

REGIONAL LAKE SEDIMENT AND WATER GEOCHEMICAL RECONNAISSANCE DATA, BAFFIN ISLAND 1978.

GSC-OF 567, NGR 47-1978, NTS 37A

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* OPEN FILE 567 *
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OPEN FILE 567 IS ONE OF THREE OPEN FILES (566, 567 AND 568) COVERING THE TOTAL CENTRAL BAFFIN ISLAND SURVEY AREA

THE RECONNAISSANCE SURVEY WAS UNDERTAKEN BY THE GEOLOGICAL SURVEY OF CANADA UNDER THE FEDERAL URANIUM RECONNAISSANCE PROGRAM.

E.H.W. HORNBROOK DIRECTED GEOLOGICAL SURVEY OF CANADA ACTIVITIES. CONTRACTS LET FOR SAMPLE COLLECTION, PREPARATION AND ANALYSIS WERE SUPERVISED AND/OR MONITORED BY STAFF OF THE GEOCHEMISTRY SECTION AS FOLLOWS:

COLLECTION	- MARSHALL MACKLIN MONOGHAN LIMITED, TORONTO. - E.H.W. HORNBROOK,
PREPARATION	- GOLDER ASSOCIATES, OTTAWA. - J.U. LYNCH
ANALYTICAL	- CHEMEX LABS. LIMITED, VANCOUVER. - BARRINGER MAGENTA LIMITED, TORONTO. - ATOMIC ENERGY OF CANADA LIMITED, OTTAWA. - J.U. LYNCH

AT THE GEOLOGICAL SURVEY OF CANADA, N.G. LUND WAS RESPONSIBLE FOR OPEN FILE PRODUCTION AND DATA MANAGEMENT AND WAS SUPPORTED BY F. WILLIAMS OF THE CARTOGRAPHIC SECTION WHO SUPERVISED MAP PREPARATION. PLOTTING FACILITIES WERE MADE AVAILABLE THROUGH THE GEOLOGICAL SURVEY OF CANADA AND 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 (5 SQUARE MILES) THROUGHOUT THE 25900 SQUARE KILOMETRE (10000 SQUARE MILE) TOTAL CENTRAL BAFFIN ISLAND SURVEY AREA. THE HELICOPTER SUPPORTED SAMPLE COLLECTION WAS CARRIED OUT DURING THE SUMMER OF 1978.

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

IN OTTAWA, FIELD DRIED SAMPLES WERE AIR-DRIED, CRUSHED 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 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, FE, MO, AS AND LOSS ON IGNITION IN LAKE SEDIMENTS WAS CARRIED OUT BY CHEMEX LABS LIMITED.

THE DETERMINATION OF U IN LAKE SEDIMENTS WAS CARRIED OUT BY ATOMIC ENERGY OF CANADA LIMITED.

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

FOR THE DETERMINATION OF ZN, CU, PB, NI, CO, AG, MN AND FE, 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 AND FE 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 QUARZ TUBE IN THE LIGHT PATH OF AN ATOMIC ABSORPTION SPECTROPHOTOMETER.
THE METHOD IS DESCRIBED BY ASLIN (1976).

MOLYBDENUM WAS 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.

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 BF₃ 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.

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.
AFTER THESE TWO DETERMINATIONS WERE COMPLETED, THE REMAINING WATER IN THE SAMPLE BOTTLE (APPROX. 225 ML) WAS ACIDIFIED WITH 3 ML CONCENTRATED HNO₃.

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 REDISOLVED.
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 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) WAS MEASURED WITH A BECKMAN COMBINATION ELECTRODE AND A MODEL 401 ORION SPECIFIC ION METER.

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 COORDINATES.

