GEOLOGICAL INVESTIGATION

OF THE

HOT# 1 TO 20 AND GRR 1 TO 56 CLAIMS

NTS 115 O 16

138 ' 20" West 63' 20" North

093294

Work done
June 2 through June 16
1994

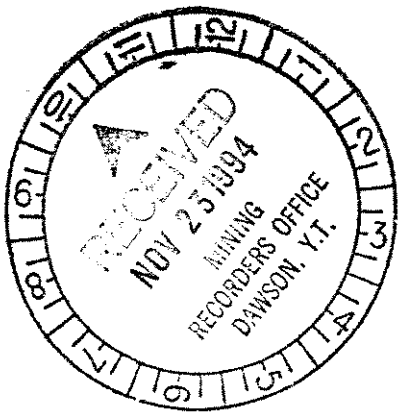
BY

G.S. HARTLEY P. GEOL.

for
Claim Owners

G. Hartley and A. Hartley

SEPTEMBER 30, 1994



Hartley and Associates

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d. Silver

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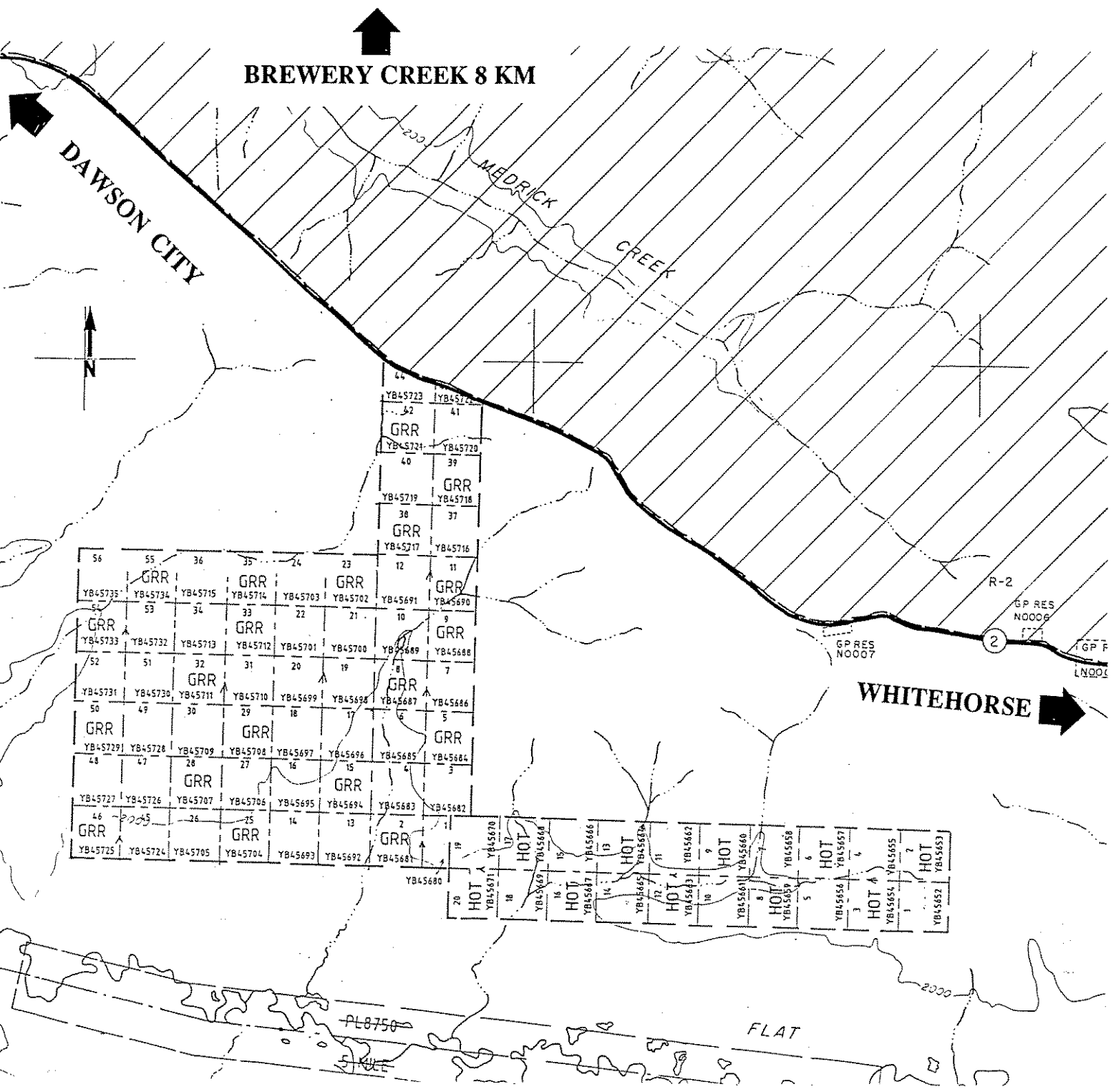
I. Summary

The Hot 1 to 20 and Grr 1 to 56 claims lie along the Tintina Trench approximately 65 km (40 miles) east of Dawson City the claim area is bounded by Flat Creek to the south and Highway #5 to the north, the claims ajoin the highway.

The property is located approximately 8 km south of the Brewery Creek deposit, known to contain at least 1 million ounces of gold at an approximate grade of .05 oz/ton. The area of the claims contains no outcrop. Geochemical survey data (GSC Open File 1364) indicated the presence of anomalous mercury, arsenic, barium, manganese, and tin, in an area where strong structural features have been identified, through thick glacial deposits. (Mortensen et al 1992).

During the 1994 season,(June 2nd to June 16) seventy stream sediment and soil samples were collected along drainage systems within the claims and along claim location lines where drainage was not present.

Results of the geochemical survey were encouraging, values up to 1.1 ppm silver occur with associated arsenic (to 29 ppm) and mercury highs,(to 145 ppb), gold values to 30 ppb are present. Backgrounds were respectively, <0.1 ppm, <10 ppm, 25 ppb, and 5 ppb.



LOCATION MAP

FLAT CREEK PROJECT

PROJECT LANDS: GRR#1 TO #56 HOT#1TO #20

II. History

There is no record of lode or placer claims within the area, old placer workings, possibly well in excess of fifty years old were noted in one location. The Yukon Minfile indicated no known mineralization in the area.

III. Location

The claims are located north of Flat Creek, and immediately south of highway #2 , on NTS sheet 115 O 16, near latitude 63'53 N and longitude 138'20 west

Access to the property is by paved highway #2 approximately 65 km east of Dawson City. Field crew accommodation during the fourteen day program was established in a trailer parked at the Dempster corner and later in Dawson City.

IV. Physiography

The region in dominated by the Tintina Trench. Thick glacial deposits mantle Paleozoic subcrop, Outcrops are not present. The area is designated as a continuous permafrost zone. Topography slopes gently to the south.

V. Regional Geology

The Geology of the region, although poorly exposed, is known to consist of Paleozoic carbonates and shales and related rocks of the Earn and Road River groups intruded by felsic dykes and sills, of Cretaceous to Tertiary age.

The project lies within the Tintina Trench structural zone. Lineament studies utilizing Landsat TM thermal imagery,indicate a number of well defined fault splays near the property, the study suggests further evaluation of the region for structurally controlled epithermal gold deposits.(Mortensen and Von Gaza 1992).

