

REGIONAL LAKE SEDIMENT AND WATER GEOCHEMICAL RECONNAISSANCE DATA, LABRADOR 1982. GSC-OF 904, NGR 57-1982, PARTS OF NTS 23I,J,O

```
*****  
* * * * *  
* OPEN FILE 904 *  
* * * * *  
*****
```

	PAGE
SURVEY NOTES	1
DATA LIST	7
SUMMARY STATISTICS	42

OPEN FILE 904 IS ONE OF FOUR OPEN FILES 901,902,903, AND 904 COVERING THE WEST LABRADOR SURVEY, COMPRISING RESPECTIVELY OF NTS 13E;22P,23A,23B;23G,23H; AND 23I,23J,23O. OPEN FILES 903 AND 904 CONTAIN AREAS RESPECTIVELY IN 23G,23H,23I AND 23J WHICH ARE OUTLINED ON EACH MAP BY A DISCONTINUOUS LINE BOUNDARY, THAT SHOWS DATA FROM SURVEYS CONDUCTED IN 1978 AND WITH THE EXCEPTION OF HG WERE PREVIOUSLY PUBLISHED IN THE GSC OPEN FILE 560.

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 COOPERATIVE MINERAL PROGRAM (1982-84).

E.H.W. HORN BROOK DIRECTED GEOLOGICAL SURVEY OF CANADA ACTIVITIES.

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

COLLECTION	- MARSHALL MACKLIN MONAGHAN LIMITED, TORONTO.
	- E.H.W. HORN BROOK, N.G. LUND
PREPARATION	- GOLDER ASSOCIATES, OTTAWA. (1978 AND 1982)
	- J.J. LYNCH
ANALYTICAL	- CHEMEX LABS. LIMITED, VANCOUVER. (1978 AND 1982)
	- ACME ANALYTICAL LABORATORIES LTD, TORONTO. (1982)
	- BARRINGER MAGENTA LIMITED, TORONTO. (1978)
	- J.J. LYNCH

AT THE GEOLOGICAL SURVEY OF CANADA, N.G. LUND WAS RESPONSIBLE FOR OPEN FILE PRODUCTION; A.C.GALLETTA WAS RESPONSIBLE FOR DATA MANAGEMENT; AND F. WILLIAMS OF THE CARTOGRAPHIC SECTION SUPERVISED MAP PREPERATION.PLOTTING FACILITIES WERE MADE AVAILABLE THROUGH THE COMPUTER SCIENCE CENTRE OF E.M.R.

LAKE SEDIMENT AND WATER SAMPLES WERE COLLECTED AT AN AVERAGE DENSITY OF ONE SAMPLE PER 13 SQUARE KILOMETRES THROUGHOUT THE 53,000 SQUARE KILOMETRE WEST LABRADOR SURVEY AREA SAMPLED IN 1982. THE HELICOPTER SUPPORTED SAMPLE COLLECTION WAS CARRIED OUT BETWEEN JULY 8 AND AUGUST 20,1982. 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 SEIVED. THE MINUS 80 MESH (177 MICRONS) FRACTION WAS USED FOR SUBSEQUENT ANALYSES. AS REQUIRED, AT THIS TIME, CONTROL REFERENCE AND BLIND DUPLICATE SAMPLES WERE INSERTED INTO EACH ANALYTICAL BLOCK OF TWENTY SEDIMENT AND WATER SAMPLES. NO OTHER SAMPLE PROCESSING IN OTTAWA WAS CARRIED OUT ON THE WATER SAMPLES.

THE DETERMINATION OF ZN, CU, PB, NI, CO, AG, MN, AS, MO, FE, HG, LOSS ON IGNITION, U, F, V, CD IN LAKE SEDIMENTS WAS CARRIED OUT BY CHEMEX LABS LIMITED.

THE DETERMINATION OF U, F AND PH IN 1978 LAKE WATERS WAS CARRIED OUT BY BARRINGER MAGENTA LIMITED.

THE DETERMINATION OF U, F AND PH IN 1982 LAKE WATERS WAS CARRIED OUT BY ACME LABORATORIES LIMITED.

N O T E :

IN THE FOLLOWING DESCRIPTIONS OF ANALYTICAL METHODOLOGY, THE YEAR IN BRACKETS AFTER THE ELEMENT SERVES, WHERE REQUIRED, TO DISTINGUISH BETWEEN DIFFERENT ANALYTICAL TECHNIQUES EMPLOYED FOR 1978 AND 1982 SAMPLES.

FOR THE DETERMINATION OF ZN, CU, PB, NI, CO, AG, MN, FE AND CD, A 1 GRAM SAMPLE WAS REACTED WITH 6 ML OF A MIXTURE OF 4M HCL AND M HNO₃ 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.

ARSENIC WAS DETERMINED BY ATOMIC ABSORPTION USING A HYDRIDE EVOLUTION METHOD WHEREIN THE ARSENIC IS EVOLVED AS ASH₃, 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 HNO₃ 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 HNO₃ 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 W/V S₂SO₄ IN M H₂SO₄. THE HG VAPOUR WAS THEN FLUSHED BY A STREAM OF AIR INTO AN ABSORTION CELL MOUNTED IN THE LIGHT PATH OF AN ATOMIC ABSORTION SPECTROPHOTOMETER. ABSORTION 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 (1978) 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 BF₃ DETECTOR TUBES EMBEDDED IN PARRAFIN. 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.