THE ANALYTICAL DATA WERE RECORDED AS FOLLOWS (SEE GARRETT, 1974, FOR DETAILS)
AND FOR CONVENIENCE THE DETECTION LIMITS OF THE ANALYTICAL METHODS USED ARE
ALSO GIVEN-

ELEMENT SEDIMENT	ANAL. CARD	COLUMNS	DETECTION LIMIT	
ZN	1	21-25	2	1
CU	1	26-30	2	1
PB	1	31-35	2	1
NI	1	36-40	2	1
CO	1	41-45	2	1
AG	1	46-50	0.2	0.1
MN	1	51-55	5	2
AS	1	56-60	1	0.5
MO	1	61-65	2	1
FE %	1	66-70	0.02	0.01
LOI %	1	76-79	1.0	0.5
U	2	21-25	0.2	0.1
 WATER				
U PPB	3	21-25	0.01	0.005
F PPB	3	26-30	20	10
PH	3	31-35		

UNLESS OTHERWISE NOTED THE UNITS OF MEASUREMENT FOR THE ANALYSES ARE PPM.
THE SECOND FIGURE UNDER DETECTION LIMIT IS THE FIGURE TO WHICH VALUES WERE
ARBITRARILY SET IF THEY FELL BELOW THE DETECTION LIMIT.

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

THE SAMPLE SITE COORDINATES WERE CHECKED BY PLOTTING SAMPLING LOCATION MAPS ON A
FLAT-BED PLOTTER FROM THE DIGITIZED COORDINATES AND THEN OVERLAYING THESE OVER
THE FIELD CONTRACTOR'S SAMPLE LOCATION BASE MAPS.

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

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.

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 SPECTROPHOTOMETRY;
JOURNAL OF GEOCHEMICAL EXPLORATION VOL. 6 PP. 321-330.

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 COORDINATES-	UNIVERSAL TRANVERSE MERCATOR(UTM) COORDINATE SYSTEM- SAMPLE COORDINATES	LAKE AREA:	POND- POND
ZN-	ZONE		LT 1- 1/4 TO 1 SQ KM
EAST-	EASTING(METERS)		1-5- 1 TO 5 SQ KM
NORTH-	NORTHING(METERS)		GT 5- GREATER THAN 5 SQ KM
LAKE AREA-	AREA OF LAKE SAMPLED	RP ST:	00- ROUTINE REGIONAL SAMPLE
SMP DTH-	SAMPLE DEPTH MEASURED TO THE NEAREST FOOT		10- FIRST OF FIELD DUPLICATE
RP ST-	REPLICATE STATUS- RELATIONSHIP OF SAMPLE WITH RESPECT TO OTHERS WITHIN THE SURVEY		20- SECOND OF FIELD DUPLICATE
			70- CELL DUPLICATE SITE SAMPLE
RELF-	RELIEF OF THE SURROUNDING LAKE CATCHMENT BASIN	RELF:	L- LOW
GEL-	PRESENCE OF AN ORGANIC GEL OR GYTJA		M- MEDIUM
CONT-	CONTAMINATION- HUMAN OR NATURAL(WORK-DRILL/TRENCH, CAMP,FUEL OR GOSSAN)		H- HIGH
SAMPL COLOR-	SEDIMENT COLOUR	GEL:	BLANK- ABSENT
SUSP-	SUSPENDED MATTER	CONT:	BLANK- NONE 1- PRESENT
ZN-	ZINC BY ATOMIC ABSORPTION SPECTROSCOPY(PPM)	SAMPL COLOR:	TN- TAN
CU-	COPPER BY ATOMIC ABSORPTION SPECTROSCOPY(PPM)		GN- GREEN
PB-	LEAD BY ATOMIC ABSORPTION SPECTROSCOPY(PPM)		GY- GREY
NI-	NICKEL BY ATOMIC ABSORPTION SPECTROSCOPY(PPM)		BR- BROWN
CO-	COBALT BY ATOMIC ABSORPTION SPECTROSCOPY(PPM)		BK- BLACK
AG-	SILVER BY ATOMIC ABSORPTION SPECTROSCOPY(PPM)	SUSP:	BLANK- NONE
MN-	MANGANESE BY ATOMIC ABSORPTION SPECTROSCOPY(PPM)		
AS-	ARSENIC COLORIMETRICALLY(PPM)		
MO-	MOLYBDENUM BY ATOMIC ABSORPTION SPECTROSCOPY(PPM)		
FE-	IRON BY ATOMIC ABSORPTION SPECTROSCOPY(%)		
LOI-	LOSS ON IGNITION BY WEIGHT DIFFERENCE(%)		
U-	URANIUM BY DELAYED NEUTRON ACTIVATION(PPM)		
U-W-	URANIUM IN WATERS BY FISSION TRACK(PPB)		
F-W-	FLUORINE IN WATERS BY SPECIFIC ION ELECTRODE(PPB)		
PH-	PH BY COMBINATION GLASS - CALOMEL ELECTRODE		

