

REGIONAL LAKE SEDIMENT AND WATER GEOCHEMICAL DATA, LABRADOR 1985, GSC-OF 1210, NGR 75-1985, NTS 14E AND PARTS OF NTS 14F, 14L, 24H, 24I

```
*****  
*                                     *  
*      OPEN FILE    1210          *  
*                                     *  
*****
```

	PAGE
SURVEY NOTES	1
DATA LIST	8
SUMMARY STATISTICS	58

REGIONAL LAKE SEDIMENT AND WATER GEOCHEMICAL DATA, LABRADOR 1985, GSC-OF 1210, NGR 75-1985, NTS 14E AND PARTS OF NTS 14F, 14L, 24H, 24I

GEOLOGICAL SURVEY OF CANADA OPEN FILE 1210: NEWFOUNDLAND DEPARTMENT
OF MINES AND ENERGY OPEN FILE LAB (695)
REGIONAL LAKE SEDIMENT AND WATER GEOCHEMICAL RECONNAISSANCE DATA,
NORTHERN LABRADOR, NTS 14E AND PARTS OF 14F, 14L, 24H AND 24I.

OPEN FILE 1210 IS ONE OF TWO OPEN FILES (1209 AND 1210) RELEASED IN 1986,
COVERING NORTHERN LABRADOR, CONSISTING OF: NTS 14D AND PARTS OF 14C AND
24A (1209); 14E AND PARTS OF 14F, 14L, 24H AND 24I (1210).

THE RECONNAISSANCE SURVEY WAS UNDERTAKEN BY THE GEOLOGICAL SURVEY OF CANADA IN
CONJUNCTION WITH THE NEWFOUNDLAND DEPARTMENT OF MINES AND ENERGY UNDER THE
CANADA-NEWFOUNDLAND MINERAL DEVELOPMENT AGREEMENT 1984-1989.

E.H.W. HORN BROOK DIRECTED THE SURVEY PROGRAM.

P.W.B. FRISKE COORDINATED THE OPERATIONAL ACTIVITIES OF THE CONTRACTING
AND GEOLOGICAL SURVEY OF CANADA STAFF THROUGHOUT THE SURVEY.

CONTRACTS LET FOR COLLECTION, SAMPLE PREPARATION AND ANALYSIS WERE THE
RESPONSIBILITY OF, AND WERE SUPERVISED AND/OR MONITORED BY THE STAFF OF
THE RESOURCE GEOCHEMISTRY SUBDIVISION AS FOLLOWS:

COLLECTION: - M.P.H. CONSULTING LTD., TORONTO, ONTARIO.
- P.W.B. FRISKE, E.W.H. HORN BROOK

PREPARATION: - GOLDER ASSOCIATES, OTTAWA, ONTARIO
- J.J. LYNCH

ANALYSIS: - BARRINGER MAGENTA LTD., REXDALE, ONTARIO
- BARRINGER MAGENTA (ALBERTA) LTD., CALGARY, ALBERTA
- J.J. LYNCH

H.R. SCHMITT AND N.G. LUND COORDINATED OPEN FILE PRODUCTION.
B.E. ELLIOTT WAS RESPONSIBLE FOR DATA MANAGEMENT AND FOR THE PREPARATION
OF THE REGIONAL TREND MARGINAL MAPS UTILIZING A PROGRAM DEVELOPED BY
D. J. ELLWOOD.

J. YELLE SUPERVISED MAP PREPARATION.

COMPUTING AND PLOTTING FACILITIES WERE PROVIDED BY THE COMPUTER SCIENCE
CENTER, E.M.R.

OPEN FILE TEXT WAS MANUFACTURED BY K.G. CAMPBELL CORPORATION LASER PRINTING,
OTTAWA

HELICOPTER SUPPORTED SAMPLE COLLECTION WAS CARRIED OUT DURING
THE SUMMER OF 1985.
LAKE SEDIMENT AND WATER SAMPLES WERE COLLECTED AT AN AVERAGE DENSITY OF ONE
SAMPLE PER 13 SQUARE KILOMETERS THROUGHOUT THE 20,000 SQUARE KILOMETERS
OF THE NORTHERN LABRADOR SURVEY AREA .

SAMPLE SITE DUPLICATE SAMPLES WERE ROUTINELY COLLECTED IN EACH
ANALYTICAL BLOCK OF TWENTY SAMPLES.

