

REGIONAL LAKE SEDIMENT AND WATER GEOCHEMICAL RECONNAISSANCE DATA, ONTARIO 1982. GSC-OF 900, NGR 59-1982. PARTS OF NTS 31D,31E,41H

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OPEN FILE 900 IS ONE OF TWO OPEN FILES- 899 AND 900, COVERING SOUTHEASTERN ONTARIO 31C(N/2),31F; 31D(N/2),31E(S/2),41H08 RESPECTIVELY. THE SURVEY WAS UNDERTAKEN BY THE GEOLOGICAL SURVEY OF CANADA IN ACCORDANCE WITH SPECIFICATIONS ESTABLISHED FOR THE URANIUM RECONNAISSANCE PROGRAM.

E.H.W. HORN BROOK DIRECTED GEOLOGICAL SURVEY OF CANADA ACTIVITIES.
N.G. LUND WAS RESPONSIBLE FOR OPEN FILE PRODUCTION AND DATA MANAGEMENT.
G.E.M. HALL SUPERVISED WATER ANALYSIS IN R.G.G. LABORATORIES.
A.C. GALLETTA WAS RESPONSIBLE FOR DATA PROCESSING.
J. YELLE SUPERVISED MAP PREPARATION.

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

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

COLLECTION	- DERRY, MICHENER, BOOTH & WAHL, TORONTO.
	- E.H.W.HORN BROOK, N.G. LUND
PREPARATION	- GOLDER ASSOCIATES, OTTAWA.
	- J.J. LYNCH
ANALYTICAL	- CHEMEX LABS LIMITED, VANCOUVER.
	- J.J. LYNCH

OPEN FILE TEXT WAS MANUFACTURED BY CAMPBELL LAZER PRINTING, OTTAWA.

HELICOPTER SUPPORTED SAMPLE COLLECTION WAS CARRIED OUT DURING THE SUMMER OF 1982.
LAKE SEDIMENT AND WATER SAMPLES WERE COLLECTED AT AN AVERAGE DENSITY OF ONE SAMPLE PER 13 SQUARE KILOMETERS (5 SQ. MILES) THROUGHOUT THE 38,054 SQUARE KILOMETER (14,693 SQ. MILES) TOTAL SOUTHEASTERN ONTARIO SURVEY AREA.

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

IN OTTAWA, FIELD DRIED SAMPLES WERE AIR-DRIED, AND BALL MILLED.
THE MINUS 80 MESH (177 MICRONS) FRACTION WAS OBTAINED AND USED FOR SUBSEQUENT ANALYSES.

AS REQUIRED, AT THIS TIME, CONTROL REFERENCE AND BLIND DUPLICATE SAMPLES WERE INSERTED INTO EACH BLOCK OF TWENTY SEDIMENT SAMPLES. G.S.C. STAFF INSERTED A CONTROL REFERENCE WATER SAMPLE. BLIND DUPLICATE SAMPLES WERE NOT USED IN WATER ANALYSIS. NO OTHER SAMPLE PROCESSING IN OTTAWA WAS CARRIED OUT ON THE WATER SAMPLES.

FIELD AND ANALYTICAL DATA WERE MANAGED BY METHODS DEVELOPED BY N.G. LUND, GSC ON RECEIPT, FIELD AND ANALYTICAL DATA WERE PROCESSED 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 COORDINATES.

THE SAMPLE SITE COORDINATES WERE CHECKED BY PLOTTING SAMPLING LOCATION MAPS ON A CALCOMP 1051 DRUM PLOTTER FROM THE DIGITIZED COORDINATES AND THEN OVERLAYING THESE ON THE FIELD CONTRACTOR'S SAMPLE LOCATION BASE MAPS.

THE DOMINANT ROCK TYPES IN THE LAKE CATCHMENT BASINS WERE IDENTIFIED ON APPROPRIATE GEOLOGICAL MAPS USED AS THE BEDROCK GEOLOGICAL BASE ON NGR MAPS.

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

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

FOR THE DETERMINATION OF ZN,CU,PB,NI,CO,AG,MN,AS,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 THE OVERNIGHT 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 AND AG.