VARIABLE NAME ZN LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL
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HISTOGRAM

VARIABLE NAME ZN LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL			*	N	%	CUM %	SUMMARY STATISTICS
**	*	*	*	*	*	*			TOTAL NUMBER OF SAMPLES
1 PPM *					*				557
2 PPM *					*				0
5 PPM *					*				557
10 PPM *					*				ARITHMETIC MEAN
20 PPM *					*				131.2029
50 PPM *	I				*	2	.36	.36	VARIANCE
50 PPM *	XXXXXX				*	181	32.50	32.85	2745.7627
100 PPM *	XXXXXXXXXXXXXX				*	330	59.25	92.10	STANDARD DEVIATION
200 PPM *	XXXXXXXXXXXXXXXXXXXXXX				*	44	7.90	100.00	SKEW
500 PPM *	XXXX				*				EXCESS KURTOSIS
1000 PPM *					*				COEFFICIENT OF VARIANCE, %
2000 PPM *					*				39.9382
5000 PPM *					*				STANDARD ERROR OF THE MEAN
0	20	40	60	80	*	181	32.50	32.85	2.2203
0	20	40	60	80	*	330	59.25	92.10	LOWER 95% LIMIT ON THE MEAN
0	20	40	60	80	*	44	7.90	100.00	UPPER 95% LIMIT ON THE MEAN
0	20	40	60	80	*				LOWER 95% LIMIT ON THE RANGE
0	20	40	60	80	*				UPPER 95% LIMIT ON THE RANGE
0	20	40	60	80	*				GEOMETRIC MEAN
0	20	40	60	80	*				122.1093
0	20	40	60	80	*				LOG10 MEAN
0	20	40	60	80	*				2.0867
0	20	40	60	80	*				LOG10 VARIANCE
0	20	40	60	80	*				.0265
0	20	40	60	80	*				LOG10 STANDARD DEVIATION
0	20	40	60	80	*				.1629
0	20	40	60	80	*				STANDARD ERROR ON THE MEAN
0	20	40	60	80	*				.0069
0	20	40	60	80	*				LOWER 95% LIMIT ON THE MEAN
0	20	40	60	80	*				118.3554
0	20	40	60	80	*				UPPER 95% LIMIT ON THE MEAN
0	20	40	60	80	*				125.9823
0	20	40	60	80	*				LOWER 95% LIMIT ON THE RANGE
0	20	40	60	80	*				58.4389
0	20	40	60	80	*				UPPER 95% LIMIT ON THE RANGE
0	20	40	60	80	*				255.1501
									PERCENT

MINIMUM VALUE	48.0000
25TH PERCENTILE OR 1ST QUARTILE	94.0000
50TH PERCENTILE OR MEDIAN	120.0000
75TH PERCENTILE OR 3RD QUARTILE	158.0000
80TH PERCENTILE	168.0000
90TH PERCENTILE	194.0000
95TH PERCENTILE	245.0000
98TH PERCENTILE	270.0000
99TH PERCENTILE	310.0000
MAXIMUM VALUE	360.0000

