaline igneous rock cut the stratigraphic section on the Cab and Zip Claim groups.



Plate II A Typical Exposure of Upper Fernie Shales and Thin Limestones

On the Cab property, narrow dykes of trachytic to aphanitic intrusives cut the Spray River in an area east of the Ram "B" location and south of Hungery Lake.

On the Zip property possibly up to 1/4 of the claim group is underlain by a stock like trachytic intrusive that cuts the core of a synclinal structure in the Spray River and Fernie formations.

The trachyte is believed to be equivalent to the Crow's Nest volcanics of the Blairmore formation (Price 1965).

Trenching the contact between the Fernie shales and the trachyte showed that the trachyte emplaces is parallel to bedding of the Fernie formation.

In other areas these intrusive trachytes are clearly cross cutting the lower Missippian formations. It is, therefore proposed that the trachyte upon entering the soft Fernie shales may have displaced portions of them in a "mushroom" configuration appearing to be both discordinate and concordinate within the formation.

#### REGIONAL STRUCTURE

The region is composed of two major structural units, namely; the Lewis Thrust Sheet and the Foothills Belt.

In contrast to other parts of the Lewis Thrust Sheet, the structure of the Fernie Basin is quite simple. The Fernie Group lies in a broad synclinal structure overlain by younger Cretaceous rocks. The Fernie strata are cut by several northwest-dipping thrust faults.





Plate III Trachyte Body Parallel to the Bedding of the Fernie Shale

and by small faults developed within the group. All these faults produce local tectonic thickening of the Fernie strata.

#### STRUCTURAL GEOLOGY OF THE PROPERTY

The area of the Cab claims has been subjected to intensive low angle thrust faulting and horizontal shortening. The observed thrust faults trend in a south westerly direction and appear to be near parallel to bedding (Price, 1965). Two major thrust faults were observed on the property, the Storm Creek thrust and the Cat Creek thrust. These thrust faults are important as a major source of deformational stress. At one location near the Cat Creek thrust, a complimentary synclinal structure (see B-B' diagrammatic section) illustrates significant tectonic thickening of the basal phosphatic zone.

It was further observed in several localities that the basal phosphatic section of the Fernie appeared thinner and lower grade in the vertical or overturned arms of synclinal structures.

One possible explanation of this phenomena is that incompetent phosphatic Fernie strata in the overturned arm of a syncline is easily mobilized along bedding to the axial portion of the structure under deformational stress.





Plate IV An Unusual Exposure Illustrating the Tectonic Style of the Storm Creek Thrust



### Trace Element Geochemistry

Several samples were selected from the 1980 data based on their relative  $P_2O_5$  content and forwarded to Mid Land Earth Sciences (M.E.S.A.) of Leicester, U.K., for analysis of major and minor elements by the Neutron Activation method. Analysis by this method has a 2 p.p.m. detection limit.

The data (Table 4) supplied by M.E.S.A. indicates that mineralogical similarities exist between this phosphate deposit and deposits currently in production in the western phosphate field of the U.S.A.

One marked dissimilarity that exists is that the FNC samples contained anomalous amounts of the element yttrium. The average yttrium value of five samples, containing in excess of 1%  $P_2O_5$  was 570 ppm Y, this value compares favorably with 110 p.p.m. Y for the western phosphate basin.

### Recovery

The element yttrium is recoverable from phosphoric acid--- -- by a similar process to that of Uranium extraction. A recent price for yttrium oxide on the Amex was \$45/Lb. U.S.

It should also be noted that the yttrium-lanthanum ratio has been recognized in other phosphorite occurrences to be 2 - 4. Hence it is reasonable to expect that the Crow's Nest phosphorites may contain appreciable concentrations of the complete rare earth series.

TABLE 4

## ANALYSIS BY NEUTRON ACTIVATION

	5E	9E	30E	35E	39E	45E	60E
MAJOR ELEMENTS (PERCENT)							
SiO <sub>2</sub>	61.65	23.4	32.48	58.3	70.91	14.72	40.40
Al <sub>2</sub> O <sub>3</sub>	4.10	4.04	6.45	13.43	4.36	2.47	10.64
TiO <sub>2</sub>	.33	.22	.17	.73	.33	.13	.52
Fe <sub>2</sub> O <sub>3</sub>	2.55	1.54	2.42	5.20	2.88	.97	3.18
MGO	1.71	.96	.65	2.63	2.68	.74	1.28
CAO	14.92	36.96	28.99	.98	9.01	43.54	18.51
Na <sub>2</sub> O	.38	.27	.26	.89	.40	.25	.32
F <sub>2</sub> D	1.65	1.96	3.22	4.63	1.49	1.25	4.34
MNO	.02	.02	.01	.02	.04	.00	.00
P <sub>2</sub> O <sub>5</sub>	<u>9.60</u>	<u>25.93</u>	<u>20.32</u>	.29	<u>5.60</u>	<u>31.04</u>	<u>12.35</u>
LOI	3.32	3.98	4.60	13.72	3.62	3.88	8.95
MINOR ELEMENTS (ppm)							
V	98	168	87	153	66	130	165
CR	382	362	334	115	495	272	423
CU	33	65	45	62	22	45	46
ZN	182	250	68	187	98	88	76
AS	23	22	37	17	16	15	39
RB	35	43	55	116	33	32	107
SR	252	702	388	98	140	769	252
Y	<u>485</u>	<u>803</u>	<u>701</u>	31	<u>225</u>	<u>975</u>	<u>240</u>
ZR	294	191	145	221	263	129	190
NB	8	10	9	18	8	6	10
MO	37	26	27	25	18	13	33
BA	216	223	398	544	194	140	417
PB	13	9	16	22	12	9	21
TH	21	16	18	13	11	16	15
U	37	68	86	21	23	53	62

### THE SAMPLING PROGRAM

A total of 18 sections were exposed through the basal portion of the Fernie Formation.

Sampling methodology was basically the same in all cases. First the sections were marked at 25 cm intervals on a horizontal line along the exposed face. Samples were then collected by a continuous chip method over the 25 cm intervals. In some cases samples were collected normal to bedding attitudes particularly where the beds were near horizontal.

The samples were given a location code and numbered consecutively.

All analysis was done by Loring Laboratories Ltd. using the Cominco Titration Method (see Appendix I).

TRENCH DESCRIPTIONS



Plate V Sampling the DS Trench

DS SECTION

## Summary of DS Section

### Analysis

This section contains abnormal amounts of uranium and vanadium (up to 348 ppm  $U_3O_8$ ). The basal phosphatic section has a "typical" width but  $P_2O_5$  grades are low (17.83% over 1 meter). This may be due to the high silt content of the oolitic zone.

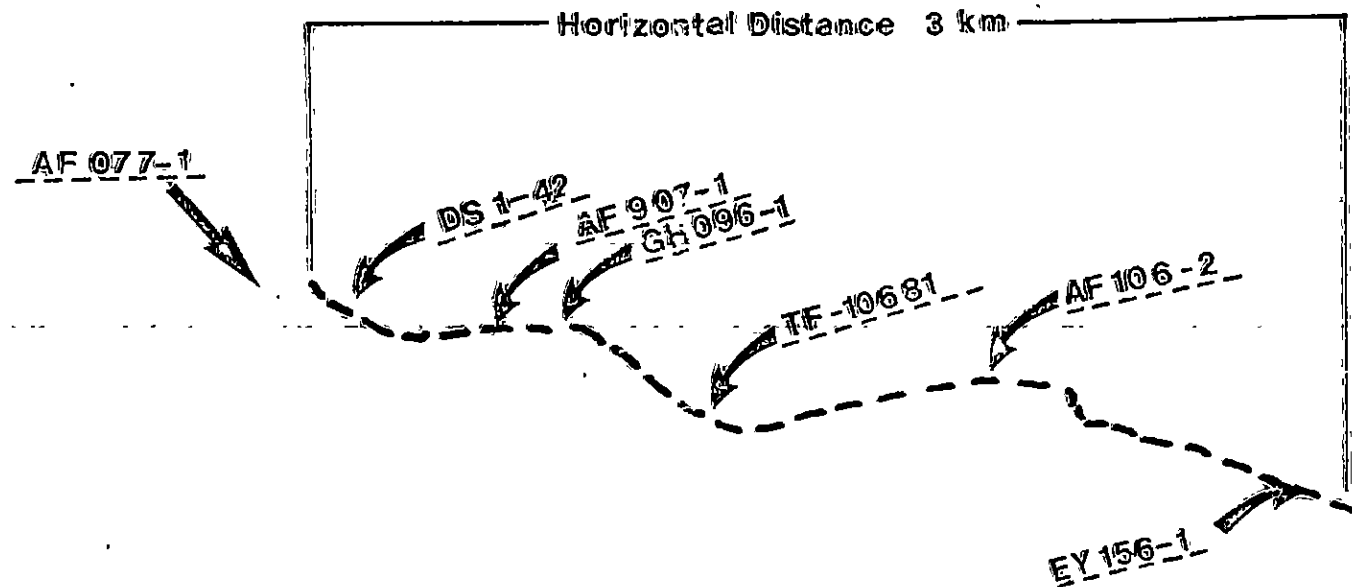
The environment of deposition is interpreted as being strongly reducing. Greenish pyritic limestones are overlain by oolitic phosphate and 5.6 m of uraniferous black shales averaging 143 ppm  $U_3O_8$  and 471 ppm vanadium.

### Zone Geometry

This section is situated near the center of a phosphatic zone whose approximate strike length has been traced for 4 kilometers. See plate VI. Other grab samples from this zone have assayed as high as 11.79%  $P_2O_5$  and 531 ppm  $U_3O_8$ .

The DS section is located on the upright arm of an overturned syncline.

As a general rule on the property, the overturned arms of synclines assayed poorly with respect to the upright arms suggesting that the phosphatic zone has a tendency to remobilize under tectonic stress. This remobilization could enhance the grades and widths of mineralization in the noses of the synclines.



ZONE	P <sub>2</sub> O <sub>5</sub>	U <sub>3</sub> O <sub>8</sub> ppm
DS	17.83/1m(t)	165/2.8m (true)
GH096-1	11.79	531
TF10681	2.83	223
AF106-2	7.27	98
EY 156-1	2.81	15
AF077-1	5.04	231
AF 907-1	9.95	400

 Phosphatic zone

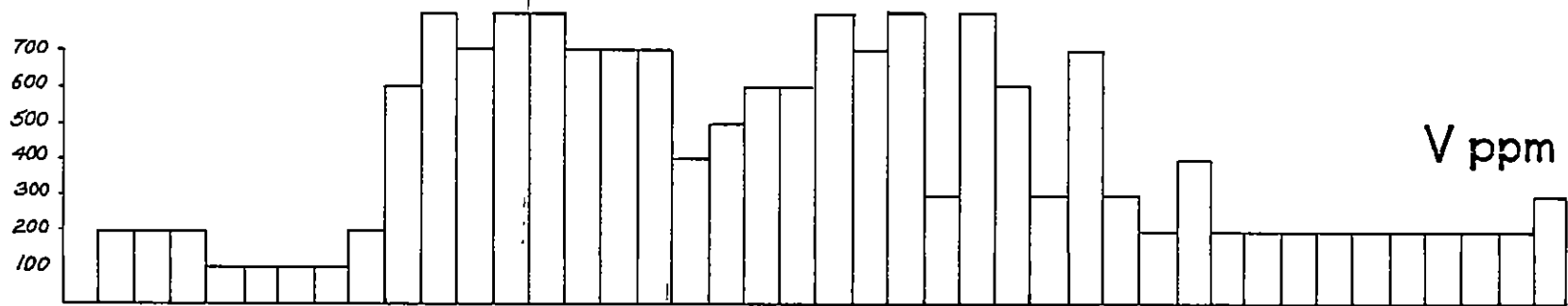
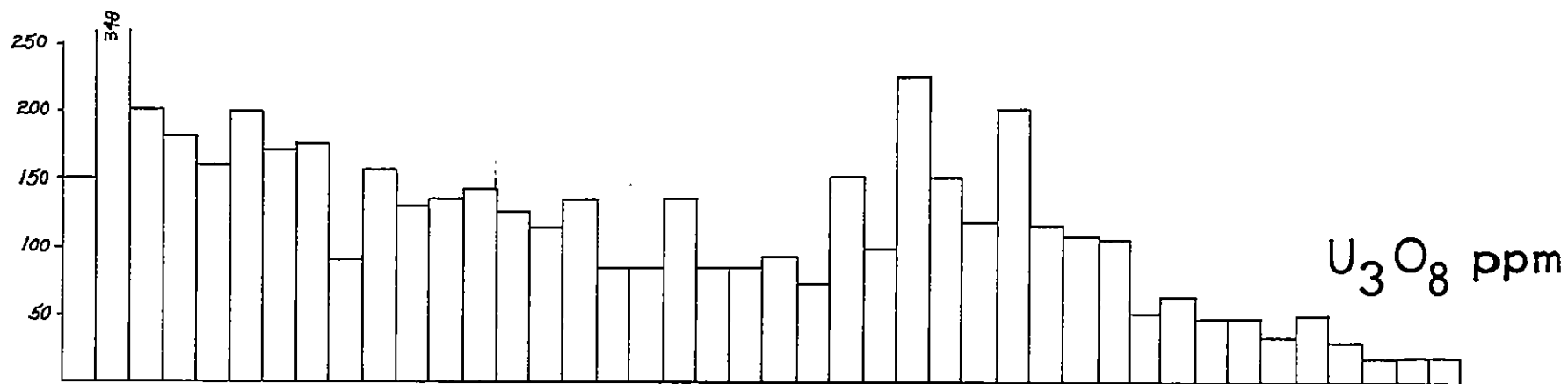
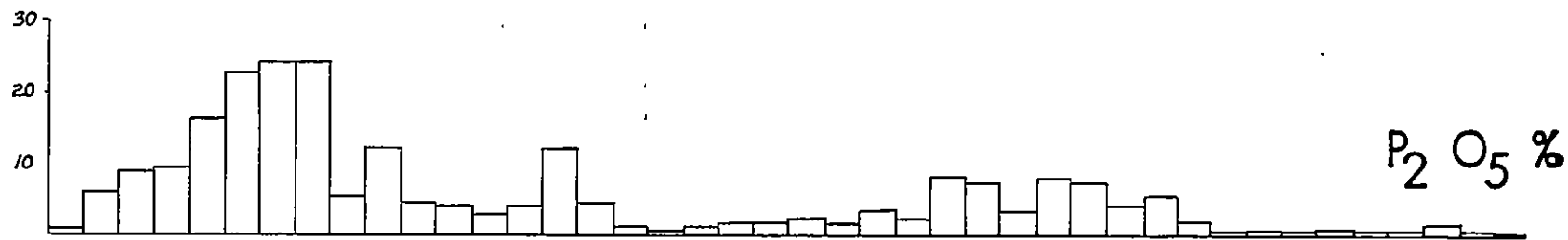
Total Length Of This Zone Exceeds 6 km





Plate VI The DS West Zone Looking East

# ANALYSIS OF DS SECTION



DS Sample #

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42

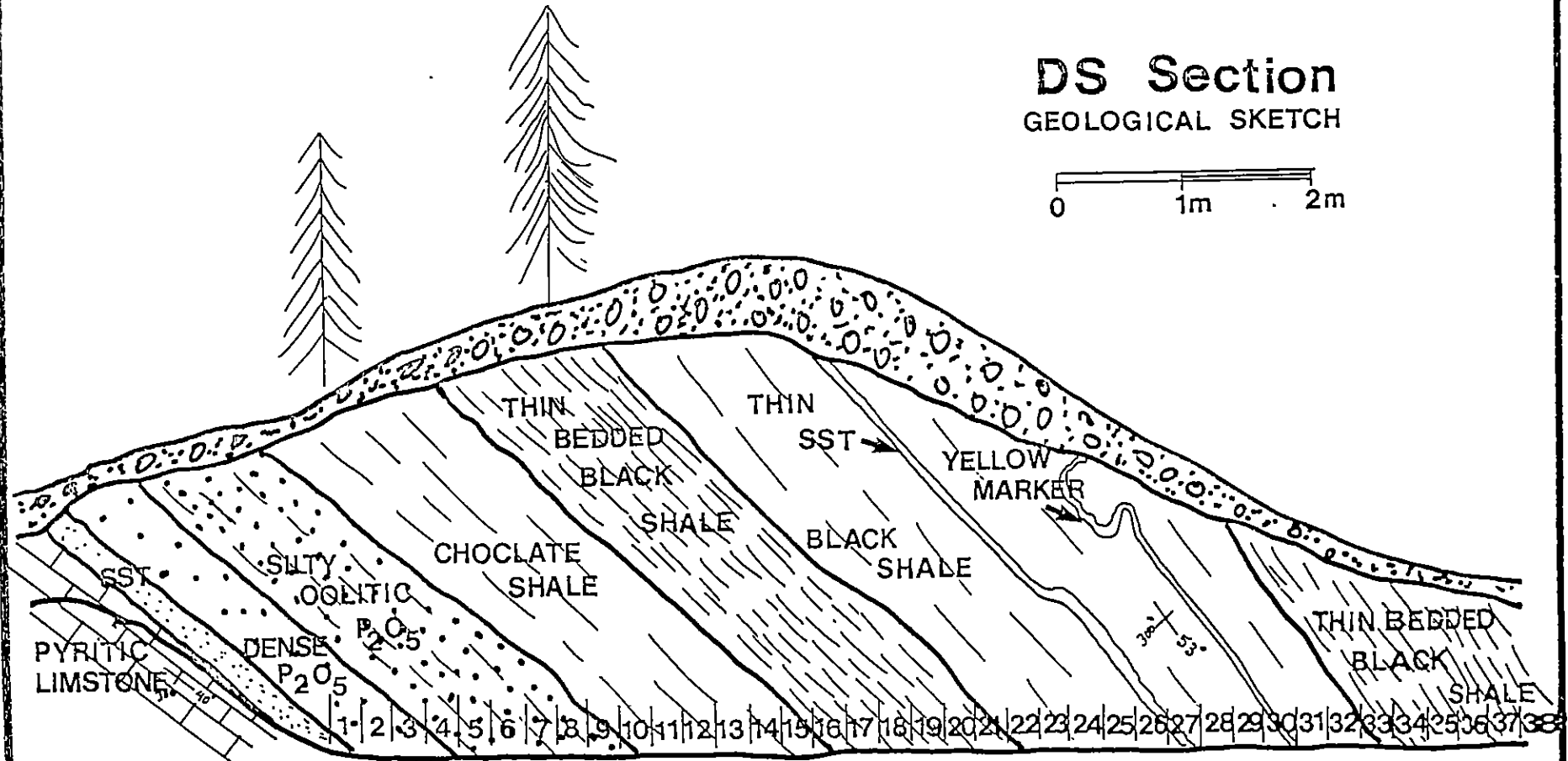
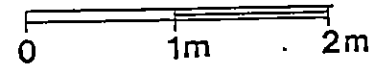
## GEOLOGICAL DESCRIPTION

The phosphatic section as exposed in the DS trench strikes 300° and dips 45°S. The base of the section is a massive gray green limestone containing 2 - 3% pyrite as fine disseminations. The limestone is overlain by 25 cm of ferroginous medium grained well sorted sandstone and overlain by 75 cm dense black phosphate containing limonitic spots and blebs. The limonite has been determined as remnant of a diagenetic pyrite.

The dense phosphate unit is overlain by 1.5 meters of silty shale and oolitic phosphate. The oolitic zone is overlain by 1.5 m of chocolate shale. The chocolate shale is overlain by 1.5 m of thin bedded black shale then 2 m of massive black shale, exhibiting high radioactivity up to 3100 cps. A 2 cm sandy bed occurs in this unit 50 cm above base and a 1 cm yellow marker band occurs 1.25 m above the base of this unit. The sequence is all overlain by a succession of monotonous thin bedded black shales of undetermined thickness.

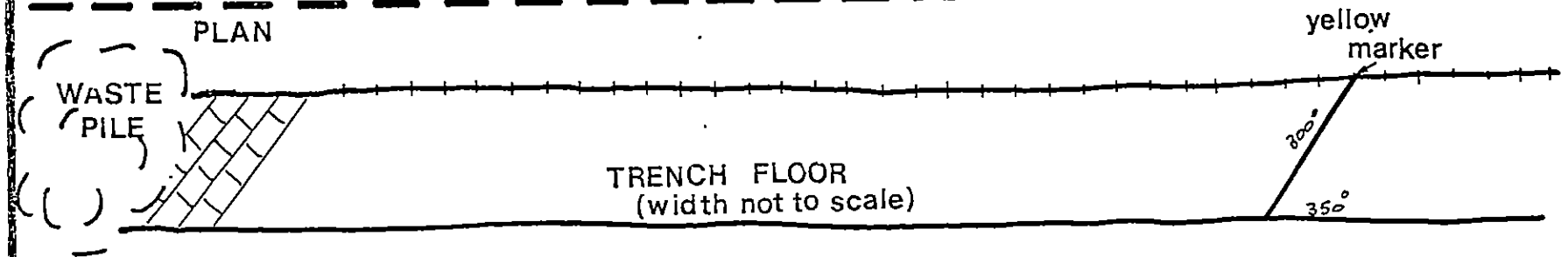
# DS Section

## GEOLOGICAL SKETCH



SECTION

PLAN



TB SECTION

## Summary of the TB Section

### Analysis

The TB section assayed 29.73%  $P_2O_5$  over 1.9 meters, 97 ppm  $U_3O_8$  over 2.6 m and 100 ppm vanadium over 7.4 m. As shown in the table, the uranium and phosphate values vary directly with each other.

### Zone Geometry

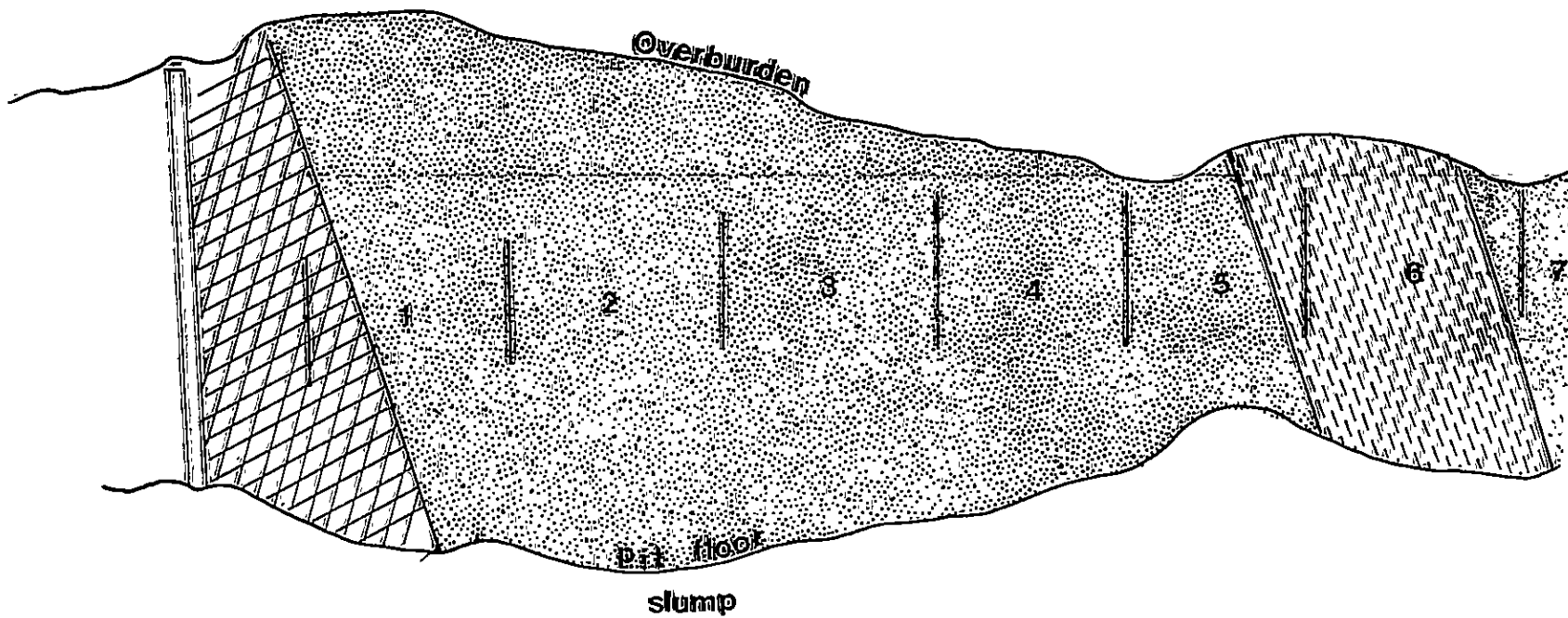
The TB section may be structurally complex since the basal limestone showed dips of  $25^\circ$  and the bedding within the phosphatic zone dipped at  $75^\circ$ . This zone was traced for approximately 500 m before being lost in heavy overburden. Several grab samples taken from prospecting pits assayed in excess of 30%  $P_2O_5$ .

TB - Section

samples TB 1-34

stk 58<sup>0</sup>

dip variable



 Gouge Zone

 Limonitic P<sub>2</sub>O<sub>5</sub>

 Black shale

 Colloidal P<sub>2</sub>O<sub>5</sub>





Plate VII Base of the TB Section



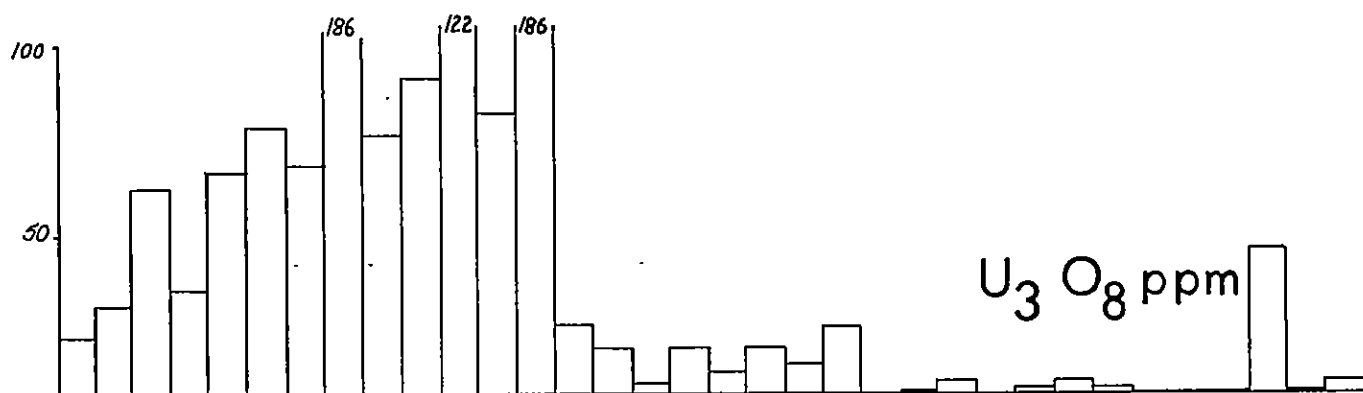
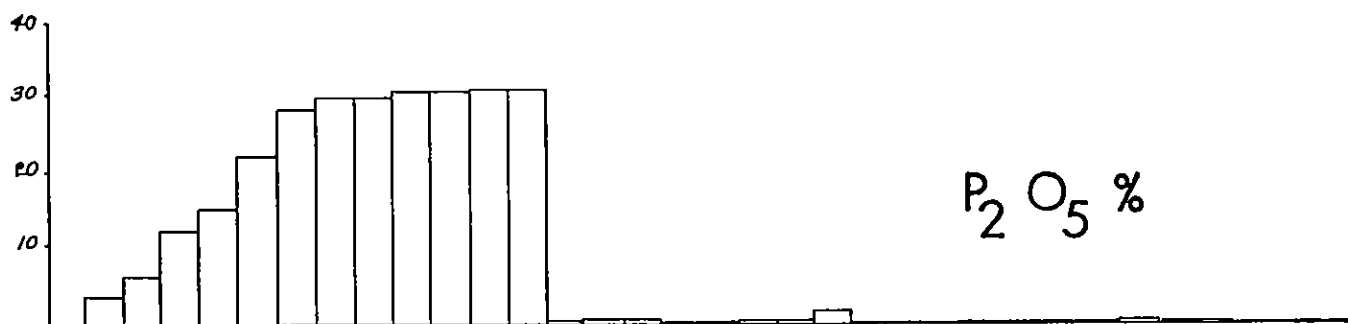
## GEOLOGICAL DESCRIPTION

The section as exposed at the TB trench strikes  $58^\circ$  and dips  $20^\circ\text{E}$  at the base, however dips taken on the phosphatic unit showed a dip of  $75^\circ\text{E}$ . This marked steepening over such a short distance (1 - 2 m) cannot be easily explained without faulting.

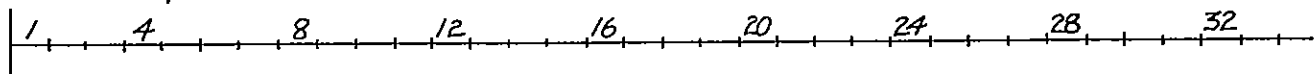
The sequence begins with a shallowly dipping gray to dark gray limestone with thin interbedded shales containing fragments of black to brown shale followed by a covered interval of approximately 2 meters. Immediately overlying the covered interval is light brown mudstone and gougy clays. The gougy clays are overlain by 125 cm of dense phosphate with limonite spots and blebs.