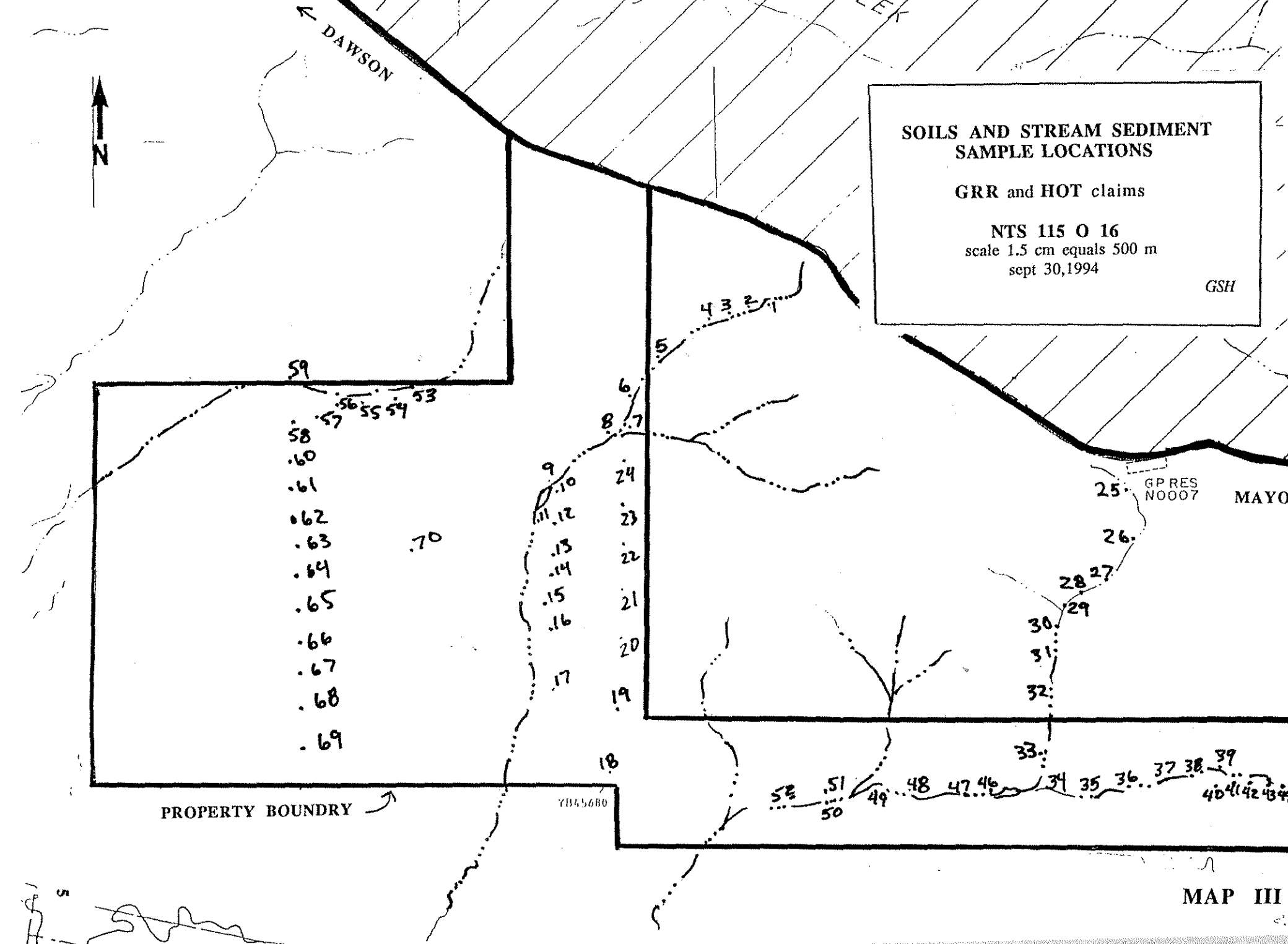
VI. Geochemistry

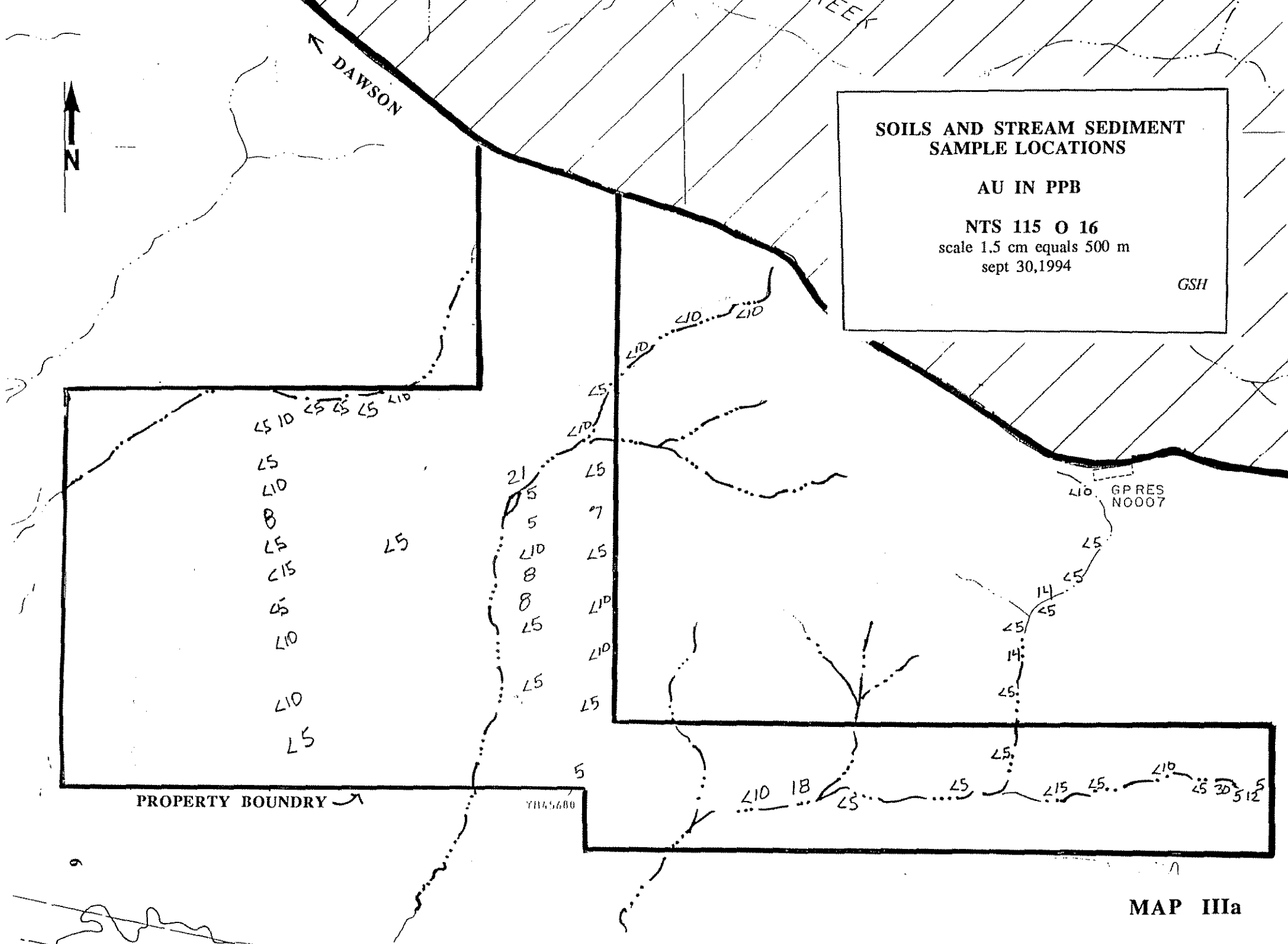
Regional stream sediment sampling data (GSC open file 1364) indicated elevated levels of arsenic, barium, cadmium, mercury, and flourine occur on the property. Anomalous values occur along drainage exhibiting strong structural control. This group of elements is frequently associated with epithermal deposits, in general and is known to be significant at Brewery Creek.

Eighty stream sediment and "B" horizon soil samples, were collected at irregular intervals (see map). Seventy samples were taken on the claims and in the immediate area, and 10 "B" horizon samples, numbered 71 through 80 were taken in the area of a known deposit, in order to obtain comparitive data for control purposes. Samples locations on or near streams (maps III a to III f) indicate that those samples were of stream sediments. Samples whose position is indicated(on map III, a to f) as more than 3 millimeters from a stream are "B" horizon soil samples.

Samples were analyzed by Northern Analytical labs of Whitehorse for gold, silver, lead, manganese, arsenic, and mercury, by atomic adsorption. due to insufficient sample quantities some analyses could not be carried out, this is indicated by "I.S." in the data table. Background values for the various elements were:

	GRR and HOT claims	Control group mineralized zone
silver	<0.1 ppm	0.3 ppm
arsenic	<10.0 ppm	64.0 ppm
mercury	29.0 ppb	255.0 ppb
gold	5.0 ppb	37.0 ppb
lead	13.0 ppm	14.0 ppm
manganese	250.0 ppm	170.0 ppm


DAWSON
N
SOILS AND STREAM SEDIMENT
SAMPLE LOCATIONS
GRR and HOT claims
NTS 115 O 16
scale 1.5 cm equals 500 m
sept 30,1994
GSH
GP RES
NO007
MAYO
PROPERTY BOUNDRY
YB45680
MAP III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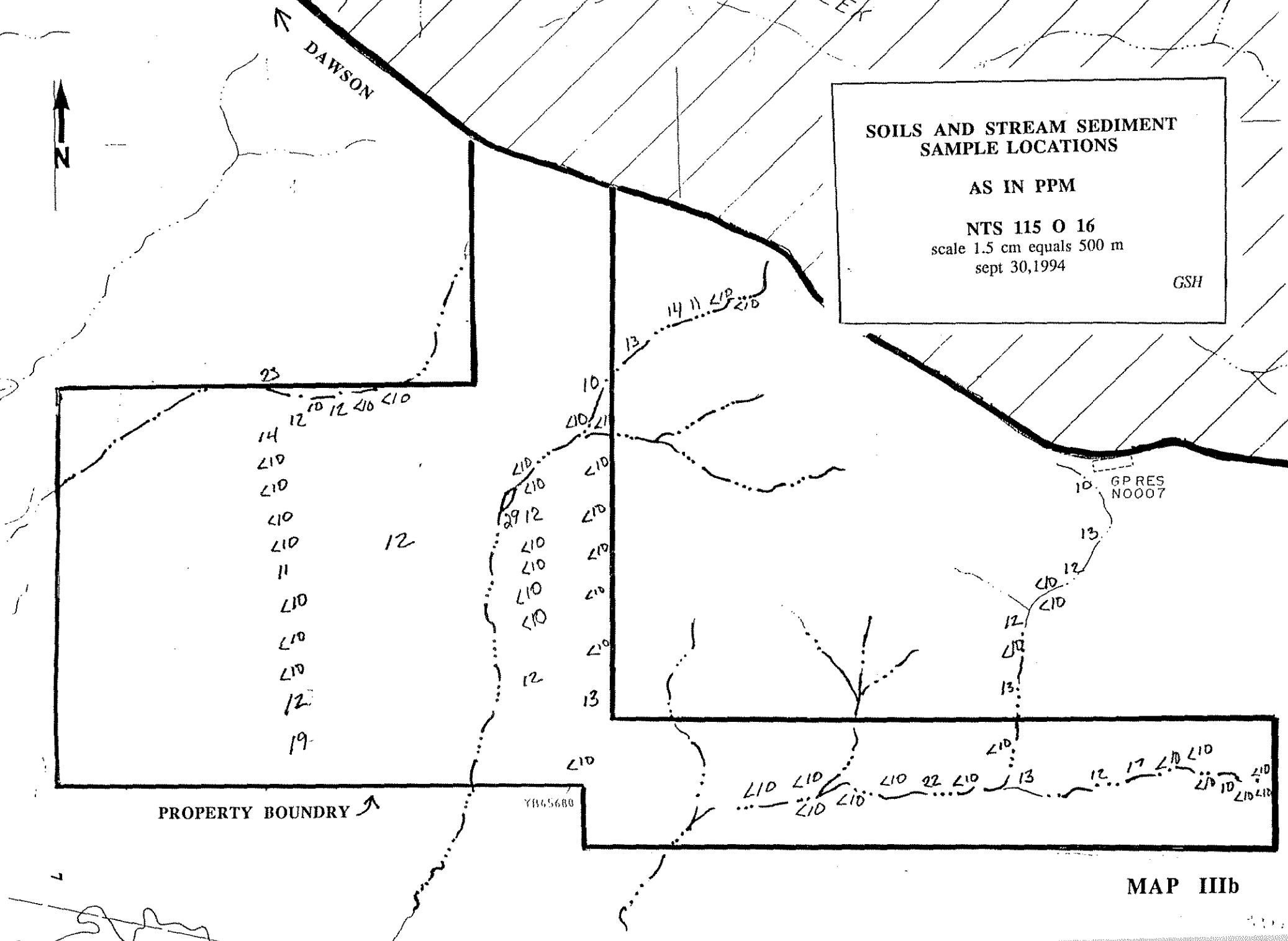
SOILS AND STREAM SEDIMENT
SAMPLE LOCATIONS
AU IN PPB
NTS 115 O 16
scale 1.5 cm equals 500 m
sept 30,1994
GSH
GP RES
NO007
PROPERTY BOUNDRY
YB45680