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 SPECTROMETER. THIS METHOD IS DESCRIBED BY G.E.M. ASLIN.

MO AND V 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 10ML W/V SnSO₄ IN M H₂SO₄. THE HG VAPOUR WAS THEN FLUSHED BY A STREAM OF AIR INTO AN ABSORPTION CELL MOUNTED IN THE LIGHT PATH OF AN A-A SPECTROMETER. 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 ORIGINAL METHOD IS PROVIDED BY BOULANGER ET AL. (1975). IN 1979, MODIFICATIONS RELATED TO THE IRRADIATION AND COUNTING TIMES WERE INTRODUCED.

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 20 SECONDS.

AFTER IRRADIATION, THE SAMPLE IS AGAIN TRANSFERRED PNEUMATICALLY TO THE COUNTING FACILITY WHERE AFTER A 10 SECOND DELAY THE SAMPLE IS COUNTED FOR 20 SECONDS.

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.

CARBON DIOXIDE WAS EVOLVED BY TREATING SAMPLE WITH HCL AND ABSORBING EVOLVED CO₂ IN BA(OH)₂ SOLUTION. MEASUREMENT WAS MADE BY BACK-TITRATING EXCESS BA(OH)₂ WITH 0.1M HCL AND PHENOLPHTHALEIN AS INDICATOR.

CARBON-ORGANIC WAS DETERMINED BY PERFORMING A LOSS ON IGNITION AT 450 DEGREES CENTIGRADE AFTER EVOLUTION OF WATER. LAKE SEDIMENTS HAD CARBON-ORGANIC LEVELS MUCH TOO HIGH FOR CONVENTIONAL CARBON-ORGANIC METHODS.

SULPHUR WAS DETERMINED BY THE X-RAY FLUORESCENCE PRESSED DISC METHOD. THE SAMPLE IS MIXED WITH AN ORGANIC BINDER AND PRESSED INTO A PELLET IN A HYDRAULIC PRESS. THE PELLET IS THEN TAKEN TO AN X-RAY FLUORESCENCE SPECTROMETER FOR ANALYSIS AND THE RESULTS CALCULATED BY A MINI COMPUTER.

RB, SR, CR, ZR, SIO₂, AL₂O₃, FE₂O₃, CAO, MGO, NAO₂, K₂O, MNO, P₂O₅, TIO₂ AND BAO ARE DETERMINED BY MIXING THE SAMPLE WITH LITHIUM METABORATE, LITHIUM FLUORIDE AND AMMONIUM NITRATE, FUSING IN CLAISSE FLUXER, POURING INTO A MOLD AND THE RESULTING DISC READ BY X-RAY FLUORESCENCE SPECTROMETRY AND CALCULATIONS DONE BY A MINI COMPUTER.

LOSS ON IGNITION (900C) 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 900C 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.

ZN, MN, FE, NA, K, CA AND MG IN LAKE WATER WERE DETERMINED BY ATOMIC ABSORPTION SPECTROPHOTOMETRY USING AN AIR-ACETYLENE FLAME ON A FULLY AUTOMATED PERKIN-ELMER 5000. CAESIUM WAS USED AS THE IONIZATION BUFFER (1000 UG ML⁻¹) FOR NA, K, CA AND MG, AND LANTHANUM WAS USED AS A RELEASING AGENT (2000 UG ML⁻¹) FOR CA AND MG.

URANIUM IN LAKE WATER WAS DETERMINED BY LAZER-INDUCED FLUOROMETRY WITH THE SCINTREX UA-3. A 500 UL ALIQUOT OF THE METAPHOSPHATE-PYROPHOSPHATE "FLURAN" BUFFER WAS ADDED TO 5 ML OF THE SAMPLE AND LEFT TO EQUILIBRATE FOR 24 HOURS. THE FLUORESCENCE OF THE URANYL PHOSPHATE FORMED WAS MEASURED BY THE METHOD OF STANDARD ADDITIONS FOLLOWING A NULLIFICATION OF ANY SIGNAL FROM ORGANIC FLUORESCENCE.