This dense unit is overlain by 25 cm of thin bedded black shale overlain by 1.5 m of weakly indurated oolitic phosphate. This oolitic zone is overlain by approximately 250 cm of chocolate shale and then by thin bedded calcarious black shales of undetermined thickness. The maximum radioactivity of 650 cps occurs in the oolitic section near its contact with the chocolate shales.

# ANALYSIS OF TB SECTION



TB Sample



CS SECTION

## Summary of CS Section

### Analysis

This section assayed 19.27%  $P_2O_5$  over 1.5 m and 200 ppm vanadium over 3.5 m. Uranium averaged 68 ppm/1.5 m.

The phosphatic zone contained a number of silty interbeds. Abnormal amounts of uranium 120 ppm and vanadium 500 ppm occurred at the top of this zone.

### Zone Geometry

The CS Section is a vertically dipping zone situated on the nose of the Cat Creek thrust fault and lies approximately 600 meters along strike from the WE zone. The occurrence of a limy gouge at the base of the section suggests that the complete phosphatic section is not exposed at this location.

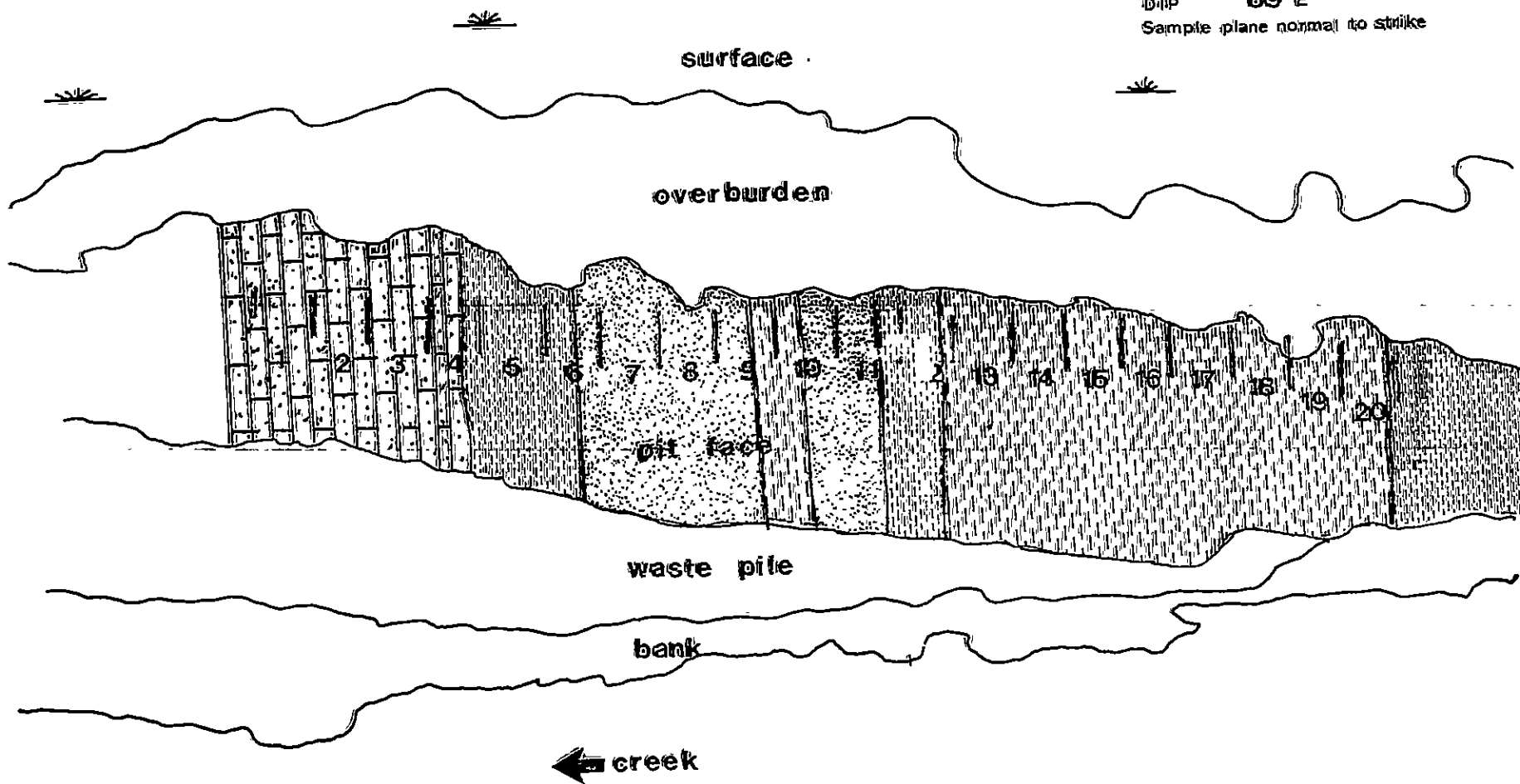
# Creek Section

SAMPLES CS 1-20

STRIKE 342°

DIP 89° E

Sample plane normal to strike



SILTY  
LIMESTONE



BLACK SHALE  
THIN BEDDED



OOBITIC P<sub>2</sub>O<sub>5</sub>



CHOCOLATE SHALE



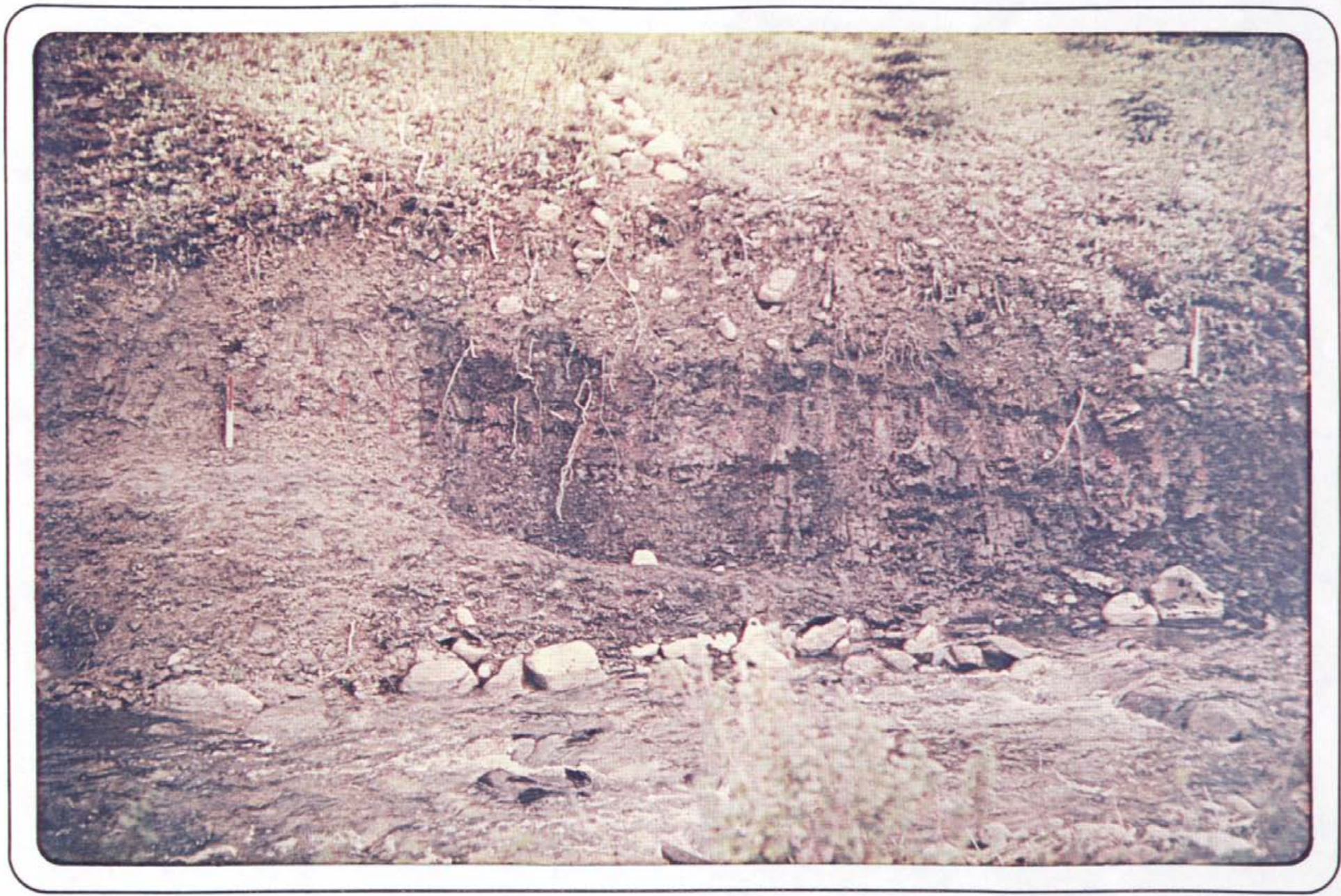


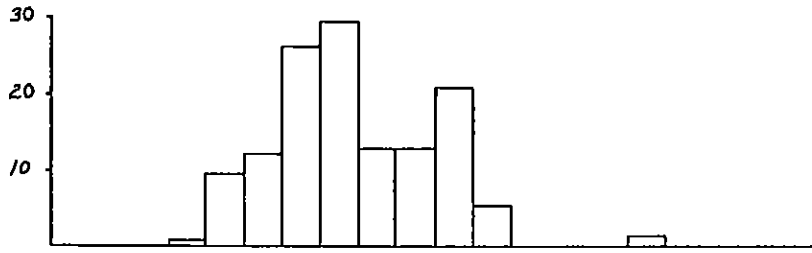
Plate VIII The CS Section

## GEOLOGICAL DESCRIPTION

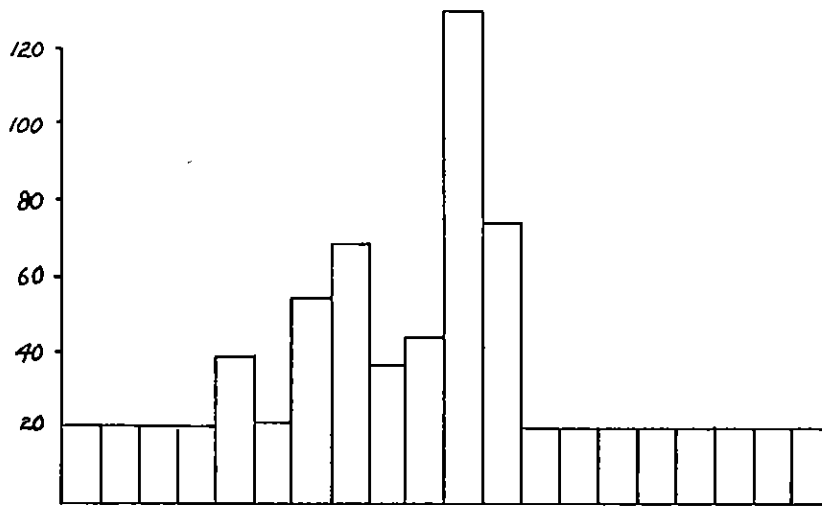
This section was exposed along Cat Creek striking  $342^{\circ}$  and dipping vertically. The base of the exposed section consists of an undetermined thickness of argillaceous siltstone overlain by a thin (5 - 10 cm) dense black phosphate bed with limonitic specks overlain by 5 meters of dolomitic siltstone gouge. The gouge zone is overlain by 50 cm of thin bedded black shale followed by 75 cm of oolitic phosphate and 20 cm of chocolate brown shale. The chocolate shale is overlain by 40 cm of oolitic phosphate and then by 25 cm of thin bedded black shale followed by 200 cm of chocolate shale, then by 250 cm of black shale containing phosphatic nodules. The entire sequence is overlain by black shale containing thin beds of black bituminous carbonate, then black shales of undetermined thickness.

Field relations suggest that this section lies immediately... above a plane of a thrust fault originating from the south west and whose particular geometry of deformation along the plane of the thrust has given rise to a vertical bedding attitude.

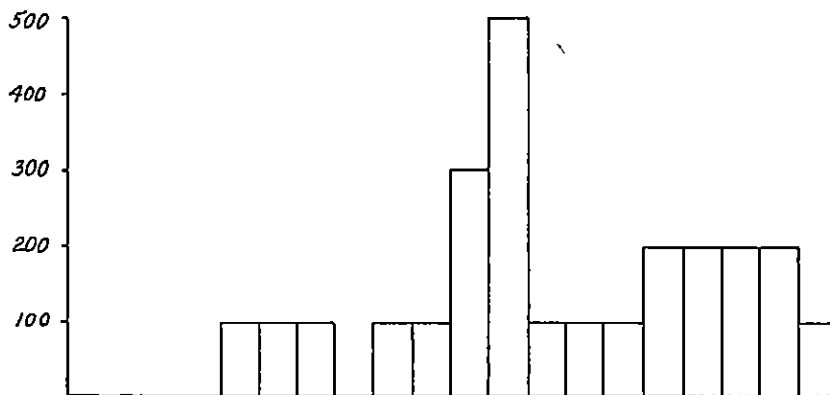
# ANALYSIS OF CS SECTION



$P_2O_5$  %

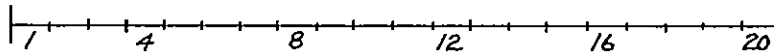


$U_3O_8$  ppm



V ppm

CS Sample





JB-33 SECTION








JB - 33

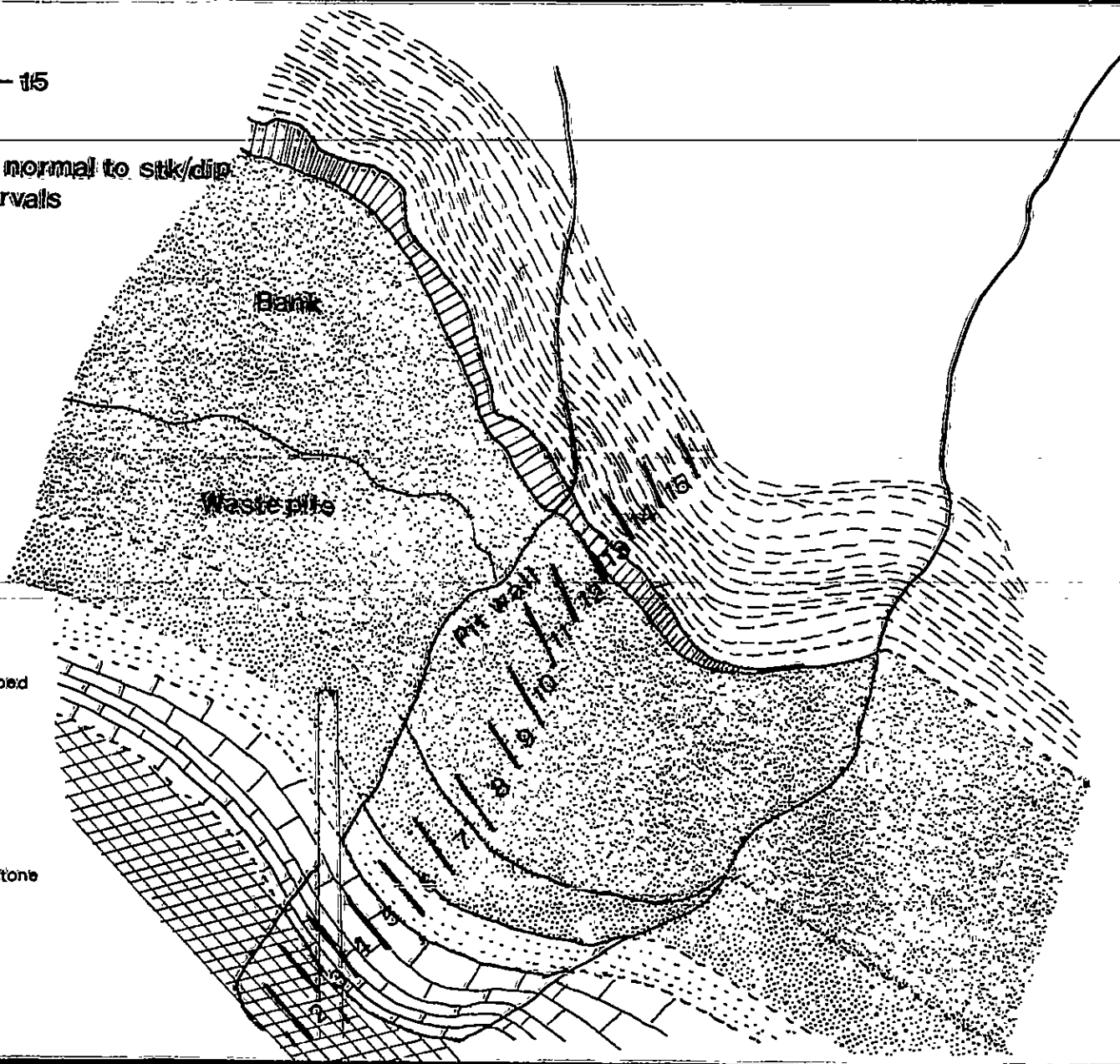
Samples JB-1 - 15

strike  $307^{\circ}$

dip  $47^{\circ}$  W

zone sampled normal to stk/dip  
at 25 cm intervals

-  Chocolate shale
-  Yellow marker bed
-  Oolitic  $P_2O_5$
-  Limonitic  $P_2O_5$
-  Sideritic sandstone
-  Silty dolomite
-  Gouge zone



## Summary of the JB-33 Section

### Analysis

This section assayed 12.39%  $P_2O_5$  over 1.75 m with low uranium and vanadium values.

### Zone Geometry

The JB-33 section represents a typical phosphatic exposure of the region in that, though low grade, it is "stratigraphically complete". Some thrusting probably occurs immediately below, due to the presence of a gougy unit underlying the basal silty dolomite. The zone was traced by surface prospecting for a distance of 4.5 km along strike to the SQ section to the south, and although obscured, at times by heavy overburden, it appears to be truncated by the Cat Creek thrust approximately 3 km along strike to the north.

A second exposure of the zone occurs in the area south east of the JB-33 section, however it probably is due to normal faulting and erosional topography.

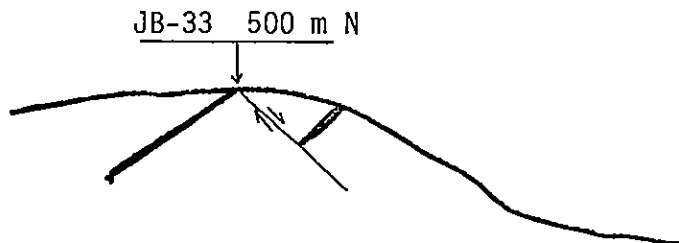




Plate IX The JB-33 Section

## GEOLOGICAL DESCRIPTION

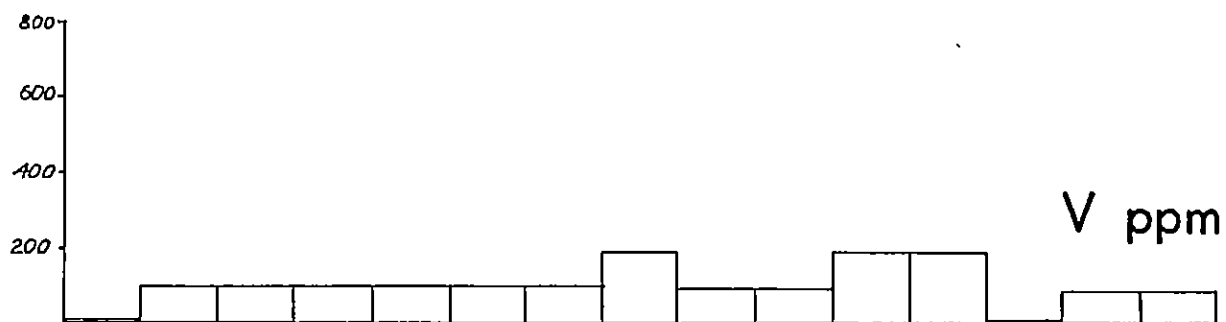
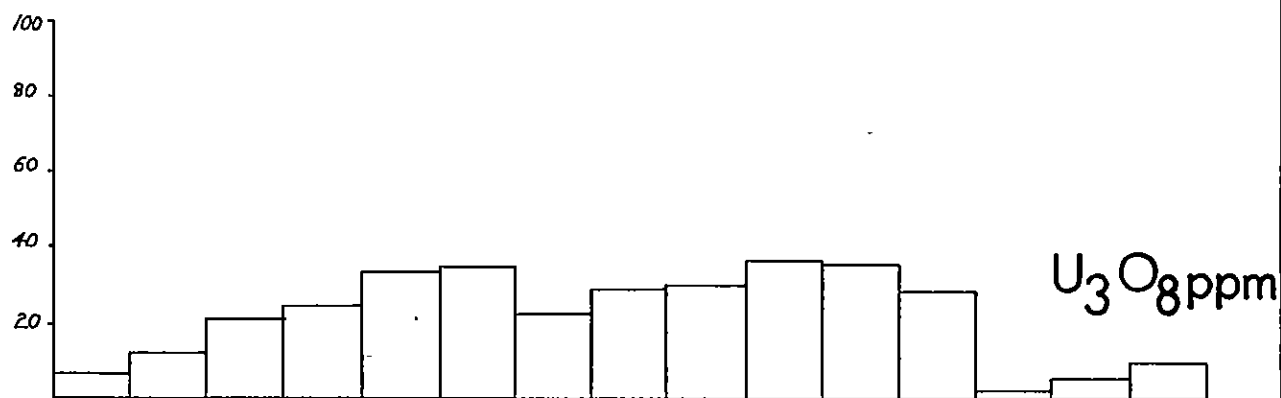
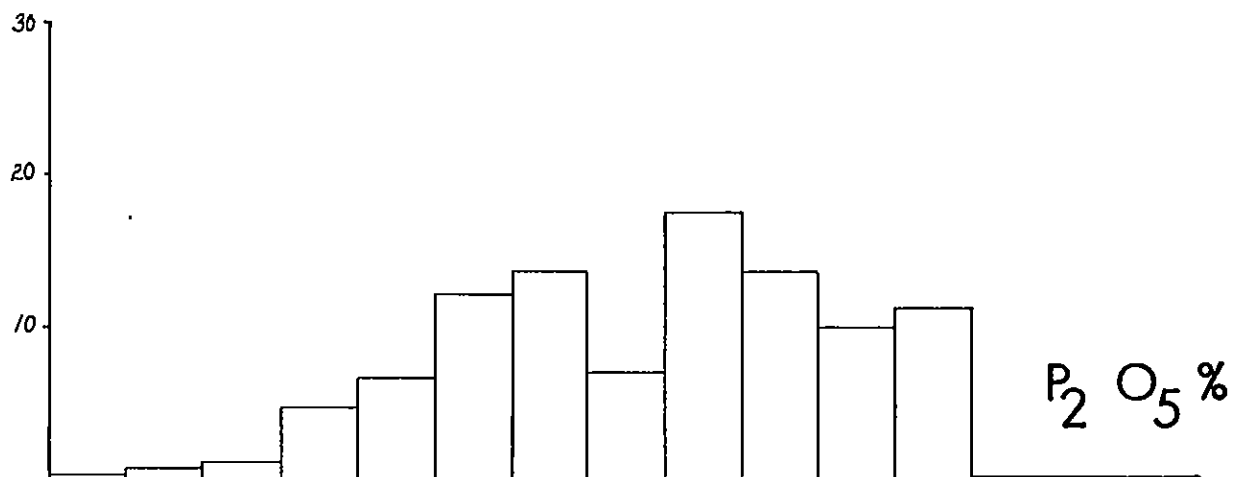
The section as exposed at JB-33 strikes 305°, dips 47° west. The lowest unit exposed in the pit was a light colored limy gouge of undetermined thickness. This is probably fault gouge within the immediate vicinity above dolomitic siltstone unit whose thickness is 50 cm.

The dolomitic siltstone is immediately overlain by 15 cm of sideritic sandstone then by 40 cm of dense black phosphate with limonite blebs. This unit is interpreted as possessing diagenetic pyrite.

The sequence is then overlain by 1.3 meters of weakly indurated oolitic phosphate. The phosphate unit is overlain by a yellow marker bed and then by brown to black shales of undetermined thickness.

The maximum radioactivity measured in this pit was 585 cps in the oolitic section.

# ANALYSIS OF JB-33 SECTION



JB-33 Sample

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

STS SECTION

Summary of the STS Section

Analysis

The STS section assayed 18.29%  $P_2O_5$  over 1.5 m. Low uranium and vanadium was 180 ppm over 2.5 m. From the chart, uranium and  $P_2O_5$  content vary directly as each other. The maximum uranium value was 90 ppm.

Zone Geometry

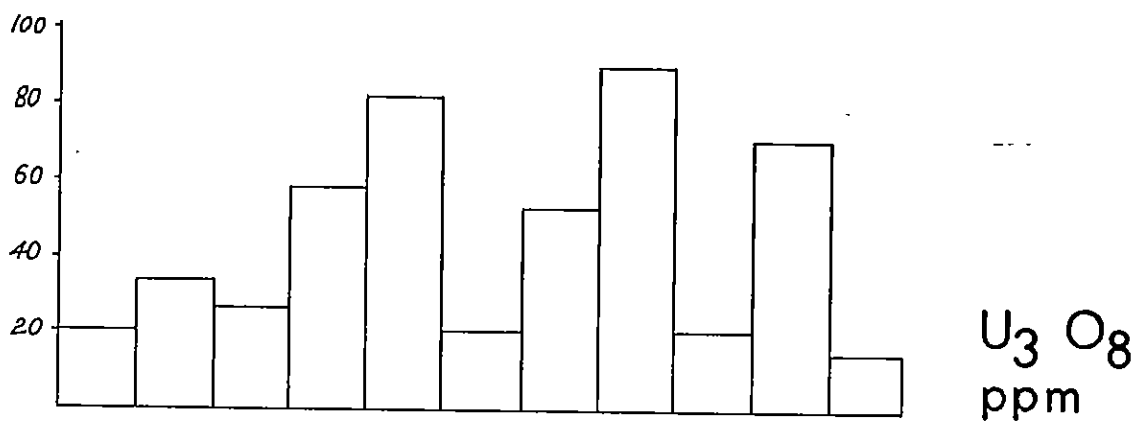
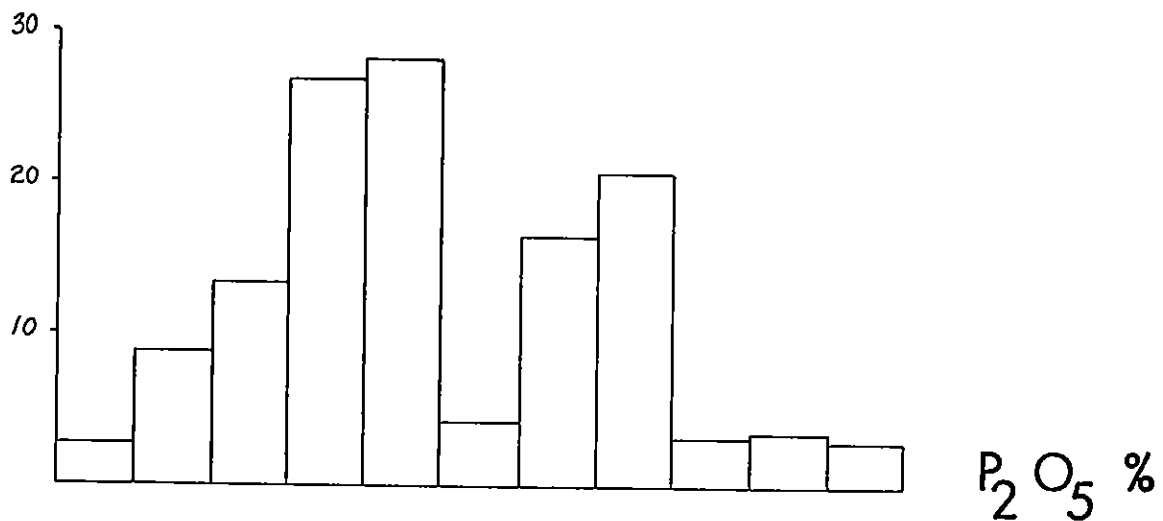
The STS section was traced by surface prospecting for 3.5 km on the "back" of the Storm Creek thrust sheet.



### GEOLOGICAL DESCRIPTION

The phosphate section as exposed in the STS trench strikes 350° and dips 60° west. The base of the section is a brown limestone with numerous irregular calcite veinlets. The basal limestone is overlain by 50 cm of dense black phosphate with numerous limonitic spots and blebs. Separating the phosphate zone from the overlying 50 cm oolitic zone is a 5 cm silt bed. A similar silty bed overlies the oolitic zone. This section is overlain by approximately 1.5 meters of chocolate brown and black shales. These shales appear to be deformed by soil creep.

# ANALYSIS OF STS SECTION



STS Sample | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

WE SECTION

## Summary of the WE Section

### Analysis

This section assayed 21%  $P_2O_5$  over 1 meter with low values of uranium and vanadium. Increases in uranium (70 ppm max) and vanadium to 200 ppm coincided with the best  $P_2O_5$  values all occurring near the top of the section.

### Zone Geometry


The WE section is approximately 600 m south along strike of the CS section where uranium and vanadium highs were also associated with the upper portion of the phosphate zone. This section occurs near the nose of the Cat Creek thrust.