MAP IIIa


DAWSON
N
SOILS AND STREAM SEDIMENT
SAMPLE LOCATIONS
AS IN PPM
NTS 115 O 16
scale 1.5 cm equals 500 m
sept 30,1994
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GP RES
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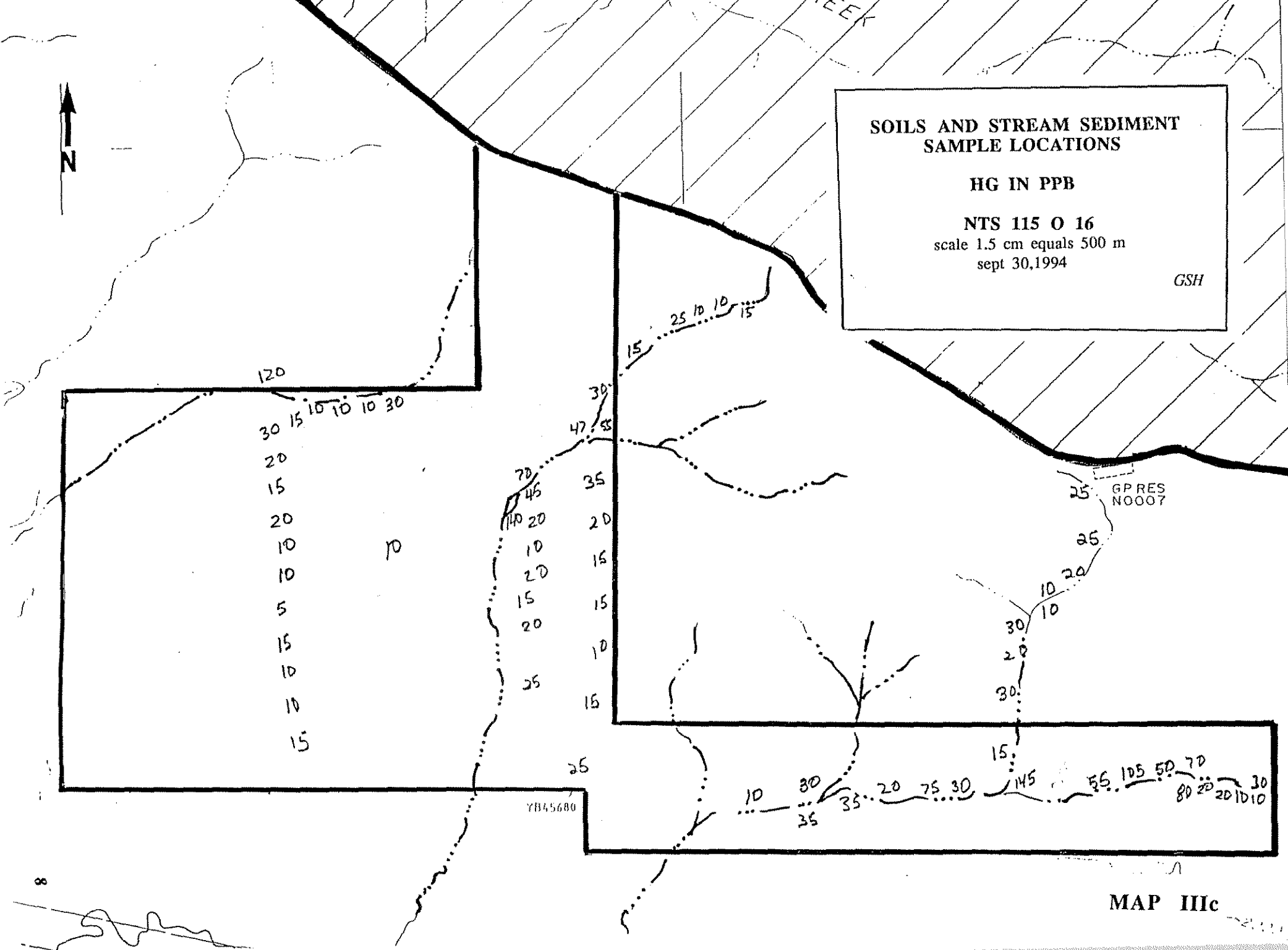
PROPERTY BOUNDRY
YB65680
MAP IIIb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SOILS AND STREAM SEDIMENT
SAMPLE LOCATIONS
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scale 1.5 cm equals 500 m
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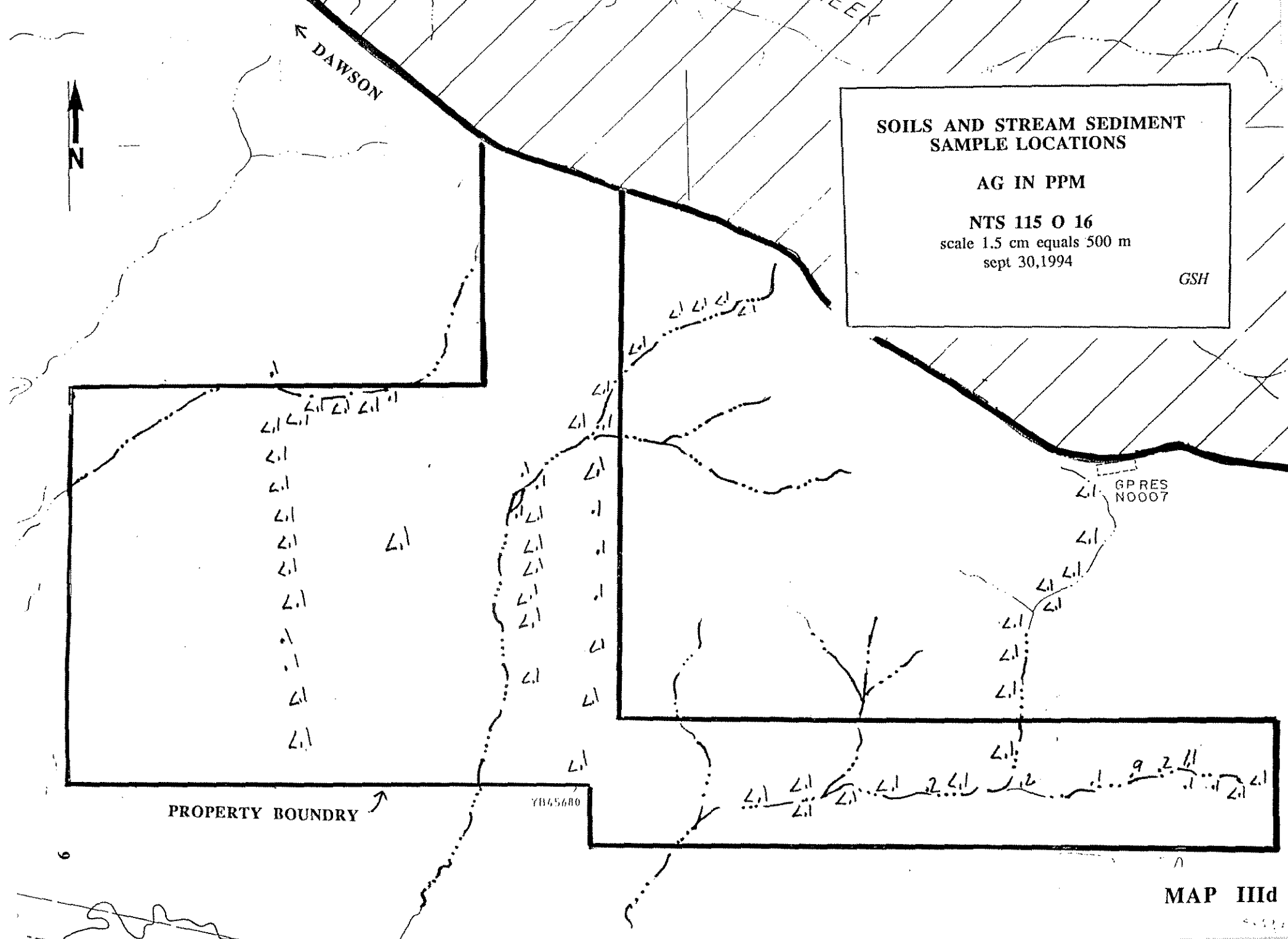
20 75 30 145 55 105 50 70
80 20 20 10 30
10

MAP IIIc


DAWSON
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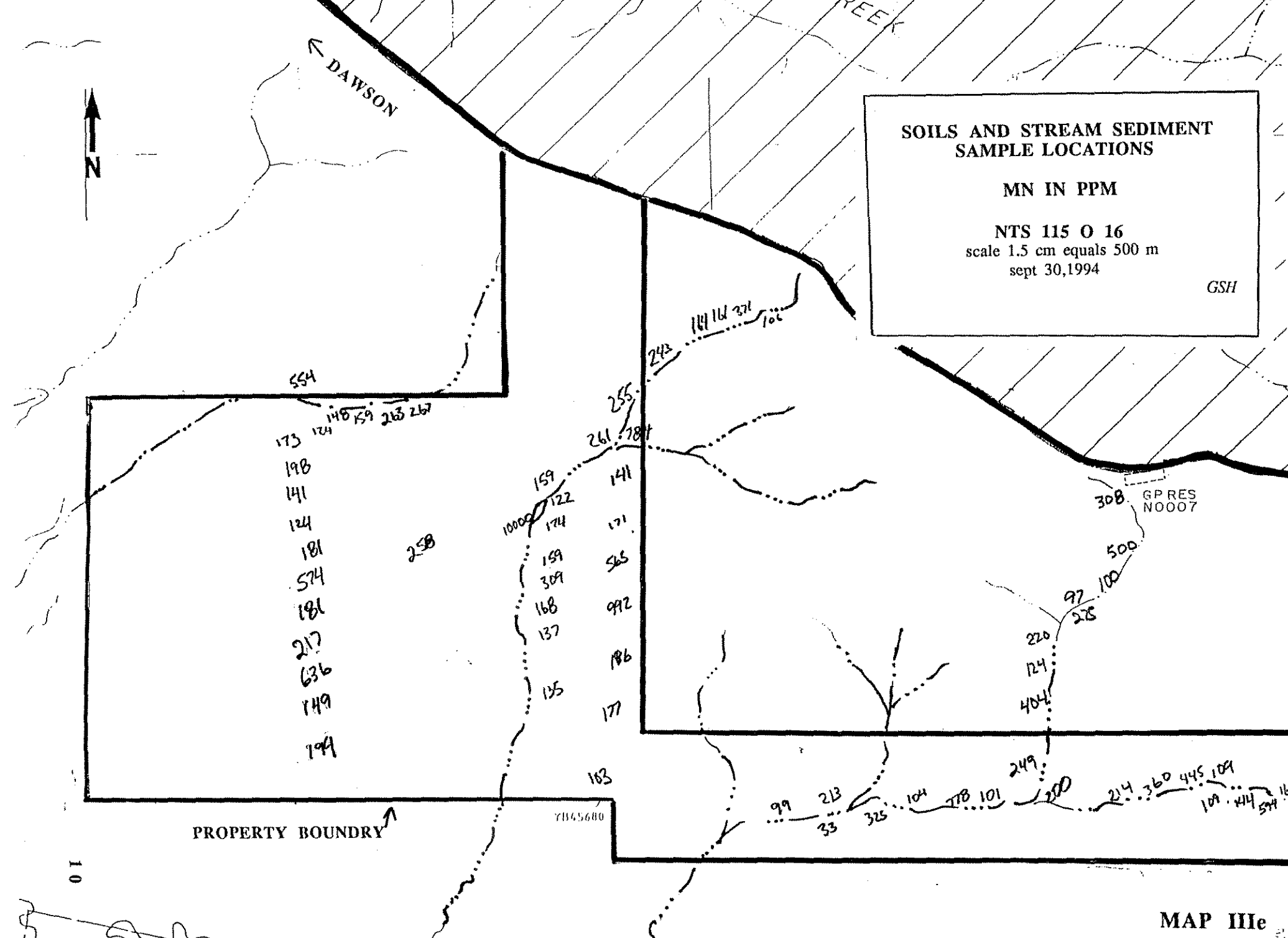
SOILS AND STREAM SEDIMENT
SAMPLE LOCATIONS
AG IN PPM
NTS 115 O 16
scale 1.5 cm equals 500 m
sept 30,1994
GSH
GP RES
NO007
PROPERTY BOUNDRY
YB45680