HYDROGEN ION ACTIVITY (PH) WAS MEASURED USING A RADIOMETER TTT81.

CARBON-ORGANIC IN LAKE WATER WAS MEASURED USING A BARNSTEAD ANALYSER BASED ON CONDUCTIMETRIC ANALYSIS. THE CO₂ CONTRIBUTION FROM INORGANIC SPECIES WAS ZEROED OUT AFTER ACIDIFICATION AND THE INCREASE IN CONDUCTIVITY WAS MEASURED AFTER LIBERATION OF CO₂ BY OXIDATION WITH ULTRA-VIOLET IRRADIATION AND POTASSIUM PERSULPHATE.

CL, BR, NO₃, SO₄, PO₄ IN LAKE WATER WERE DETERMINED BY ION CHROMATOGRAPHY/ CONDUCTIMETRIC ANALYSIS USING A FULLY AUTOMATED DIONEX MODEL 12 CHROMATOGRAPH. THE SAMPLES WERE INITIALLY FILTERED THROUGH 0.45 UM MILLIPORE FILTER PAPER AND INJECTED ONTO THE COLUMNS. AN ANION EXCHANGE RESIN WAS USED AS SEPARATOR FOLLOWED BY A HIGH CAPACITY CATION EXCHANGE RESIN AS SUPPRESSOR IN AN ELUENT OF 0,0024 M NAHCO₃/0.003 M NA₂CO₃. A CHART RECORDER WAS USED TO CHECK THE PEAKS FOR POSSIBLE INTERFERENCE.

ALKALINITY (CACO₃) WAS DETERMINED BY AUTOMATICALLY TITRATING AN ALIQUOT OF SAMPLE AGAINST 0.01N H₂SO₄ FROM THE PH OF THE SAMPLE TO AN END-POINT CALCULATED BY THE MICRO-PROCESSOR OF THE RADIOMETER TTT81.

FLUORINE IN LAKE WATER WAS DETERMINED BY ADDING AN ALIQUOT OF THE SAMPLE TO A BUFFER (TISAB) SOLUTION AND THE MV READING OF THE RESULTING MIXTURE MEASURED AFTER A DELAY TIME OF 10 MINUTES WITH A COMBINATION ORION ION-SELECTIVE ELECTRODE.

CONDUCTIVITY, TEMPERATURE AND DISSOLVED OXYGEN WERE DETERMINED BY THE USE OF A MARTEK MARK V INSTRUMENT. THIS IS A GENERAL PURPOSE, MULTI-PARAMETER, PORTABLE WATER ANALYSER. THE SYSTEM MEASURES IN SITU TEMPERATURE, CONDUCTIVITY, DISSOLVED OXYGEN AND PH WITH AUTOMATIC TEMPERATURE COMPENSATION FOR PH AND DISSOLVED OXYGEN. IT CAN BE POWERED BY AN INTERNAL OR EXTERNAL BATTERY OR 115V POWER LINE.

THE FOLLOWING TABLE DISPLAYS THE DATA RECORD FORMAT SPECIFICATIONS.
 THE DETECTION LIMITS OF THE ANALYTICAL METHODS ARE ALSO GIVEN WITH THE
 SECOND FIGURE UNDER DETECTION LIMIT USED AS AN ARBITRARILY SET VALUE IF
 THE RESULT FELL BELOW THE DETECTION LIMIT.

VARIABLE	UNIT	CARD	COLUMNS	DETECTION LIMIT	
FIELD					
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	FEET	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		
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	0.5
MO	PPM	2	61-65	2	1
FE	%	2	66-70	0.02	0.01
HG	PPB	2	71-75	10	5
LOI5	%	2	76-79	1.0	0.5
U	PPM	3	21-25	0.5	0.2
V	PPM	3	31-35	5	2
CD	PPM	3	36-40	0.2	0.1
CO2	%	3	41-45	0.2	0.1
C-ORG	%	3	46-50	0.2	0.1
S	%	3	51-55	0.02	0.01
RB	PPM	3	56-60	20	10
SR	PPM	3	61-65	20	10
CR	PPM	3	66-70	10	5
ZR	PPM	3	71-75	10	5