WE TRENCH  
Samples WE 1-6  
stk 335  
dip 30  
sampled normal to dip  
at 25 cm intervals

overburden

trench floor

 Colitic  $P_2O_5$

 Silty  $P_2O_5$  with occnl limonitic specks

 Limonitic  $P_2O_5$

THIS TRENCH WAS ABANDONED DUE TO EXCESSIVE WATER INFLOW





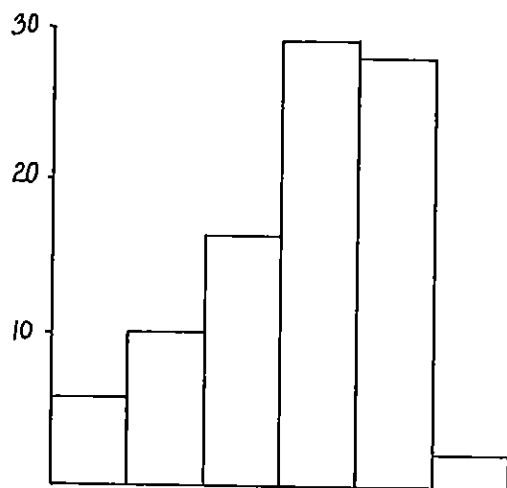
Plate X The WE Section



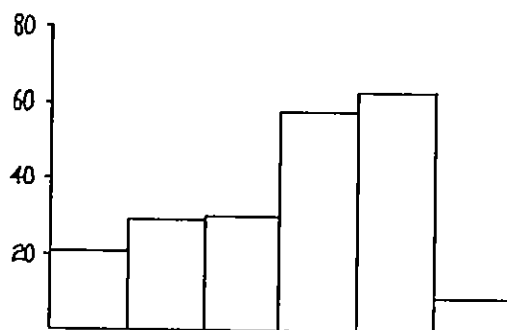
## GEOLOGICAL DESCRIPTION

The phosphatic section at the WE trench strikes 335° and dips 30° south. The lowest exposure in this trench was a 25 cm thickness of dense black phosphatic material with numerous limonitic specks. This dense unit is overlain by 1.5 m of medium to poorly indurated sandy oolitic phosphate. An undetermined thickness of chocolate brown shale overlies the phosphatic section. Maximum radioactivity of 600 cps occurred near the top of the phosphatic zone.

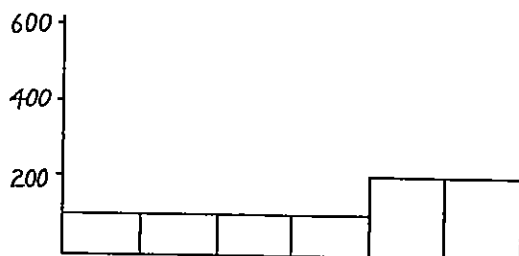
# ANALYSIS OF WE SECTION



P<sub>2</sub>O<sub>5</sub> %

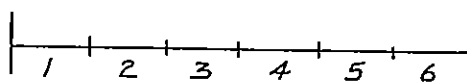


U<sub>3</sub>O<sub>8</sub> ppm



V ppm

WE Sample



RAM "A" SECTION

## Summary of the Ram "A" Section

### Analysis

The Ram "A" section assayed 18.32%  $P_2O_5$  over 1.5 m with low values of uranium and vanadium.

### Zone Geometry

At the Ram "A" trench mineralization was generally flat lying. It is observed that the zone may be structurally complex due to the disturbed nature of the pit walls and by the absence of the limonitic basal phosphatic unit at this location.

This zone dips very shallowly and the failure to trace the zone along an appreciable strike length indicates it may be eroded in some areas particularly to the north west.

This zone was located rather late in the season and due to access problems, the area was not intensively explored.

RAM - A TRENCH

Samples A 1-6





Stk 310°

Dip 18° E

Sampled normal to dip  
at 25 cm intervals

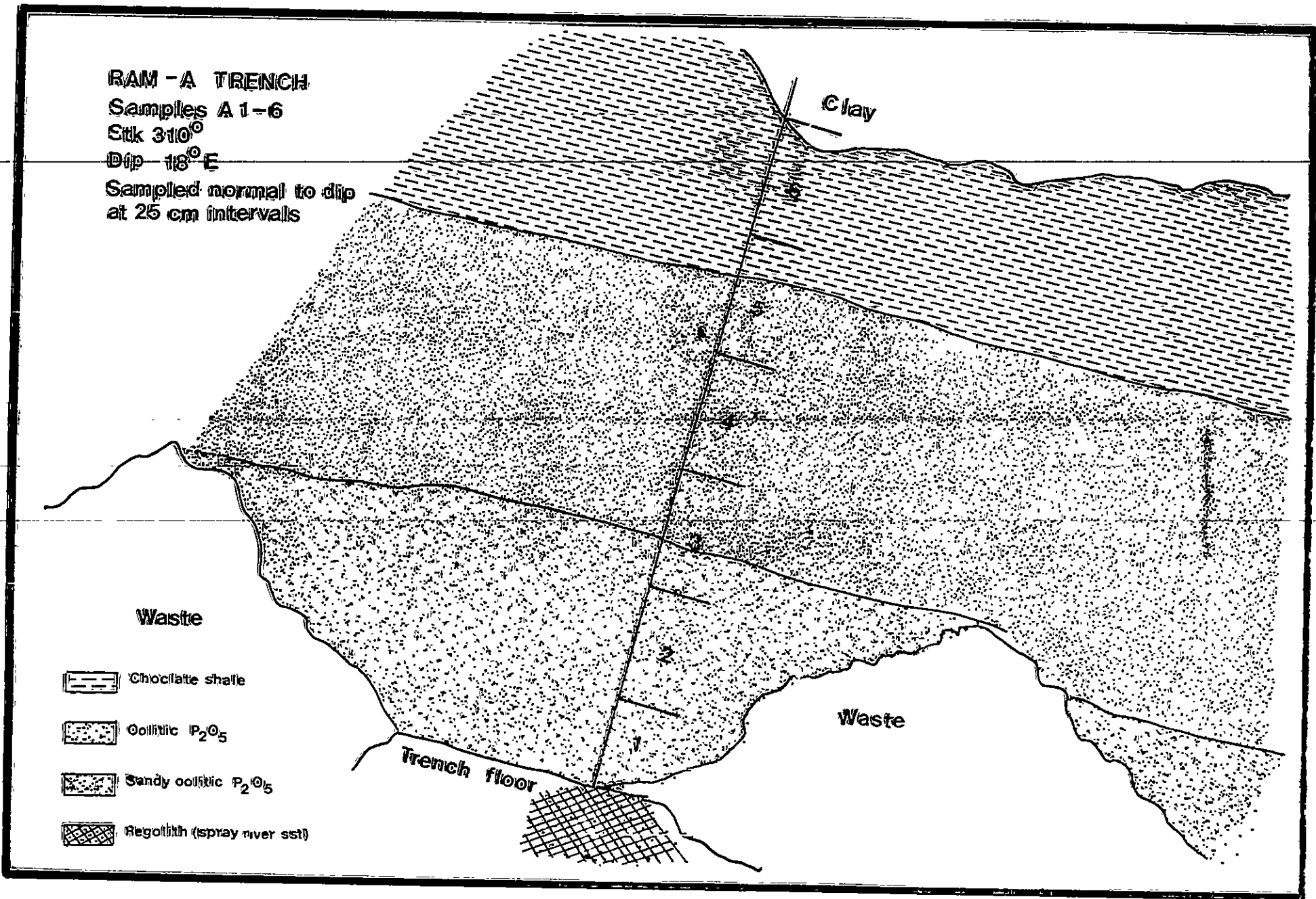
Clay

Waste

-  Chocolate shale
-  Collicitic P<sub>2</sub>O<sub>5</sub>
-  Sandy collicitic P<sub>2</sub>O<sub>5</sub>
-  Regolith (spray river sst)

Waste

Trench floor





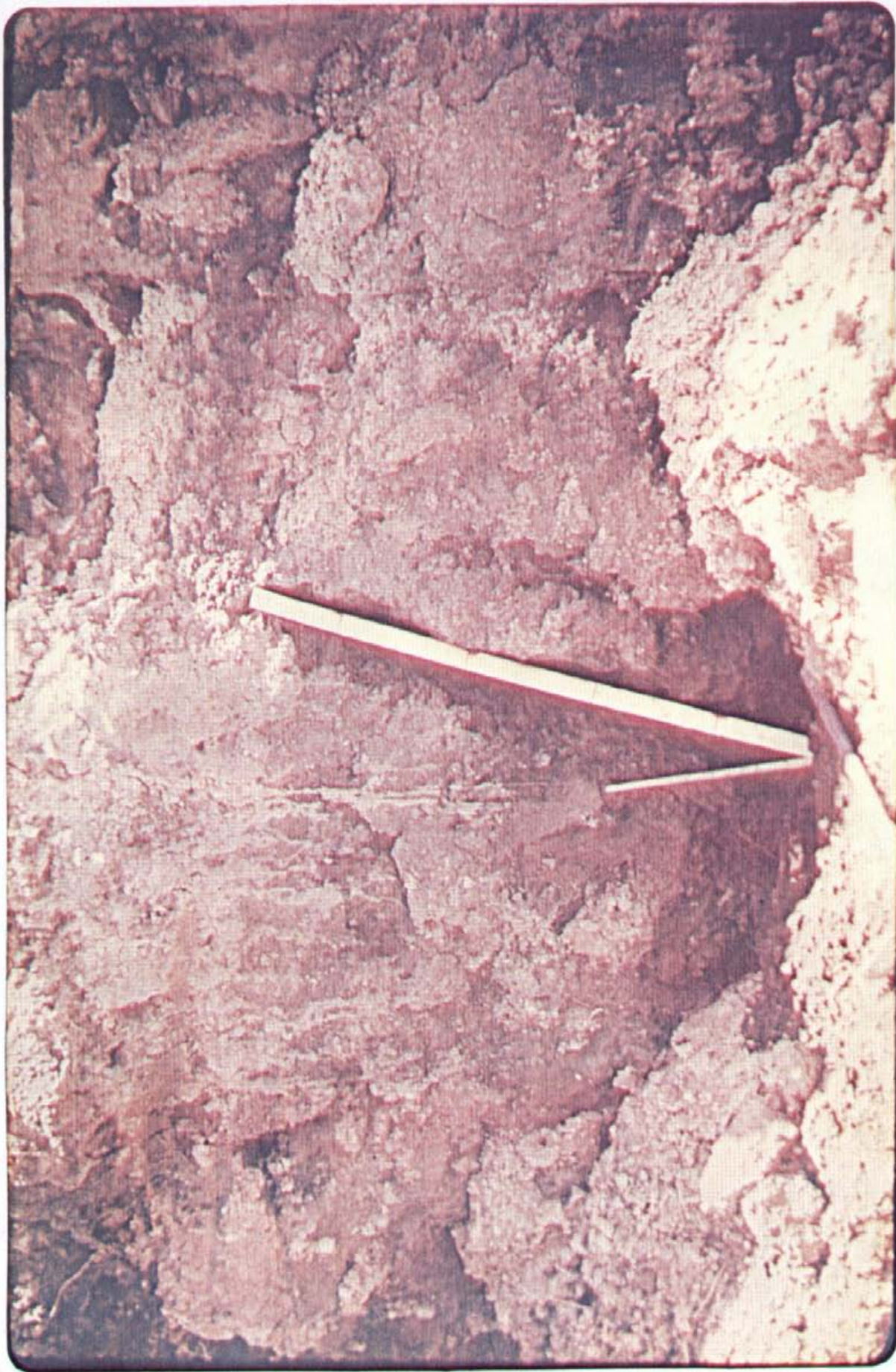


Plate XI The RAM "A" Section



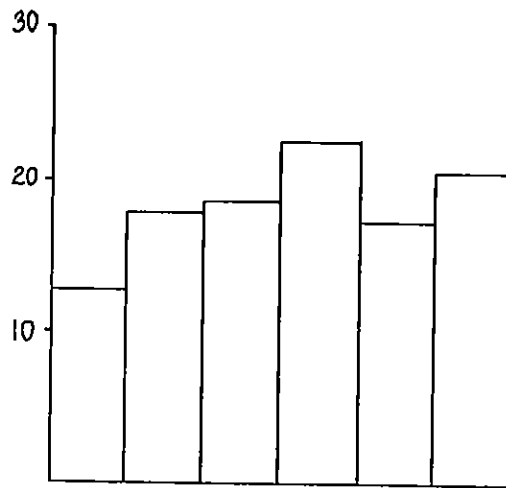
### GEOLOGICAL DESCRIPTION

The phosphatic section as exposed in the Ram "A" trench strikes at  $310^{\circ}$  and dips at  $40^{\circ}$  east. However both strike and dip were observed to be variable.

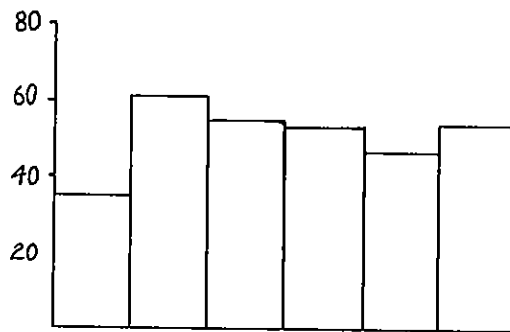
The base of this section was observed to be oxidized regolith consisting of uncemented sand and probably represents a prephosphate Spray River highland subject to subareal erosion prior to transgression by Fernie Sea.

The regolith is overlain by 100 cm of oolitic phosphate in a very sandy matrix. This matrix becomes less dominant going up section. This oolitic zone is overlain by chocolate brown shale of undetermined thickness. No yellow marker beds were observed.

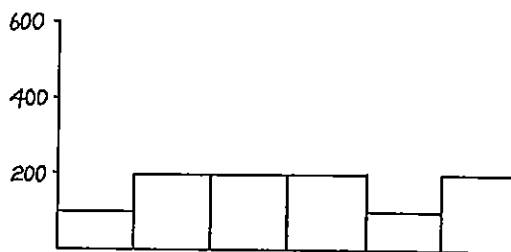
# ANALYSIS OF RAM "A" SECTION



P<sub>2</sub>O<sub>5</sub> %

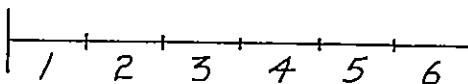


U<sub>3</sub>O<sub>8</sub> ppm



V ppm

RAM "A" Sample



RAM "B" SECTION

## Summary of the Ram "B" Section

### Analysis

The Ram "B" section assayed 22.96%  $P_2O_5$  over 1.5 meters with low values of uranium and vanadium. Vanadium values show a sharp increase from 100 to 400 ppm as phosphate values drop off at sample Ram "B"-7.

### Geometry of Zone

This zone can be traced along strike by surface prospecting for approximately 1.5 km to north west and approximately 0.5 km to the south east. This zone was located late in the exploration season and due to area access problems, it was not intensively prospected or mapped.

## GEOLOGICAL DESCRIPTION

The phosphatic section as exposed in the Ram "B" trench strikes 30°, dips 25° east and overlies a micritic, gray to brown bituminous limestone of undetermined thickness.

The overlying phosphatic section consists of 1.25 meters of weakly indurated oolitic phosphate, with occasional limonitic specks throughout. This oolitic section is overlain by dense black phosphate containing numerous limonitic specks and nodules that may represent the formation of diagenetic pyrite. Elsewhere this section is characteristic of the basal portion of the phosphate zone and usually constitutes the initial phosphatic deposition.

This section is in turn overlain by a black to brown shale sequence of undetermined thickness.

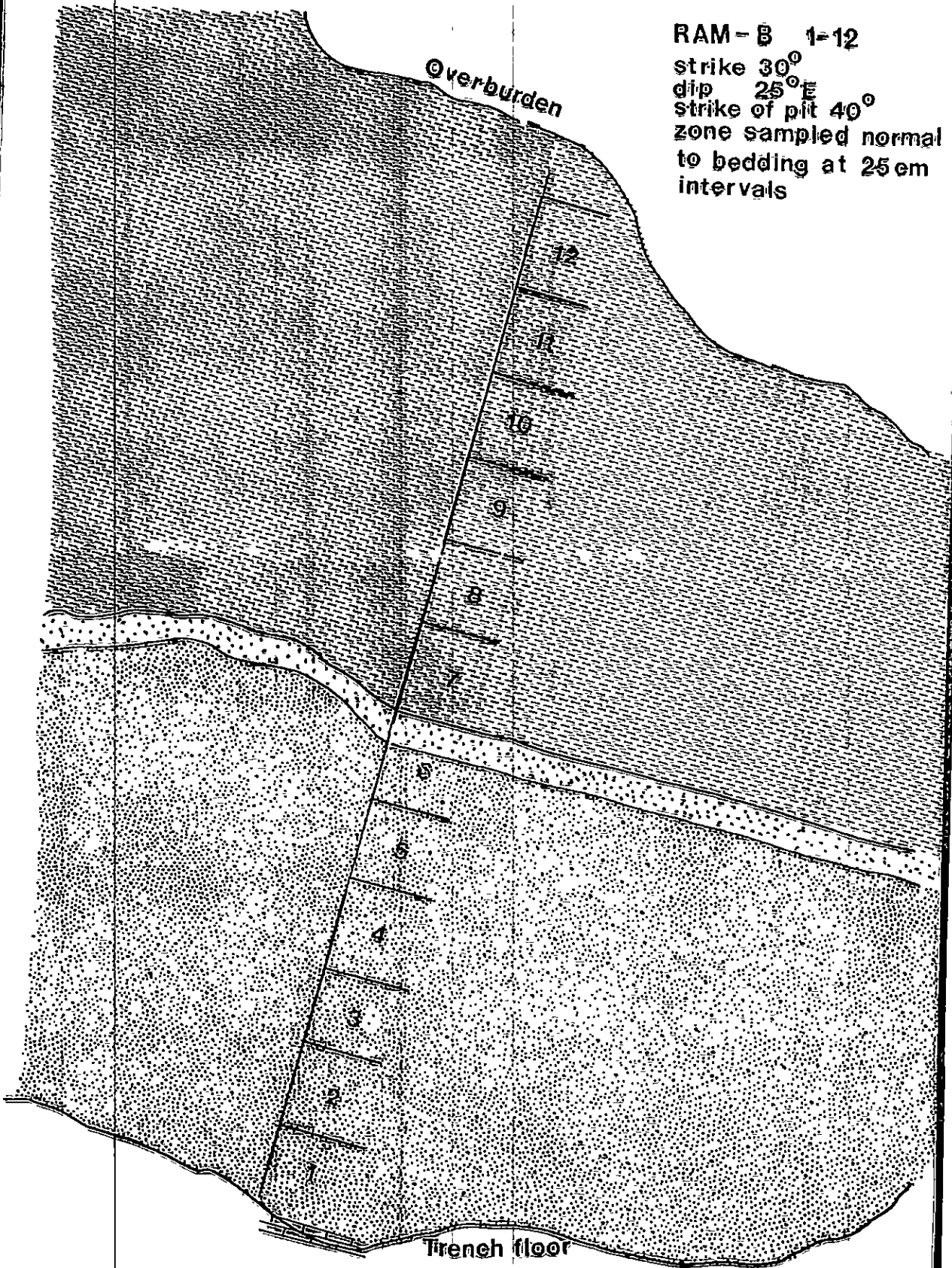
This exposure appears to be extremely atypical of the other phosphatic sections for the following reasons:

- ( i ) No ferruginous sandstone unit overlies the basal limestone.
- ( ii ) The "Diagenetic Pyrite" portion of the section sequence is not near to the base.
- ( iii ) No yellow clay markers are present immediately above the phosphatic section.

A speculative assessment of these observations would seem to indicate that this section is overturned or at least subject to some degree of structural deformation.


RAM - B 1-12  
strike  $30^{\circ}$   
dip  $25^{\circ}$  E  
strike of pit  $40^{\circ}$   
zone sampled normal  
to bedding at 25 cm  
intervals

Overburden



Trench floor

 Limestone

 Oolitic  $P_2O_5$   
with limonitic  
specks

 Limonite  $P_2O_5$

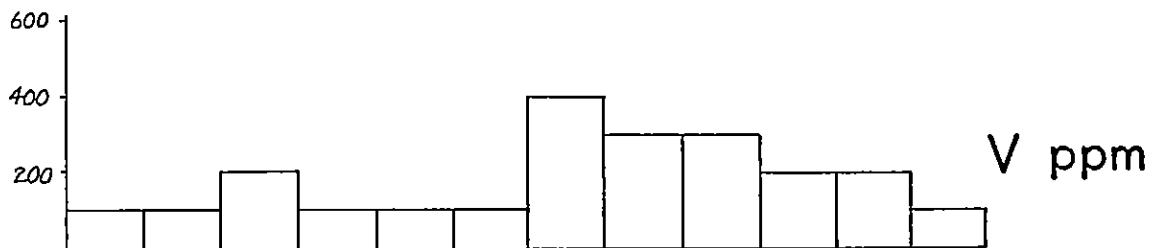
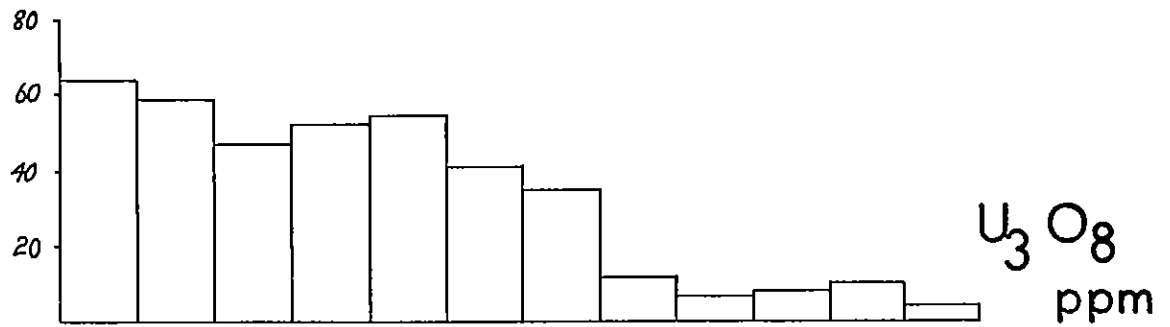
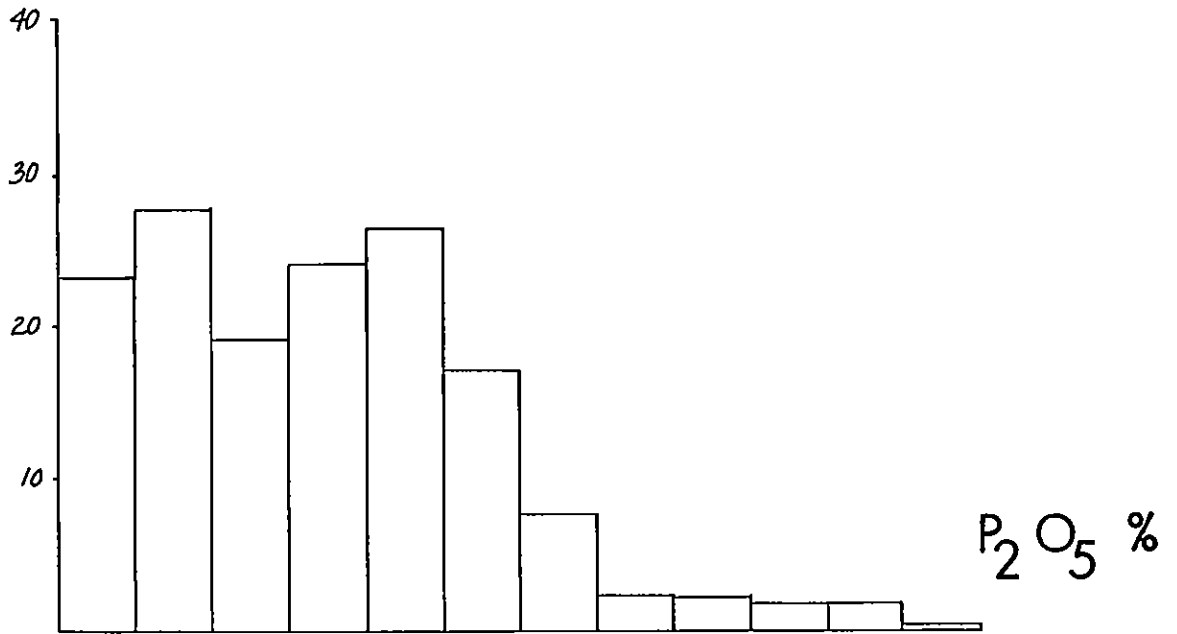
 Black shale.





Plate XII The RAM "B" Section

# ANALYSIS OF RAM "B" SECTION



RAM "B" Sample 1 2 3 4 5 6 7 8 9 10 11 12

MS SECTION

## Summary of the MS Section

### Analysis

The MS section assayed 12.66%  $P_2O_5$  over 1.25 meters with associated low values of uranium and vanadium. The histogram of analysis illustrates the direct relationship of uranium and phosphate values.

### Zone Geometry

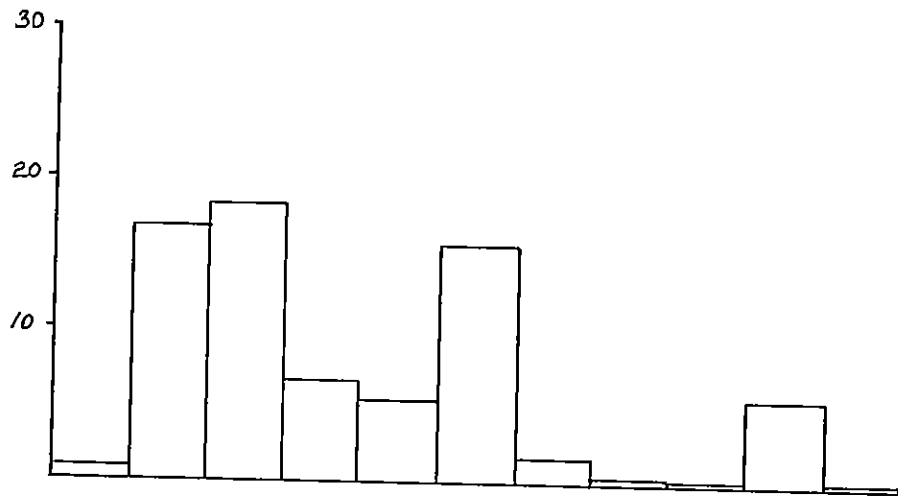
The MS section dips vertically and occurs in a structurally complex area, associated with an overturned fold. The zone contains no oolitic phosphatic member, thus it can be inferred that this zone is a remnant of a tectonically - - - reconcentrated phosphate zone.

## GEOLOGICAL DESCRIPTION

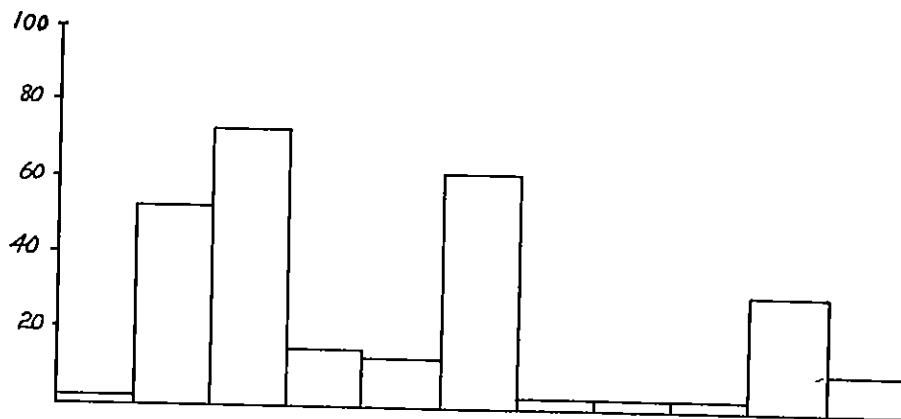
The phosphatic section as exposed in the MS pit strikes 350° and dips vertically. It is interpreted as occurring on one arm of the overturned syncline that comprises the DS zone. At the base of the section, a gray bituminous limestone with occasional calcite infills parallel to bedding, is overlain by 25 cm of well sorted fine grained ferrogenous sandstone. The sandstone member is overlain by 40 cm of dense black phosphate with large reddish limonitic blebs (possibly the remnants of diagenetic pyrite). The phosphatic zone is overlain by 1 m of thin bedded chocolate colored shale. This shale is overlain by a yellow marker bed and approximately 80 cm of thin bedded black shale, then a thin (5 cm) bed of black bituminous carbonate then black shale of undetermined thickness.

The MS section does not contain an oolitic phosphatic member. This oolitic zone may never have been deposited or as observed in other localities (AB-BA section). This zone was tectonically remobilized by deformational stress during the episode of folding to other areas, i.e. the nose of the syncline.