	VARIABLE NAME CU LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL
HISTOGRAM			
**	*	*	*
100 PPB *		*	
200 PPB *		*	
500 PPB *		*	
1 PPM *		*	
2 PPM *		*	
5 PPM *		*	
10 PPM *	I	*	
20 PPM *	XX	*	
50 PPM *	XXXXXXXXXX	*	
100 PPM *	XXXXXXXXXXXXXXXXXX	*	
200 PPM *	XXXXXXXXXXXXXXXXXX	*	
500 PPM *	XX	*	
1000 PPM *		*	
2000 PPM *		*	
5000 PPM *		*	
**	*	*	*
0	20	40	60
			80
			100
PERCENT			
N	%	CUM %	
SUMMARY STATISTICS			
			TOTAL NUMBER OF SAMPLES 557
			NUMBER OF ZERO VALUE SAMPLES 0
			NUMBER OF NON-ZERO SAMPLES 557
			ARITHMETIC MEAN 90.7379
			VARIANCE 2891.6866
			STANDARD DEVIATION 53.7744
			SKEW 1.1755
			EXCESS KURTOSIS 1.8992
			COEFFICIENT OF VARIANCE, % 59.2635
			STANDARD ERROR OF THE MEAN 2.2785
			LOWER 95% LIMIT ON THE MEAN 86.2619
			UPPER 95% LIMIT ON THE MEAN 95.2138
			LOWER 95% LIMIT ON THE RANGE -14.8982
			UPPER 95% LIMIT ON THE RANGE 196.3739
			GEOMETRIC MEAN 75.6432
			LOG10 MEAN 1.8788
			LOG10 VARIANCE .0757
			LOG10 STANDARD DEVIATION .2752
			STANDARD ERROR ON THE MEAN .0117
			LOWER 95% LIMIT ON THE MEAN 71.7566
			UPPER 95% LIMIT ON THE MEAN 79.7403
			LOWER 95% LIMIT ON THE RANGE 21.7831
			UPPER 95% LIMIT ON THE RANGE 262.6761

MINIMUM VALUE	10.0000
25TH PERCENTILE OR 1ST QUARTILE	52.0000
50TH PERCENTILE OR MEDIAN	80.0000
75TH PERCENTILE OR 3RD QUARTILE	122.0000
80TH PERCENTILE	132.0000
90TH PERCENTILE	160.0000
95TH PERCENTILE	194.0000
98TH PERCENTILE	250.0000
99TH PERCENTILE	265.0000
MAXIMUM VALUE	360.0000

VARIABLE NAME PB LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL
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HISTOGRAM

VARIABLE NAME PB LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL	SUMMARY STATISTICS						
100 PPB *			*	*	*				TOTAL NUMBER OF SAMPLES 557
200 PPB *				*	*				NUMBER OF ZERO VALUE SAMPLES 0
500 PPB *					*				NUMBER OF NON-ZERO SAMPLES 557
1 PPM *	I								
2 PPM *	XXXXXX				*	4	.72	.72	ARITHMETIC MEAN 11.6230
5 PPM *	XXXXXXXXXXXXXXXXXXXX				*	68	12.21	12.93	VARIANCE 62.2785
10 PPM *	XXXXXXXXXXXXXXXXXXXX				*	249	44.70	57.63	STANDARD DEVIATION 7.8917
20 PPM *	XXXX				*	191	34.29	91.92	SKEW 2.9423
50 PPM *	I				*	42	7.54	99.46	EXCESS KURTOSIS 13.1467
100 PPM *					*	3	.54	100.00	COEFFICIENT OF VARIANCE, % 67.8971
200 PPM *					*				STANDARD ERROR OF THE MEAN .3344
500 PPM *					*				LOWER 95% LIMIT ON THE MEAN 10.9661
					*				UPPER 95% LIMIT ON THE MEAN 12.2798
0	20	40	60	80	100				LOWER 95% LIMIT ON THE RANGE -3.8797
									UPPER 95% LIMIT ON THE RANGE 27.1256
									GEOMETRIC MEAN 9.9043
									LOG10 MEAN .9958
									LOG10 VARIANCE .0562
									LOG10 STANDARD DEVIATION .2371
									STANDARD ERROR ON THE MEAN .0100
									LOWER 95% LIMIT ON THE MEAN 9.4643
									UPPER 95% LIMIT ON THE MEAN 10.3649
									LOWER 95% LIMIT ON THE RANGE 3.3883
									UPPER 95% LIMIT ON THE RANGE 28.9514
									MINIMUM VALUE 2.0000
									25TH PERCENTILE OR 1ST QUARTILE 7.0000
									50TH PERCENTILE OR MEDIAN 10.0000
									75TH PERCENTILE OR 3RD QUARTILE 13.0000
									80TH PERCENTILE 15.0000
									90TH PERCENTILE 19.0000
									95TH PERCENTILE 28.0000
									98TH PERCENTILE 36.0000
									99TH PERCENTILE 44.0000
									MAXIMUM VALUE 75.0000