MAP IIId


DAWSON
N
SOILS AND STREAM SEDIMENT
SAMPLE LOCATIONS
MN IN PPM
NTS 115 O 16
scale 1.5 cm equals 500 m
sept 30,1994
GSH
GP RES
NO007
PROPERTY BOUNDRY
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148
159
263
267
173
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141
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574
181
217
636
149
199
258
159
122
10000
174
159
309
168
137
135
255
261
784
141
171
565
992
186
177
183
141
161
371
102
243
308
500
100
97
228
220
124
404
249
200
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101
214
360
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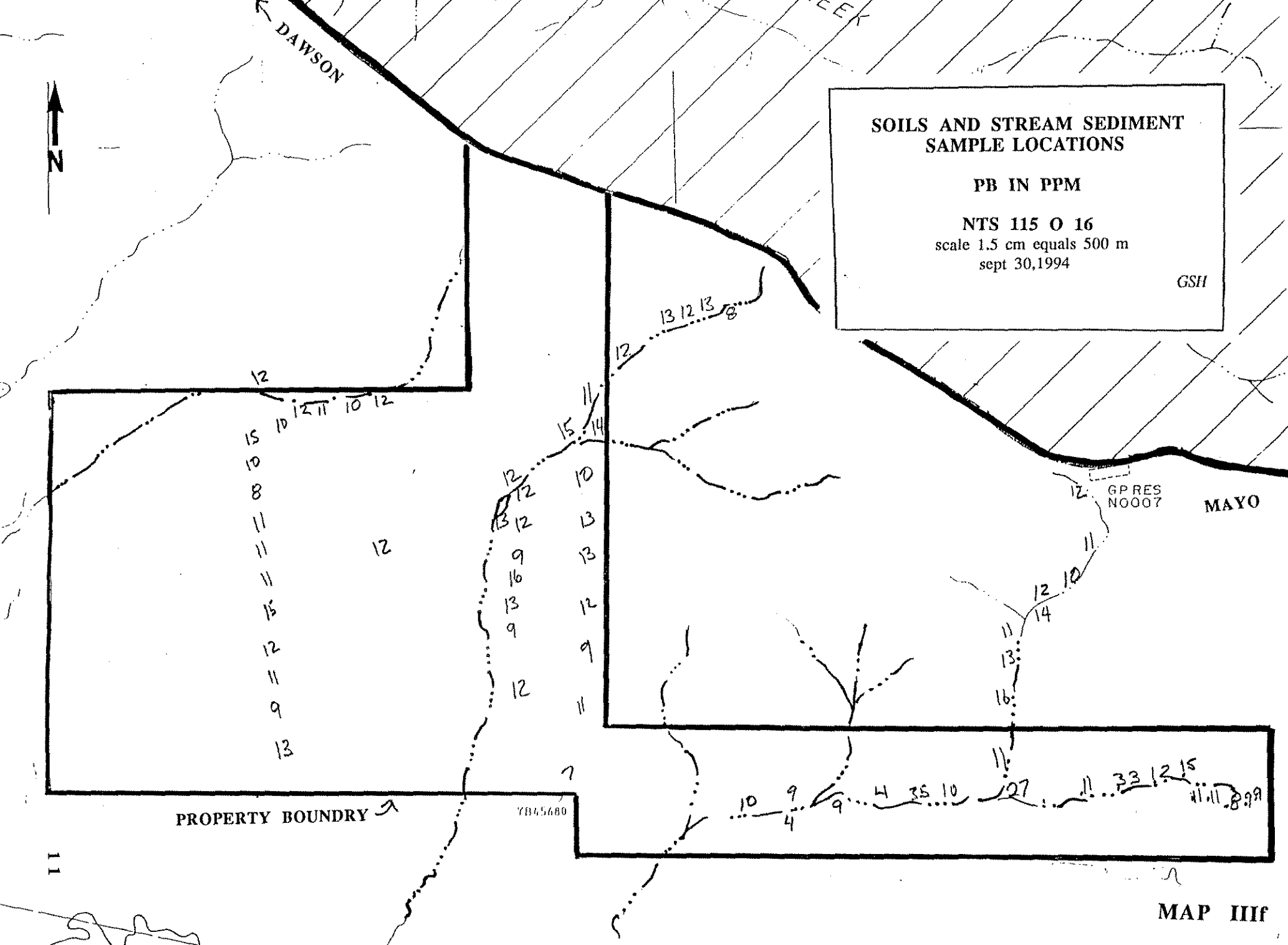
109
109
414
574
YDG5680
10

MAP IIIe


DAWSON
N
SOILS AND STREAM SEDIMENT
SAMPLE LOCATIONS
PB IN PPM
NTS 115 O 16
scale 1.5 cm equals 500 m
sept 30,1994
GSH
GP RES
NO007
MAYO
PROPERTY BOUNDRY
YB45680
MAP IIIf

VII. Geochemical Interpertation

The exploration model for this property is the Brewery Creek deposit, there, gold mineralization is associated with increased levels of Mercury, Arsenic, Silver, and Lead. The ore body is controlled by a east trending fault, mineralization occurs within limestones and shales, intruded by felsic intrusives.

Ten soil samples were collected at 30 meter intervals across the Canadian zone, containing the highest grade mineralization, in the Brewery Creek deposit(from published data). These samples were analyzed and the results compared to the stream sediment data from the HOT and GRR claims.

The data are not directly comparable because the HOT claims data is stream sediment data, in an area of thick overburden, while the Brewery Creek samples were collected as soil samples where mineralized bedrock occurs within one half meter of the surface. The average value, or background value, for each data set was calculated, and the highest elemental values are compared to the average for the data set.

Hot claims

	High value	background	ratio
mercury	145	29	5/1
arsenic	17	<10	1.7/1
silver	1.1	.1	11/1
lead	33	13	2.5/1

Brewery Creek ore zone

High value	Background	ratio
1260	255	4.9/1
416	64	6.5/1
1.2	.3	4/1
36	14	2.5/1

The differing sample mediums, (stream mud vers thin soil over mineralized sub crop) make the direct comparison of absolute values meaningless, however it must be noted that the ratios to background are similar. It also should be noted that, on the HOT claims, as in Brewery Creek, coincident "above average" values of silver, lead , arsenic and mercury occur

VIII. Prospecting

Regional geological mapping (Bostock, 1964) suggests that subcrop in the area is a Paleozoic package of sedimentary rocks intruded by felsic dykes, under the cover of thick glacial debris. Felsic intrusives are closely associated with mineralization at Brewery Creek. Most tertiary and Cretaceous felsic rocks in the Cordillera, exibit some radioactivity due to the presence of Potassium 40, and may be located using a hand held scintillometer.

Conventional field prospecting was applied to the claims with the addititon of a hand held Urtec, UG 135 , discriminating scintillometer (see appendix). No outcrop was observed within the entire claim group. A small zone of increased radioactivity (twice background) was noted, near sample location 12. No outcrops were located in the immediate area , and no "hot spots" could be indentified. The radioactivity could be due to the presence of felsic intrusives in subcrop, or increased potassium 40 levels with in clasts of till.

References

Bostock, H.S. , 1964. Geology, McQuesten, Yukon Territory. Geological Survey of Canada, Map 1143A.

Geological Survey of Canada " Open file 1364" Stream Sediment Geochemistry NTS 115 N,0.

Mortensen , J.K.and P. Von Gaza. 1992.Application of Landsat TM Thermal Imagery to Structural Interpretations of the Tintina Trench in West-Central Yukon. In Yukon Geology, Vol.3; Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, p.214-222

IX. Statement of Expenditure

Truck travel in the Yukon (2000 km@40).....800.00

Food and consumables.....(55.15/day/person).....772.10

Assay costs.....1705.58

P. Geol fees $500/day/14 days.....7000.00

Urtec UG 135 scintillometer $30/day/14 days.....420.00

Report preparation 500.00

$11197.68

YTG YMIP GRANT $5598.00

CERTIFICATE

I, Glenn S. Hartley of 7302-118 A street Edmonton, hereby state that:

1. I am a graduate of the University of Alberta, Department of Geology (B. Sc. Specialization 1977).

2. I am a registered Professional Geologist in the province of Alberta.

3. Since 1970, I have been employed by various exploration firms and have conducted field programs in Alberta, British Columbia, Saskatchewan, Northwest Territories, and the Yukon.

4. I have a direct interest in the lode claims of this report.

Respectfully submitted,

Glenn S. Hartley, P. Geol.

UPDATED COPY GH MAY 1/95

Appendix I

INTERNATIONAL PLASMA LABORATORY LTD.

2036 Columbia Street
Vancouver, B.C.
Canada V5Y 3E1
Phone (604) 879-7878
Fax (604) 879-7898

CERTIFICATE OF ANALYSIS
iPL 94F1501

Client: Northern Analytical Laboratories iPL: 94F1501 M Out: Jun 20, 1994 Page 1 of 2 Section 1 of 1
Project: WO# 00481 78 Pulp [023913:24:5] 94] In: Jun 15, 1994 Certified BC Assayer: David Chiu

Sample Name	Hg ppb	Sample Name	Hg ppb	Sample Name	Hg ppb	Sample Name	Hg ppb	Sample Name	Hg ppb	Sample Name	Hg ppb
GH 1	P 15	GH 41	P 20								
GH 2	P 10	GH 42	P 20								
GH 3	P 10	GH 43	P 10								
GH 4	P 25	GH 44	P 10								
GH 5	P 15	GH 45	P 30								
GH 6	P 30	GH 46	P 30								
GH 7	P 55	GH 47	P 75								
GH 8	P 47	GH 49	P 20								
GH 9	P 70	GH 50	P 35								
GH 10	P 45	GH 51	P 30								
GH 11	P 140	GH 52	P 10								
GH 12	P 20	GH 53	P 30								
GH 13	P 10	GH 54	P 10								
GH 14	P 20	GH 55	P 10								
GH 15	P 15	GH 56	P 10								
GH 16	P 20	GH 57	P 15								
GH 17	P 25	GH 58	P 30								
GH 18	P 25	GH 59	P 120								
GH 19	P 15	GH 60	P 20								
GH 20	P 10	GH 61	P 15								
GH 21	P 15	GH 62	P 20								
GH 22	P 15	GH 63	P 10								
GH 23	P 20	GH 64	P 10								
GH 24	P 35	GH 65	P 5								
GH 25	P 25	GH 66	P 15								
GH 26	P 25	GH 67	P 10								
GH 27	P 20	GH 68	P 10								
GH 28	P 10	GH 69	P 15								
GH 29	P 10	GH 70	P 10								
GH 30	P 30	GH 71	P 220								
GH 31	P 20	GH 72	P 345								
GH 32	P 30	GH 73	P 190								
GH 33	P 15	GH 74	P 170								
GH 34	P 145	GH 75	P 50								
GH 36	P 55	GH 76	P 105								
GH 37	P 105	GH 77	P 75								
GH 38	P 50	GH 78	P 995								
GH 39	P 70	GH 79	P 1260								
GH 40	P 80	GH 80	P 200								
	5		5		5		5		5		5
	9999		9999		9999		9999		9999		9999
	Geo		Geo		Geo		Geo		Geo		Geo

fficient Sample S=Soil R=Rock C=Core L=Silt P=Pulp U=Undefined m=Estimate/1000 %=Estimate % Max=No Estimate

INTERNATIONAL PLASMA LABORATORY LTD.

CERTIFICATE OF ANALYSIS
iPL 94F1501

2036 Columbia Street
Vancouver, B.C.
Canada V5Y 3E1
Phone (604) 879-7878
Fax (604) 879-7898

Northern Analytical Laboratories — 78 Samples

	0= Rock	0= Soil	0= Core	0=RC Ct	78= Pulp	0=Other	[023913:24:47:49062094]
Raw Storage:	--	--	--	--	12Mon/Dis	--	Mon=Month Dis=Discard
Pulp Storage:	--	--	--	--	12Mon/Dis	--	Rtn=Return Arc=Archive

Out: Jun 20, 1994 Project: WO# 00481
In : Jun 15, 1994 Shipper: Norm Smith
PO#: Shipment: ID=C030900
Msg: Hg(CVA)
Msg:

Document Distribution

	EN	RT	CC	IN	FX
1 Northern Analytical Laboratories	1	2	2	2	1
105 Copper Road	DL	3D	5D	BT	BL
Whitehorse	0	0	0	1	0
YT Y1A 2Z7					
ATT: Norm Smith	Ph:403/668-4968				
	Fx:403/668-4890				

Analytical Summary

##	Code	Method	Title	Limit Low	Limit High	Units	Description	Element	##
01	520P	Geo	Hg	5	9999	ppb	Hg Cold Vapor/AAS	Mercury	01

Style CC=Copies IN=Invoices FX=Fax(1=Yes 0=No)
5D=5-1/4 Disk BT=BBS Type BL=BBS(1=Yes 0=No) Totals: 2=Copy 2=Invoice 0=3-1/2 Disk 0=5-1/4 Disk

Analytical Laboratories ltd.