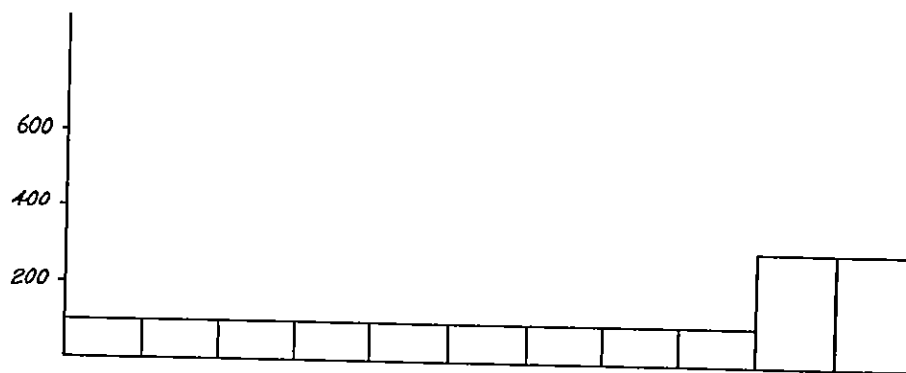
# ANALYSIS OF MS SECTION



$P_2O_5$  %



$U_3O_8$  ppm



V ppm

MS Sample

1 2 3 4 5 6 7 8 9 10 11



STN SECTION

### Summary of the STN Section

#### Analysis

The STN section assayed 21.3%  $P_2O_5$  over 1.5 m with low values of associated uranium and vanadium.

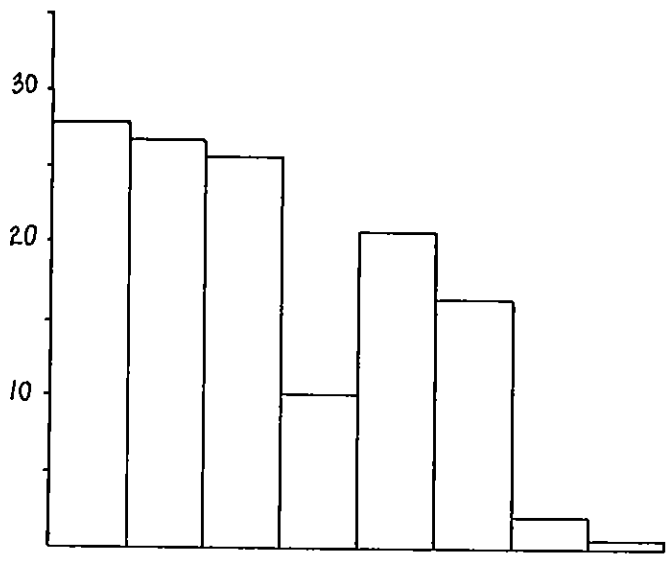
#### Zone Geometry

The zone was traced for approximately 500 m to the north and 500 m along strike to the south. The section occurs at the "nose" of the northern extension of the Storm Creek thrust fault.

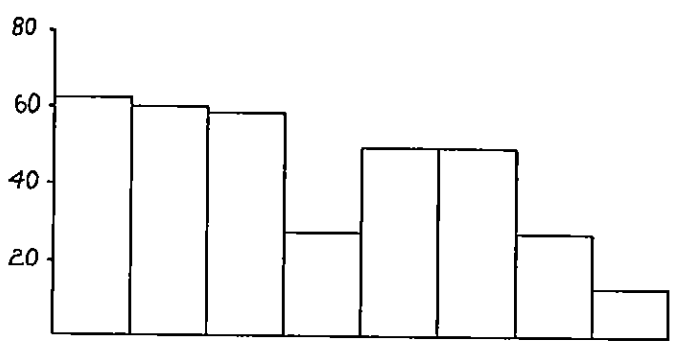
Extremely unstable pit conditions made sampling hazardous and geological description and mapping of this section impossible.

No further information is available.

# ANALYSIS OF STN SECTION



P<sub>2</sub>O<sub>5</sub> %



U<sub>3</sub>O<sub>8</sub> ppm



V ppm

STN Sample | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

JH 226 SECTION

## Summary of the JH-226 Section

### Analysis

The JH-226 section assayed 25.8%  $P_2O_5$  over 1.34 m with low values of uranium and vanadium. The histogram of analysis show a close association of uranium and phosphate values.

### Zone Geometry

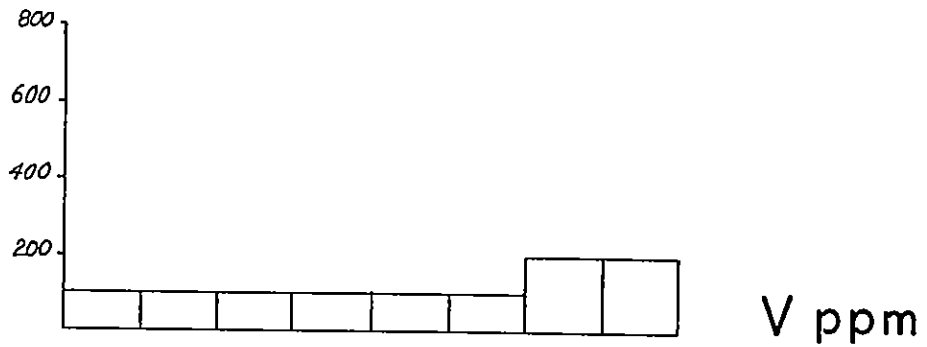
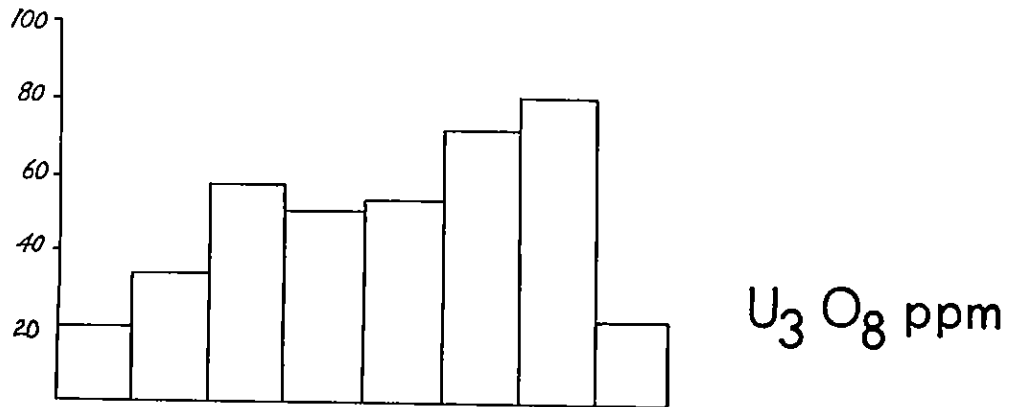
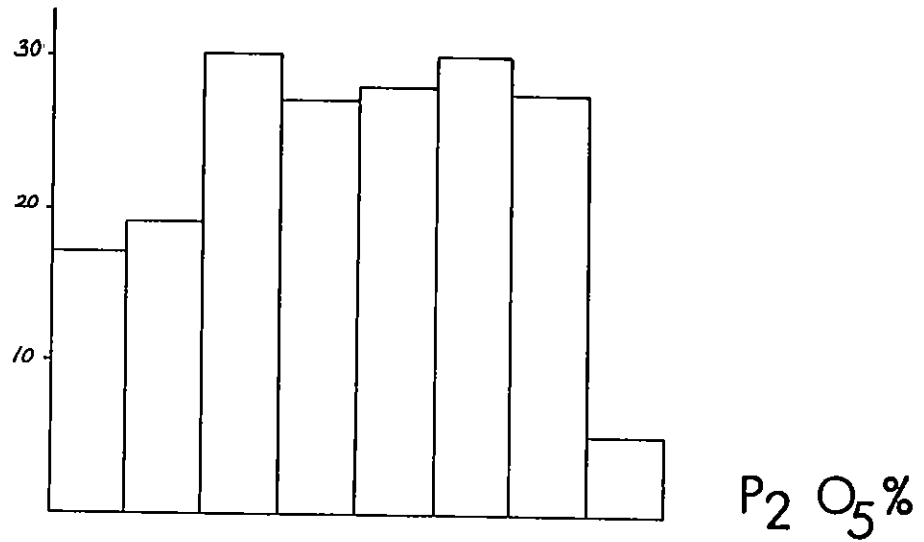
The JH-226 section is located near the Cat Creek thrust and may occur as a "sympathetic" structural thickening of the thrust similar to AB-BA tectonic thickening; see diagramatic section

### GEOLOGICAL DESCRIPTION

The phosphatic section as exposed at JH 226 overlies a dense brown silty limestone base of undetermined thickness. A thin ferrogenous band immediately underlies 1 meter of dense black phosphate with limonitic spots and blebs. The dense phosphatic zone is overlain by 50 cm of poorly indurated sandy oolitic phosphate that is in turn overlain by black shales of undetermined thickness. This section may appear artificially thickened due to some contortion of bedding.



# ANALYSIS OF JH226 SECTION



JH226 Sample 1 2 3 4 5 6 7 8

AB SECTION

## Summary of the AB-BA Sections

### Analysis

The AB Section assayed 20.97%  $P_2O_5$  over 2 meters. The BA Section assayed 21.46%  $P_2O_5$  over 1 meter. Both sections contained only low values of Uranium and Vanadium.

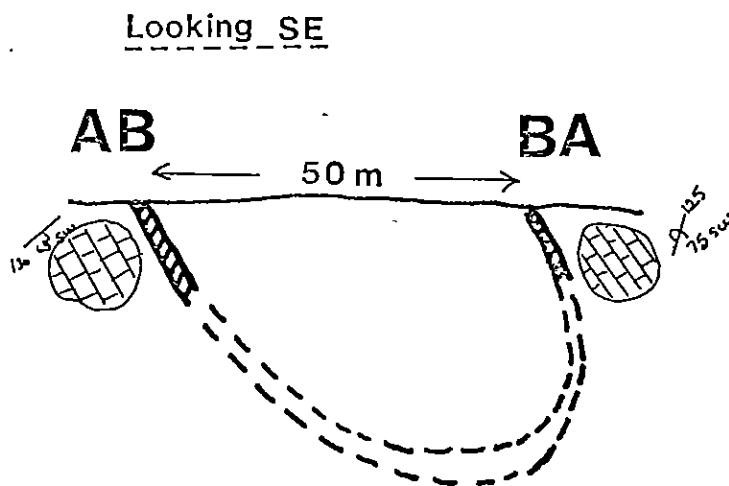
### Zone Geometry

The AB-BA Sections lie as part of the same structure on opposite arms of an overturned syncline.

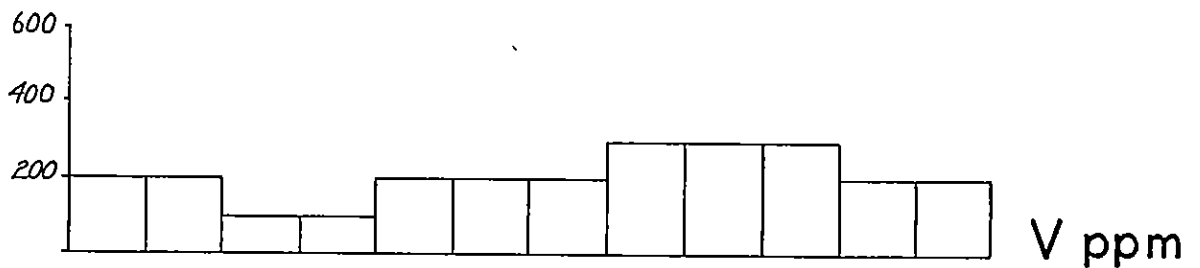
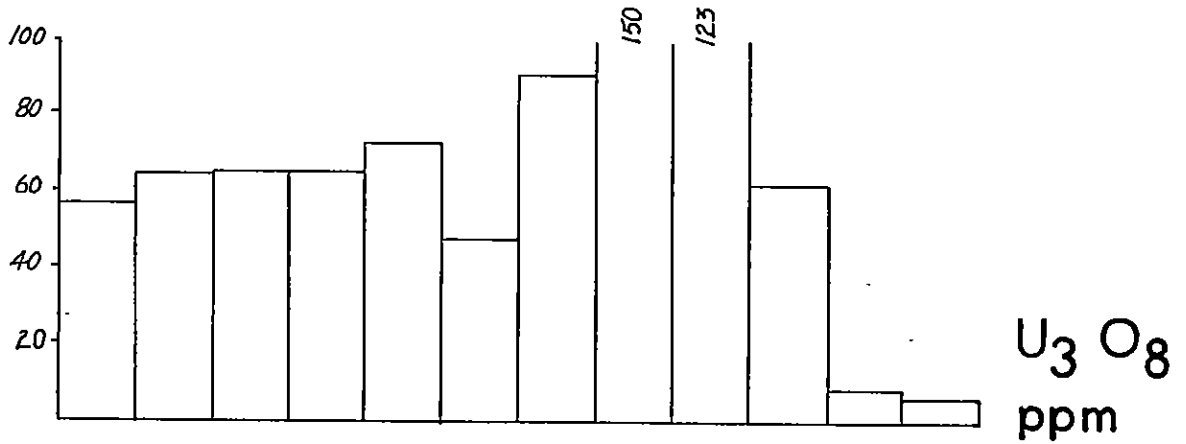
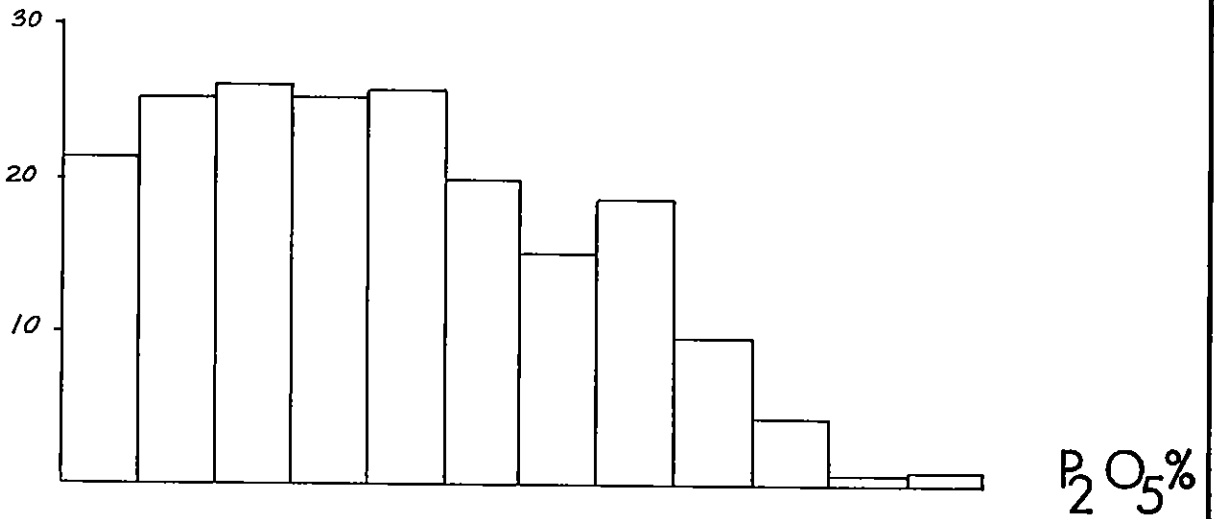
The thickness of the oolitic member has been tectonically improved from 1 to 2 meters. This improvement is encouraging since tectonically thickened phosphate beds are known to exist in the Fernie Formation (Telfer 1935) and mega-structure necessary for large scale improvement is present on the property.

GEOLOGICAL DESCRIPTION

The phosphatic section at the AB pit strikes 130° and dips 65° to the south west. The base of the section is comprised of finely laminated massive dark gray bituminous limestone. The phosphatic bed overlying the limestone consists of 1.75 m of sandy oolitic phosphate overlain by an undetermined thickness of chocolate brown shales. Maximum radioactivity occurs at the top of the oolitic phosphate zone near its contact with the upper shales. The BA section occurs only 50 meters away and is on the overturned limb of the AB-BA syncline.

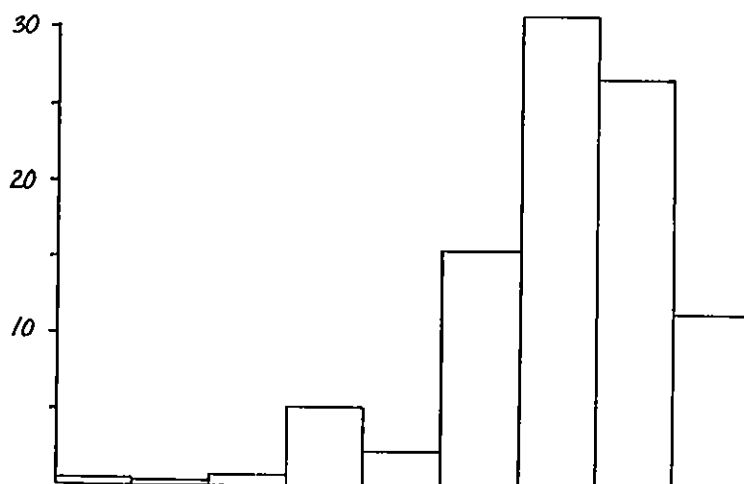


# ANALYSIS OF AB SECTION

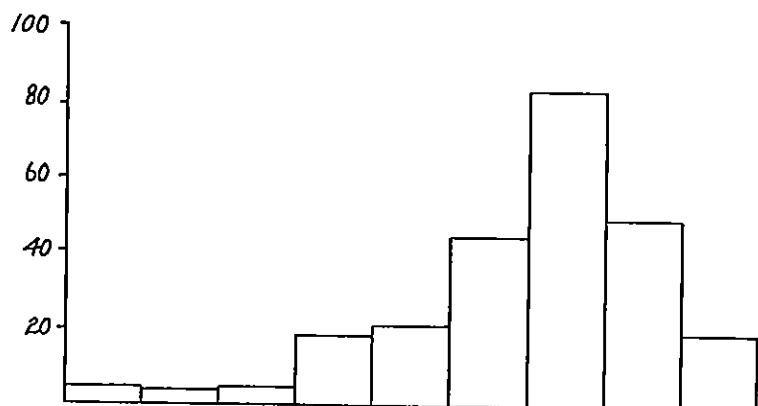


AB Sample | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |

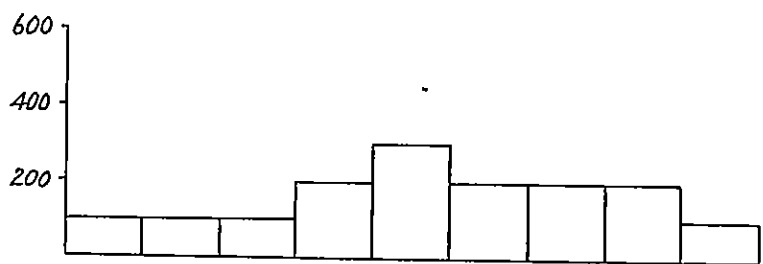
# ANALYSIS OF BA SECTION



P<sub>2</sub>O<sub>5</sub> %



U<sub>3</sub>O<sub>8</sub> ppm



V ppm

BA Sample | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |



OT SECTION

### GEOLOGICAL DESCRIPTION

The section as exposed at the OT pit strikes  $315^{\circ}$  and dips  $30^{\circ}$  south and is overturned. The base of the section is a bituminous silty limestone. The base of phosphatic unit consists of a 20 cm silty oolitic phosphate overlain by 80 cm of medium indurated oolitic phosphate and overlain by 10 cm of sandy poorly indurated oolitic phosphate. The sequence is all overlain by chocolate brown shale of undetermined thickness. The maximum radioactivity of 620 cps occurs in the oolitic section near the contact of the chocolate shale.

Summary of the OT Section

Analysis

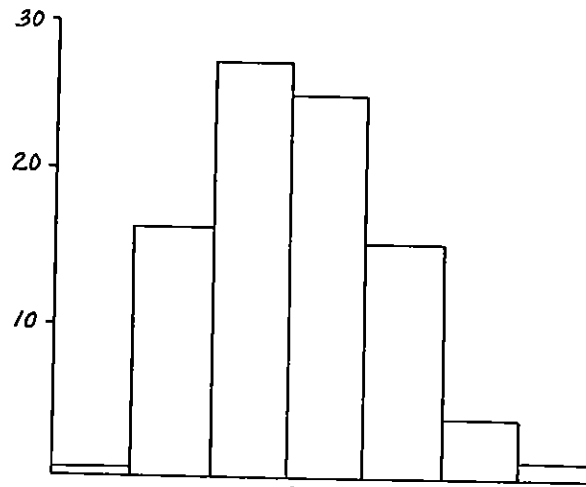
The OT Section assayed 21%  $P_2O_5$  over .5 meters with low values of Uranium and Vanadium.

Zone Geometry

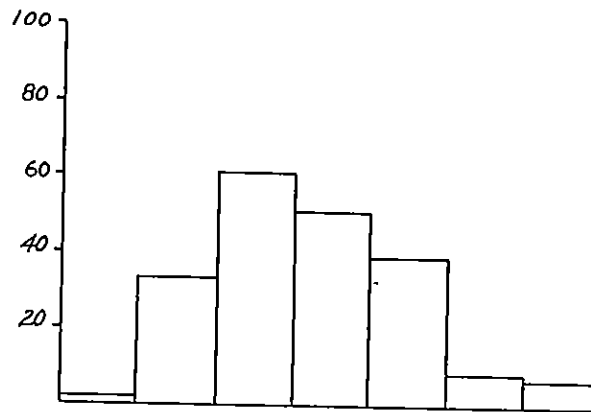
The OT Section is overturned, possibly part of the major overturned synclinal structure that parallels the mountain over the length of the property.

This area was not intensively prospected.

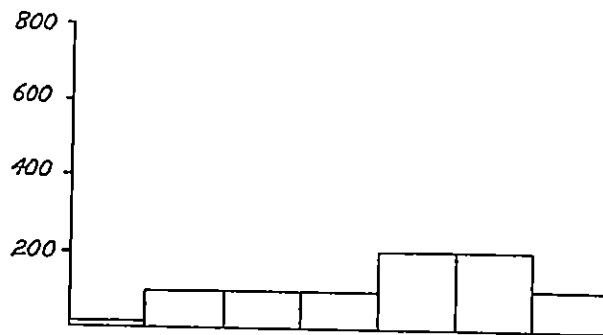
# ANALYSIS OF OT SECTION



P<sub>2</sub>O<sub>5</sub> %



U<sub>3</sub>O<sub>8</sub> ppm



V ppm

OT Sample

1 2 3 4 5 6 7

SP SECTION

## Summary of the SP Section

### Analysis

The SP section assayed 26.04%  $P_2O_5$  over 1 meter with low values of Uranium and Vanadium. The highest value of Uranium and Vanadium (70 and 200 ppm respectively) occur at the top of the phosphatic zone.

### Zone Geometry

The SP section is exposed along the main access road. Two sample sections were taken across the main phosphatic zone and a third through the upper shales. The zone is interpreted as proximal to the southern extension of the Cat Creek thrust. See diagramatic section "B-B".



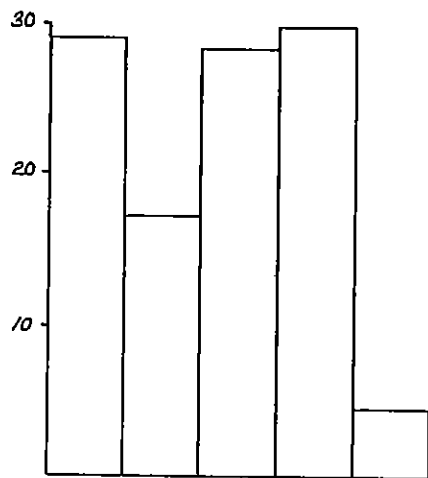
### GEOLOGICAL DESCRIPTION

The phosphatic section of the SP location strikes 310° and dips 10° to the west.

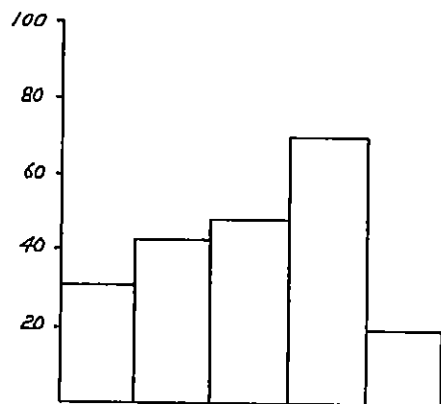
The base of the section is light gray, finely laminated silty limestone of undetermined thickness. The black limestone is overlain by 1 meter of medium to poorly indurated oolitic phosphate. The phosphatic zone is overlain by dark chocolate brown shales of undetermined thickness.

The maximum radioactivity of 860 cps noted in the section occurs in the oolitic phosphate 25 cm below the upper shale contact.

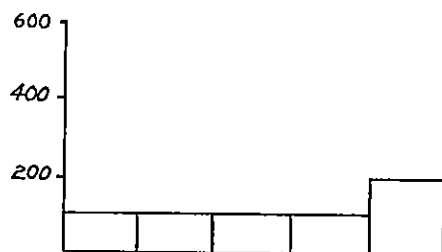
# ANALYSIS OF SPB SECTION



P<sub>2</sub>O<sub>5</sub> %



U<sub>3</sub>O<sub>8</sub> ppm



V ppm

SPB Sample

1 2 3 4 5

SQ SECTION

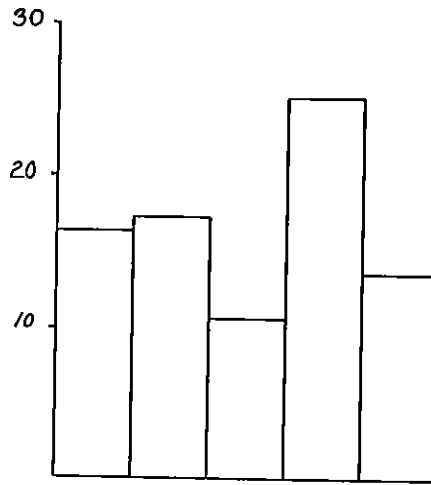
### GEOLOGICAL DESCRIPTION

The phosphatic section as exposed in the SQ section strikes 310° and dips 25° west. The base of the section is laminated silty limestone of undetermined thickness immediately overlain by 90 cm of black oolitic phosphate in turn overlain by chocolate brown shales of undetermined thickness. The maximum radioactivity occurs in the upper portion of the oolitic section near the contact with the chocolate shales.

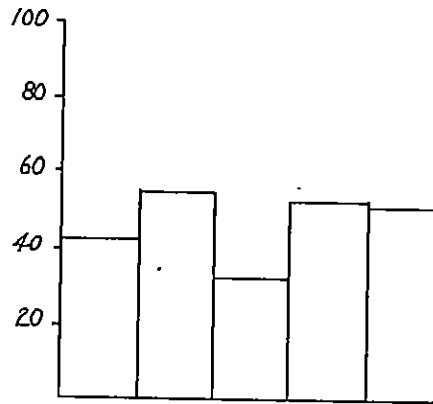


Plate XIII The SQ Section

# ANALYSIS OF SQ SECTION



P<sub>2</sub>O<sub>5</sub> %



U<sub>3</sub>O<sub>8</sub> ppm



V ppm

SQ Sample

1 2 3 4 5

LT SECTION



## Summary of the LT Section

### Analysis

The LT Section assayed 13.68%  $P_2O_5$  over a distance of 2.5 meters with low association values of Uranium and Vanadium.

### Zone Geometry

The LT Trench represents a tectonically improved thickness of the phosphatic zone. Minor thrusting has served to improve the overall true width. However, the phosphatic zone is unusually silty, similar to the lower grade JB33 section and thus is not as attractive as a 2.5 meter thickness elsewhere on the property.