PERCENT

	VARIABLE NAME NI LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL
HISTOGRAM			
**	*	*	*
100 PPB *		*	
200 PPB *		*	
500 PPB *		*	
1 PPM *		*	
2 PPM *		*	
5 PPM *		*	
10 PPM *	I	*	
20 PPM *	XXXX	*	
50 PPM *	XXXXXXXXXXXXXXXXXXXX	*	
100 PPM *	XXXXXXXXXXXXXXXXXXXX	*	
200 PPM *	XXXX	*	
500 PPM *		*	
1000 PPM *		*	
2000 PPM *		*	
5000 PPM *		*	
**	*	*	*
0	20	40	60
			80
			100
PERCENT			
N % CUM %			
SUMMARY STATISTICS			
			TOTAL NUMBER OF SAMPLES 557
			NUMBER OF ZERO VALUE SAMPLES 0
			NUMBER OF NON-ZERO SAMPLES 557
			ARITHMETIC MEAN 52.8510
			VARIANCE 905.1091
			STANDARD DEVIATION 30.0850
			SKEW 1.3382
			EXCESS KURTOSIS 2.2075
			COEFFICIENT OF VARIANCE % 56.9243
			STANDARD ERROR OF THE MEAN 1.2747
			LOWER 95% LIMIT ON THE MEAN 50.3468
			UPPER 95% LIMIT ON THE MEAN 55.3551
			LOWER 95% LIMIT ON THE RANGE -6.2489
			UPPER 95% LIMIT ON THE RANGE 111.9509
			GEOMETRIC MEAN 45.3402
			LOG10 MEAN 1.6565
			LOG10 VARIANCE .0602
			LOG10 STANDARD DEVIATION .2453
			STANDARD ERROR ON THE MEAN .0104
			LOWER 95% LIMIT ON THE MEAN 43.2578
			UPPER 95% LIMIT ON THE MEAN 47.5227
			LOWER 95% LIMIT ON THE RANGE 14.9482
			UPPER 95% LIMIT ON THE RANGE 137.5232
MINIMUM VALUE 9.0000			
25TH PERCENTILE OR 1ST QUARTILE 31.0000			
50TH PERCENTILE OR MEDIAN 47.0000			
75TH PERCENTILE OR 3RD QUARTILE 66.0000			
80TH PERCENTILE 75.0000			
90TH PERCENTILE 95.0000			
95TH PERCENTILE 110.0000			
98TH PERCENTILE 142.0000			
99TH PERCENTILE 150.0000			
MAXIMUM VALUE 188.0000			