/06/94 Assay Certificate Page 1

Glenn Hartley & Ron Owens WO#00481

Sample #	Au ppb	Ag ppm	Pb ppm	Mn ppm	As ppm
GH-1	<10	<0.1	8	106	<10
GH-2	I.S.	<0.1	13	371	<10
GH-3	I.S.	<0.1	12	161	11
GH-4	<10	<0.1	13	164	14
GH-5	<10	<0.1	12	243	13
GH-6	<5	<0.1	11	255	10
GH-7	I.S.	0.1	14	784	<10
GH-8	<10	<0.1	15	261	<10
GH-9	21	0.1	12	175	<10
GH-10	5	0.1	12	122	<10
GH-11	I.S.	0.1	13	>10000	29
GH-12	5	<0.1	12	174	12
GH-13	<10	<0.1	9	159	<10
GH-14	8	<0.1	16	309	<10
GH-15	8	<0.1	13	168	<10
GH-16	<5	<0.1	9	137	<10
GH-17	<5	<0.1	12	135	12
GH-18	5	<0.1	7	103	<10
GH-19	<5	<0.1	11	177	13
GH-20	<10	<1	9	196	<10
GH-21	<10	0.1	12	992	<10
GH-22	<5	0.1	13	565	<10
GH-23	7	0.1	13	171	<10
GH-24	<5	<0.1	10	141	<10
GH-25	<10	<0.1	12	308	10
GH-26	<5	<0.1	11	500	13
GH-27	<5	<0.1	10	100	12
GH-28	14	<0.1	12	97	<10
GH-29	<5	<0.1	14	275	<10
GH-30	<5	<0.1	11	220	12
GH-31	14	<0.1	13	124	<10
GH-32	<5	<0.1	16	404	13
GH-33	<5	<0.1	11	249	<10
GH-34	I.S.	0.2	27	200	13
GH-35	<15	I.S.	I.S.	I.S.	I.S.

Certified by

105 Copper Road, Whitehorse, YT, Y1A 2Z7 Ph: (403) 668-4968 Fax: (403) 668-4890

Glenn Hartley & Ron Owens WO#00481

Sample #	Au ppb	Ag ppm	Pb ppm	Mn ppm	As ppm
GH-36	<5	0.1	11	214	12
GH-37	I.S.	0.9	33	360	17
GH-38	<10	0.2	12	445	<10
GH-39	I.S.	1.1	15	109	<10
GH-40	I.S.	I.S.	I.S.	I.S.	I.S.
GH-41	<5	0.1	11	281	<10
GH-42	30	0.1	11	144	10
GH-43	5	<0.1	8	594	<10
GH-44	12	<0.1	9	39	<10
GH-45	5	0.1	9	1626	<10
GH-46	<5	<0.1	10	101	<10
GH-47	I.S.	0.2	35	778	22
GH-48	I.S.	<0.1	4	104	<10
GH-49	<5	<0.1	9	325	<10
GH-50	I.S.	<0.1	4	33	<10
GH-51	18	<0.1	9	213	<10
GH-52	<10	<0.1	10	99	<10
GH-53	<10	0.1	12	267	<10
GH-54	<5	<0.1	10	263	<10
GH-55	<5	<0.1	11	159	12
GH-56	<5	<0.1	12	148	10
GH-57	10	<0.1	10	124	12
GH-58	<5	<0.1	15	173	14
GH-59	I.S.	0.1	12	554	23
GH-60	<5	<0.1	10	198	<10
GH-61	<10	<0.1	8	141	<10
GH-62	8	<0.1	11	161	<10
GH-63	<5	<0.1	11	181	<10
GH-64	<15	<0.1	11	574	11
GH-65	<5	<0.1	15	181	<10
GH-66	<10	0.1	12	217	<10
GH-67	I.S.	0.1	11	636	<10
GH-68	<10	<0.1	9	149	12
GH-69	<5	<0.1	13	194	19
GH-70	<5	<0.1	12	258	12

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Sample #	Au ppb	Ag ppm	Pb ppm	Mn ppm	As ppm
GH-71	19	0.2	14	227	68
GH-72	24	0.2	15	236	72
GH-73	I.S.	0.2	14	193	29
GH-74	97	0.4	13	118	111
GH-75	I.S.	0.4	16	170	54
GH-76	10	0.2	12	207	43
GH-77	I.S.	0.5	16	348	43
GH-78	I.S.	1.2	36	82	461
GH-79	I.S.	0.7	15	148	67
GH-80	I.S.	0.4	15	153	91

Notes: "I.S." means insufficient sample.
Au was analysed on less than the standard 15 grams of sample when this amount of sample was not available. Detection limits were raised proportionately.

Certified by

405 Copper Road, Whitehorse, YT, Y1A 2Z7 Ph: (403) 668-4968 Fax: (403) 668-4890

Northern Analytical Laboratories ltd.

15/06/94

Invoice for Analytical Services

Glenn Hartley & Ron Owens

WO#00481

Soil Sample Preparation	80 x $ 1.50 =	$ 120.00
Au FA/AAS	61 x $ 8.50 =	$ 518.50
AAS - 1st Element	78 x $ 2.75 =	$ 214.50
AAS - Additional Elements	234 x $ 1.50 =	$ 351.00
Mercury	78 x $ 5.00 =	$ 390.00
Subtotal		$ 1594.00
GST @ 7% (#R 121285662)		$ 111.58
Total due on receipt of invoice		$ 1705.58

2% interest charge on accounts over 30 days

105 Copper Road, Whitehorse, YT, Y1A 2Z7 Ph: (403) 668-4968 Fax: (403) 668-4890

Appendix II

Claims

Claims to which this work applies for assessment credit

Hot # 1 to 20	YB45652-YB45671
Grr # 1 to 24	YB45680-YB45703
GRR #37 to 42	YB45717-YB45721

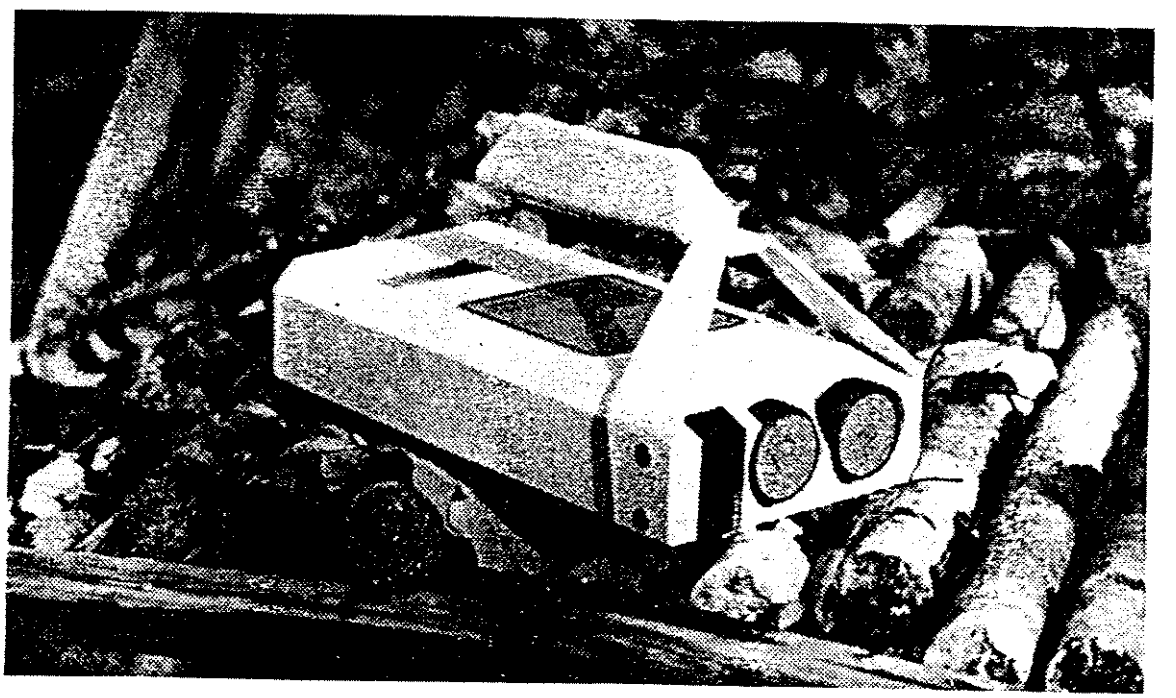
APPENDIX III

OPERATING MANUAL

FOR A PORTABLE, FIVE-CHANNEL

THRESHOLD SCINTILLOMETER

miniScint UG130



This manual applies

to all model above B90500

March 1980

Printed In Canada

WARRANTY

URTEC Limited warrants all its manufactured portable instruments against defective parts and workmanship for a period of 15 months from date of shipment. In the event of failure of equipment URTEC Limited, will at its expense repair or replace any materials, equipment work or parts which prove defective under normal operating conditions when instruments are returned to its main plant or to any of its authorized service dealers. URTEC will not be responsible for transit and freight costs.

WARRANTY SERVICE

When warranty service or technical consultation is required, contact:

URTEC LIMITED
129 TELSON ROAD
MARKHAM, ONTARIO
CANADA, L3R 1E4
TELEPHONE: (416) 495-0660
TELEX: 06-986677

NOTE TO USERS

WARNING

The circuitry within the UG 130 system generates high voltage during operation. Ensure that system power is switched off when servicing internally. URTEC Limited suggests that when service is required, contact first the technical department at URTEC Limited.

TECHNICAL SUMMARY

Selectable energy levels:	
CAL - Calibration	All energy above 0.30 MeV
TC1 - Total count I	All energy above 0.08 MeV
TC2 - Total count II	All energy above 0.40 MeV
KUT - Potassium + Uranium + Thorium	All energy above 1.36 MeV
UT - Uranium + Thorium	All energy above 1.66 MeV
T - Thorium	All energy above 2.46 MeV
Detector:	NaI (Tl) crystal; Volume, 66 cm^3 (4.0 cu in.), Mechanically ruggedized.
Spectral shift as a function of count rate:	2% or less from 0 CPS to 15000 CPS, Integrated over an energy interval from 80 keV to 1500 keV
Energy response linearity error:	Less than 2%
Visual display:	Ruggedized low temperature version five digit liquid crystal display. Readout in CPS regardless of selected sample rate. Excellent visibility in direct sunlight.

TECHNICAL SUMMARY (Cont)

Display overflow:	When count exceeds 99999, two dots will indicate count rate overflow.
Sample rate:	1.0 or 10.0 seconds, auto recycle, for all energy levels, except the 'CAL' position
Power:	Three 'C' size alkaline batteries provide 40 hours continuous operation at 23°C ambient without audio.
Battery test monitor:	Three indicators provide battery charge status when required. When batteries are nearly discharged, a keyed audio alarm is activated, overriding count rate audio.
Audio:	The count rate may be monitored in a continuous mode or may be adjusted to monitor above any background threshold.

TECHNICAL SUMMARY (Cont)

Audio response:	0.5 seconds from 0 CPS to 2500 CPS above selected threshold
Temperature range:	−25°C to +60°C (−13°F to +140°F)
Dimensions:	21 cm. (8.3 in.) long, 10.7 cm (4.2 in.) wide, 52 cm (2.0 in.) high
Weight:	1.5 kg (3.3 lb) including batteries and handle.
Rate meter output: (optional)	100 mV/100 CPS, available through a miniature connector.
Altitude:	To 3500 m (12000 ft) maximum.