# LT - SECTION

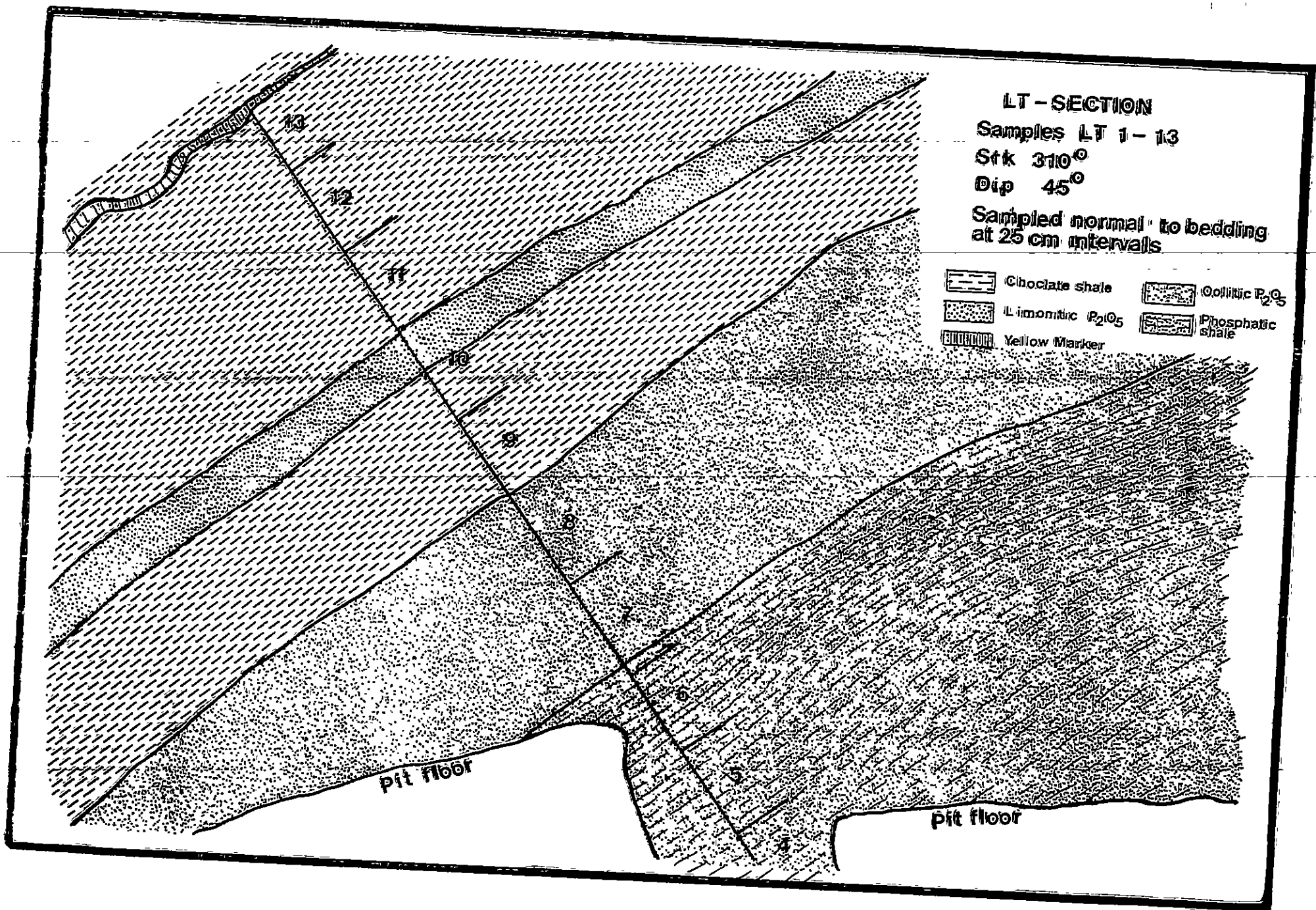
Samples LT 1 - 13

Stk 310°

Dip 45°

Sampled normal to bedding  
at 25 cm intervals

- |   |   |   |                                       |
|---|---|---|---------------------------------------|
|  | Chocolate shale                         |  | Colitic P <sub>2</sub> O <sub>5</sub> |
|  | Limonitic P <sub>2</sub> O <sub>5</sub> |  | Phosphatic shale                      |
|  | Yellow Marker                           |   |                                       |





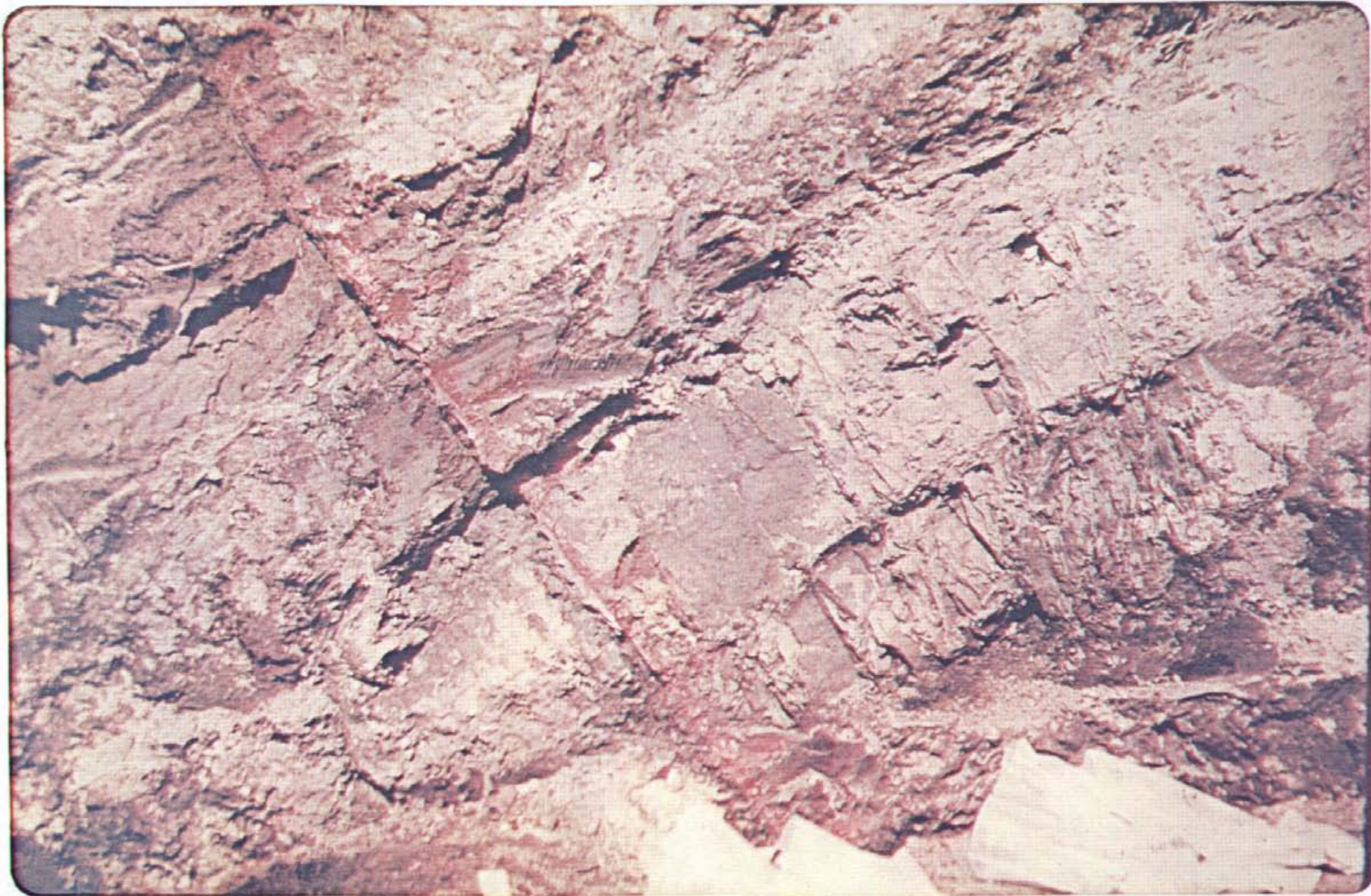


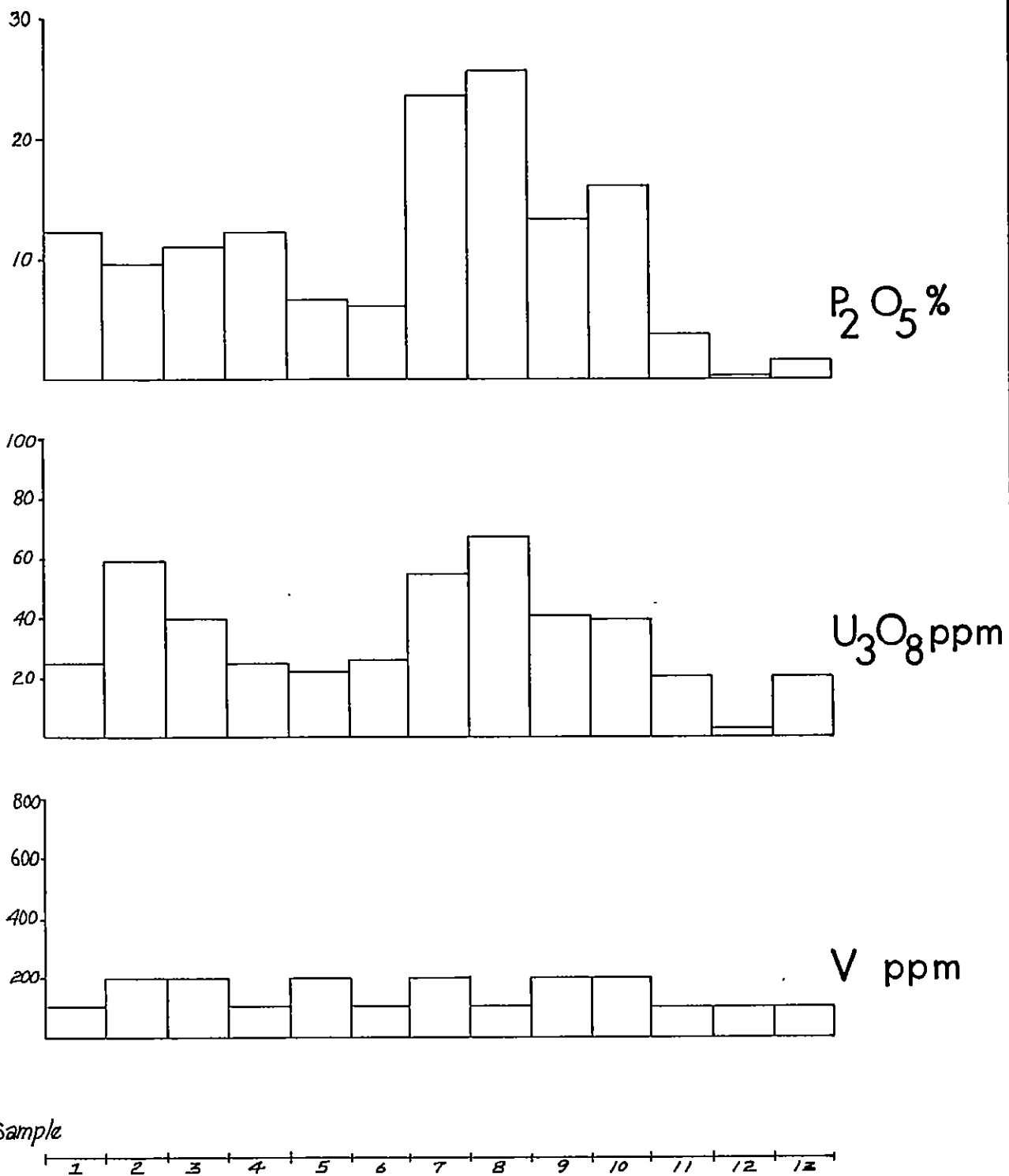
Plate XIV The LT Section

### GEOLOGICAL DESCRIPTION

The phosphate section as exposed at the LT trench strikes  $310^{\circ}$  and dips  $35 - 45^{\circ}$  south.

Some minor thrusting is evident in the trench walls generating a tectonically improved thickness. The lowest exposure in this section was 25 cm of dense black phosphate and limonite overlain by 25 cm of black shales. The thin black shale was overlain by 1.5 meters of medium to poorly indurated sandy oolitic phosphate. The oolitic section is overlain by 50 cm of chocolate shale that is overlain by a 10 cm band of oolitic phosphate. 75 cm of chocolate shale overlies the thin phosphate and are capped by a 2 cm yellow marker band. Maximum radioactivity was measured at the base of the first oolitic zone at 900 cps.

# ANALYSIS OF LT SECTION



SCI SECTION

## Summary of the SCI Section

### Analysis

The section is structurally complex. One 25 cm interval averaged 32.3%  $P_2O_5$  with 60 ppm  $U_3O_8$  and 200 ppm Vanadium.

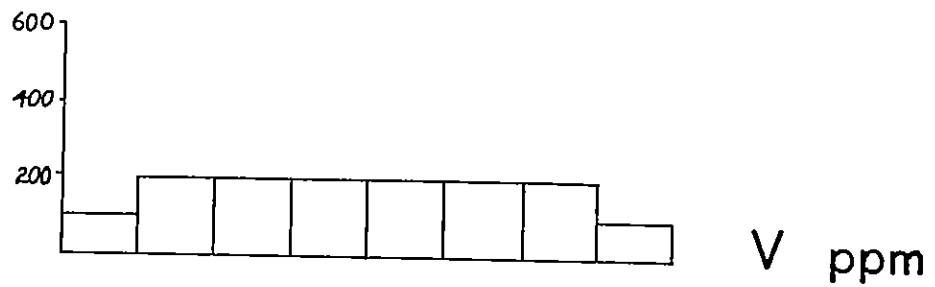
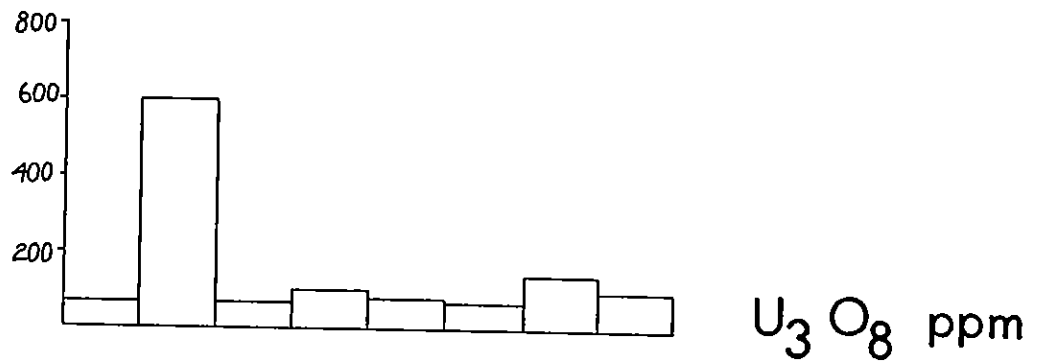
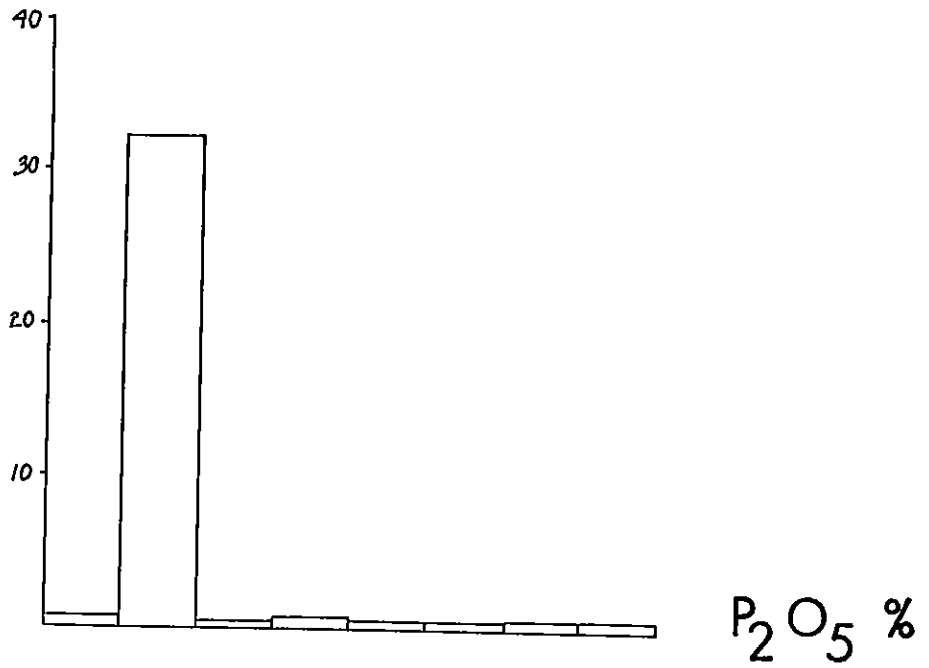
### Zone Geometry

The base of this section was not exposed at this location. The trench exposed a series of black shales, dense phosphate and back into black shales. This section has been complicated by major thrusting and possibly off-setting normal faults.

Five trenches were dug in an attempt to locate an undisturbed section. However, they either bottomed out in black shale or were abandoned due to excessively thick overburden.

This area was located very late in the season, hence limited prospecting and no detailed geological mapping was undertaken.

# ANALYSIS OF SCI SECTION



SCI Sample

1 2 3 4 5 6 7 8



ZIP TRENCHES

### SUMMARY OF THE ZIP TRENCHES 1 THROUGH 3

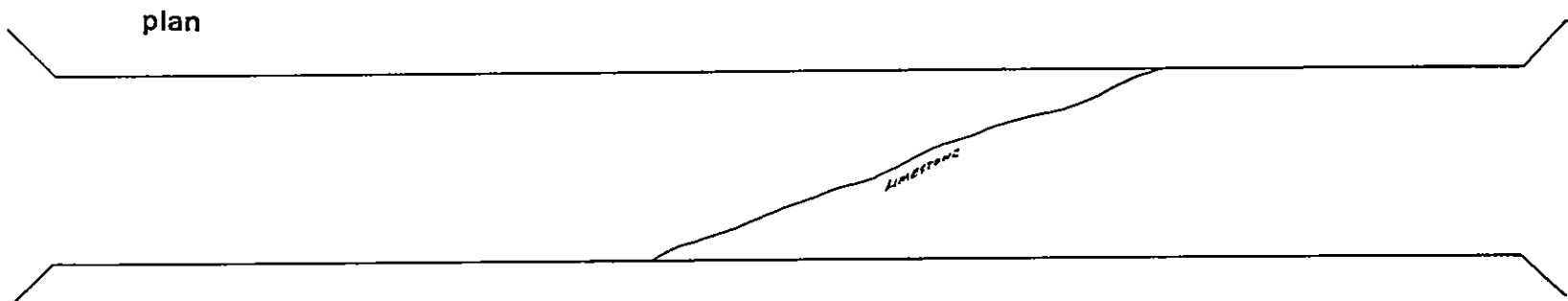
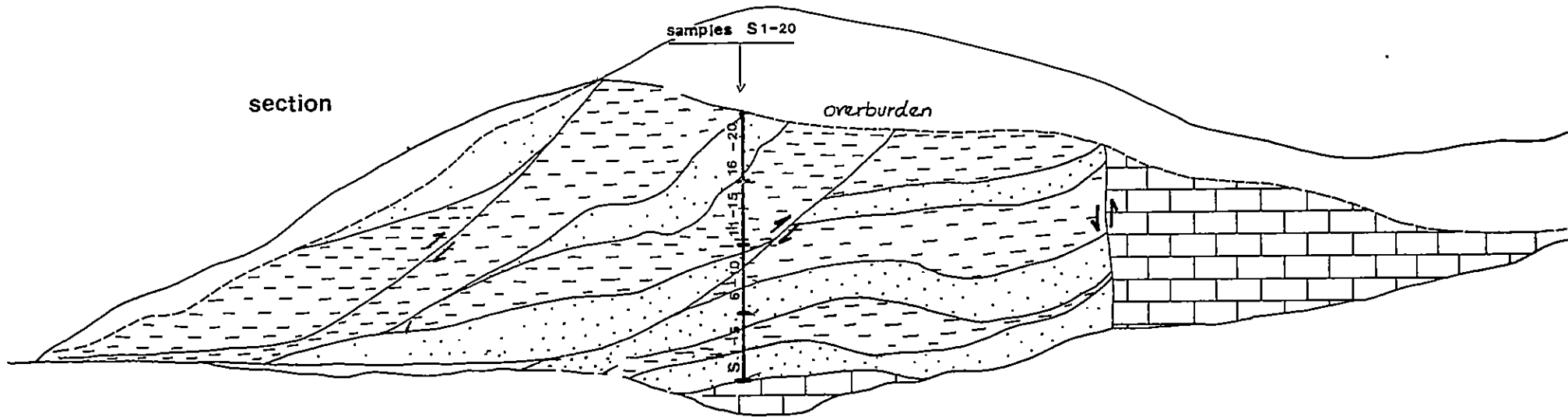
The number 1 trench was initially dug in 1980. During the 1981 season this trench was cleaned out and deepened an additional 3 meters to a total depth of 7 meters. Trenches 2 and 3 were dug in 1981. The mineralized zones vary in complexity, one should refer to the sketches provided.

#### Trench 1

Analysis of the Trench 1 yielded 20.57 percent  $P_2O_5$  over 2 m as the section sketches indicate this would vary considerably depending upon the location selected for the chip sample due to the extreme complexity of this zone.

This zone consists of three relatively flat lying repetitions of the basal phosphate zone each separated by 1 to 2 meters of black shale, at the southern end of the trench. This triple duplication is truncated by a normal fault, basal limestone being the up thrown block relative to the phosphate. In the Northern Section of the trench the triple duplication is overridden by a basal phosphate bed that has been thrust over the triple duplication.

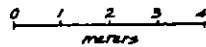
# TRENCH 1



3 PHOSPHATIC ZONES

## LEGEND

-  Limestone
-  Colitic Phosphate
-  Black Shale

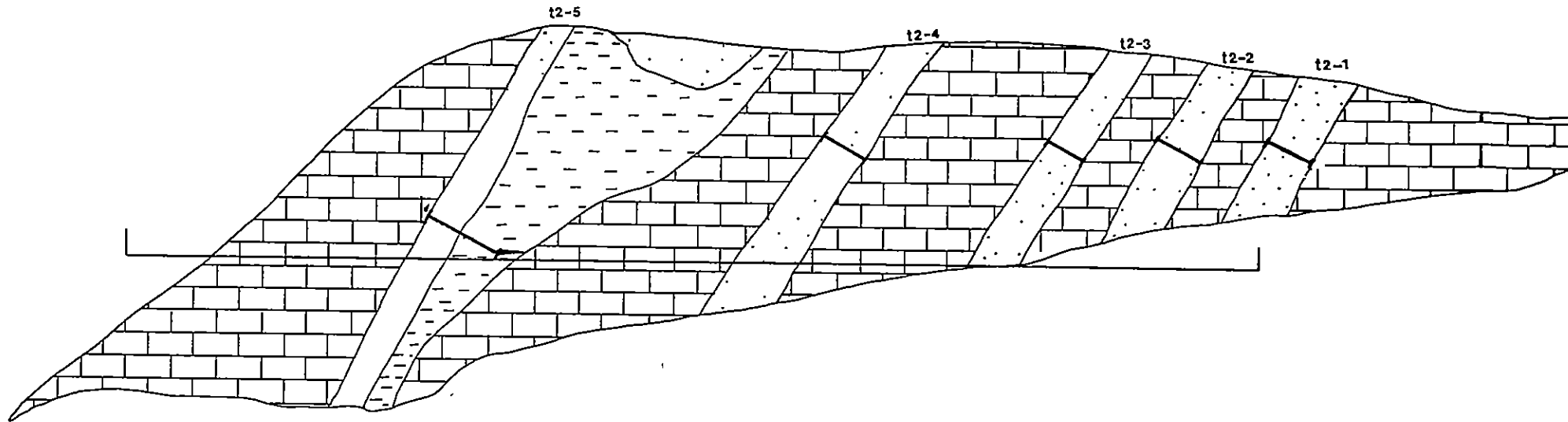


FIRST NUCLEAR CORPORATION

PROJECT: MORRIS CREEK  
TRENCH I




Dwg. No. N.T.S. Scale: 1cm=1m Date: Drawn By: pmv Checked By: gh

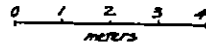
# TRENCH 2



5 PHOSPHATIC ZONES

## LEGEND

-  Limestone
-  Oolitic Phosphate
-  Black Shale



FIRST NUCLEAR CORPORATION

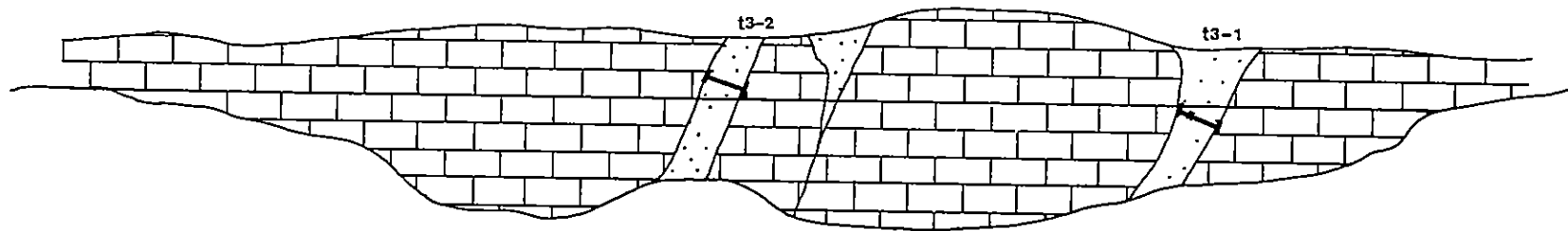
PROJECT: MORRIS CREEK

TRENCH 2

Dwg. No. Scale: 1cm=1m Drawn By: pmv

N.T.S. Date: Checked By: gh

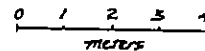
# TRENCH 3



3 PHOSPHATIC ZONES

## LEGEND

-  Limestone
-  Oolitic Phosphate



FIRST NUCLEAR CORPORATION

PROJECT: MORRIS CREEK  
TRENCH 3

Dwg. No.      Scale: 1cm = 1m      Drawn By: pmv  
N.T.S.      Date:      Checked By: gh

### Trench 2

Here the mineralized zone consisted of a stack of 5 duplications of the phosphate zone each approximately 1 m thick separated by 1 - 2 m of black shale. The best assay width relationship came from T2-2 second bed of the 5. It assayed 24.97%  $P_2O_5$  over 1 m.

### Trench 3

This trench was located on the access road to Trench 2 approximately equidistant from 1 and 2. Here 3 duplications of the phosphatic zone occur separated by 2 - 3 m of black limestone. The best assay width relationship came from T3-2, the second bed of the 3. It assayed 19.72%  $P_2O_5$  over 1 meter.

## GEOLOGICAL INTERPRETATION

The Zip Claims are underlain by an east plunging syncline of Mesozic sediments including the Fernie formation, all intruded by a stock like trachyte body of cretaceous age (Price, 1965).

The trachyte is interpreted to be discordinate and concordinate within the Fernie formation. (This report page 15.)

The structural thickening exhibited in the Zip trenches may well be a product of tectonic forces related to synclinal development AND plastic deformation induced by the development of the concordinate trachyte sill. However, comparing the observed data in the Zip trenches to earlier reports (Telfer, 1933) it seems apparent that similar thickening occurs where structural forces related to thrusting are the only source of deformation.

## INTERPRETATION

### Historical Background

The Fernie Basin has been the subject of investigation by several exploration ventures since Cominco's Regional Assessment of the 1930's. In the Cominco report (L. Telfer, 1933) most of the research was conducted (for obvious logistical reasons) in close proximity to the railway system of the Crow's Nest Pass. In the Pass Region, the phosphatic beds are subject to severe structural complications. Here the steep attitude of bedding and poor hanging wall stability of the upper shales combined to complicate mining procedures and the area was "written off" in favor of American phosphate deposits.

A major assessment program was carried out by Western Co-op Fertilizers in the 1960's. However, no reports were filed with the B.C. Department of Mines or formally published. However, the company moved to purchase a fifty percent interest in an American phosphate mine near Soda Springs, Idaho.

Esso Minerals conducted a rather cursory assessment of the area of the Cab Claim Group in 1978. (B.C. Mineral Resources Branch Pac 18). Thirty-three holes were drilled for a total of 430 meters. Drilling was conducted along major access roads. No regional prospecting programs were reported.



The total cost of the project was \$25,000. A total of five holes were assayed, the others failed to intersect the proper stratigraphy. The best intersection was .8 m of 21.8%  $P_2O_5$ .

#### BACKGROUND OF THE CANADIAN PHOSPHATE INDUSTRY

Appendix VI illustrates Canadian imports of phosphate rock since 1955. An obvious exponential relationship exists; this is due to the increased fertilizer consumption and the development of the Canadian fertilizer secondary processing industry based on abundance of Canadian sulfur and natural gas.

Appendix VII illustrates the price through time relationship for 29% phosphate rock. Prices are quoted along side ship Tampa, Florida. From the table the relative price increases can be seen, over the seven year period from 1973 - 1980, the price of phosphate rock has increased over 650%.

## INTERPRETATION OF DATA

It is hoped that this study (the first such comprehensive work to be recorded in the area will form the basis for detailed studies that will inevitably follow in the future, as on land phosphate reserves become depleted on the North American Continent.

During this program a total of 18 measured sections through the phosphatic basal Fernie were described and evaluated by First Nuclear geologists, in addition approximately 27 kilometers of the phosphatic zone exposed along the erosional edge of the Crow's Nest Basin was prospected, sampled and mapped.

The average zone thickness appears to be 1 - 1.5 meters. Some variation in grade due to conditions of primary sedimentation is apparent. Sections exhibiting a silty nature of the basal oolitic zone generally averaged 13 - 20%  $P_2O_5$ . Elsewhere silt free gritty oolitic phosphate averaged 21% to 29%.

The phosphatic exposures are, for convenience divided into four areas.

### Area 1

Consists of the showings, AB, BA, SO, SQ, LT, CS, STS, JB-33, the phosphatic zone generally averages 18 - 20% in these areas.

### Area 2

Consists of the DS Section and the DS West zone here relatively low grades of basal phosphate (17% over 1 meter) are overlain by 5.6 m of silty phosphate shale averaging 143 ppm and 471 ppm Vanadium. Grab samples containing as high as 531 ppm  $U_3O_8$  have been found while prospecting the zone that exceeds 4 km in length.

### Area 3

Consists of showing RAM "A" and "B" and SCI. Here grades of 23% over 1.5 meters occur. Phosphate values up to 32% occur in the SCI trench. However, the area is extremely structurally complex and a complete section through this zone could not be located.

### Area 4

This area comprises the TB Section and although was not located on the ground east of the SCI location, a strong airborne radiometric signature indicated its presence. This zone generally dips east and may be formed under differing conditions from the rest of the basin due to the major thrusting that has occurred in the area. The TB Section is the only data available in this zone, its average grade being 29.7% over 1.9 meters. Boulders assaying in excess of 30%  $P_2O_5$  were located while attempting to extend the TB Section along strike.