IN OTTAWA, FIELD DRIED SAMPLES WERE AIR-DRIED, CRUSHED, BALL MILLED AND SIEVED. THE MINUS 80 MESH (177 MICRONS) FRACTION WAS USED FOR SUBSEQUENT ANALYSES. AT THIS TIME, CONTROL REFERENCE AND BLIND DUPLICATE SAMPLES WERE INSERTED INTO EACH BLOCK OF TWENTY SEDIMENT SAMPLES. FOR THE WATER SAMPLES, ONLY CONTROL REFERENCE SAMPLES WERE INSERTED INTO THE BLOCK. THERE WERE NO BLIND DUPLICATE WATER SAMPLES.

ON RECEIPT, FIELD AND ANALYTICAL DATA WERE PROCESSED WITH THE AID OF COMPUTERS. THE FIELD DATA WERE RECORDED BY THE FIELD CONTRACT STAFF ON STANDARD LAKE SEDIMENT FIELD CARDS (REV. 74) USED BY THE GEOLOGICAL SURVEY OF CANADA (GARRETT, 1974). THE SAMPLE SITE POSITIONS WERE MARKED ON APPROPRIATE 1/250,000 SCALE NTS MAPS IN THE FIELD. THESE MAPS WERE DIGITIZED AT THE GEOLOGICAL SURVEY IN OTTAWA TO OBTAIN THE SAMPLE SITE UTM COORDINATES. THE SAMPLE SITE COORDINATES WERE CHECKED AS FOLLOWS: A SAMPLE LOCATION MAP WAS PRODUCED ON A CALCOMP 1051 DRUM PLOTTER USING THE DIGITIZED COORDINATES; THE FIELD CONTRACTORS'S SAMPLE LOCATION MAP WAS THEN OVERLAYED WITH THE CALCOMP MAP; THE TWO SETS OF POINTS WERE CHECKED FOR COINCIDENCE. THE DOMINANT ROCK TYPES IN THE LAKE CATCHMENT BASINS WERE IDENTIFIED ON APPROPRIATE GEOLOGICAL MAPS USED AS THE BEDROCK GEOLOGICAL BASE ON RGR MAPS.

THOROUGH INSPECTIONS OF THE FIELD AND ANALYTICAL DATA WERE MADE TO CHECK FOR ANY MISSING INFORMATION AND/OR GROSS ERRORS.

QUALITY CONTROL AND MONITORING OF THE GEOCHEMICAL DATA WAS UNDERTAKEN BY A STANDARD METHOD USED BY THE RESOURCE GEOCHEMISTRY SUBDIVISION AT THE GEOLOGICAL SURVEY OF CANADA.

FOR THE DETERMINATION OF ZN, CU, PB, NI, CO, AG, MN, FE, CD, AND AS A 1 GRAM SAMPLE WAS REACTED WITH 6 ML OF A MIXTURE OF 4M HNO₃ AND M HCL IN A TEST-TUBE OVERNIGHT AT ROOM TEMPERATURE. AFTER DIGESTION, THE TEST-TUBE WAS IMMERSSED IN A HOT WATER BATH AT ROOM TEMPERATURE AND BROUGHT UP TO 90C AND HELD AT THIS TEMPERATURE FOR 2 HOURS WITH PERIODIC SHAKING. THE SAMPLE SOLUTION WAS THEN DILUTED TO 20 ML WITH METAL FREE WATER AND MIXED. ZN, CU, PB, NI, CO, AG, MN, FE AND CD WERE DETERMINED BY ATOMIC ABSORPTION SPECTROSCOPY USING AN AIR-ACETYLENE FLAME. BACKGROUND CORRECTIONS WERE MADE FOR PB, NI, CO, AG AND CD.

AS WAS DETERMINED BY ATOMIC ABSORPTION USING A HYDRIDE EVOLUTION METHOD WHEREIN THE HYDRIDE (ASH₃) IS EVOLVED, PASSED THROUGH A HEATED QUARTZ TUBE IN THE LIGHT PATH OF AN ATOMIC ABSORPTION SPECTROPHOTOMETER. THE METHOD IS DESCRIBED BY ASLIN (1976).

MOLYBDENUM AND VANADIUM WERE DETERMINED BY ATOMIC ABSORPTION SPECTROSCOPY USING A NITROUS OXIDE ACETYLENE FLAME.