URANIUM (1982) WAS DETERMINED USING A NEUTRON ACTIVATION METHOD WITH DELAYED NEUTRON COUNTING. WITH THE EXCEPTION OF THE IRRADIATION FACILITY, THE METHOD IS VERY SIMILAR TO THAT USED BY AECL IN PREVIOUS YEARS; A DETAILED DESCRIPTION OF WHICH IS PROVIDED BY BOULANGER ET AL (1975). A TWO GRAM SAMPLE WAS IRRADIATED FOR 10 SECONDS IN THE TRIGA REACTOR LOCATED AT WASHINGTON STATE UNIVERSITY. THE OPERATING FLUX WAS 8×10^{13} NEUTRONS/SQUARE CM/SECOND. AFTER A 10 SECOND DELAY, THE SAMPLE WAS COUNTED FOR 10 SECONDS.

THE COUNTING EQUIPMENT WAS OF AECL DESIGN. CALIBRATION WAS DONE TWICE A DAY OR AS REQUIRED.
ONE STANDARD WAS ANALYSED AFTER EVERY 20 SAMPLES.

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.

URANIUM, FLUORIDE AND PH WERE DETERMINED IN LAKE WATER SAMPLES.
UPON RECEIVING A BATCH OF SAMPLES, FLUORIDE AND PH WERE DETERMINED BY SPECIFIC ION ELECTRODE AND GLASS-CALOMEL COMBINATION ELECTRODE RESPECTIVELY.

URANIUM (1978)
TWO WEEKS AFTER ACIDIFICATION, A 5 MICROLITRE ALIQUOT OF THE SAMPLE WAS THEN REMOVED FOR THE DETERMINATION OF URANIUM BY FISSION TRACK ANALYSES.
THE TWO WEEK WAITING PERIOD WAS TO INSURE THAT ALL PRECIPITATED URANIUM WAS REDISSOLVED.
TO DETERMINE URANIUM, SAMPLE ALIQUOTS WERE PLACED ON A POLYCARBONATE TAPE AND DRIED.
THE TAPE WAS THEN IRRADIATED IN A NUCLEAR REACTOR AT MCMASTER UNIVERSITY FOR 1 HOUR IN A FLUX OF 10^{13} NEUTRONS/SQ. CM./SEC.
THE TAPE WAS SUBSEQUENTLY ETCHED WITH 25% NAOH SOLUTION AND THE FISSION TRACKS WERE COUNTED WITH AN OPTICAL COUNTER FITTED TO A MICROSCOPE.
THE NUMBER OF TRACKS WAS PROPORTIONAL TO THE URANIUM CONCENTRATION.
EACH TAPE CONTAINED ITS OWN CALIBRATION STANDARDS, BLANKS AND SAMPLE DUPLICATES.

FLUORIDE IN LAKE WATER SAMPLES WAS DETERMINED USING AN ORION FLUORIDE ELECTRODE AND A MODEL 401 (1978), 404 (1982) ORION SPECIFIC ION METER.
PRIOR TO MEASUREMENT AN ALIQUOT OF THE SAMPLE WAS MIXED WITH AN EQUAL VOLUME OF A MODIFIED TISAB SOLUTION (TOTAL IONIC STRENGTH ADJUSTMENT BUFFER).
THE MODIFICATION CONSISTED OF ADDING 60 ML 8M KOH SOLUTION TO THE BUFFER.
THIS PERMITTED THE RE-ANALYSIS OF FLUORIDE IN ACIDIFIED WATER SAMPLES WHEN REQUIRED.
WHEN THIS ANALYSIS WAS REQUIRED, ACIDIFIED STANDARD SOLUTIONS WERE USED FOR CALIBRATION.

HYDROGEN ION ACTIVITY (PH) (1978) WAS MEASURED WITH A BECKMAN COMBINATION ELECTRODE AND A MODEL 401 ORION SPECIFIC ION METER.
IN (1982) PH WAS MEASURED WITH A BROADLEY-JAMES COMBINATION ELECTRODE AND A MODEL 404 ORION SPECIFIC ION METER.

URANIUM IN WATERS (1982) 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 UNPREDICABLE 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 DELEAY BETWEEN THE ADDITION OF THE FLURAN AND THE ACTUAL READING WAS INCORPORATED INTO THIS METHOD.
IN PRACTICE, 500UL FLURAN SOLUTION WAS ADDED TO A 5ML 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 (20UL ALIQUOTS OF 55 OR 550 PPB U WERE USED).
ALL READINGS WERE TAKEN AGAINST A SAMPLE BLANK.