## RECOMMENDATIONS AND CONCLUSIONS

This preliminary study of the Fernie Basin indicates that economic grades up to or exceeding 30%  $P_2O_5$  of phosphate rock are present on the Cab claims occurring within the basal portion of the Fernie Formation.

Studies conducted by Cominco (Telfer 1933) show that the phosphatic portion of the Fernie Formation is tectonically remobilized into the axial portions of synclines within the Fernie Formation. This process of tectonic thickening was first described by Telfer (1933)

"... the incompetent Fernie shale tend to flow and crumble, the phosphatic seam ... leaves its footwall and follows the Fernie shale to pile itself up in areas relatively free from stress".

On the property, this process is illustrated in the BA-AB structure. Here in an overturned syncline the phosphate section is doubled (2 meters) on the up right arm relative to the overturned arm (1 meter).

The BA-AB syncline is not economically viable

due to its relatively small size, however it serves to illustrate that the process of structural thickening occurs in the Basal Fernie on the claim group. Telfer refers to structurally produced thickening in the order of 31 meters in one instance.

Large scale structures presumably would have a greater capacity to produce tectonic thickening of the phosphatic zone.

The largest and most prospective structure in the area occurs along the Western Margin of the property where intensified thrusting has produced a single or possibly a series of recumbent synclines approximately 20 km in length. The grade of the up right arm as seen . . . . in the DS trench is approximately 1 m of 18%  $P_2O_5$ . Exposures of the overturned arm contained only a few centimeters of  $P_2O_5$ .

Evaluation of the Western Margin syncline could be obtained by the application of a refraction seismic survey. This method was successfully applied in similar circumstances to evaluate phosphate on claims in the Flat Head Pass held by Western Warner Oils in 1975. (Dornian

Consultants, B.C. Assessment Report 5056). The average velocity of the underlying Spray River Formation was reported to be 12,000 ft/sec while the Fernie Formation reportedly has a velocity of 4,000 to 7,000 ft/sec. This velocity differential is substantial and may aid in defining structural irregularities relating to this syncline.

Any further program of evaluation on the phosphate potential of the Cab Claims should include:

1. Investigation of the Western Margin syncline by means of a series of seismic profiles run normal to the structural trend in order to establish the relative position and depth of the synclinal axis.
2. A drilling program should be initiated to test the targets as defined by the seismic survey, the extent of which should be contingent upon the seismic targets defined.

STATEMENT OF EXPENDITURE FOR ASSESSMENT CREDIT

To facilitate accounting procedures the program expenditures have been computerized. The four character project expense code preceeding each major item is arbitrarily assigned by First Nuclear Accountants to gain access to particular catagories of exploration expense.

I. SALARIES:

1060 Salaries permanent staff

G. Hartley	6 months @ \$3,416/mo	\$20,500		
R. Tilsley	3 months @ \$2,750/mo	\$ 8,250		
J. Brophy	1 month @ \$2,750/mo	2,750		
	TOTAL	\$31,500	.....	\$31,500

1061 Salaries temporary staff - - - - -

J. Slater	1 month @ \$2,500/mo	\$ 2,500		
J. Hooper	1 month @ \$1,800/mo	\$ 1,800		
J. Gardiner	1 month @ \$1,800/mo	\$ 1,800		
E. Yeates	4 months @ \$2,300/mo	\$ 9,200		
L. Bakker	3 months @ \$1,200/mo	\$ 3,600		
T. Fleur	3 months @ \$1,200/mo	\$ 3,600		
A. Felker	3 months @ \$1,200/mo	\$ 3,600		
P. Hill	3 months @ \$1,200/mo	\$ 3,600		
G. McKean	24 days @ \$1,200/mo	\$ 960		
B. Hartley	3.24 mo @ \$2,000/mo	\$ 6,500		
	TOTAL	\$37,160	.....	\$37,160
				<u>\$68,660</u>

Balance forward ..... \$68,660.00

II. FOOD AND ACCOMMODATION

1054	Camp expenses	\$19,824.50	
1045	Trailer Rental	\$13,601.87	
1052	Travel/sustenance	\$54,551.37	
		<hr/>	
		\$87,977.74	..... \$87,977.74

III. TRANSPORTATION

1040 Vehicles

1	4x4 truck @ \$1000/mo for 6 mos	\$ 6,000.00	
2	4x4 trucks @ \$1000/mo for 1 mo	\$ 2,000.00	
3	4x4 trucks @ \$1000/mo for 4 mos	\$12,000.00	
	Excess mileage of vehicles	\$ 1,380.50	
		<hr/>	
		\$21,380.50	

1056 Vehicle costs

	Repairs and clean up charges	\$ 8,012.98	
		<hr/>	
		\$29,393.52	..... \$29,393.48

IV. EQUIPMENT RENTAL

1041	Equipment	\$33,458.81	
1071	Equipment Rental	\$ 2,887.41	
		<hr/>	
		\$36,346.22	..... \$36,346.22

SUB TOTAL ..... \$222,377.44



Balance Forward .. \$222,377.44

V. ASSAY COSTS

1028 Analytical

625 P<sub>2</sub>O<sub>5</sub> @ \$11.00 \$ 6,875

532 U<sub>3</sub>O<sub>8</sub> @ \$11.50 \$ 6,118

532 V @ \$13.00 \$ 6,916

freight \$ 136.95

\$20,045.95 ..... \$20,045.95

VI. PHOTOGRAPHY AND REPRODUCTION

1020 Photography

\$ 7,181.75 ..... \$ 7,181.75

VII. LICENCE FEES

1051

\$ 245.00 ..... \$ 245.00

VIII. DELIVERY, FIELD OFFICE SUPPLIES, FREIGHT CHARGES

1055

\$ 2,344.20 ..... \$ 2,344.20

IX. ENVIRONMENTAL RECLAMATION

1029

\$11,450.00 ..... \$11,450.00

GRAND TOTAL ..... \$263,644.34

REFERENCES

- ECONOMIC GEOLOGY BULLETIN. B.J. Skinner, Ed., March 1979,  
Vol. 74, Number 2.
- FREEMAN, M.R., 1980. Phosphate Rock Mining Annual Review,  
1980, pp 113 - 115.
- MINERAL BULLETIN. MR 160, Phosphate Mineral Policy  
Series, Energy Mines and Resources  
Canada.
- PRICE, R.A., 1965. Flathead Map Area, British Columbia  
and Alberta, GSC Mem. 336.
- TELFER, L., 1933. Phosphate in the Canadian Rockies, Trans.  
Can. Inst. Min. Met. Vol. 36, pp 566 - 605.

PERSONNEL EMPLOYED ON THIS PROJECT

G. Hartley	Project Supervisor	January 1981 - January 1982
R. Tilsley	Senior Geologist	May 21 - August 22
J. Brophy	Senior Geologist	May 30 - June 30
J. Slater	Geologist	May 30 - June 30
J. Hooper	Geologist	May 30 - June 30
J. Gardiner	Geologist	May 30 - June 30
E. Yeates	Prospector	May 1 - August 30
L. Bakker	Assistant	June 2 - August 30
T. Fleur	Assistant	June 2 - August 30
A. Felker	Assistant	June 2 - August 30
P. Hill	Assistant	June 2 - August 30
G. McKean	Assistant	June 17 - July 10
B. Hartley	Cook	May 21 - August 30

CERTIFICATE

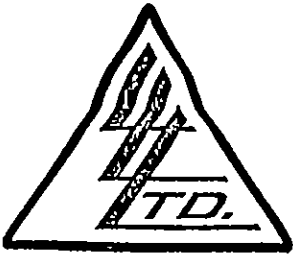
I, Glenn Stafford Hartley, of 7302 - 118A Street,  
Edmonton, Alberta, do hereby state that:

1. I am a registered Professional Geologist in the Province of Alberta.
2. I am employed as a Senior Geologist by First Nuclear Corporation.
3. I am a member of the Canadian Institute of Mining and Metallurgy.
4. Since 1970 I have been employed by various exploration companies and have participated in exploration programs in Alberta, Saskatchewan, British Columbia, Yukon and the Northwest Territories.
5. First Nuclear and Triple Five Corporations are, to my knowledge, private companies in which I have no shares or interests.
6. The information contained herein is based on a personal evaluation of the property.

Respectfully submitted.

  
Glenn S. Hartley, P. Geol.

APPENDIX I



# LORING LABORATORIES LTD.

Phone 274-2777

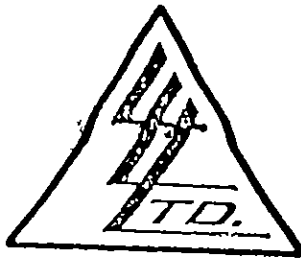
629 Beaverdam Rd. N.E.  
Calgary 67, Alberta

## P205 ASSAY

- Weigh suitable amount of sample into 250 ml beaker.
- Dissolve in nitric acid and Potassium Chlorate crystals.
- Add 5 cc HCl and evaporate to dryness.
- Filter, wash with hot H<sub>2</sub>O.
- Neutralize excess HNO<sub>3</sub> with NH<sub>4</sub>OH.
- Add slowly 50 cc of molybdate mixture at 65°C.
- Settle until room temperature.
- Filter through filter paper.
- Place paper in beaker, add hot H<sub>2</sub>O, boil and titrate hot with N NaOH or  $\frac{N}{5}$  NaOH depending on the amount of phosphorous present.
- Use U.S. Bureau of Standards, Tennessee Rock Sample # 58 (31.33 P205)

APPENDIX II

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 21745  
 Date July 6, 1981  
 Samples Chip

ATTN: Glenn Hartly

**Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.**

Page # 1

SAMPLE No.	Chemical PPM U308	% P205	% V
1	24.0	.65	Trace
2	33.7	4.03	Trace
3	64.0	6.33	Trace
4	37.7	12.76	.01
5	68.0	15.77	.01
6	80.5	22.77	.01
7	70.0	28.74	.01
8	186.	30.14	.01
9	78.3	30.60	.01
10	94.7	31.32	.01
11	122.	31.29	.01
12	84.9	31.33	.01
13	186.	31.65	.01
14	29.3	.10	.01
15	22.8	.20	.01
16	13.0	.23	.01
17	24.2	Trace	.01
18	16.5	.23	.01
19	23.8	.32	.01
20	18.1	.14	.01

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

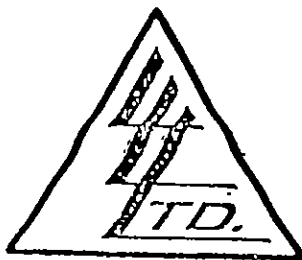
Rejects Retained one month.  
 Pulps Retained one month  
 unless specific arrangements  
 made in advance.

*D. Eichel*

Assayer



To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4  
 ATTN: Glenn Hartly



File No. 21745  
 Date July 6, 1981  
 Samples Chip

Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.

Page # 2

SAMPLE No.	Chemical PPM U308	% P205	% V
TB-21	28.5	2.21	.02
22	8.3	.26	.01
23	12.1	.24	.01
24	14.9	.30	.01
25	11.1	.46	.01
26	12.4	.40	.01
27	14.0	.58	.02
28	12.1	.78	.01
29	10.2	.95	.01
30	6.4	.49	.01
31	9.8	.53	.01
32	49.7	.24	.01
33	10.7	.05	Trace
34	14.1	.07	Trace
CS- 1	3.3	.22	Trace
2	6.3	.20	Trace
3	1.1	.08	Trace
4	10.4	.92	Trace
5	39.6	9.71	.01
6	21.7	12.35	.01
7	55.2	26.78	.01

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.  
 Pulp Retained one month  
 unless specific arrangements  
 made in advance.

*D. Enders*

Assayer

TO: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. .... 21745  
 Date .... July 6, 1981  
 Samples .... Chip

TTN: Glenn Hartly

**Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.**

Page # 3

SAMPLE No.	Chemical PPM U308	% P205	% V
CS- 8	69.3	29.03	Trace
9	36.9	13.00	.01
10	44.0	13.13	.01
11	130.	21.34	.03
12	73.9	5.88	.05
13	20.0	.35	.01
14	7.0	.20	.01
15	12.3	.40	.01
16	20.0	1.21	.02
17	18.2	.46	.02
18	8.9	.43	.02
19	9.5	.35	.02
20	12.3	.55	.01
JB 036- 2	121.	17.92	.01
5	99.7	23.62	.01
6	25.7	5.92	.01
7	70.8	12.80	.01
JB 046- 8	23.0	.51	Trace
JB 056-10	13.0	.42	Trace
JB 056-11	64.0	7.59	.01
13	20.8	.37	Trace

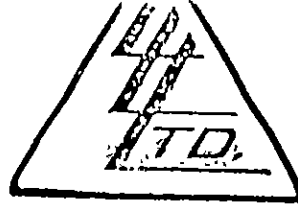
**I** *Hereby Certify* THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.  
 Samples Retained one month  
 unless specific arrangements  
 made in advance.

*P. Enders*

Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045, 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 21745  
 Date July 6, 1981  
 Samples Chip

ATTN: Glenn Hartly

Certificate of  
**ASSAY**  
 LORING LABORATORIES LTD.

Page # 4

SAMPLE No.	Chemical PPM U308	% P205	% V
JB 056-14	29.1	4.14	.01
17	93.5	15.30	.01
18	62.1	29.92	.01
19	51.4	11.77	.01
JB 315- 1	37.1	3.73	Trace
GS 016- 1	13.7	.77	.02
GS 026- 1	27.8	.20	.01
GH 076- 6	20.3	11.89	.01
JH 036- 1	165.	20.34	.01
2	163.	20.68	.01
JS 036- 1	62.2	28.68	.01
JS 056- 1	93.5	27.74	.01
2	22.1	5.14	Trace
3	17.8	.41	.01

**I Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

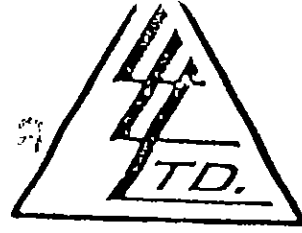
Rejects Retained one month.  
 Samples Retained one month  
 unless specific arrangements  
 made in advance.

*D. E. [Signature]*

Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4

File No. 21783  
 Date July 8, 1981  
 Samples Rock Chip



ATTN: Glenn Hartly

*Certificate of*  
**ASSAY**  
**LORING LABORATORIES LTD.**

Page # 1

SAMPLE No.	Chemical PPM U308	% P205	% V
<u>"Rock Chips"</u>			
TF10-6-81-1	223.0	2.83	.07
AF10-6-81-2	98.0	7.27	.04
TF 116- 1	27.0	.25	.02
PH 116- 1	82.0	8.85	.02
2A	15.3	.25	.02
2B	7.0	.17	.02
3	16.3	.25	.02
4	10.0	.33	.01
JS 096- 1	92.4	25.90	.02
2	57.1	25.01	.02
JS 106- 1	62.7	22.43	.01
2	73.4	26.05	.02
3	75.1	25.21	.02
JS 116- 1	21.4	6.62	.01
2	10.4	1.65	.01
3	17.4	.87	Trace
4	59.1	26.22	.02
JB 086-20	8.0	.24	.01
21	34.2	2.86	.02
JB 093-23	23.9	.38	.02

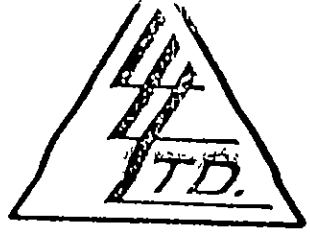
**I** *Herby* **Certif** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Projects Retained one month.  
 Samples Retained one month  
 unless specific arrangements  
 made in advance.

*D. Enells*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4

File No. 21783  
 Date July 8, 1981  
 Samples Rock Chip



ATTN: Glenn Hartly

**Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.**

Page # 2

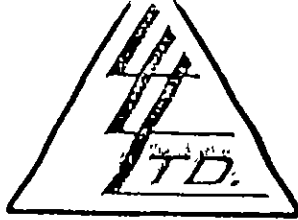
SAMPLE No.	Chemical PPM U308	% P205	% V
JB 096-22	157.0	26.07	.03
24	21.1	6.63	.01
25	25.4	2.33	.01
26	110.0	10.56	.01
27	59.8	28.01	.02
28	71.6	27.96	.02
29	157.0	19.63	.01
30	23.1	2.70	.01
JH 096- 1	67.1	22.89	.02
JH 106- 1	79.9	21.33	.02
GH 096- 1	531.0	11.79	.06
2	64.9	10.60	.02
JH 116- 1	66.0	12.69	.02
LFB6-11-2	1.8	.04	.02
C520- A	14.4	.35	.02
EY086- 1	57.5	30.55	.03

**I** **Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Specs Retained one month.  
 unless specific arrangements  
 made in advance.

*[Handwritten Signature]*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. ... 21951 ...  
 Date ... July 23, 1981  
 Samples ... Rock Chip

○ TN: Glenn Hartly

Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.

Page # 1

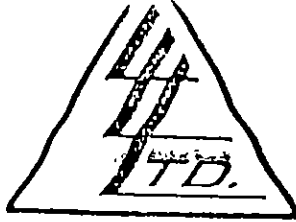
SAMPLE No.	% P205
<u>"Rock Chips"</u>	
DS- 1	1.18
2	6.33
3	9.05
4	9.94
5	16.66
6	22.70
7	24.31
8	24.32
9	5.37
10	12.40
11	4.75
12	4.11
13	3.26
14	4.59
15	12.78
16	4.17
17	1.31
18	.89
19	1.04
20	1.93

**I** Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

○ Retained one month.  
 Purps Retained one month  
 unless specific arrangements  
 made in advance.

*[Handwritten Signature]*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 21951  
 Date July 23, 1981  
 Samples Rock Chip

CTN: Glenn Hartly

Certificate of  
**ASSAY** of  
**LORING LABORATORIES LTD.**

Page # 2

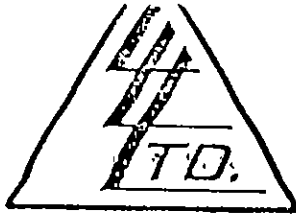
SAMPLE No.	%
	P205
DS-21	1.94
22	2.80
23	1.94
24	3.94
25	2.37
26	8.58
27	7.83
28	3.47
29	8.35
30	7.69
31	4.34
32	5.82
33	2.06
34	.57
35	.70
36	.54
37	.77
38	.63
39	.66
40	1.83
41	.94

**I** **Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Results Retained one month.  
 Reports Retained one month  
 unless specific arrangements  
 made in advance.

*R. J. [Signature]*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. 21951  
Date July 23, 1981  
Samples Rock Chip

ATTN: Glenn Hartly

Certificate of  
ASSAY OF  
LORING LABORATORIES LTD.

Page # 3

SAMPLE No.	% P205
DS-42	.50

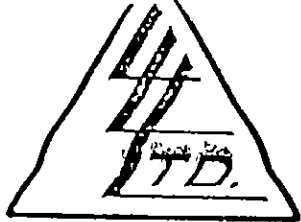
I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Objects Retained one month.  
Copies Retained one month  
unless specific arrangements  
made in advance.

*G. J. M. Joann*  
Assayer



To: FIRST NUCLEAR CORP. LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. 21951-1  
Date August 5, 1981  
Samples Rock Chip

ATTN: Glenn Hartly

Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page # 1

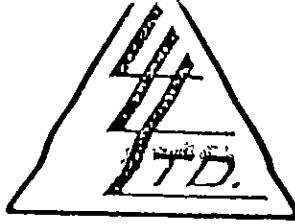
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<u>"Rock Chips"</u>	
DS- 1	153.
2	348.
3	203.
4	183.
5	160.
6	200.
7	173.
8	177.
9	91.7
10	153.
11	130.
12	137.
13	144.
14	126.
15	116.
16	137.
17	85.5
18	85.9
19	137.

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Copies Retained one month.  
Copies Retained one month  
unless specific arrangements  
made in advance.

*D. Crokes*  
Assayer

To: FIRST NUCLEAR CORP. LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. . 21951-1.....  
Date . . . August 5, 1981  
Samples Rock Chips . . . . .

ATTN: Glenn Hartly

Certificate of  
ASSAY OF  
LORING LABORATORIES LTD.

Page # 2

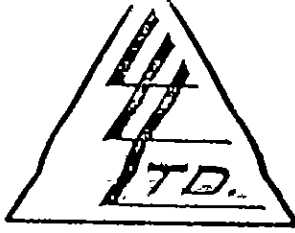
SAMPLE No.	Chemical PPM U308
DS-20	85.3
21	86.9
22	95.9
23	74.7
24	153.
25	100.
26	227.
27	153.
28	120.
29	203.
30	117.
31	112.
<u>32</u>	<u>109.</u>
33	53.9
34	65.4
35	47.1
36	49.3
37	34.2
38	51.4
39	30.6
40	19.0

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Samples Retained one month.  
Copies Retained one month  
unless specific arrangements  
made in advance.

*D. Crooks*  
Assayer

To: FIRST NUCLEAR CORP. LTD.  
1210, 10045 - 111th Street  
Edmonton, Alberta T5K 1K4



File No. 21951-1  
Date August 5, 1981  
Samples Rock Chip

ATTN: Glenn Hartly

Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page # 3

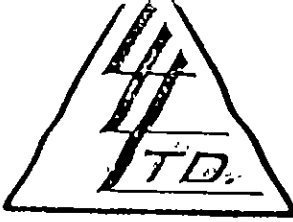
SAMPLE No.	Chemical PPM U308
DS-41	20.0
42	20.2

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Tests Retained one month.  
Pulps Retained one month  
unless specific arrangements  
made in advance.

*D. E. [Signature]*  
Assayer

To: FIRST NUCLEAR CORP. LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. 22951-2  
Date November 17, 1981  
Samples Rock Chip

IN: Glenn Hartly

Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page # 1

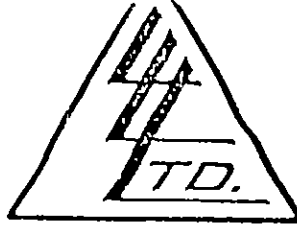
SAMPLE No.	% v
<u>"Rock Chips"</u>	
DS- 1	.01
2	.02
3	.02
4	.02
5	.01
6	.01
7	.01
8	.01
9	.02
10	.06
11	.08
12	.07
13	.08
14	.08
15	.07
16	.07
17	.07
18	.04
19	.05
20	.06

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Results Retained one month.  
Results Retained one month  
unless specific arrangements  
made in advance.

Assayer

To: FIRST NUCLEAR CORP...LTD.,  
 ...1210, ...10045 ...111th Street,  
 ...Edmonton, Alberta ...T5K 1K4...



File No. 22951-2  
 Date November 17, 1981  
 Samples Rock Chip

ATTN: Glenn Hartly

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page # 2

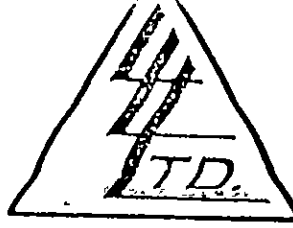
SAMPLE No.	% v
DS-21	.06
22	.08
23	.07
24	.08
25	.03
26	.08
27	.06
28	.03
29	.07
30	.03
31	.02
32	.04
33	.02
34	.02
35	.02
36	.02
37	.02
38	.02
39	.02
40	.02
41	.02

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Objects Retained one month.  
 Pulps Retained one month  
 unless specific arrangements  
 made in advance.

*[Signature]*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. ... 22951-2 ...  
Date ... November 17, 1981  
Samples . Rock Chip .....

ATTN: Glenn Hartly


Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page # 3

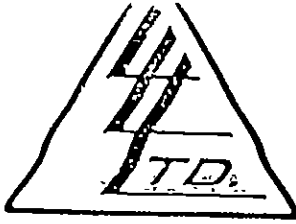
SAMPLE No.	% V
DS-42	.03

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Objects Retained one month.  
Pumps Retained one month  
unless specific arrangements  
made in advance.

  
Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. ... 21839  
 Date ... August 5, 1981  
 Samples ... Rock

ATTN: Glenn Hartly

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

1-15-81  
 24.11/81

Page # 1

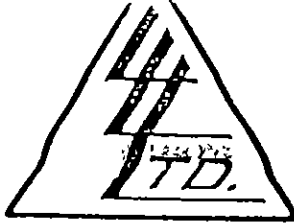
SAMPLE No.	% P205	% V
<u>"Rock Samples"</u>		
AB- 1	21.43	.02
AB- 2	25.60	.02
AB- 3	26.98	.01
AB- 4	25.30	.01
AB- 5	25.74	.02
AB- 6	20.03	.02
AB- 7	15.12	.02
AB- 8	18.84	.03
AB- 9	9.76	.03
AB-10	4.37	.03
AB-11	.58	.02
AB-12	.63	.02
BA- 1	.48	.01
BA- 2	.36	.01
BA- 3	.81	.01
BA- 4	5.24	.02
BA- 5	2.46	.03
BA- 6	15.73	.02
BA- 7	31.31	.02
BA- 8	27.21	.02

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Results Retained one month.  
 unless specific arrangements  
 made in advance.

*D. Enslin*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 21839  
 Date August 5, 1981  
 Samples Rock

Client: Glenn Hartly

Certificate of  
**ASSAY**  
**LORING LABORATORIES LTD.**

Page # 2

SAMPLE No.	% P205	% V
BA- 9	11.62	.01
GH-166- 1	16.79	.01
GH-166- 2	.27	.03
GH-176- 1	3.45	.01
GH-176-33	24.15	.01
GH-176- 3	24.32	.01
GH-176- 4	20.70	.01
GH-226-14	13.91	.01
EY-15-6-81-1	2.81	.03
EY-15-6-81-2	31.14	.01
EY-196- 1	27.46	.02
EY-226- 1	.98	.05
IB-256-31	.91	.01
JB-166-32	2.08	.01
JB-166-33	12.50	.01
JB-166-34	14.29	.01
JB-166-35	4.91	.01
JB-176-36	25.21	.01
JB-186-37	13.77	.02
JB-196-38	28.08	.01
JB-196-39	23.89	.01

**I** *Hereby Certify* THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Tests Retained one month.  
 Pulp Retained one month  
 unless specific arrangements  
 made in advance.

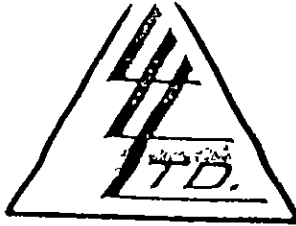
*D. Enokas*  
 Assayer



To: FIRST NUCLEAR CORP. LTD.

1210, 10045 - 111th Street,

Edmonton, Alberta T5K 1K4



File No. 21839

Date August 5, 1981

Samples Rock

By: Glenn Hartly

Certificate of  
ASSAY OF

LORING LABORATORIES LTD.

Page # 3

SAMPLE No.	% P205	% V
JB-196-40	24.60	.02
JB-196-41	24.92	.01
JB-196-42	25.48	.01
JB-196-43	.48	.03
JB-206-44	.35	.02
JB-206-45	30.70	.02
JB-226-46	26.94	.01
JH-166- 1	27.47	.02
JH-186- 1	7.75	.01
JH-206- 1	1.67	Trace
JH-226-1-H	17.41	.01
JH-226-2-H	19.29	.01
JH-226-3-H	30.13	.01
JH-226-4-H	27.58	.01
JH-226-5-H	28.37	.01
JH-226-6-H	30.06	.01
JH-226-7-H	27.88	.01
JH-226-8-H	5.42	.02
JH-226-9-H	29.55	.02
JS-116- 1	20.48	.01
JH-196- 1	18.30	.02

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Results Retained one month.  
Purposes Retained one month  
unless specific arrangements  
made in advance.

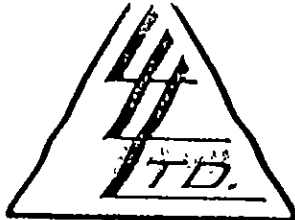
*P. Enders*

Assayer

To: ...FIRST NUCLEAR CORP. LTD. ...

1210, 10045 - 111th Street, ...

Edmonton, Alberta T5K 1K4



File No. . . . 21839 . . . . .

Date . . . . . August 5, 1981 . . . . .

Samples . . . . . Rock . . . . .

ATTN: Glenn Hartly

Certificate of  
ASSAY OF

LORING LABORATORIES LTD.

Page # 4

SAMPLE No.	% P205	% V
JS-226-1-L	.40	.02
JS-226-2-H	26.48	.01
JS-226-3-H	27.20	.01
MS- 1	.62	.01
SP-4-C	11.44	.03
SP-5-C	7.30	.02
SP-6-C	.52	.02
SP-7-C	.55	.02
SP-8-C	.35	.01
SP-9-C	.14	.01
MS- 2	16.96	.01
MS- 3	18.38	.01
MS- 4	6.88	.01
MS- 5	5.25	.01
MS- 6	15.87	.01
MS- 7	1.89	.01
MS- 8	.38	.01
MS- 9	.23	.01
MS-10	5.31	.03
MS-11	.33	.03
RT-20-6-1	.20	.01

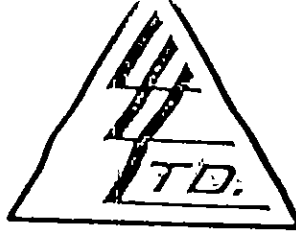
I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Tests Retained one month.  
Pulps Retained one month  
unless specific arrangements  
made in advance.