		VARIABLE NAME CO LKSM	UNIT OF MEASUREMENT PPM		DATA SUBSET TOTAL	
HISTOGRAM						
**	*	*	*	*	*	
100 PPB *					*	
200 PPB *					*	
500 PPB *					*	
1 PPM *	I				*	
2 PPM *	X				*	
5 PPM *	XXXXXX				*	
10 PPM *	XXXXXXXXXXXXXXXXXX				*	
20 PPM *	XXXXXXXXXXXXXXXXXX				*	
50 PPM *	XX				*	
100 PPM *	I				*	
200 PPM *					*	
500 PPM *					*	
1000 PPM *					*	
2000 PPM *					*	
5000 PPM *					*	
**	*	*	*	*	*	
0	20	40	60	80	100	
PERCENT						
N % CUM %						
SUMMARY STATISTICS						
					TOTAL NUMBER OF SAMPLES	557
					NUMBER OF ZERO VALUE SAMPLES	0
					NUMBER OF NON-ZERO SAMPLES	557
					ARITHMETIC MEAN	19.6661
					VARIANCE	193.1833
					STANDARD DEVIATION	13.8990
					SKEW	2.6601
					EXCESS KURTOSIS	10.5939
					COEFFICIENT OF VARIANCE, %	70.6752
					STANDARD ERROR OF THE MEAN	.5889
					LOWER 95% LIMIT ON THE MEAN	18.5092
					UPPER 95% LIMIT ON THE MEAN	20.8230
					LOWER 95% LIMIT ON THE RANGE	-7.6376
					UPPER 95% LIMIT ON THE RANGE	46.9698
					GEOMETRIC MEAN	16.3706
					LOG10 MEAN	1.2141
					LOG10 VARIANCE	.0660
					LOG10 STANDARD DEVIATION	.2570
					STANDARD ERROR ON THE MEAN	.0109
					LOWER 95% LIMIT ON THE MEAN	15.5838
					UPPER 95% LIMIT ON THE MEAN	17.1971
					LOWER 95% LIMIT ON THE RANGE	5.1193
					UPPER 95% LIMIT ON THE RANGE	52.3499
					MINIMUM VALUE	2.0000
					25TH PERCENTILE OR 1ST QUARTILE	11.0000
					50TH PERCENTILE OR MEDIAN	16.0000
					75TH PERCENTILE OR 3RD QUARTILE	24.0000
					80TH PERCENTILE	26.0000
					90TH PERCENTILE	35.0000
					95TH PERCENTILE	45.0000
					98TH PERCENTILE	66.0000
					99TH PERCENTILE	75.0000
					MAXIMUM VALUE	113.0000

VARIABLE NAME AG LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL
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HISTOGRAM

N % CUM %

**	*	*	*	*	*		SUMMARY STATISTICS
1 PPB *					*		TOTAL NUMBER OF SAMPLES 557
2 PPB *					*		NUMBER OF ZERO VALUE SAMPLES 0
5 PPB *					*		NUMBER OF NON-ZERO SAMPLES 557
10 PPB *					*		
20 PPB *					*		ARITHMETIC MEAN .1461
50 PPB *					*		VARIANCE .0149
100 PPB *	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			*	443 79.53 79.53		STANDARD DEVIATION .1219
200 PPB *	XXXXX			*	51 9.16 88.69		SKEW 3.9462
500 PPB *	XXXXX			*	52 9.34 98.03		EXCESS KURTOSIS 19.1446
1 PPM *	X			*	11 1.97 100.00		COEFFICIENT OF VARIANCE, % 93.4245
2 PPM *				*			STANDARD ERROR OF THE MEAN .0052
5 PPM *				*			LOWER 95% LIMIT ON THE MEAN .1360
10 PPM *				*			UPPER 95% LIMIT ON THE MEAN .1563
20 PPM *				*			
50 PPM *				*			LOWER 95% LIMIT ON THE RANGE -.0934
	**	*	*	*	*		UPPER 95% LIMIT ON THE RANGE .3856
0	20	40	60	80	100		

PERCENT

MINIMUM VALUE	.1000
25TH PERCENTILE OR 1ST QUARTILE	.1000
50TH PERCENTILE OR MEDIAN	.1000
75TH PERCENTILE OR 3RD QUARTILE	.1000
80TH PERCENTILE	.2000
90TH PERCENTILE	.3000
95TH PERCENTILE	.4000
98TH PERCENTILE	.6000
99TH PERCENTILE	.8000
MAXIMUM VALUE	1.0000

VARIABLE NAME MN LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL
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HISTOGRAM