DESCRIPTION

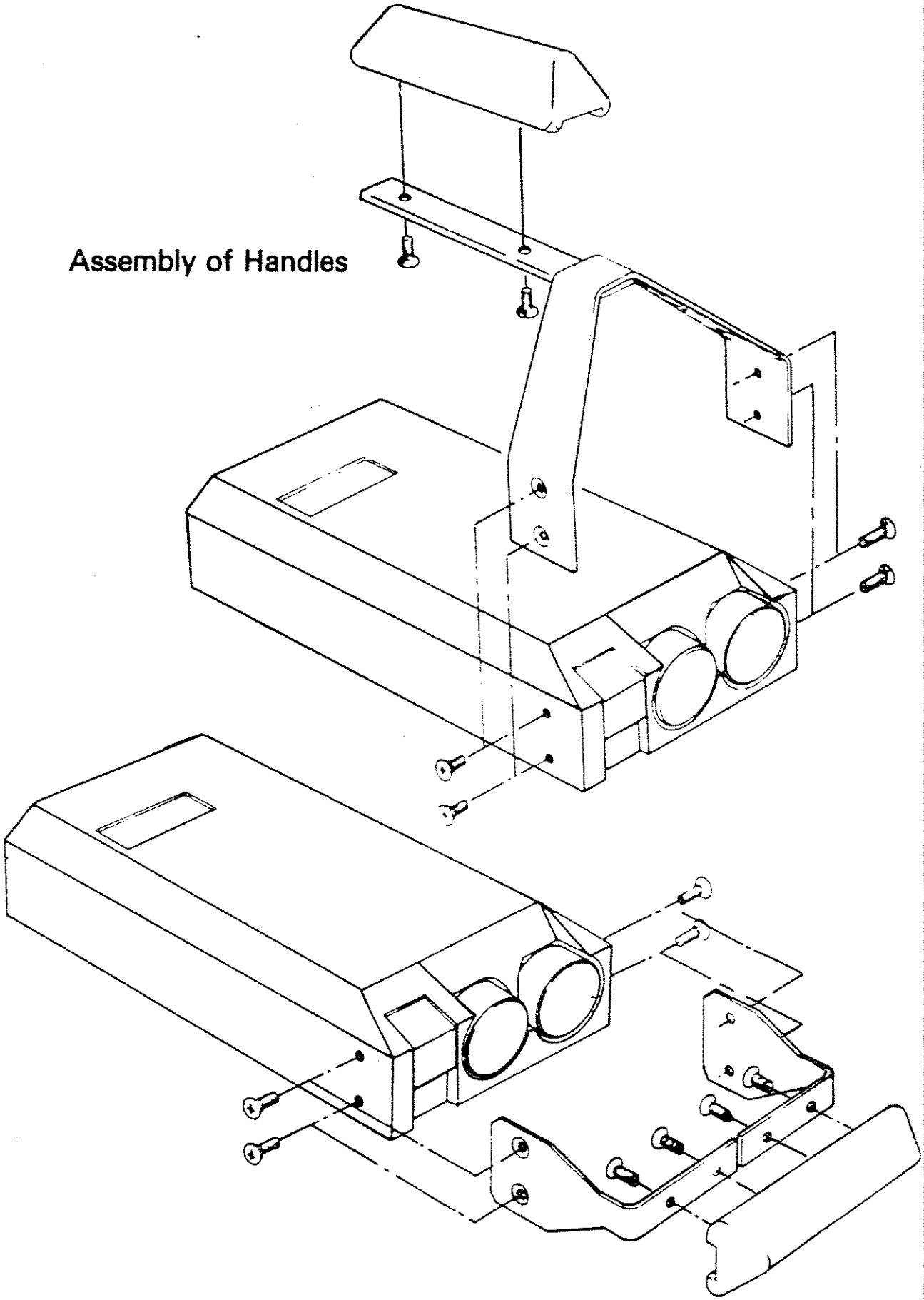
The UG 130 unit is a high-performance, threshold scintillometer for measuring all gamma radiation above five selectable energy levels. Each selectable energy level may be sampled at either one or ten second time intervals. The count rate displayed on the ruggedized five digit liquid crystal display is normalized to CPS (counts per second) regardless of the selected sample rate. When operated in the ten second sample mode, a decimal point is displayed automatically. UG 130 may be operated in two different total count modes or in a threshold mode for the measurement of Uranium, Potassium and Thorium.

The unit is a ruggedized, compact portable field instrument with simplified operational controls. The main enclosure is a single piece aluminum casting with sealed controls and battery compartment. The unit can be operated safely in the rain or in high humidity environments.

The detector is a custom designed ruggedized NaI (Tl) crystal detector which has a volume of 66 cm^3 (4 cu in.). The geometry of the crystal has been optimized to provide a greater detection sensitivity compared to other similar units. An audio signal generator has been incorporated which may be operated in a continuous mode or in an adjustable count rate threshold mode. The frequency response of the audio is five times the actual displayed count rate in CPS. This feature allows for a greater audio response to low intensity anomalies.

The UG 130 is equipped with a unique calibration source. Supplied with the unit are two sets of alkaline batteries, two carrying handles, genuine leather case with shoulder strap, operating manual and shipping container.

Assembly of Handles



ITEMS SUPPLIED

The shipping container includes the following items:

- ☐ UG 130 console with clip-on calibration source.
- ☐ One handle and two handle bracket configurations.
- ☐ Two sets of C-size alkaline batteries. (Total of six).
- ☐ Leather carrying case with shoulder strap.
- ☐ Two operating manuals.
- ☐ Assembly screwdriver.
- ☐ Allen key.

HANDLE ASSEMBLY

Two separate handle configurations may be used with the unit. Install the preferred handle configuration as shown.

INSTRUMENT STORAGE

When the UG 130 is not to be operated for a long period of time, the batteries should be removed from the unit and stored separately.

Prior to insertion of batteries into battery compartment, inspect for leakage.

OPERATION

The UG 130 is complete and ready for field operation. The following procedures should ensure optimum results. It is recommended that the operator follow each step as outlined and become familiar with the various controls, indicators and survey procedures.

OPERATIONS DIAGRAM

On the bottom of the unit there is a printed plate with operational procedures. These procedures include: Battery installation and battery capacity status indicator interpretation; calibration using the calibration source.

■ INSTRUMENT CHECK-OUT

- Check that all items have been supplied.

- Check that the AUDIO and MODE controls are in good mechanical condition. Inspect for damage including battery leakage. If any damage has occurred or parts are missing, report immediately to URTEC Limited.

■ BATTERY REPLACEMENT AND TEST

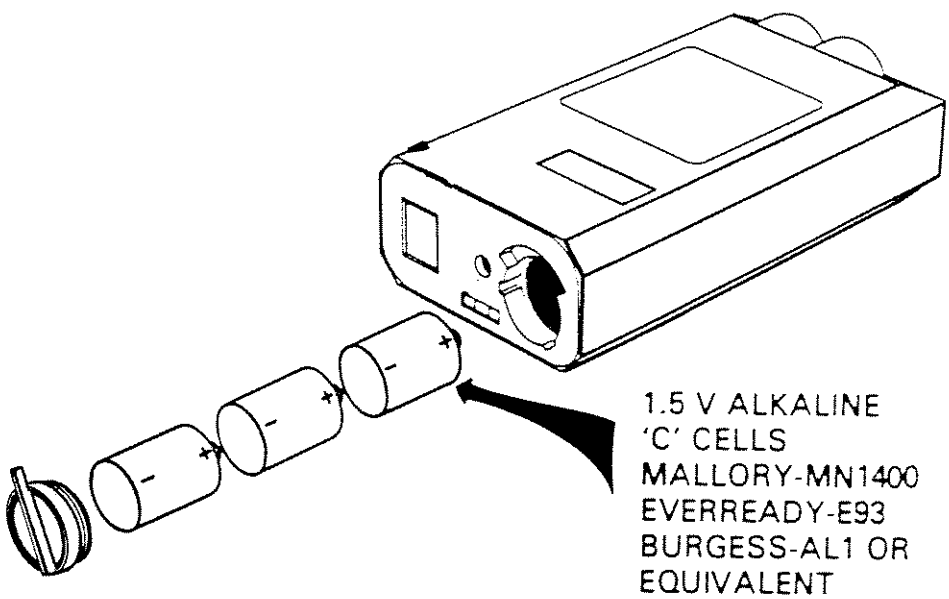
The battery compartment is completely sealed and leak-proof to prevent any battery leakage into the electronics section. The battery cap is equipped with an o-ring seal to prevent water leakage.

NOTE: When the instrument is new and the battery compartment is empty, some difficulties may be encountered when removing the battery cap. Battery cap removal will be easier after several battery changes.

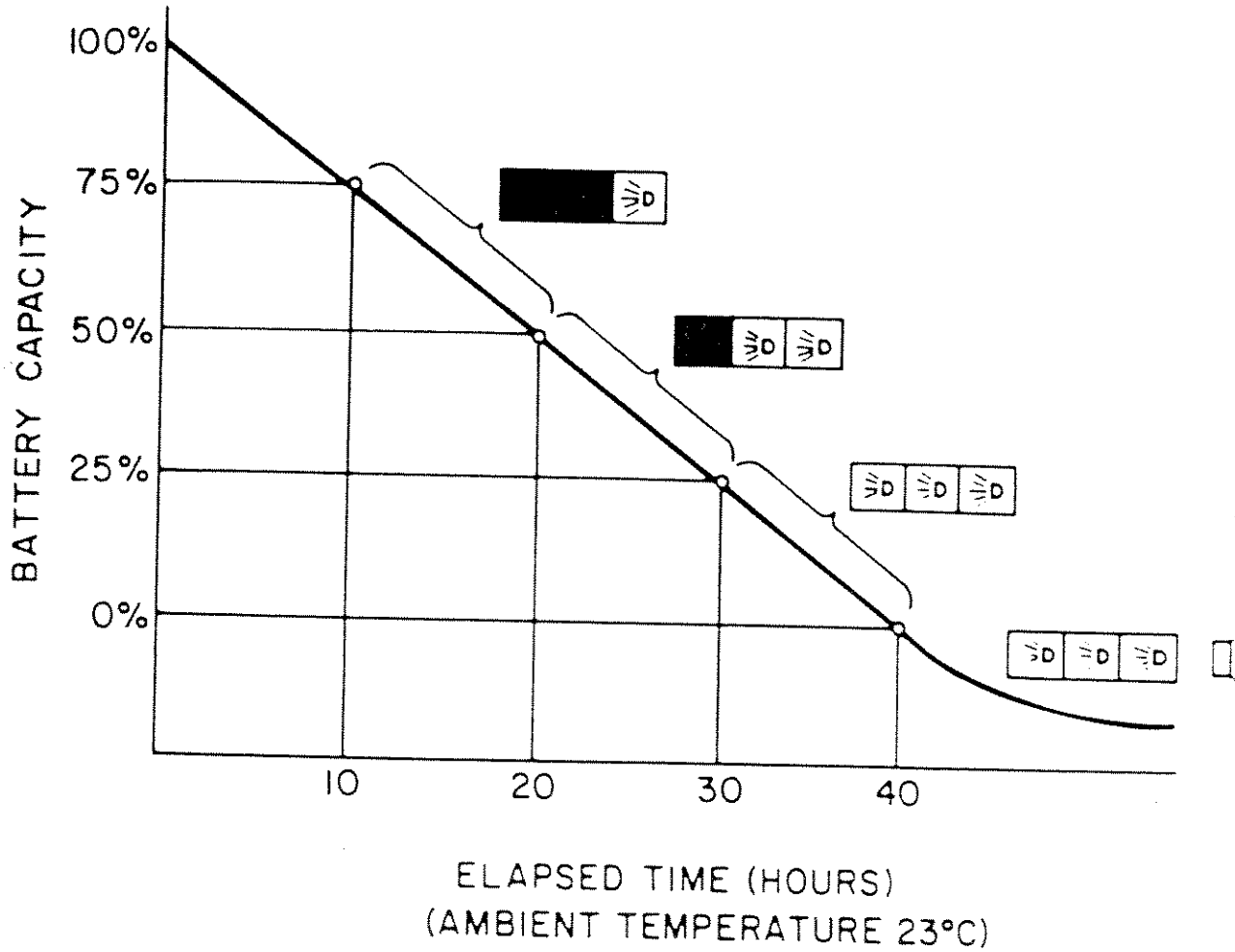
- Place new set of batteries in the battery compartment.