A 0.5 GRAM SAMPLE WAS REACTED WITH 1.5 ML CONCENTRATED HN_3 AT 90C FOR 30 MINUTES.

AT THIS POINT 0.5 ML CONCENTRATED HCL WAS ADDED AND THE DIGESTION WAS CONTINUED AT 90C FOR AN ADDITIONAL 90 MINUTES.

AFTER COOLING, 8 ML OF 1250 PPM AL SOLUTION WERE ADDED AND THE SAMPLE SOLUTION WAS DILUTED TO 10 ML BEFORE ASPIRATION.

MERCURY WAS DETERMINED BY THE HATCH AND OTT PROCEDURE WITH SOME MODIFICATIONS. THE METHOD IS DESCRIBED BY JONASSON ET AL. (1973).

A 0.5 GRAM SAMPLE WAS REACTED WITH 20 ML CONCENTRATED HNO_3 AND 1 ML CONCENTRATED HCL IN A TEST-TUBE FOR 10 MINUTES AT ROOM TEMPERATURE PRIOR TO 2 HOURS OF DIGESTION WITH MIXING AT 90C IN A HOT WATER BATH.

AFTER DIGESTION, THE SAMPLE SOLUTIONS WERE COOLED AND DILUTED TO 100 ML WITH METAL FREE WATER.

THE HG PRESENT WAS REDUCED TO THE ELEMENTAL STATE BY THE ADDITION OF 10 ML 10% W/V SnSO_4 IN M H_2SO_4 .

THE HG VAPOUR WAS THEN FLUSHED BY A STREAM OF AIR INTO AN ABSORPTION CELL MOUNTED IN THE LIGHT PATH OF AN ATOMIC ABSORPTION SPECTROPHOTOMETER.

ABSORPTION MEASUREMENTS WERE MADE AT 253.7 NM.

LOSS ON IGNITION WAS DETERMINED USING A 500 MG SAMPLE.

THE SAMPLE, WEIGHED INTO 30 ML BEAKER, WAS PLACED IN A COLD MUFFLE FURNACE AND BROUGHT UP TO 500C OVER A PERIOD OF 2-3 HOURS.

THE SAMPLE WAS LEFT AT THIS TEMPERATURE FOR 4 HOURS, THEN ALLOWED TO COOL TO ROOM TEMPERATURE FOR WEIGHING.

URANIUM WAS DETERMINED USING A NEUTRON ACTIVATION METHOD WITH DELAYED NEUTRON COUNTING.

A DETAILED DESCRIPTION OF THE METHOD IS PROVIDED BY BOULANGER ET AL (1975).

IN BRIEF, A 1 GRAM SAMPLE IS WEIGHED INTO A 7 DRAM POLYETHYLENE VIAL, CAPPED AND SEALED.

THE IRRADIATION IS PROVIDED BY THE SLOWPOKE REACTOR WITH AN OPERATING FLUX OF 10^{12} NEUTRONS/SQ.CM./SEC.

THE SAMPLES ARE PNEUMATICALLY TRANSFERRED FROM AN AUTOMATIC LOADER TO THE REACTOR, WHERE EACH SAMPLE IS IRRADIATED FOR 60 SECONDS.

AFTER IRRADIATION, THE SAMPLE IS AGAIN TRANSFERRED PNEUMATICALLY TO THE COUNTING FACILITY WHERE AFTER A 10 SECOND DELAY THE SAMPLE IS COUNTED FOR 60 SECONDS WITH SIX BF_3 DETECTOR TUBES EMBEDDED IN PARAFFIN.

FOLLOWING COUNTING, THE SAMPLES ARE AUTOMATICALLY EJECTED INTO A SHIELDED STORAGE CONTAINER.

CALIBRATION IS CARRIED OUT TWICE A DAY AS A MINIMUM, USING NATURAL MATERIALS OF KNOWN URANIUM CONCENTRATION.