VARIABLE NAME MN LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL	SUMMARY STATISTICS						
**	*	*	*	*	*				TOTAL NUMBER OF SAMPLES
1 PPM *					*				557
2 PPM *					*				0
5 PPM *					*				557
10 PPM *					*				ARITHMETIC MEAN
20 PPM *					*				329.0215
50 PPM *					*				VARIANCE
100 PPM *	X				*	7	1.26	1.26	39005.7405
200 PPM *	XXXXXXXXXX				*	128	22.98	24.24	STANDARD DEVIATION
500 PPM *	XXXXXXXXXXXXXXXXXXXXXX				*	355	63.73	87.97	SKEW
1000 PPM *	XXXXX				*	61	10.95	98.92	EXCESS KURTOSIS
2000 PPM *	X				*	6	1.08	100.00	COEFFICIENT OF VARIANCE, %
5000 PPM *					*				8.3683
1 PCT *					*				STANDARD ERROR OF THE MEAN
2 PCT *					*				312.5826
5 PCT *					*				UPPER 95% LIMIT ON THE MEAN
**	*	*	*	*	*				345.4605
0	20	40	60	80	100				LOWER 95% LIMIT ON THE RANGE
									-58.9508
									UPPER 95% LIMIT ON THE RANGE
									716.9939
									GEOMETRIC MEAN
									286.8879
									LOG10 MEAN
									2.4577
									LOG10 VARIANCE
									.0484
									LOG10 STANDARD DEVIATION
									.2201
									STANDARD ERROR ON THE MEAN
									.0093
									LOWER 95% LIMIT ON THE MEAN
									275.0394
									UPPER 95% LIMIT ON THE MEAN
									299.2468
									LOWER 95% LIMIT ON THE RANGE
									106.0247
									UPPER 95% LIMIT ON THE RANGE
									776.2783

PERCENT

MINIMUM VALUE	60.0000
25TH PERCENTILE OR 1ST QUARTILE	210.0000
50TH PERCENTILE OR MEDIAN	270.0000
75TH PERCENTILE OR 3RD QUARTILE	380.0000
80TH PERCENTILE	410.0000
90TH PERCENTILE	590.0000
95TH PERCENTILE	770.0000
98TH PERCENTILE	930.0000
99TH PERCENTILE	1050.0000
MAXIMUM VALUE	1450.0000

		VARIABLE NAME AS LKSM	UNIT OF MEASUREMENT PPM		DATA SUBSET TOTAL					
HISTOGRAM										
** * * . * * *										
					N	%	CUM %			
10 PPB *				*						
20 PPB *				*						
50 PPB *				*						
100 PPB *				*						
200 PPB *				*						
500 PPB *	XXXXXX			*	69	12.39	12.39			
1 PPM *	XXXX			*	42	7.54	19.93			
2 PPM *	XXX			*	32	5.75	25.67			
5 PPM *	XXXX			*	47	8.44	34.11			
10 PPM *	XXXXXX			*	43	7.72	41.83			
20 PPM *	XXXXXXXXXXXX			*	82	14.72	56.55			
50 PPM *	XXXXXXXXXXXX			*	131	23.52	80.07			
100 PPM *	XXXXXX			*	65	11.67	91.74			
200 PPM *	XXX			*	34	6.10	97.85			
500 PPM *	X			*	9	1.62	99.46			
1000 PPM *	I			*	3	.54	100.00			
2000 PPM *				*						
5000 PPM *				*						
** 0	* 20	* 40	* 60	* 80	*					
					100					
PERCENT										
SUMMARY STATISTICS										
TOTAL NUMBER OF SAMPLES							557			
NUMBER OF ZERO VALUE SAMPLES							0			
NUMBER OF NON-ZERO SAMPLES							557			
ARITHMETIC MEAN							37.5575			
VARIANCE							5774.2467			
STANDARD DEVIATION							75.9885			
SKEW							5.7562			
EXCESS KURTOSIS							44.9014			
COEFFICIENT OF VARIANCE, %							202.3259			
STANDARD ERROR OF THE MEAN							3.2197			
LOWER 95% LIMIT ON THE MEAN							31.2325			
UPPER 95% LIMIT ON THE MEAN							43.8824			
LOWER 95% LIMIT ON THE RANGE							-111.7166			
UPPER 95% LIMIT ON THE RANGE							186.8315			
GEOMETRIC MEAN							10.5564			
LOG10 MEAN							1.0235			
LOG10 VARIANCE							.6147			
LOG10 STANDARD DEVIATION							.7840			
STANDARD ERROR ON THE MEAN							.0332			
LOWER 95% LIMIT ON THE MEAN							9.0836			
UPPER 95% LIMIT ON THE MEAN							12.2679			
LOWER 95% LIMIT ON THE RANGE							.3044			
UPPER 95% LIMIT ON THE RANGE							366.1263			
MINIMUM VALUE							.5000			
25TH PERCENTILE OR 1ST QUARTILE							2.0000			
50TH PERCENTILE OR MEDIAN							15.0000			
75TH PERCENTILE OR 3RD QUARTILE							38.0000			
80TH PERCENTILE							52.0000			
90TH PERCENTILE							90.0000			
95TH PERCENTILE							145.0000			
98TH PERCENTILE							225.0000			
99TH PERCENTILE							400.0000			
MAXIMUM VALUE							835.0000			