*D. E. ...*

Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. . . . 21839 . . . . .  
 Date . . . . . August 5, 1981  
 Samples . . . . . Rock . . . . .

ATTN: Glenn Hartly

Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.

Page # 5

SAMPLE No.	% P205	% V
RT-20-6-2	.17	.02
RT-20-6-3	.37	.01
RT-20-6-4	.62	.02
RT-20-6-5	1.21	.02
RT-20-6-6	3.58	.03
RT-156- 1	5.12	.01
RT-50- 1	24.23	.01
RT-50- 2	1.44	.01
SP-1-A	10.87	.01
SP-2-A	24.67	.01
SP-3-A	24.49	.01
SP-4-A	28.73	.01
SP-1-B	28.95	.01
SP-2-B	17.20	.01
SP-3-B	28.12	.01
SP-4-B	29.91	.01
SP-5-B	4.52	.02
SP-1-C	7.30	.01
SP-3-C	1.00	.02
SP-10-C	.12	Trace
SP-11-C	.24	.01

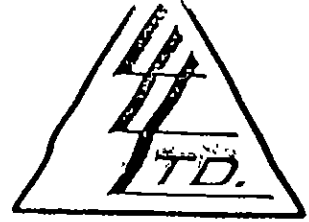
I **Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Reprints Retained one month.  
 Purps Retained one month  
 unless specific arrangements  
 made in advance.

*D. Enders*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4

File No. 21839  
Date August 5, 1981  
Samples Rock



Client: Glenn Hartly

Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page # 6

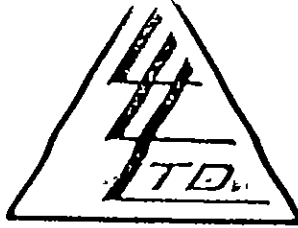
SAMPLE No.	% P205	% V
SQ- 1	16.27	.01
SQ- 2	17.34	.02
SQ- 3	10.60	.02
SQ- 4	25.04	.01
SQ- 5	13.54	.01

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Reports Retained one month.  
Samples Retained one month  
unless specific arrangements  
made in advance.

*D. E. Ender*  
Assayer

To: FIRST NUCLEAR CORP. LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. 21839-1  
Date August 5, 1981  
Samples Rock

Client: Glenn Hartly

Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page # 1

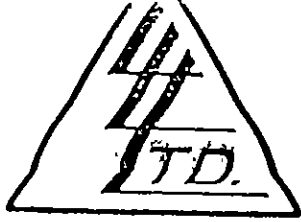
SAMPLE No.	Chemical PPM U308
<u>"Rock Samples"</u>	
AB- 1	56.2
AB- 2	64.8
AB- 3	65.8
AB- 4	65.8
AB- 5	72.3
AB- 6	47.6
AB- 7	90.5
AB- 8	150.
AB- 9	123.
AB-10	62.4
AB-11	8.7
AB-12	6.3
BA- 1	5.0
BA- 2	4.3
BA- 3	5.0
BA- 4	19.0
BA- 5	21.6
BA- 6	44.2
BA- 7	83.6
BA- 8	49.3

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Tests Retained one month.  
Pulps Retained one month  
unless specific arrangements  
made in advance.

Assayer

To: FIRST NUCLEAR CORP. LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. 21839-1  
Date August 5, 1981  
Samples Rock

IN: Glenn Hartly

Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page # 2

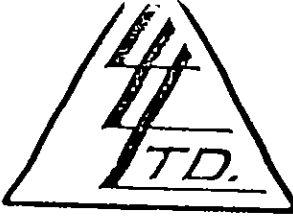
SAMPLE No.	Chemical PPM U308
BA- 9	19.3
GH-166- 1	39.2
GH-166- 2	3.9
GH-176- 1	13.3
GH-176-33	46.2
GH-176- 3	52.5
GH-176- 4	41.9
GH-226-14	11.6
EY-15-6-81-1	15.8
EY-15-6-81-2	67.1
EY-196- 1	104.
EY-226- 1	15.6
IB-256-31	4.4
JB-166-32	11.1
JB-166-33	26.3
JB-166-34	79.3
JB-166-35	12.2
JB-176-36	99.6
JB-186-37	75.6
JB-196-38	84.4
JB-196-39	75.0

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Results Retained one month.  
Reports Retained one month  
unless specific arrangements  
made in advance.

*P. Enckes*  
Assayer

To: FIRST NUCLEAR CORP. LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. 21839-1  
Date August 5, 1981  
Samples Rock

Client: Glenn Hartly

Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page # 3

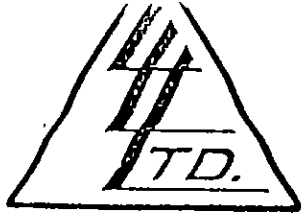
SAMPLE No.	Chemical PPM U308
JB-196-40	78.9
JB-196-41	83.7
JB-196-42	73.2
JB-196-43	7.3
JB-206-44	6.7
JB-206-45	55.3
JB-226-46	113.
JH-166- 1	52.2
JH-186- 1	16.0
JH-206- 1	2.0
JH-226-1-H	18.7
JH-226-2-H	34.5
JH-226-3-H	58.6
JH-226-4-H	51.8
JH-226-5-H	54.6
JH-226-6-H	72.3
JH-226-7-H	81.2
JH-226-8-H	22.6
JH-226-9-H	77.6
JS-116- 1	58.2
JS-196- 1	92.0

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Refracts Retained one month.  
Retained one month  
unless specific arrangements  
made in advance.

*D. Enok*  
Assayer

To: FIRST NUCLEAR CORP. LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. 21839-1  
Date August 5, 1981  
Samples Rock

Client: Glenn Harry

Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page # 4

SAMPLE No.	Chemical PPM U308
JS-226-1-L	5.6
JS-226-2-H	52.6
JS-226-3-H	66.4
MS- 1	1.0
SP-4-C	170.
SP-5-C	40.8
SP-6-C	13.0
SP-7-C	8.0
SP-8-C	4.3
SP-9-C	3.0
MS- 2	51.9
MS- 3	73.7
MS- 4	15.7
MS- 5	12.7
MS- 6	62.5
MS- 7	3.3
MS- 8	2.7
MS- 9	3.3
MS-10	31.6
MS-11	10.3
RT-20-6-1	2.1

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

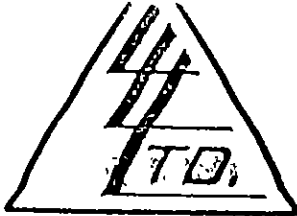
Samples Retained one month.  
Samples Retained one month  
unless specific arrangements  
made in advance.

*P. Endrus*

Assayer



To: FIRST NUCLEAR CORP. LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. 21839-1  
Date August 5, 1981  
Samples Rock

IN: Glenn Hartly

Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page # 5

SAMPLE No.	Chemical PPM U308
RT-20-6-2	NIL
RT-20-6-3	NIL
RT-20-6-4	6.4
RT-20-6-5	21.0
RT-20-6-6	41.3
RT-156- 1	62.0
RT-50- 1	62.3
RT-50- 2	12.7
SP-1-A	35.0
SP-2-A	64.0
SP-3-A	51.0
SP-4-A	80.5
SP-1-B	31.5
SP-2-B	42.5
SP-3-B	48.0
SP-4-B	70.0
SP-5-B	19.8
SP-1-C	46.9
SP-3-C	14.7
SP-10-C	8.0
SP-11-C	6.0

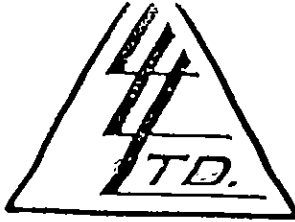
I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Results Retained one month.  
Samples Retained one month  
unless specific arrangements  
made in advance.

*P. Crokes*

Assayer

To: FIRST NUCLEAR CORP. LTD.  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. 21839-1  
Date August 5, 1981  
\*Samples Rock

ATTN: Glenn Haxtly

Certificate of  
ASSAY of  
LORING LABORATORIES LTD.

Page # 6

SAMPLE No.	Chemical PPM U308
SQ- 1	42.5
SQ- 2	55.3
SQ- 3	32.2
SQ- 4	53.9
SQ- 5	51.3

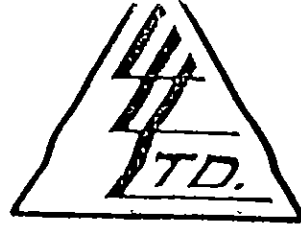
I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Objects Retained one month.  
P... Retained one month  
unless specific arrangements  
made in advance.

*D. Erolu*  
Assayer

To: FIRST NUCLEAR CORP. LTD.  
 1210, 10045 - 111th Street  
 Edmonton, Alberta  
 Attn: Glenn Hartly

File No. 21990  
 Date August 18, 1981  
 Samples Rock Chip



Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.

Page # 1

SAMPLE No.	% P205
<u>Rock Chip</u>	
SR - 1	.21
2	.14
3	.17
4	.26
5	.50
6	.57
7	.59
8	.86
9	1.48
10	1.23
11	.74
12	.65
13	.83
14	.32
15	.65
16	5.58
17	29.09
18	29.90
19	10.94
20	1.63
21	.38
22	.39
23	.47
24	.37

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Results Retained one month.  
 Plans Retained one month  
 unless specific arrangements  
 made in advance.

*D. Enders*  
 Assayer

To: ..FIRST NUCLEAR CORP...LTD...

File No. . .21990 ....

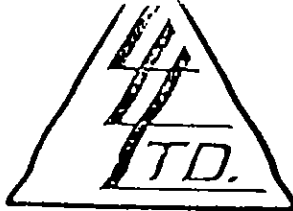
.....1210, 10045 - 111th Street

Date . . . . .August 18, 1981

.....Edmonton, Alberta.....

Samples ..Rock Chip .....

.....Attn: Glenn Hartly.....



Certificate of  
ASSAY OF

LORING LABORATORIES LTD.

Page # 2

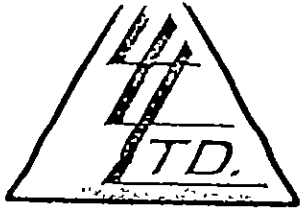
SAMPLE No.	% P205
SR - 25	.51
26	.30
27	.69
28	.52
29	.23
30	.16
31	.24
32	.12
33	.73
34	.63
35	.47
36	.46
37	.55
38	.46
OT-1-H	.41
OT-2-H	16.64
OT-3-H	27.16
OT-4-H	25.06
OT-5-H	15.16
OT-6-L	3.69
OT-7-L	1.00
SM-1-H	21.61
SM-2-L	10.77
SM-3-L	1.48
TF-226	18.30
AF-07-07-1	5.04
AF-09-07-1	9.95
GH-079-1	.39
EY-26-06-3	21.95

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Projects Retained one month.  
Retained one month  
unless specific arrangements  
made in advance.

*P. Ender*  
Assayer

To: FIRST NUCLEAR CORP. LTD.  
 1210, 10045 - 111th Street  
 Edmonton, Alberta  
 Attn: Glenn Hartly



File No. 21990  
 Date August 18, 1981  
 Samples Rock Chip

**Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.**

Page # 3

SAMPLE No.	% P205
EY-027-1	.40
EY-027-2	24.26
EY-027- 3	.70
EY-027- 4	14.34
EY-266- 1	14.83
EY-266- 2	15.87
EY-296- 1	15.63
EY-296-1-H	1.76
JH-246-1-H	18.81
JH-246-2-H	23.07
JH-256-1	21.56
JH-266-1-H	10.13
JH-266-2-H	12.43
JH-276-1-H	15.06
JH-296-1	28.47
JH-296-2	4.62
JS-256-1	.36
JS-296-1-L	1.79
JS-296-2-L	3.16
JB-236-47	5.63
JB-236-48	9.74
JB-236-49	5.96
JB-236-50	.63
JB-236-51	23.78
JB-236-52	.38
JB-236-53	22.65
JB-236-54	28.49
JB-236-55	25.78

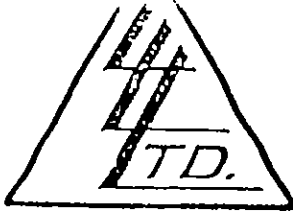
I Heroby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.  
 Retained one month  
 unless specific arrangements  
 made in advance.

*D. Enders*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.  
 1210, 10045, 111th Street  
 Edmonton, Alberta  
 Attn: Glenn Hartly

File No. 21990  
 Date August 18, 1981  
 Samples Rock Chip



Certificate of  
**ASSAY** of  
**LORING LABORATORIES LTD.**

Page # 4

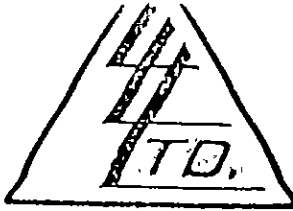
SAMPLE No.	%
	P205
JB-236-56	29.95
RT-0207-1	29.84
RT-2506-2	27.12
RT-2406-2	12.81
RT-2406-3	14.76
RT-2606-1	20.10
RT-2606-2	20.43
RT-2606-3	.68
RT-196-1	1.03
RT-196-2	.50
RT-226-1	.53
RT-226-2	.44
RT-225-3	10.56
RT-236-1	10.03
RT-236-2	12.59
RT-236-3	3.00
RT-236-4	21.62
RT-236-5	27.77
RT-236-6	27.16
RT-246-1	1.26

**I** *Hereby* **Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Results Retained one month.  
 Retained one month  
 unless specific arrangements  
 made in advance.

*D. Enders*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.  
 1210, 10045 - 111th Street  
 EDMONTON, Alberta



File No. 22045  
 Date ... August 20, 1981  
 Samples Rock

Attn: G. HARTLY

**Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.**

*From JB-33*

Page # 1

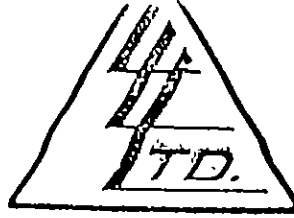
SAMPLE No.	% P205
<u>"Rock"</u>	
JB- 1	.26
2	.84
3	1.38
4	4.79
5	6.66
6	12.30
7	13.76
8	7.18
9	17.74
10	13.91
11	10.36
12	11.50
13	.34

**I Heroby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.  
 Retained one month  
 unless specific arrangements  
 made in advance.

*[Signature]*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.  
1210, 10045, 111th Street  
Edmonton, Alta.



File No. 22045  
Date ... August 20, 1981  
Samples Rock

Attn: G. Hartly

Certificate of  
ASSAY OF  
LORING LABORATORIES LTD.

Page # 2

SAMPLE No.	% P205
JB-14	.37
JB-15	.36
LFB-7-6- 1	20.05
LFB-7-6- 2	24.89
LFB-7-8- 1	.73
<input checked="" type="radio"/> LFB-7-8- 2	.56
LFB-7-8- 3	2.75
LFB-7-15- 1	10.60
AF-20-07-81-1	6.40
AF-10-7-1	25.50
EY-16-7-1	11.85

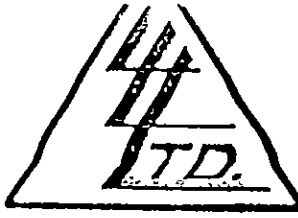
I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Objects Retained one month.  
 Objects Retained one month  
unless specific arrangements  
made in advance.

*For. D. ...*  
Assayer



To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 22631  
 Date November 13, 1981  
 Samples Rock

CTN: Glenn Hartly

Certificate of  
**ASSAY** of  
**LORING LABORATORIES LTD.**

Page # 1

SAMPLE No.	Chemical PPM U308	% P205	% V
<u>"Rock Samples"</u>			
HB-7- 1	13.3	2.26	.025
2	12.4	1.47	.030
3	14.2	1.05	.020
4	5.2	.58	.015
5	9.7	.69	.015
6	9.1	.55	.010
7	4.5	.35	.010
8	4.2	.26	.010
9	2.4	.35	.010
10	3.0	.21	.010
11	2.1	.17	.010
12	2.1	.28	.010
NR- 1	63.4	31.08	.010
NR-2- 1	68.0	11.36	.010
2	76.0	25.46	.015
3	77.3	31.53	.010
4	110.0	27.33	.010
T2-1- 1	58.8	14.12	.010
2	58.5	30.85	.015
3	66.7	21.12	.015

**I** *Hereby Certify* THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Objects Retained one month.  
 unless specific arrangements  
 made in advance.

*D. EnCoss*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.,

1210, 10045 - 111th Street,

Edmonton, Alberta T5K 1K4

File No. 22631

Date November 13, 1981

Samples Rock



ATTN: Glenn Hartly

Certificate of ASSAY OF

LORING LABORATORIES LTD.

Page # 2

SAMPLE No.	Chemical PPM U308	% P205	% V
T2-1- 4	54.0	12.16	.010
5	64.2	27.79	.015
T2-2- 1	73.1	16.31	.010
2	64.9	25.99	.010
3	56.7	30.01	.010
4	81.9	27.57	.015
T2-3- 1	80.5	14.12	.010
2	68.3	27.86	.015
3	67.7	25.90	.010
4	73.4	29.40	.015
5	30.5	7.31	.010
6	22.7	5.71	.005
T2-4- 1	57.4	10.01	.005
2	68.0	21.94	.010
3	73.3	29.36	.010
4	40.4	7.43	.015
5	8.9	.58	.005
6	19.6	.72	.005
7	5.6	.37	.010
8	16.3	.29	.010
T2-5- 1	52.8	10.50	.010

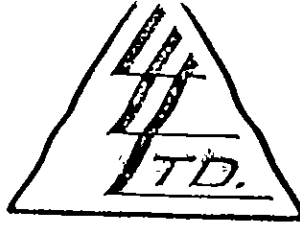
I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Samples Retained one month unless specific arrangements made in advance.

[Handwritten signature]

Assayer

To: ...FIRST.NUCLEAR.CORP..LTD.,  
 ..1210,....10045...111th..Street,..  
 .Edmonton,..Alberta. ..T5K.1K4....



File No. ... 22045-1  
 Date ... November 17, 1981  
 Samples ... Rock

ATTN: ... Glenn Hartly

Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.

Page # 1

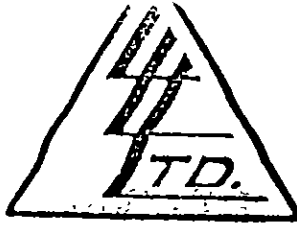
SAMPLE No.	Chemical PPM U308	% V
<u>"Rock Samples"</u>		
JB- 1	6.4	Trace
JB- 2	13.3	.01
JB- 3	22.1	.01
JB- 4	25.1	.01
JB- 5	34.6	.01
JB- 6	35.0	.01
JB- 7	23.7	.01
JB- 8	29.9	.02
JB- 9	30.3	.01
JB-10	37.6	.01
JB-11	35.8	.02
JB-12	29.2	.02
JB-13	3.9	Trace
JB-14	6.7	.01
JB-15	11.2	.01
LFB-7-6-1	50.7	.01
LFB-7-6-2	60.6	.02
LFB-7-8-1	2.1	Trace
LFB-7-8-2	18.6	.02
LFB-7-8-3	38.3	.03

**I** Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Results Retained one month.  
 unless specific arrangements  
 made in advance.

Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 22631  
 Date November 13, 1981  
 Samples Rock

ATTN: Glenn Hartly

\* — A0 Ag

**Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.**

Page # 3

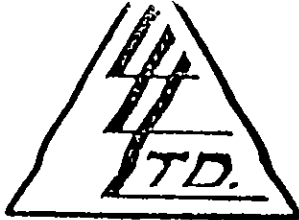
SAMPLE No.	Chemical PPM U308	% P205	% V
T2-5- 2	52.6	14.93	.010
3	57.6	29.88	.010
4	78.3	22.08	.015
5	7.0	.51	.010
T3-1- 1	56.0	8.10	.005
2	59.0	14.28	.005
3	83.5	13.14	.010
4	50.5	10.84	.010
T3-2- 1	54.0	10.80	.010
2	66.5	30.98	.015
3	92.7	27.40	.015
4	54.5	9.73	.020
Z- 1	25.5	<u>4.06</u>	.015
2	29.3	<del>9.10</del>	.010
3	33.5	<u>10.77</u>	.010
4	25.1	8.35	.005
5	31.4	8.91	.005
6	67.8	27.22	.010
7	67.4	26.17	.015
8	7.0	.71	.015
9	4.4	.45	.015

**I Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Samples Retained one month.  
 unless specific arrangements  
 made in advance.

*[Signature]*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 22631  
 Date November 13, 1981  
 Samples Rock

ATTN: Glenn Hartly

Certificate of  
**ASSAY** of  
**LORING LABORATORIES LTD.**

Page # 4

SAMPLE No.	Chemical PPM U308	% P205	% V
Z- 10	10.8	.79	.015
11	12.3	.98	.010
12	11.5	1.95	.010
13	64.1	<u>10.99</u>	.010
14	40.9	7.53	.010
15	40.0	9.23	.010
16	79.0	<u>24.11</u>	.020
17	84.1	22.93	.020
18	80.7	29.16	.015
19	64.1	<u>30.31</u>	.020
20	93.6	<u>30.35</u>	.020
ZZ- 1	59.0	26.72	.015
2	39.0	11.70	.010
3	70.7	31.07	.020
4	56.3	30.74	.015
5	60.3	<u>19.67</u>	.015

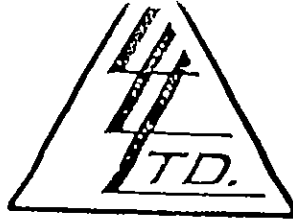
**I** **Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Samples Retained one month.  
 unless specific arrangements  
 made in advance.

*[Handwritten Signature]*  
 Assayer

To: FIRST NUCLEAR CORP., LTD.,  
1210, 10045, 111th Street,  
Edmonton, Alberta T5K 1K4

File No. 22045-1  
Date November 17, 1981  
Samples Rock



ATTN: Glenn Hartly


Certificate of  
ASSAY OF  
LORING LABORATORIES LTD.

Page # 2

SAMPLE No.	Chemical PPM U308	% V
LFB-7-15-1	38.3	.01
AF-20-07-81-1	136.0	.07
AF-10-7-1	43.6	.02
EY-16-7-1	103.0	.02

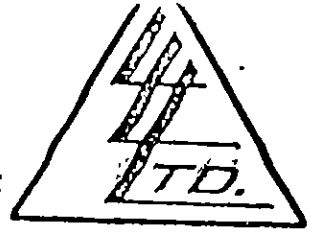
I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Samples Retained one month.  
Copies Retained one month  
unless specific arrangements  
made in advance.

  
Assayer

To: FIRST NUCLEAR CORP. LTD.  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4

File No. 22712  
 Date November 6, 1981  
 Samples Pulp

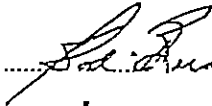


TIN: Glenn Hartly

Certificate of  
**ASSAY** of  
**LORING LABORATORIES LTD.**

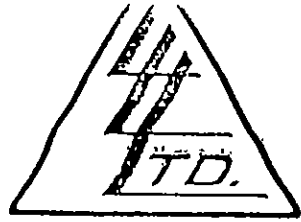
SAMPLE No.	% P205
<p><u>"Re-Checks"</u>  <u>File # 21839</u></p>	
<p><input type="radio"/> JH 226-8-H  <u>File # 22205</u></p>	5.23
<p>STS-6</p>	4.21
<p>LT -2</p>	9.35
<p>LT -5</p>	6.76
<p>LT -6</p>	6.05
<p><b>I</b> <b>Hereby Certify</b> THAT THE ABOVE RESULTS ARE THOSE          ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .</p>	

Retained one month.  
 Retained one month  
 unless specific arrangements  
 made in advance.

  
 Assayer

To: FIRST CLEAR CORP. LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4

File No. 22307  
Date October 1, 1981  
Samples Rock Chip



By: Glenn Hartly

Certificate of  
ASSAY OF  
LORING LABORATORIES LTD.

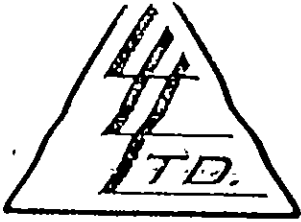
SAMPLE No.	% P205
<p><input type="checkbox"/> "CORRECTED" <input checked="" type="checkbox"/> "Rock Chip"</p> <p>P-72</p>	<p>16.06</p> <p>I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .</p>

Objects Retained one month.  
 Pulps Retained one month  
unless specific arrangements  
made in advance.

*C. S. [Signature]*  
Assayer



To: FIRST NUCLEAR CORP. LTD.  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 21990-2  
 Date November 17, 1981  
 Samples Rock Chip

ATTN: Glenn Hartly

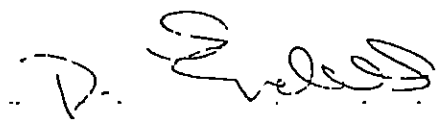
Certificate of  
**ASSAY OF**  
**LORING LABORATORIES LTD.**

Page # 1

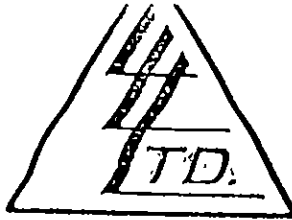
SAMPLE No.	Chemical PPM U308	% V
<u>"Rock Chips"</u>		
SR- 1	5.4	Trace
2	3.2	.01
3	4.8	.01
4	4.4	.01
5	3.2	.01
6	5.7	.01
7	3.2	Trace
8	2.2	Trace
9	8.3	.01
10	4.8	.01
11	3.2	Trace
12	2.3	.01
13	3.3	.01
14	3.0	.01
15	5.0	.01
16	18.7	.01
17	52.5	.01
18	55.8	.01
19	33.0	.01
20	9.0	.02

I **Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . .

Objects Retained one month.  
 Pumps Retained one month  
 unless specific arrangements  
 made in advance.

  
 Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 21990-2  
 Date November 17, 1981  
 Samples Rock Chip

ATTN: Glenn Hartly

Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.

Page # 2

SAMPLE No.	Chemical PPM U308	% V
SR-21	7.7	.01
22	7.7	.01
23	6.0	.01
24	5.3	.01
25	8.0	.01
26	5.0	.01
27	6.7	.01
28	5.7	.02
29	5.3	.02
30	5.0	.01
31	6.5	.01
32	5.7	.01
33	9.7	.03
34	10.3	.02
35	11.0	.03
36	13.0	.03
37	9.7	.03
38	10.0	.03
OT-1-H	1.7	Trace
OT-2-H	32.8	.01
OT-3-H	61.3	.01

I <sup>61.3</sup> Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

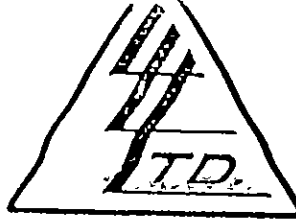
Objects Retained one month.  
 Samples Retained one month  
 unless specific arrangements  
 made in advance.

Assayer

To: FIRST NUCLEAR CORP. LTD.

1210, 10045 - 111th Street,

Edmonton, Alberta T5K 1K4



File No. 21990-2

Date November 17, 1981

Samples Rock Chip

ATTN: Glenn Hartly

Certificate of  
ASSAY OF

LORING LABORATORIES LTD.

Page # 3

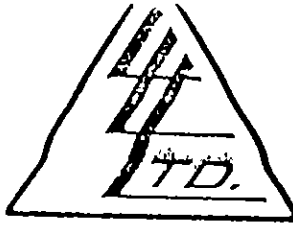
SAMPLE No.	Chemical PPM U308	% V
OT-4-H	50.2	.01
OT-5-H	39.5	.02
OT-6-L	17.0	.02
OT-7-L	7.9	.01
SM-1-H	129.0	.01
SM-2-L	31.4	.01
SM-3-L	4.5	.01
TF-226	48.8	.01
AF-07-07-1	231.0	.08
AF-09-07-1	400.0	.07
GH-079-1	14.5	.01
EY-26-06-3	74.8	.01
EY-027-1	4.3	.03
EY-027-2	58.8	.01
EY-027-3	18.0	.05
EY-027-4	42.7	.01
EY-266-1	45.7	.01
EY-266-2	46.8	.01
EY-296-1	47.5	.01
EY-296-1-H	16.7	.01
JH-246-1-H	56.1	.01

I Herby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Products Retained one month.  
Unless Retained one month  
unless specific arrangements  
made in advance.

Assayer

To: FIRST NUCLEAR CORP. LTD.  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 21990-2  
 Date November 17, 1981  
 Samples Rock Chip

Client: Glenn Hartly

Certificate of  
**ASSAY** of  
**LORING LABORATORIES LTD.**

Page # 4

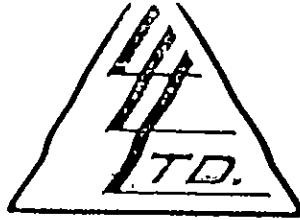
SAMPLE No.	Chemical PPM U308	% V
JH-246-2-H	83.1	.01
JH-256-1	71.9	.01
JH-266-1-H	32.3	.01
JH-266-2-H	26.8	.01
JH-276-1-H	112.0	.01
JH-296-1	84.9	.01
JH-296-2	25.1	.01
JS-256-1	2.4	.02
JS-296-1-L	10.0	.03
JS-296-2-L	50.9	.01
JB-236-47	7.5	.01
JB-236-48	10.7	.01
JB-236-49	7.7	.01
JB-236-50	5.0	.02
JB-236-51	63.7	.02
JB-236-52	11.0	.02
JB-236-53	70.4	.02
JB-236-54	55.2	.01
JB-236-55	47.1	.01
JB-236-56	64.4	.01
RT-0207-1	90.8	.01

**I** **Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Tests Retained one month.  
 Samples Retained one month  
 unless specific arrangements  
 made in advance.