FLUORINE WAS DETERMINED IN LAKE SEDIMENTS AS DESCRIBED BY FICKLIN (1970).
A 250 MG SAMPLE IS SINTERED WITH 1 GRAM OF A FLUX CONSISTING OF TWO PARTS BY WEIGHT SODIUM CARBONATE AND 1 PART BY WEIGHT POTASSIUM NITRATE.
THE RESIDUE IS THEN LEACHED WITH WATER, THE SODIUM CARBONATE IS NEUTRALIZED WITH 10 ML 10% (W/V) CITRIC ACID AND THE RESULTING SOLUTION IS DILUTED TO 100 ML WITH WATER.
THE PH OF THE RESULTING SOLUTION SHOULD BE FROM 5.5 TO 6.5.
THE FLUORIDE CONTENT OF THE TEST SOLUTION IS THEN MEASURED USING A FLUORIDE ION ELECTRODE.
STANDARD SOLUTIONS CONTAIN SODIUM CARBONATE AND CITRIC ACID IN THE SAME QUANTITIES AS THE SAMPLE SOLUTION.
A DETECTION LIMIT OF 40 PPM IS ACHIEVED.

TUNGSTEN WAS DETERMINED AS FOLLOWS: A 0.2 GRAM SAMPLE OF LAKE SEDIMENT WAS FUSED WITH 1 GRAM K₂S₂O₇ IN A RIMLESS TEST TUBE AT 575C FOR 15 MINUTES IN A FURNACE. THE COOLED MELT WAS THEN LEACHED WITH 10 ML CONCENTRATED HCL IN A WATER BATH HEATED TO 85C. AFTER THE SOLUBLE MATERIAL WAS COMPLETELY DISSOLVED, THE INSOLUBLE MATERIAL WAS ALLOWED TO SETTLE AND AN ALIQUOT OF 5 ML WAS TRANSFERRED TO ANOTHER TEST TUBE. 5 ML OF 20% SNCL₂ SOLUTION WAS THEN ADDED TO THE SAMPLE ALIQUOT, MIXED AND HEATED FOR 10 MINUTES AT 85C IN A HOT WATER BATH. A 1 ML ALIQUOT OF DITHIOL SOLUTION (1% DITHIOL IN ISO-AMYL ACETATE) WAS ADDED TO THE TEST SOLUTION AND THE TEST SOLUTION WAS THEN HEATED FOR 4-6 HOURS AT 80-85C IN A HOT WATER BATH. THE TEST SOLUTION WAS THEN REMOVED FROM THE HOT WATER BATH, COOLED AND 2.5 ML OF KEROSENE ADDED TO DISSOLVE THE GLOBULE. THE COLOUR INTENSITY OF THE KEROSENE SOLUTION WAS MEASURED AT 630 NM USING A SPECTROPHOTOMETER.
A DETAILED DESCRIPTION OF THE METHOD IS GIVEN BY QUIN AND BROOKS (1972)

ANTIMONY WAS DETERMINED IN LAKE SEDIMENTS AS DESCRIBED BY (ASLIN, 1976).
A 500 MG SAMPLE IS PLACED IN A TEST TUBE; 3 ML CONCENTRATED HNO₃ AND 9 ML CONCENTRATED HCL ARE ADDED AND THE MIXTURE IS ALLOWED TO STAND OVERNIGHT AT ROOM TEMPERATURE. THE MIXTURE IS HEATED SLOWLY TO 90C AND MAINTAINED AT THIS TEMPERATURE FOR AT LEAST 90 MINUTES.
THE SOLUTION IS COOLED AND DILUTED TO 10 ML. A 400 MICRO L ALIQUOT OF THIS TEST SOLUTION IS REMOVED AND DILUTED TO 10 ML WITH 1.8M HCL. THE ANTIMONY IN AN ALIQUOT OF THIS DILUTE SOLUTION IS THEN DETERMINED BY HYDRIDE EVOLUTION-ATOMIC ABSORPTION SPECTROMETRY .

FLUORIDE IN LAKE WATER SAMPLES WAS DETERMINED USING A FLUORIDE ELECTRODE.
PRIOR TO MEASUREMENT AN ALIQUOT OF THE SAMPLE WAS MIXED WITH AN EQUAL VOLUME OF TISAB II SOLUTION (TOTAL IONIC STRENGTH ADJUSTMENT BUFFER).
THE TISAB II BUFFER SOLUTION IS PREPARED AS FOLLOWS: TO 50 ML METAL FREE WATER ADD 57 ML GLACIAL ACETIC ACID, 58 GM NA₂CO₃ AND 4 GM CDTA (CYCLOHEXYLENE DINITRILE TETRAACETIC ACID). STIR TO DISSOLVE AND COOL TO ROOM TEMPERATURE. USING A PH METER, ADJUST THE PH BETWEEN 5.0 AND 5.5 BY SLOWLY ADDING 5 M NAOH SOLUTION. COOL AND DILUTE TO ONE LITER IN A VOLUMETRIC FLASK.