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VARIABLE	UNIT	CARD	COLUMNS	DETECTION LIMIT	
SEDIMENT CONT'D.					
SiO ₂	%	4	16-20	1.0	0.5
Al ₂ O ₃	%	4	21-25	0.1	0.05
Fe ₂ O ₃	%	4	26-30	0.1	0.05
CaO	%	4	31-35	0.1	0.05
MgO	%	4	36-40	0.05	0.02
Na ₂ O	%	4	41-45	0.1	0.05
K ₂ O	%	4	46-50	0.1	0.05
MnO	%	4	51-55	0.02	0.01
P ₂ O ₅	%	4	56-60	0.02	0.01
TiO ₂	%	4	61-65	0.02	0.01
BaO	%	4	66-70	0.02	0.01
LOI ₉	%	4	71-75	0.2	0.1
WATER					
Zn	PPB	5	21-25	5	2
Mn	PPB	5	26-30	10	5
Fe	PPB	5	31-35	20	10
Na	PPM	5	36-40	0.2	0.1
K	PPM	5	41-45	0.2	0.1
Ca	PPM	5	46-50	0.2	0.1
Mg	PPM	5	51-55	0.2	0.1
U	PPB	5	56-60	0.02	0.01
PH		5	61-65	0.1	
C-ORG	PPM	5	66-70	0.2	0.1
CL	PPM	6	21-25	0.05	0.02
BR	PPM	6	26-30		
NO ₃	PPM	6	31-35	0.2	0.1
SO ₄	PPM	6	36-40	0.2	0.1
PO ₄	PPM	6	41-45		
CaCO ₃	PPM	6	46-50	0.2	0.1
F	PPB	6	51-55	40	20
CONDUCTIVITY	UMHOS/CM	6	66-68		
TEMP	C	6	69-70		
O-D	PPM	6	74-75		

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D A T A L E G E N D

MAP-	NATIONAL TOPOGRAPHIC SYSTEM(NTS)- LETTERED QUADRANGLE (SCALE 1:250000). PART OF SAMPLE NUMBER	ROCK TYPE: (CONT.)	HSLT- SLATE HNCM- MARBLE HNHG- HORNBLLENDE GNEISS HNPG- PARAGNEISS HNXG- GARNET-AMPHIBOLE-PYROXENE GNEISS ANBH- HORNBLLENDE-BIOTITE GNEISS ANGH- HORNBLLENDE-GARNET-BIOTITE GNEISS ANQF- BIOTITIC QUARTZOFELDSPATHIC GNEISS ANGG- MIGMATITE,GRANITIC GNEISS PGDR- GRANODIORITE PNGM- MIGMATITE PNGB- BIOTITIC MIGMATITE PNQF- BIOTITIC QUARTZOFELDSPATHIC GNEISS DIRT- DIORITE NBGG- GARNET-BIOTITE GNEISS NGGG- MIGMATITE,GRANITE GNEISS
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	LAKE AREA :	POND- POND LT 1- 1/4 TO 1 SQ KM 1-5- 1/4 TO 5 SQ KM GT 5- GREATER THAN 5 SQ KM
SMP DTH-	SAMPLE DEPTH MEASURED TO THE NEAREST FOOT		
RP ST-	REPLICATE STATUS- RELATIONSHIP OF SAMPLE WITH RESPECT TO OTHERS WITHIN THE SURVEY	RP ST :	00- ROUTINE REGIONAL SAMPLE 10- FIRST OF FIELD DUPLICATE 20- SECOND OF FIELD DUPLICATE
RELf-	RELIEF OF THE SURROUNDING LAKE CATCHMENT BASIN		
CONT-	CONTAMINATION- HUMAN OR NATURAL (WORK-DRILL/TRENCH, CAMP,FUEL,OR GOSSAN)	RELf :	L- LOW M- MEDIUM H- HIGH
SAMPL COLOR-	SEDIMENT COLOUR	CONT :	BLANK- NONE 1- PRESENT
SUSP-	SUSPENDEd MATTER	SAMPL COLOR :	TN- TAN GN- GREEN YL- YELLOW GY- GREY BR- BROWN BK- BLACK
ROCK TYPE:	MOTG- TRENTON GROUP: LIMESTONE MOBR- BLACK RIVER GROUP: LIMESTONE HYSY- SYENITE HYHS- HORNBLLENDE SYENITE HGKG- POTASSIC GRANITE HANG- ANORTHOSITE,GABBRO HDIO- DIORITE HBGB- GABBRO	SUP :	BLANK- NONE L- LIGHT H- HEAVY