- Observe carefully polarity on batteries and ensure proper insertion into battery compartment.

- To replace batteries, turn battery cap fully ccw and hold cap between two fingers. The battery cap will be pushed out, due to the internal spring action. Empty battery compartment and insert new batteries observing polarity of batteries. Position battery cap in hole, press and rotate fully clockwise.



BATTERY STATUS



NOTES:

1. Diagram based on typical data obtained with 'C' size alkaline batteries.

2. Graph illustrates battery life using 'C' size alkaline batteries operated continuously with audio alarm not in use.

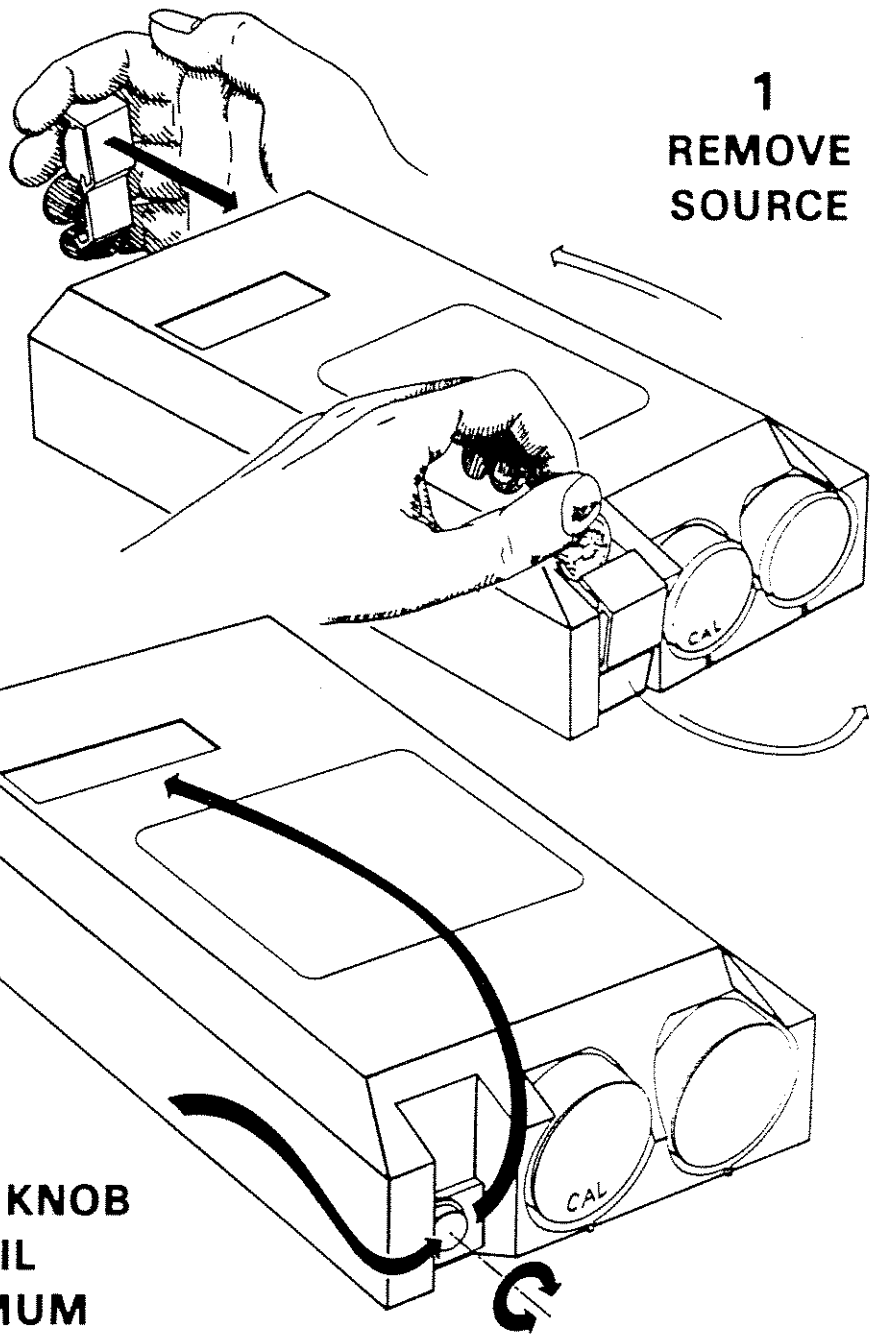
- To test battery condition: Set MODE switch to the CAL (BAT) position. The battery condition is indicated by three status indicators on the rear of the instrument.

No lights on	Battery capacity between 75% and 100%.
One light on	Battery capacity between 50% and 75% of full capacity.
Two lights on	Battery capacity between 25% and 50% of full capacity.
Three lights on	Battery capacity between 0% and 25% of full capacity.
Three lights on and beeping audio	Batteries must be replaced.

The unit may be operated safely for several hours when the three battery status indicators are on. When the batteries are approaching a completely discharged state, a beeping audio alarm is activated, overriding the regular count rate audio. When this situation occurs, the batteries should be replaced.

NOTE: Battery capacity is expressed as a linear function of elapsed operating time. Refer to graph.

CALIBRATION



2
INSERT SOURCE INTO CAVITY

1
REMOVE SOURCE

3
ADJUST KNOB UNTIL MAXIMUM COUNTRATE IS DISPLAYED

DISPLAY:
Reading in counts per second

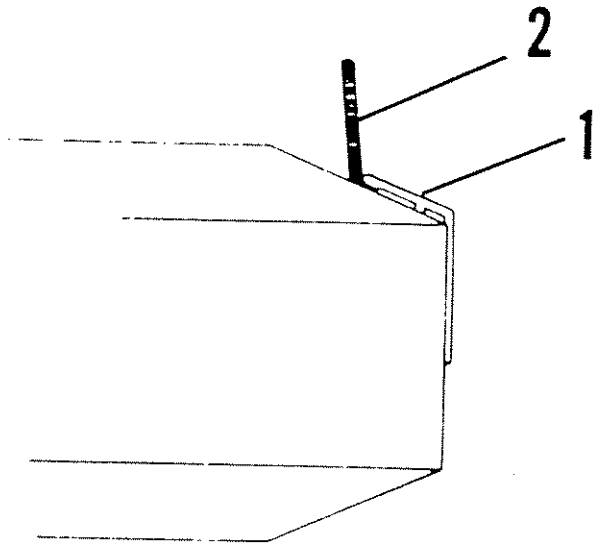
DETECTOR:
NaI (Tl) Vol. 66cm^3 (4 in.^{3})

CALIBRATION PROCEDURE

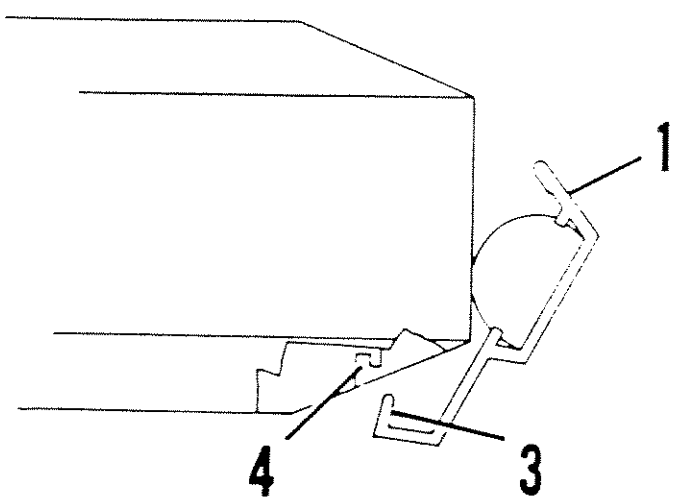
The UG 130 is equipped with a unique calibration source. The actual isotope, Barium 133 (Ba^{133}) is located in a 2π lead shield attached mechanically to an aluminum clip designated as the source holder. The source holder may be removed from the unit by using a coin or key as a lever. Once the source holder is removed, a cavity is observed. Within this cavity is a CALIBRATION control.

The source holder, when in its original place, will only emit gamma photons from the face in a 2π geometry. The lead shield will absorb all the gamma photons emitted to the back. This method allows the test source to be located close to the detector without any count rate contributions.

To remove calibration source (1) insert coin (2) in slot and gently pry until source holder releases.



To install calibration source (1) insert source holder lip (3) into groove (4). Gently rotate holder upward until it snaps into place.



Removal and Installation of
Calibration Source

The isotope Ba^{133} used as the test source is of a very low intensity and does not cause danger to health. No special precautions are required.

IMPORTANT NOTE: When removing or inserting the test source, do not apply force. Check very carefully the diagrams which explain proper removal and insertion. Source holder spring action may be damaged permanently when external force is used or spring is handled improperly.

To Calibrate

IMPORTANT NOTE: Calibrate unit only in areas where the background count rate is very low. Do not position unit close to the ground.

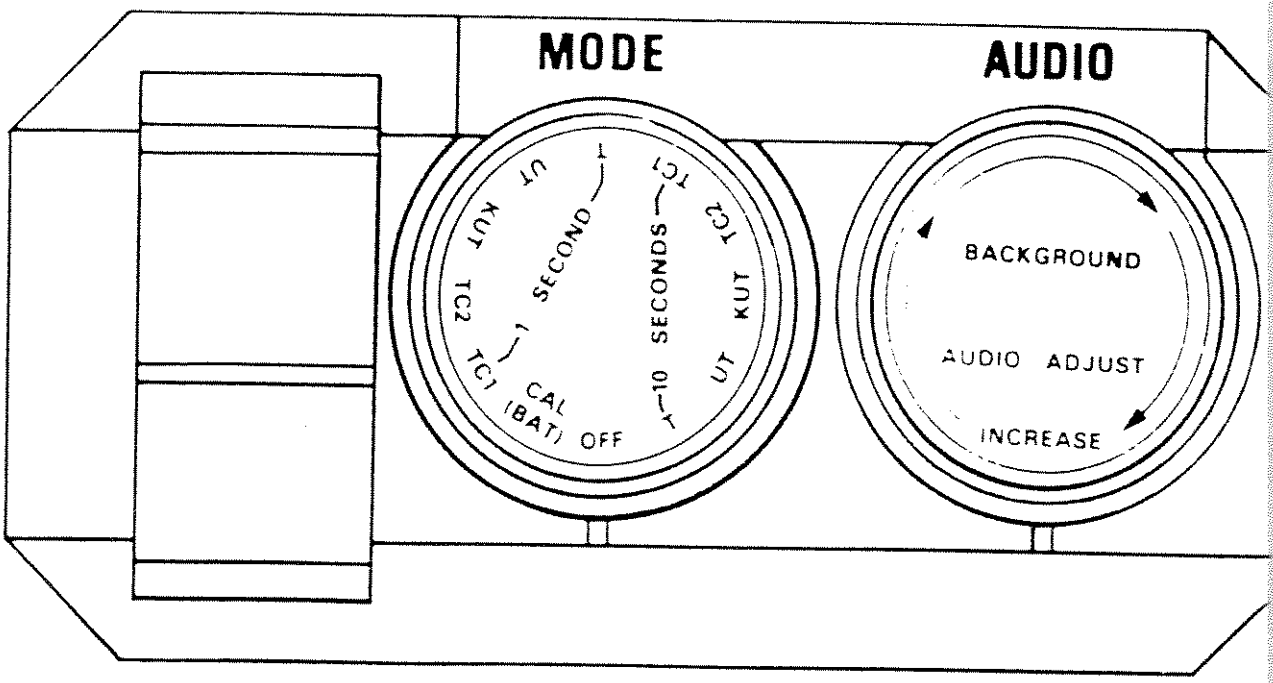
(a) Set the MODE switch to the CAL (BAT) position.