HYDROGEN ION ACTIVITY (PH) WAS MEASURED WITH A COMBINATION GLASS-CALOMEL ELECTRODE AND A PH METER.

URANIUM IN WATERS WAS DETERMINED BY A LASER-INDUCED FLUOROMETRIC METHOD USING A SCINTREX UA-3 URANIUM ANALYSER.

A COMPLEXING AGENT, KNOWN COMMERCIALY AS FLURAN AND COMPOSED OF SODIUM PYROPHOSPHATE AND SODIUM MONOPHOSPHATE, (HALL, G.E.M., 1979) IS ADDED TO PRODUCE THE URANYL PYROPHOSATE SPECIES WHICH FLUORESCES WHEN EXPOSED TO THE LASER.

SINCE ORGANIC MATTER IN THE SAMPLE CAN CAUSE UNPREDICTABLE BEHAVIOUR, A STANDARD ADDITION METHOD WAS USED.

FURTHER, THERE HAVE BEEN INSTANCES AT THE G.S.C. WHERE THE REACTION OF URANIUM WITH FLURAN IS EITHER DELAYED OR SLUGGISH; FOR THIS REASON AN ARBITRARY 24 HOUR TIME DELAY BETWEEN THE ADDITION OF THE FLURAN AND THE ACTUAL READING WAS INCORPORATED INTO THIS METHOD.

IN PRACTICE, 500 UL OF FLURAN SOLUTION WERE ADDED TO A 5 ML SAMPLE AND ALLOWED TO STAND FOR 24 HOURS. AT THE END OF THIS PERIOD FLUORESCENCE READINGS WERE MADE WITH THE ADDITION OF 0.0, 0.2 AND 0.4 PPB U.

FOR HIGH SAMPLES THE ADDITIONS WERE 0.0, 2.0 AND 4.0 (20 UL ALIQUOTS OF EITHER 55 OR 550 PPB U WERE USED).

ALL READINGS WERE TAKEN AGAINST A SAMPLE BLANK.

THE FOLLOWING TABLES DISPLAY THE DATA RECORD FORMAT SPECIFICATIONS.
 THE DETECTION LIMITS OF THE ANALYTICAL METHODS ARE GIVEN.
 THE SECOND FIGURE UNDER THE DETECTION LIMIT HEADING IS USED
 AS AN ARBITRARILY SET VALUE IF THE RESULTS FALL BELOW THE
 DETECTION LIMIT. (USUALLY 1/2 THE DETECTION LIMIT)

ELEMENT FIELD		CARD	COLUMNS
MAP		1	01-06
ID		1	07-12
UTM ZONE		1	13-14
UTM EAST (METER)		1	15-20
UTM NORTH (METER)		1	21-27
ROCK TYPE		1	28-31
LAKE AREA		1	32-35
SAMPLE DEPTH (METER)		1	36-38
REPLICATE STATUS		1	39-40
RELIEF		1	41-43
CONTAMINATION		1	48-51
SAMPLE COLOUR		1	52-57
SUSPENDED MATTER		1	58-59

THE ANALYTICAL DATA WERE RECORDED AS FOLLOWS:

ELEMENT	UNITS	CARD	COLUMNS	DETECTION LIMIT	
SEDIMENT					
ZN	PPM	2	21-25	2	1
CU	PPM	2	26-30	2	1
PB	PPM	2	31-35	2	1
NI	PPM	2	36-40	2	1
CO	PPM	2	41-45	2	1
AG	PPM	2	46-50	0.2	0.1
MN	PPM	2	51-55	5	2
AS	PPM	2	56-60	1	0.5
MO	PPM	2	61-65	2	1
FE	PCT	2	66-70	0.02	0.01
HG	PPB	2	71-75	10	5
LOI	PCT	2	76-80	1.0	0.5
U	PPM	3	21-25	0.5	0.2
F	PPM	3	26-30	40	20
V	PPM	3	31-35	5	2
CD	PPM	3	36-40	0.2	0.1
W	PPM	3	46-50	2	1
SB	PPM	3	56-60	0.2	0.1
WATER					
F	PPB	4	26-30	20	10
PH		4	31-35		
U	PPB	4	36-40	0.05	0.02