*D. Evelyn*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,<sup>2</sup>  
 Edmonton, Alberta T5K 1K4



File No. 21990-2  
 Date November 17, 1981  
 Samples Rock Chip

ATTN: Glenn Hartly


Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.

Page # 5

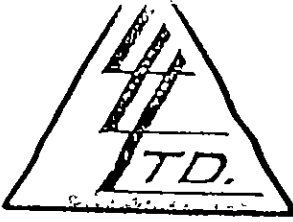
SAMPLE No.	Chemical PPM U308	% V
RT-2506-2	48.5	.01
RT-2406-2	178.0	.06
RT-2406-3	39.4	.01
RT-2606-1	31.7	.01
RT-2606-2	126.0	.02
RT-2606-3	8.8	.03
RT-196- 1	11.2	.01
RT-196- 2	6.7	.02
RT-226- 1	11.5	.02
RT-226- 2	4.2	.02
RT-225- 3	28.1	.01
RT-236- 1	31.1	.01
RT-236- 2	203.0	.02
RT-236- 3	12.4	.01
RT-236- 4	62.1	.01
RT-236- 5	55.0	.01
RT-236- 6	49.2	.01
RT-246- 1	9.7	.03

**I** Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Results Retained one month.  
 Reports Retained one month  
 unless specific arrangements  
 made in advance.

  
 Assayer

To: FIRST NUCLEAR CORP. LTD.  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 22205  
 Date September 15, 1981  
 Samples Rock Chip

IN: Glenn Hartly

Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.

Page # 1

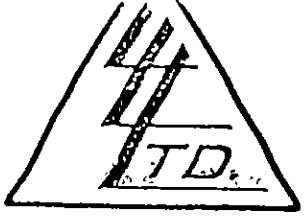
SAMPLE No.	% P205
<u>"Rock Chips"</u>	
RAM-A- 1	12.66
A- 2	17.85
A- 3	18.70
A- 4	22.60
A- 5	17.32
A- 6	20.79
RAM-B- 1	23.28
B- 2	27.58
B- 3	19.16
B- 4	24.10
B- 5	26.43
B- 6	17.26
B- 7	7.85
B- 8	2.42
B- 9	2.22
B-10	1.82
B-11	1.75
B-12	0.23
STS- 1	2.89
2	8.88

**I** Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Results Retained one month.  
 unless specific arrangements  
 made in advance.

*A. J. [Signature]*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 22205  
 Date September 15, 1981  
 Samples Rock Chip

EN: Glenn Hartly

Certificate of  
 ASSAY  
 LORING LABORATORIES LTD.

Page # 2

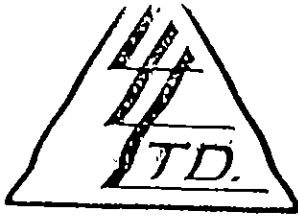
SAMPLE No.	%
	P205
STS- 3	13.46
4	26.74
5	28.06
6	4.19
7	16.54
8	20.79
9	3.24
10	3.60
11	2.98
LT- 1	12.20
2	9.51
3	11.10
4	12.30
5	6.61
6	6.14
7	23.55
8	25.87
9	13.39
10	16.15
11	3.98
12	0.31

**I Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Products Retained one month.  
 unless specific arrangements  
 made in advance.

*John Deane*  
 Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 22205  
 Date September 15, 1981  
 Samples Rock Chip

STN: Glenn Hartly

**Certificate of  
 ASSAY of  
 LORING LABORATORIES LTD.**

Page # 3

SAMPLE No.	% P205
LT- 13	1.72
WE- 1	5.73
2	10.14
3	16.61
4	29.22
5	28.06
6	2.22
SCI- 1	0.85
2	32.30
3	0.66
4	0.90
5	0.58
6	0.61
7	0.65
8	0.69
STN- 1	27.96
2	26.76
3	25.76
4	10.02
5	20.86
6	16.49

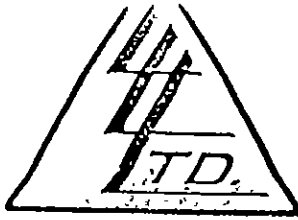
**I Hereby Certify** THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Rejects Retained one month.  
 P Retained one month  
 unless specific arrangements  
 made in advance.

*Ed. Bern*  
 Assayer



To: FIRST NUCLEAR CORP. LTD.  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. 22205  
Date September 15, 1981  
Samples Rock Chip

STN: Glenn Hartly

Certificate of  
ASSAY

LORING LABORATORIES LTD.

Page # 4

SAMPLE No.	% P205
STN- 7	2.19
8	0.56
AKA- 1	1.06
PH- 247-1	15.58

I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Products Retained one month.  
Unless Retained one month  
unless specific arrangements  
made in advance.

*[Signature]*  
Assayer

To: FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 22205-1  
 Date November 17, 1981  
 Samples Rock Chip

ATTN: Glenn Hartly

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page # 1

SAMPLE No.	Chemical PPM U308	% V
<u>"Rock Chips"</u>		
RAM-A- 1	35.3	.01
A- 2	61.3	.02
A- 3	55.3	.02
A- 4	53.0	.02
A- 5	46.7	.01
A- 6	55.0	.02
RAM-B- 1	64.3	.01
B- 2	58.7	.01
B- 3	47.0	.02
B- 4	53.0	.01
B- 5	55.7	.01
B- 6	41.4	.01
B- 7	35.3	.04
B- 8	12.7	.03
B- 9	7.7	.03
B-10	9.3	.02
B-11	10.7	.02
B-12	4.7	.01
STS- 1	20.7	Trace
2	34.6	.01

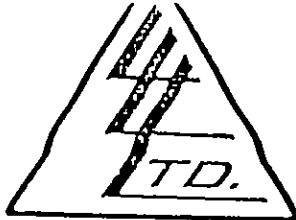
I Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Objects Retained one month.  
 Samples Retained one month  
 unless specific arrangements  
 made in advance.

*D. Enders*

Assayer

To: FIRST NUCLEAR CORP. LTD.  
 1210, 10045 - 11th Street,  
 Edmonton, Alberta T5K 1K4



File No. 22205-1  
 Date November 17, 1981  
 Samples Rock Chip

ATTN: Glenn Hartly

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page # 2

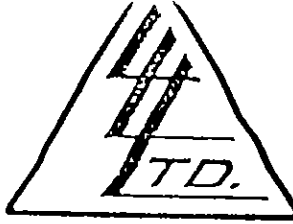
SAMPLE No.	Chemical PPM U308	% V
STS- 3	26.8	.01
4	58.7	.01
5	82.2	.01
6	21.0	.01
7	53.1	.02
8	90.3	.02
9	21.0	.03
10	71.0	.03
11	15.8	.03
LT- 1	25.0	.01
2	59.9	.02
3	39.6	.02
4	25.0	.01
5	22.0	.02
6	26.7	.01
7	55.8	.02
8	66.9	.01
9	41.2	.02
10	40.9	.02
11	20.6	.01
12	2.7	.01

I Herby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Samples Retained one month.  
 unless specific arrangements  
 made in advance.

Assayer

To: ...FIRST NUCLEAR CORP. LTD.,  
 1210, 10045 - 111th Street,  
 Edmonton, Alberta T5K 1K4



File No. 22205-1  
 Date ... November 17, 1981  
 Samples Rock Chip

STN: ... Glenn Hartly

Certificate of  
 ASSAY OF  
 LORING LABORATORIES LTD.

Page # 3

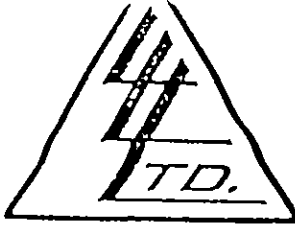
SAMPLE No.	Chemical PPM U308	% V
LT- 13	21.2	.01
WE- 1	20.6	.01
2	29.3	.01
3	30.0	.01
4	58.1	.01
5	63.3	.02
6	9.1	.02
SCI- 1	6.7	.01
2	60.2	.02
3	6.7	.02
4	10.3	.02
5	8.5	.02
6	7.6	.02
7	15.0	.02
8	11.0	.02
STN- 1	63.1	.01
2	60.1	.01
3	59.3	.01
4	27.8	.02
5	50.0	.02
6	49.0	.02

**I** Hereby Certify THAT THE ABOVE RESULTS ARE THOSE  
 ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Tests Retained one month.  
 Purps Retained one month  
 unless specific arrangements  
 made in advance.

*D. E. ...*  
 Assayer

To: FIRST NUCLEAR CORP., LTD.,  
1210, 10045 - 111th Street,  
Edmonton, Alberta T5K 1K4



File No. .... 22205-1...  
Date ..... November 17, 1981  
Samples ... Rock Chip .....

STN: Glenn Hartly

*Certificate of*  
**ASSAY OF**  
**LORING LABORATORIES LTD.**

Page # 4

SAMPLE No.	Chemical PPM U308	% v
STN- 7	27.8	.02
8	13.3	.01
AKA- 1	13.0	.01
PH- 247-1	49.6	.01

I Herby Certify THAT THE ABOVE RESULTS ARE THOSE  
ASSAYS MADE BY ME UPON THE HEREIN DESCRIBED SAMPLES . . . .

Tests Retained one month.  
Pulps Retained one month  
unless specific arrangements  
made in advance.

*D. E. [Signature]*  
Assayer

APPENDIX III

REPORT ON THE CARBORNE SURVEY

J. GARDNER

CAB CLAIM GROUP

JUNE 1981

## Instruments:

Hewitt-Packard Chart Records (12 V source)

Exploranium GR 410 Spectrometer

NaI 110 Crystal (in back seat of Jimmy)

## Settings

Chart Recorder Range Voltage - 0.1 mv.

Charter Speed - 30 sec/cm.

Range Multiplier. - 4

Mode - Total Count Spectrum

Sample Period - 1 sec.

## Vehicle Speed

The vehicle was run at 30 km./hr. However, conditions of the road etc, caused variations on particular runs along uphill side of road towards outcrops.

## Orientation

Orientation was achieved by means of an air photograph (1:18,000 scale). Prevalant topographic features were recorded on both the air photograph and the chart recorder paper by means of a fiducal mark. The survey incorporated the use of fiducals 1-287 inclusive.

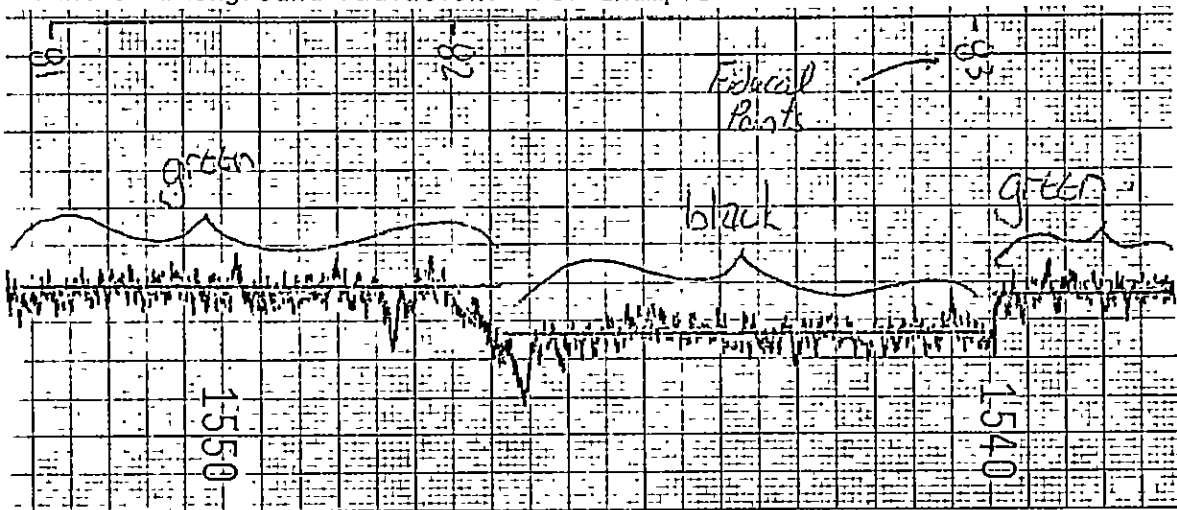
## Determination of Background

Backgrounds are split into four groups pending the quality of background radiation. These are:



	Range (cm) above base
Red	3.5 - 00
Orange	3.0 - 3.49
Green	2.50 - 2.99
Black	0 - 2.49

The median line was consistently drawn on the chart to qualify the amount of background radiation. For example:



HEWLETT-PACKARD, 9280-0278

The background was then plotted as road traverses onto a number of 1.18,000 mylar overlays.

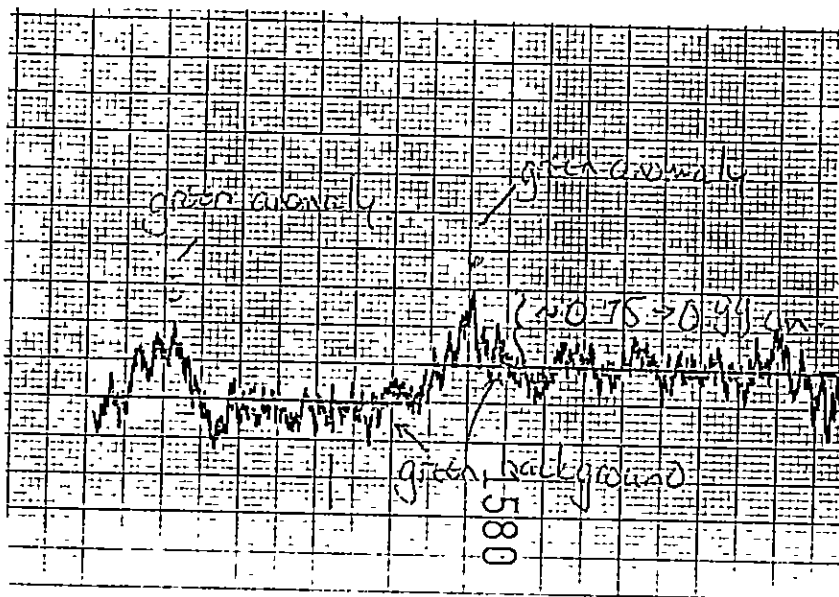
### Anomalies

Where major inflections occurred in the background radiation, these were designated anomalies. These were subsequently divided into four groupings based on the number of cm. they stood above the background.

These were:

	Range (cms) above background
Red	1.25 - 00
Orange	1.0 - 1.249
Green	0.75 - 0.99
Black	0.5 - 0.749

Since these tended to be geographically and geologically isolated they were illustrated on the mylar overlay as colored dots. Inflections ranging 0.01 - 0.49 cms. above the background were regarded as being within the background range of statistical variation, and were therefore dealt with as a background.



### Calibration

HEV

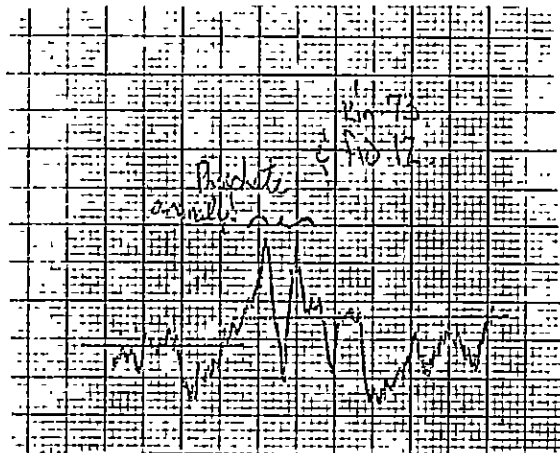
The gain monitor was rigidly controlled and battery tests were frequently monitored to ensure a properly functioning system.

In addition to this, the system had to constantly be calibrated so that data would be useable on a day to day basis. This was accomplished

by traversing a known anomaly and recording the radioactive signature at the start of each day. This anomaly occurred at kilometer 73½ and took the form of a double green anomaly superimposed on a green background. This was then compared with a signature recorded on the first day, and the calibration adjusted respectively by means of a control on the graph recorder.

- (For reference to standard, consult carborne roll June 3rd, Fiducal 12 - the double anomalie is due to intercalated shales or possible tectonic deformation)

Shown below is the calibration traverse:



Also to ensure calibration, the unit was tested outside the office tent every morning so that the pen gave a signature of 2.0 cm. Comments are frequently found on the graphs to ensure easy interpretation, as well as kilometre posts where applicable.

APPENDIX IV

REPORT ON THE AIRBORNE SURVEY

J. BROPHY

CAB CLAIM GROUP

JUNE 1981

### Instruments:

Hewitt-Packard Chart Recorder

Exploranium GR 410 Spectrometer

NaI 110 Crystal

This instrument was mounted in the rear of a Bell 206 Helicopter

### Settings

Chart Recorder Voltage - 0.1 mv

Chart Speed - 30 sec/cm

Range Multiplier - 4

Mode - Total Count

Sample Period - 1 sec.

### Speed

The helicopter ground speed was approximately 25 km (15 - 20 mph), however this varied with changes in topography, winds, etc.

### Survey Height

The survey was conducted at tree top level of approximately (22 meters) 75 feet. Navigation control was accomplished by the use of a compilation of topographic and geological information.

## Calibration

The instrument was calibrated using a trial and error approach over a model of known response.

## Determination of Background

Background values were considered to be the average value measured through time. These values were categorized as:

<u>Background</u>	<u>Range in cm (Deflection above Base)</u>
Red	3.5 or more
Orange	3 - 3.49
Green	2.5 - 2.99
Black	0 - 2.49

## Anomalies

Major spike-like deflections that occurred in excess of a perceived background level were designated as anomalies. These were subsequently divided into four classes based upon their relative variance from the perceived norm.

The four classes were:

	<u>cm Deflection above Background</u>
Red	1.25 or more
Orange	1 - 1.249
Green	.75 - .99
Black	.5 - .749

The results including location of flight survey traverses are shown on the accompanying map.

APPENDIX V



REPORT ON THE MAGNETOMETER SURVEY

J. SLATER - J. HOOPER

ZIP CLAIM GROUP

OCTOBER 1981

## MAGNETOMETER REPORT FOR THE ZIP CLAIMS

A magnetometer survey was conducted from October 14 to 16, 1981 on the Zip claim group near Fernie in Souther, B.C. The work was done by J. Slater and J. Hooper on a grid established during the 1981 field season.

A Model G-816/825 Portable Proton Magnetometer was used for the survey, with the sensor carried on a 2.2 meter staff for  $\pm 1$  gamma accuracy. Readings were taken at 50 meter intervals on the baseline and crosslines resulting in a total of 261 readings. Each reading was taken at least twice to check its validity.

A recording base station positioned on the SW corner of the grid was used to correct for diurnal magnetic time variations. Corrections for time variations ranged from 0 to 50 gammas, with an average of 10 gammas per reading.

The corrected values are plotted on the grid map and contoured at 100 gamma intervals (Map 7). The 58300 gamma contour line appears to coincide closely with the previously mapped intrusive contact. Areas of known phosphate lie within the 58200 - 58300 gamma range and have little magnetic expression. The two profiles of the data show there is a slight drop and then a sharp increase when the intrusive contact is crossed. The contrast is not as prominent along the southern edge of the contact, possibly because the sill is dipping gently in this direction.

APPENDIX VI

SUMMARY OF CAB CLAIMS

<u>Cab Claim</u>	<u>Number of Units</u>	<u>Staking Date</u>	<u>Anniversary Date</u>	<u>Cab Claim</u>	<u>Number of Units</u>	<u>Staking Date</u>	<u>Anniversary Date</u>
1	12	Jan. 12	Feb. 10	23	16	Jan. 15	Feb. 10
2	6	13	"	24	16	15	"
3	9	16	"	25	8	11	"
4	3	16	"	26	12	11	"
5	15	15	"	27	12	14	"
6	20	15	"	28	20	11	April 9
7	12	15	"	29	4	March 11	"
8	16	15	"	30	1	11	"
9	6	15	"	31	1	12	"
10	20	12	"	32	1	11	"
11	12	12	"	33	5	12	"
12	20	12	"	34	2	11	"
13	18	12	"	35	1	13	"
14	9	16	"	36	2	13	"
15	20	16	"	37	1	13	"
16	15	16	"	38	12	12	"
17	18	15	"	39	12	13	"
18	18	14	"	40	6	13	"
19	9	16	"	41	12	14	"
20	15	16	"	42	6	13	"
21	4	15	"	43	3	14	"
22	20	15	"	44	8	12	"
				45	1	14	"

APPENDIX VII

**CANADIAN  
PHOSPHATE  
IMPORTS**

THOUSANDS OF METRIC TONS

3000

2000

1000

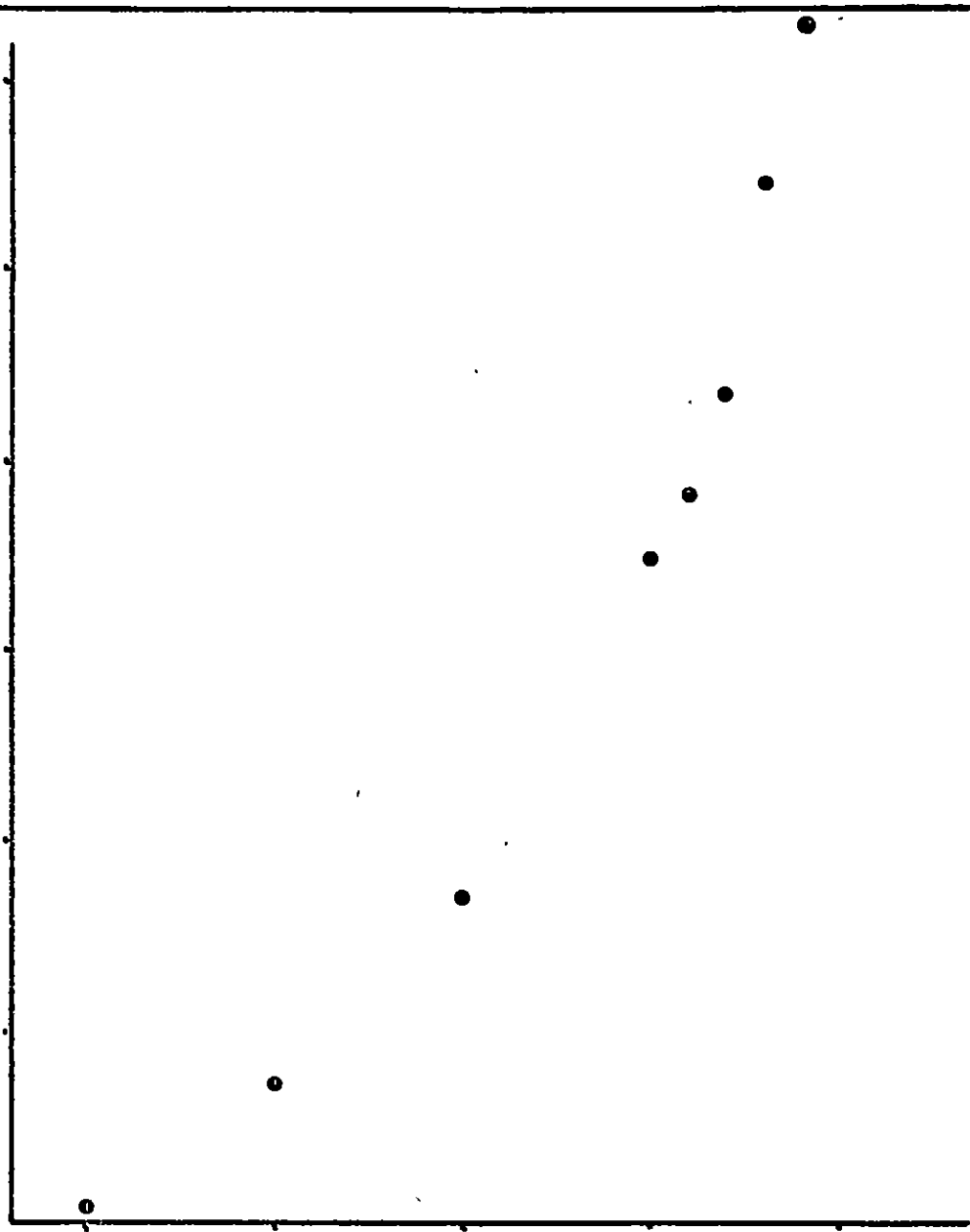
1955

60

65

70

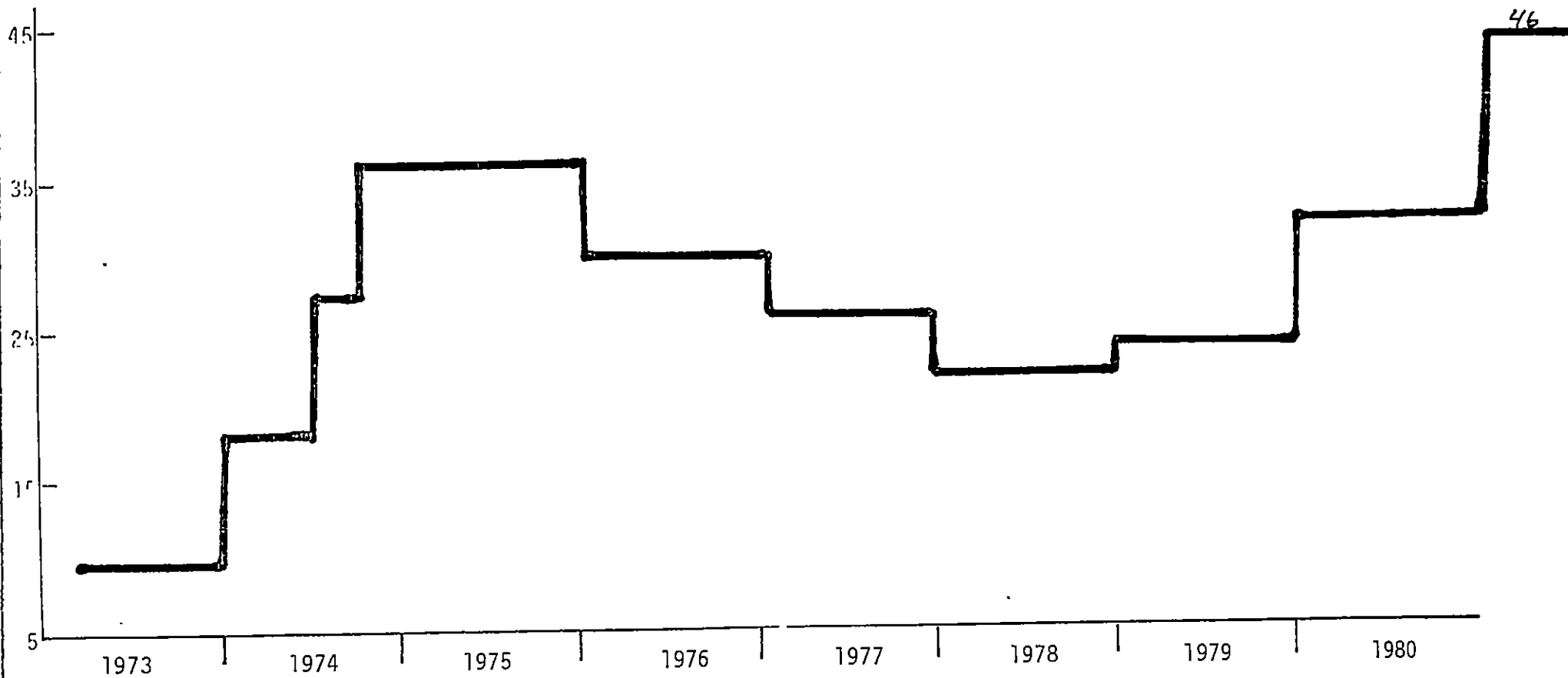
75



APPENDIX VIII

U.S. \$/TONNE FOR 66 - 64% TPL

ASL TAMPA, FLORIDA





## RARE EARTHS

### Relative Abundance

These elements are seldom concentrated to any degree in nature, although they are typically associated with alkalic intrusives, placer beach sands and phosphatic sedimentary rocks and uranium ores.

Canadian production has been derived from the Elliot Lake uranium deposit that averages .11%  $U_3O_8$  and 570 ppm rare earth oxides. Canadian production ceased in 1978 due to escalating production costs.

### Canadian Industry

In 1979 Sherritt Gordon Mines Ltd. completed a cobalt-samarium production facility at Fort Saskatchewan, Alberta. Sherritt has been involved in an extensive research program to improve the cobalt rare earth technology for some time.

### Consumption and Uses

Since 1979 Yittrium has been used in the automotive industry in exhaust gas sensors and purification systems. Uses also include metallurgical industry, optical polish, television tubes, catalysis for petroleum refining, refractory ceramics.

The latest developments include uses in fluorescent lighting, data storage and hydrogen sponge alloys. Yttrium has also been receiving some attention as a nuclear reactor component and in heat exchanges. Canadian production for 1977 was 30,000 kilograms, world production for 1978 was approximately 40,000 kilograms.

#### Prices

The world price Yttrium is \$40.00 per pound. Other rare earths vary from \$6 (Lanthanum) to \$900 (Europium) per pound.