(b) Set the AUDIO control to a convenient background threshold.

(c) Use a coin or key to remove the source holder. Do not use force.

(d) Position source holder in cavity, located on the back plate of the unit and hold tightly in place.

(e) Rotate the CALIBRATION control CLOCKWISE until the count rate displayed is less than 800 CPS.


MODE
AUDIO
SECOND
10 SECONDS
TC1
TC2
KUT
UT
CAL
(BAT)
OFF
BACKGROUND
AUDIO ADJUST
INCREASE

Front Panel

(f) Rotate the CALIBRATION control COUNTER-CLOCKWISE and observe the display.

(g) Check that the count rate increases until a maximum is obtained after which the count rate decreases. After the count rate starts to decrease, stop rotation of the CALIBRATION control.

(h) Carefully rotate the CALIBRATION control CLOCKWISE until the maximum countrate is again obtained. The audio alarm can also be used to signal when a maximum countrate is achieved.

When the unit is calibrated, remove test source holder from cavity in back plate and carefully return test source holder to original position. Check diagram.

AUDIO SIGNAL

The audio signal response is proportional to the count rate being measured. The audio response is multiplied five times, therefore the frequency of the audio is always five times greater than the measured count rate.

The audio control is designed to provide the operator with the ability to distinguish by audio response any anomalous signatures above the average background count rate in any specific area. This is achieved by moving the control until the audio is barely audible. Any increase in the count rate will produce a noticeable increase in the audio output.

PRINCIPLES OF GAMMA RAY DETECTION

Scintillation Theory

A scintillation phosphor is a material which is able t convert energy lost by ionizing radiation into impulses of light Ionizing radiation may be in the form of gamma rays, alpha o beta particles.

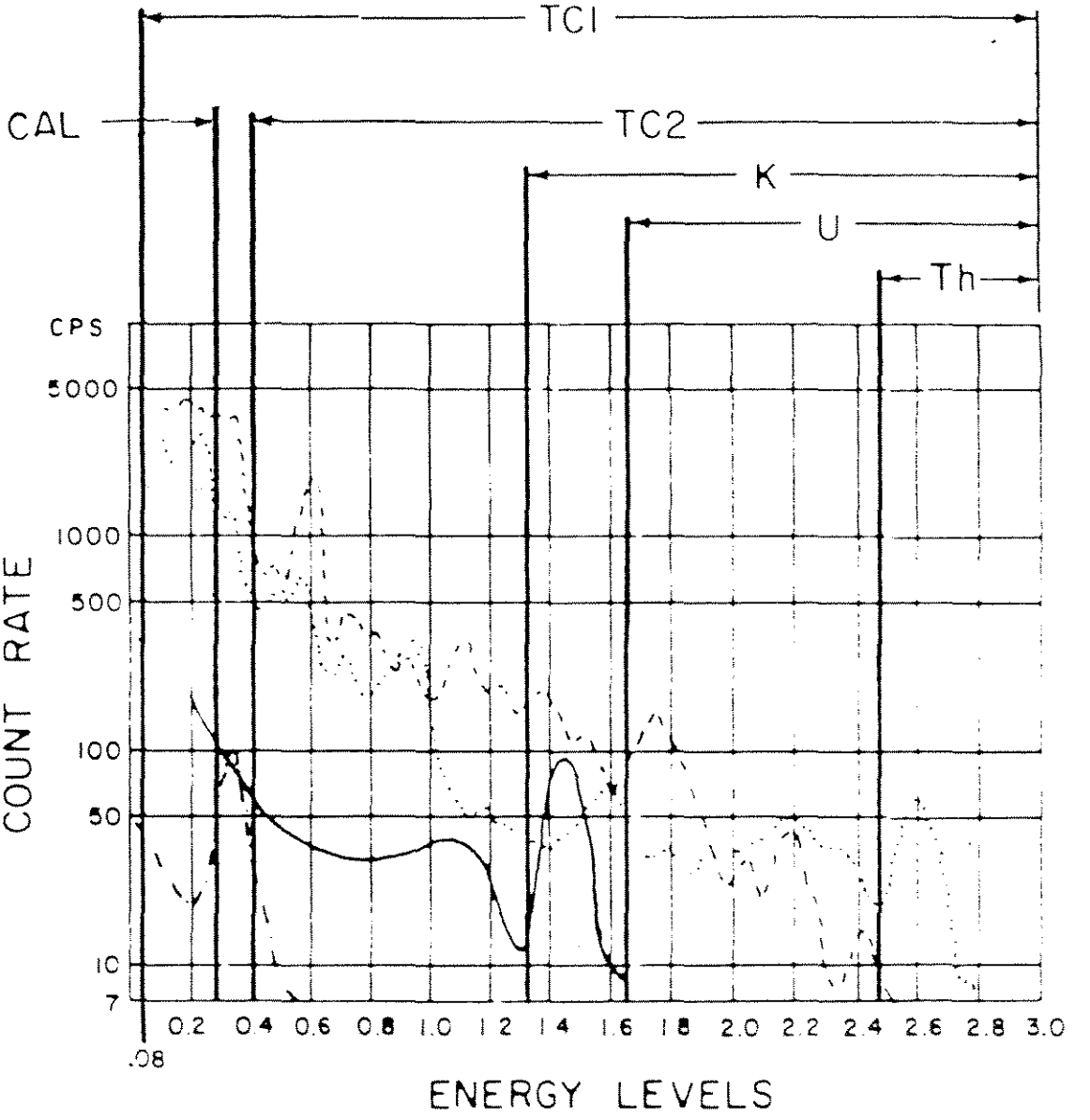
The impulses produced by the phosphor may be detectec by the use of a photomultiplier tube. The photomultiplier tube then converts the light impulses into electrical impulses.

The electrical impulses are then processed by electronic circuitry. As a scintillation phosphor, thallium-activatec sodium iodide, NaI (Tl) material is used. The material has a high atomic number, which results in good gamma ray stopping power and has a high luminescent efficiency which results in large pulse heights or amplitudes for low energy gamma ray interactions.

The spectral emission characteristics of NaI (Tl) matches that of the photomultiplier tube.

NaI (Tl) is an inorganic material which is extremely hygroscopic and is relatively fragile, especially, when subjectec to mechanical shocks or large sudden temperature changes.

NaI (Tl) is produced in a crystal form, packaged and sealed in a moisture proof container, together with the photomultiplier tube. The entire package is called: 'the detector'.



Legend

Thorium
Uranium
Potassium
Barium

Gamma Ray Spectrum

The characteristic of the electric impulses is that they vary in amplitude. The amplitude of the electrical impulse is directly proportional to the incident gamma ray energy that has been deposited into the crystal.

The detector detects virtually all gamma radiation to which it is exposed. In the natural environment, the gamma ray range is from zero to 3000 keV. This range accommodates all naturally occurring radio isotopes, such as Th^{232}, U^{238} and K^{40}. Th^{232} and U^{238} have very complex decay series. The probability of a gamma ray being absorbed by the crystal is a function of detector geometry. The probability of gamma ray detection is greater when the source emits low energy gamma rays or photons, than high energy photons, using the same geometry detector. An analysis of the gamma photon spectrum from high to low energy indicates that the count rate increases from the high energy to the low energy end. The count rate versus the energy curve (spectrum) is in general exponential.

When a gamma photon enters the crystal and it happens to collide with an electron in the crystal, it may impart a portion of its energy to the electron. Because of the collision, the gamma photon loses some of its initial energy.

The gamma photon with a lower energy level has more probability now to be fully absorbed by the crystal. This phenomenon is identified as a 'Compton scatter'.

Th^{232}, U^{238} and K^{40} are the three naturally occurring radio isotopes. Th^{232} and U^{238} have very complex decay chains. K^{40} on the other hand emits only one single energy gamma photon at 1.47 MeV.

The standard energy line for U^{238} has been set at 1.76 MeV which is produced by a daughter decay product; Bi^{214}.

The standard energy line for Th^{232} has been set at 2.62 MeV which is produced by a daughter decay product; Tl^{208}.

The UG 130 utilizes selectable energy levels to detect the presence of Th^{232}, U^{238} or K^{40}. Once an energy level has been selected the instrument will only process gamma photons which have energies larger than the selected energy level.

The UG 130 is not capable of differentiating between energy levels, hence the instrument is identified as an integrating spectrometer. The UG 130 instrument has five basic energy levels from which to select (not including the CAL position). Selections are made by using the MODE switch.

(1) Total Count 1 (TC1) - Processes all energies above 80 keV (usually the most sensitive position but also the most critical, as far as geometry and source detector distance is concerned).

(2) Total Count 2 (TC2) - Processes all energies above 400 keV (less sensitive than the TC1 position but provides more reliable data).

(3) K + U + T - Processes all energy above 1.36 MeV. Indicates the sum of Th^{232}, U^{238} and K^{40}.

(4) U + T - Processes all energy above 1.66 MeV. Indicates the sum of U^{238} and Th^{232}.

(5) T - Processes all energy above 2.46 MeV. Indicates Th^{232} only.

Additionally, the MODE switch contains a CAL (BAT) position. Once set in this position, the instrument may be calibrated. (Refer to calibration procedures). In this position, and with the calibration source in place, the instrument measures all radiation between 300 keV and 400 keV.

Data may be obtained at one of the five basic selectable energy levels utilizing either a 1 second or a 10 second sample interval.

When the instrument is used in the 10 second sample interval mode the count rate displayed has been automatically normalized to counts per second by placing a decimal point on the display.

GENERAL OPERATING NOTES

The UG130 is designed to be an exceptionally linear instrument.

The linearity is specified to be $\pm 2\%$ from 0 to 15000 CPS.

When the displayed count rate is larger than 15000 CPS the linearity error increases rapidly.

It is suggested that, when this occurs, the unit be operated in the TC2 mode.

Additionally ore grade analysis may be obtained, when the unit has been calibrated properly and tested over calibrated test pads. It has been proven mathematically that reliable ore grade figures can be obtained by using the instrument in the TC2 mode.

Avoid subjecting the instrument to heavy mechanical shocks. The unit contains a relatively fragile detector and, although URTEC Limited has incorporated a ruggedized detector, it still can be damaged.

Avoid subjecting the instrument to large temperature variations. Generally, the unit should not be subjected to a temperature-time gradient in excess of 15°C/hour.

YUKON MINFILE
YUKON GEOLOGY PROGRAM
WHITEHORSE

NAME(S): Hot
MINFILE #: 115O 158
MAJOR COMMODITIES: -
MINOR COMMODITIES: -
TECTONIC ELEMENT: Yukon Tanana Terrane
NTS MAP SHEET: 115 O 16
LATITUDE: 63°52'30"N
LONGITUDE: 138°16'30"W
DEPOSIT TYPE: Unknown
STATUS: Uncertain

CLAIMS (PREVIOUS AND CURRENT)

HOT, GRR, DAD, WET

WORK HISTORY

First staked as Hot 1-20 (YB45652) and GRR 1-56 cl (YB45680) in Oct/93 by R. Tilsley.
G. Hartley staked Dad cl 1-16 (YB53877) and Wet cl 1-4 (YB53893) 3 km to the east in Jul/95.

GEOLOGY

The claims are staked in an overburden covered area within the Tintina Trench. Tisley staked the claims to cover anomalous mecury, arsenic, barium, manganese and tin values reported in a GSC regional stream sediment survey (GSC Open File 1364). Lineament studies conducted by Mortensen and Von Gaza (1992) utilizing Landsat TM thermal imagery suggest the presence of a number of well defined fault splays near the claims. These structures may represent possible loci for structurally controlled epithermal precious metal mineralization.

YUKON MINFILE
YUKON GEOLOGY PROGRAM
WHITEHORSE

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