REFERENCES

- ASLIN, G.E.M. (1976) THE DETERMINATION OF ARSENIC AND ANTIMONY IN GEOLOGICAL MATERIALS BY FLAMELESS ATOMIC ABSORPTION SPECTROPHOTOMETER
JOURNAL OF GEOCHEMICAL EXPLORATION, VOL. 6, PP. 321-330.
- BOULANGER, A., EVANS, D.J.R. AND RABY, B.F. (1975) URANIUM ANALYSIS BY NEUTRON ACTIVATION DELAYED NEUTRON COUNTING: PROC. OF THE 7TH ANNUAL SYMP. OF CANADIAN MINERAL ANALYSTS. THUNDER BAY, ONTARIO, SEPT. 22-23, 1975.
- FICKLIN, W.H. (1970) A RAPID METHOD FOR THE DETERMINATION OF FLUORIDE IN ROCKS AND SOILS, USING AN ION SELECTIVE ELECTRODE. U.S. GEOL. SURV. PAPER 700C PP. C186-188.
- GARRETT, R.G. (1974) FIELD DATA ACQUISITION METHODS FOR APPLIED GEOCHEMICAL SURVEYS AT THE GEOLOGICAL SURVEY OF CANADA: GEOL SURV. CAN. PAPER 74-52.
- HALL, G.E.M. (1979) A STUDY OF THE STABILITY OF URANIUM IN WATERS COLLECTED FROM VARIOUS GEOLOGICAL ENVIRONMENTS IN CANADA; IN CURRENT RESEARCH, PART A, GEOL. SURV. CAN. PAPER 79-1A, P. 361-365.
- JONASSON, I.R., LYNCH, J.J. AND TRIP, L.J. (1973) FIELD AND LABORATORY METHODS USED BY THE GEOLOGICAL SURVEY OF CANADA IN GEOCHEMICAL SURVEYS: NO. 12, MERCURY IN ORES, ROCKS, SOILS, SEDIMENTS AND WATER: GEOL. SURV. CAN. PAPER 73-21.
- QUIN, B.F. AND BROOKS, R.R. (1972) THE RAPID DETERMINATION OF TUNGSTEN IN SOILS, STREAM SEDIMENTS, ROCKS AND VEGETATION. ANAL. CHIM. ACTA. 58 PP 301-309.

DATA LIST LEGEND

MAP-	NATIONAL TOPOGRAPHIC SYSTEM(NTS)- LETTERED QUADRANGLE (SCALE 1:250000). PART OF SAMPLE NUMBER
ID-	REMAINDER OF SAMPLE NUMBER- YEAR(2), FIELD CREW(1), SAMPLE SEQUENCE NUMBER(3)
UTM COORDINATS-	UNIVERSAL TRANSVERSE MERCATOR(UTM) COORDINATE SYSTEM- SAMPLE COORDINATES
ZN-	ZONE
EAST-	EASTING (METERS)
NORTH-	NORTHING (METERS)
ROCK TYPE-	MAJOR ROCK TYPE OF LAKE CATCHMENT AREA
LAKE AREA-	AREA OF LAKE SAMPLED
SMP DTH-	SAMPLE DEPTH MEASURED TO THE NEAREST METER
RP ST-	REPLICATE STATUS- RELATIONSHIP OF SAMPLE WITH RESPECT TO OTHERS WITHIN THE SURVEY
RELF-	RELIEF OF THE SURROUNDING LAKE CATCHMENT BASIN
CONT-	CONTAMINATION- HUMAN OR NATURAL (WORK-DRILL/TRENCH, CAMP, FUEL OR GOSSAN)
SMPL COLOR-	SEDIMENT COLOUR
SUSP-	SUSPENDED MATTER
ZN-	ZINC BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
CU-	COPPER BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
PB-	LEAD BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
NI-	NICKEL BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
CO-	COBALT BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
AG-	SILVER BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
MN-	MANGANESE BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
AS-	ARSENIC BY COLOURIMETRY (PPM)
MO-	MOLYBDENUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
FE-	IRON BY ATOMIC ABSORPTION SPECTROSCOPY (%)
HG-	MERCURY BY FLAMELESS SPECTROSCOPY (PPB)
LOI-	LOSS ON IGNITION BY WEIGHT DIFFERENCE (%)
U-	URANIUM BY DELAYED NEUTRON ACTIVATION (PPM)
F-	FLUORINE BY SPECIFIC ION ELECTRODE (PPM)
V-	VANADIUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
CD-	CADMIUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
W-	TUNGSTEN BY COLORIMETRY USING DITHIOL (PPM)
SB-	ANTIMONY BY HYDRIDE EVOLUTION-ATOMIC ABSORPTION SPECTROMETRY (PPM)
F-W-	FLUORIDE IN WATERS BY SPECIFIC ION ELECTRODE (PPB)
PH-	PH BY COMBINATION GLASS-CALOMEL ELECTRODE
U-W-	URANIUM IN WATERS BY SCINTREX (PPB)