D A T A L E G E N D (C O N T ' D)

L A K E S E D I M E N T

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)
 LOI5- LOSS ON IGNITION BY WEIGHT DIFFERENCE (%) AT 500 DC
 U- URANIUM BY DELAYED NEUTRON ACTIVATION (PPM)
 V- VANADIUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
 CD- CADMIUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
 CO2- CARBON DIOXIDE BY EVOLUTION METHOD (%)
 C-ORG- CARBON-ORGANIC BY LECO COMBUSTION METHOD (%)
 S- SULPHUR BY XRAY FLUORESCENT-PRESSED PELLETT (%)
 RB- RUBIDIUM BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (PPM)
 SR- STRONTIUM BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (PPM)
 CR- CHROMIUM BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (PPM)
 ZR- ZIRCONIUM BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (PPM)
 SIO2- SILICA BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (%)
 AL2O3- ALUMINUM OXIDE BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (%)
 FE2O3- FERROUS OXIDE BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (%)
 CAO- CALCIUM OXIDE BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (%)
 MGO- MAGNESIUM OXIDE BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (%)
 NAO2- SODIUM OXIDE BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (%)
 K2O- POTASSIUM OXIDE BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (%)
 MNO- MANGANESE OXIDE BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (%)
 P2O5- PHOSPHORUS OXIDE BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (%)
 TIO2- TITANIUM OXIDE BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (%)
 BAO- BARIUM OXIDE BY XRAY FLUORESCENT-FUSSED WITH LIBO2 (%)
 LOI9- LOSS ON IGNITION BY WEIGHT DIFFERENCE (%) AT 900 DC

L A K E W A T E R

ZN- ZINC BY ATOMIC ABSORPTION SPECTROSCOPY (PPB)
 MN- MANGANESE BY ATOMIC ABSORPTION SPECTROSCOPY (PPB)
 FE- IRON BY ATOMIC ABSORPTION SPECTROSCOPY (PPB)
 NA- SODIUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
 K- POTASSIUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
 CA- CALCIUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
 MG- MAGNESIUM BY ATOMIC ABSORPTION SPECTROSCOPY (PPM)
 U- URANIUM BY LAZER-INDUCED FLUOROMETRY (PPB)
 PH- HYDROGEN ION ACTIVITY BY RADIOMETER TTT81
 C-ORG- CARBON-ORGANIC BY BARNSTEAD ANALYSER (PPM)
 CL- CHLORINE BY ION CHROMATOGRAPHY/CONDUCTIMETRIC (PPM)
 BR- BROMINE BY ION CHROMATOGRAPHY/CONDUCTIMETRIC (PPM)
 NO3- NITRATE BY ION CHROMATOGRAPHY/CONDUCTIMETRIC (PPM)
 SO4- SULPHATE BY ION CHROMATOGRAPHY/CONDUCTIMETRIC (PPM)
 PO4- PHOSPHATE BY ION CHROMATOGRAPHY/CONDUCTIMETRIC (PPM)
 CACO3- ALKALINITY (PPM CACO3) BY TITRATION WITH 0.01N H2SO4
 F- FLUORINE BY SPECIFIC IRON ELECTRODE (PPB)
 COND- CONDUCTIVITY BY MARTEK V ANALYSER (UMHOS/CM)
 TEMP- TEMPERATURE BY MARTEK V ANALYSER (DEGREES CENTIGRADE)
 O-D- OXYGEN-DISSOLVED BY MARTEKV ANALYSER (PPM)