ON RECEIPT, FIELD AND ANALYTICAL DATA WERE PUNCHED ONTO 80 COLUMN CARDS AND ALL SUBSEQUENT PROCESSING WAS CARRIED OUT WITH THE AID OF COMPUTERS.
THE FIELD DATA WERE RECORDED BY THE FIELD CONTRACT STAFF ONTO 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 (UNIVERSAL TRANVERSE MERCATOR) COORDINATES.
THE DOMINANT ROCK TYPES IN THE LAKE CATCHMENT BASINS WERE IDENTIFIED ON APPROPRIATE GEOLOGICAL MAPS USED AS THE BEDROCK GEOLOGICAL BASE ON NGR MAPS.

REFERENCES

- 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.
- 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.
- 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.

DATA LEGEND

MAP- NATIONAL TOPOGRAPHIC SYSTEM(NTS)- LETTERED QUADRANGLE
(SCALE 1:250000). PART OF SAMPLE NUMBER

ID- REMAINDER OF SAMPLE NUMBER- YEAR(2), FILED CREW(1),
SAMPLE SEQUENCE NUMBER(3)

UTM COORDINATES- UNIVERSAL TRANVERSE 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 FOOT

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)

SAMPL 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 ATOMIC ABSORPTION SPECTROSCOPY (PPM)

MO- MOLYBDENUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)

FE- IRON BY ATOMIC ABSORPTION SPECTROSCOPY (%)

HG- MERCURY BY ATOMIC ABSORPTION SPECTROSCOPY (PPB)

LOI- LOSS ON IGNITION BY WEIGHT DIFFERENCE (%)

U- URANIUM BY DELAYED NEUTRON ACTIVATION (PPM)

F- FLOURINE BY SPECIFIC ION ELECTRODE (PPM)

V- VANADIUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)

CD- CADMIUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)

F-W- FLOURINE IN WATERS BY FISSION TRACK (PPB)

PH- PH BY COMBINATION GLASS - CALOMEL ELECTRODE

(1978) U-W- URANIUM IN WATERS BY FISSION TRACK (PPB)

(1982) U-W- URANIUM IN WATERS BY SCINTREX (PPB)

ROCK TYPE: HDHL- RED CONGLOMERATE, ARKOSE, AND SILTSTONE
 AUGP- METASEDIMENTARY GRANITOID GNEISSES, MINOR
 AMPHIBOLITE, SILLIMANITE GNEISS
 METAQUARTZITE, MARBLE
 ARCS- PYROXENE GRANULITE, UNSEPARATED ACIDIC
 INTRUSIVES: ASHUANIPI COMPLEX
 PHAW- GREYWACKE, QUARTZITE, ARKOSE, SLATE,
 PHYLLITE, BASIC TO INTERMEDIATE VOLCANIC
 ROCKS, DERIVED SCHISTS AND GNEISSES
 VAW2- BASALTIC FLOWS AND PYROCLASTICS,
 QUARTZITE, GREYWACKE, SLATE...
 (BASIC VOLCANIC ROCKS)
 APW1- GRIT, ARKOSE, CONGLOMERATE, QUARTZITE, GREYWACKE
 SLATE, ACIDIC TO BASIC VOLCANICS
 AW1S- FERRUGINOUS SLATE AND IRON FORMATION RUTH
 AND COKOMAN FORMATIONS OF KNOB LAKE GROUP
 AUWR- GRANULITE, PYROXENE GNEISS, CHARNOCKITE;
 MINOR GRANITIC GNEISS, MYLONITIC GNEISS
 AUWG- GRANITIC GNEISS, GRANODIORITIC GNEISS,
 MIGMATITE, AGMATITE, AMPHIBOLITE
 AUWB- AMPHIBOLITE, PYROXENE AMPHIBOLITE, CHLORITE
 SCHIST, GARNET- AND BIOTITE-RICH GNEISS
 PH14- GRANITE, QUARTZ, MONZONITE, GRANODIORITE,
 QUARTZ CIORITE, SYENITE
 PH13- ADAMELLITE SUITE: ADAMELLITE, MONZONITE,
 AGENITE, GRANODIORITE, GRANITE AND THEIR
 HYPERTHENE
 PH11- ANORTHOSITE SUITE: ANORTHOSITE,
 ANORTHOSITIC GABBRO, LEUCOTROCTOLITE
 PH10- GABBRO, NORITE, ANORTHOSITE GABBRO, TROCTOLITE,
 DIORITE, DERIVED BASIC GNEISSES AND AMPHIBOLITE
 AP6W- GABBRO- WAKUACH GABBRO- GABBRO, METAGABBRO,
 GLOMEROPORPHYRITIC GABBRO AND DIORITE
 ARC2- MASSIVE GRANITE AND QUARTZ MONZONITE
 ARC1- MASSIVE TO POORLY FOLIATED PYROXENE-BEARING
 GRANODIORITE AND SYENODIORITE

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

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

RELF: L- LOW
 M- MEDIUM
 H- HIGH

CONT: 1- PRESENT
 BLANK- NONE

SAMPL COLOR: TN- TAN
 YL- YELLOW
 GR- GREEN
 GY- GREY
 BN- BROWN
 BK- BLACK

SUSP: L- LIGHT
 H- HEAVY
 BLANK- NONE