ROCK TYPE:

HELIKIAN

NEOHELIKIAN

NHE2 - BASALT, ANDESITE, TUFF AND AGGLOMERATE, WITH INTERBEDDED QUARTZITE, ARGILLITE, SLATE AND DOLOMITE OF MUGFORD GROUP.

NHE1 - SLATE, QUARTZITE AND MICA SCHIST, WITH MINOR ARKOSE, CONGLOMERATE, DOLOMITE AND ANDESITE OF RAMAH GROUP.

APHEBIAN AND EARLIER

AUWR - GRANULITE, PYROXENE GNEISS, CHARNOKITE; MINOR GRANITIC GNEISS, MYLONITIC GNEISS, AMPHIBOLITE, ULTRABASIC INTRUSIONS.

AUWY - GARNET-QUARTZ-FELDSPAR GNEISS, CHIEFLY MYLONITIZED, LOCALLY GRANITIC. INCLUDES SOME GRANULITE.

AUWG - GRANITIC GNEISS, GRANODIORITIC GNEISS, MIGMATITE, AGMATITE, AMPHIBOLITE.

AWGM - MIGMATITE, AGMATITE.

AUWP - PARAGNEISS: INCLUDES BIOTITE-QUARTZ FELDSPAR GNEISS, GARNET-BIOTITE-QUARTZ-FELDSPAR GNEISS, HORNBLende-GNEISS, AUGEN GNEISS, GRAPHITIC GNEISS, MINOR QUARTZITE AND AMPHIBOLITE.

AUWS - METASEDIMENTARY ROCKS, MAINLY QUARTZITE AND MARBLE.

ARCHEAN

AREG - GRANITIC AND GRANODIORITIC GNEISS, MIGMATITE, GRANULITE, AMPHIBOLITE; MINOR PARAGNEISS AND METASEDIMENTARY ROCKS. SMALL ULTRABASIC INTRUSIONS AND DIABASE DYKES.

PALEOHELIKIAN

PH13 - ADAMELLITE SUITE: ADAMELLITE, MONZONITE, SYENITE, GRANODIORITE, GRANITE AND THEIR HYPERSTHENE-BEARING EQUIVALENTS. ALSO MINOR GABBRO, NORITE, ANORTHOSITIC GABBRO AND ANORTHOSITE.

PH12 - KIGLAPAIT LAYERED INTRUSION. MAINLY TROCTOLITE, GABBRO AND OLIVINE GABBRO; MINOR ANORTHOSITE, PYROXENITE, FERROSYENITE.

PH11 - ANORTHOSITE SUITE: ANORTHOSITE, ANORTHOSITIC GABBRO, LEUCOTROCTOLITE; MINOR GABBRO, MONZONITE, GRANODIORITE, FERROSYENITE.

LAKE AREA: POND- POND
LT 1- 1/4 TO 1 SQ KM
1-5- 1 TO 5 SQ KM
GT 5- GREATER THAN 5 SQ KM

RP ST: 00- ROUTINE REGIONAL SAMPLE
10- FIRST OF FIELD DUPLICATE
20- SECOND OF FIELD DUPLICATE

RELF: L- LOW
M- MEDIUM
H- HIGH

CONT: BLANK- NONE
1- PRESENT

SMPL COLOR: TN- TAN
YL- YELLOW
GN- GREEN
GY- GREY
BR- BROWN
BK- BLACK

SUSP: BLANK- NONE
L- LIGHT
H- HEAVY