	VARIABLE NAME MO LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL
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HISTOGRAM						SUMMARY STATISTICS			
	*	*	*	*	*	N	%	CUM %	
**	*	*	*	*	*	*			TOTAL NUMBER OF SAMPLES
10 PPB *					*				557
20 PPB *					*				0
50 PPB *					*				557
100 PPB *					*				
200 PPB *					*				
500 PPB *					*				
1 PPM *	XXXXXXXXXXXXXXXXXXXX					*	211	37.88	37.88
2 PPM *	XXXXXXXXXXXXXX					*	144	25.85	63.73
5 PPM *	XXXXXXXXXXXXXX					*	161	28.90	92.64
10 PPM *	XX					*	27	4.85	97.49
20 PPM *	X					*	13	2.33	.99.82
50 PPM *	I					*	1	.18	100.00
100 PPM *						*			
200 PPM *						*			
500 PPM *						*			
**	*	*	*	*	*	*			LOWER 95% LIMIT ON THE RANGE
0	20	40	60	80	100				UPPER 95% LIMIT ON THE RANGE

PERCENT		MINIMUM VALUE	
			1.0000
		25TH PERCENTILE OR 1ST QUARTILE	1.0000
		50TH PERCENTILE OR MEDIAN	2.0000
		75TH PERCENTILE OR 3RD QUARTILE	3.0000
		80TH PERCENTILE	4.0000
		90TH PERCENTILE	5.0000
		95TH PERCENTILE	8.0000
		98TH PERCENTILE	12.0000
		99TH PERCENTILE	15.0000
		MAXIMUM VALUE	25.0000

	VARIABLE NAME FE LKSM	UNIT OF MEASUREMENT PCT	DATA SUBSET			SUMMARY STATISTICS
			N	%	CUM %	
HISTOGRAM						
**	*	*	*	*	*	
100 PPM *					*	
200 PPM *					*	
500 PPM *					*	
1000 PPM *					*	
2000 PPM *					*	
5000 PPM *	I					
1 PCT *	XXX		*	1	.18	.18
2 PCT *	XXXXXXXXXXXXXXXXXXXXXXXXXXXXX		*	34	6.10	6.28
5 PCT *	XXXXXXXXXX		*	408	73.25	79.53
10 PCT *	I		*	110	19.75	99.28
20 PCT *			*	4	.72	100.00
50 PCT *			*			
**	*	*	*	*	*	
0	20	40	60	80	100	
PERCENT						
MINIMUM VALUE						
25TH PERCENTILE OR 1ST QUARTILE						
50TH PERCENTILE OR MEDIAN						
75TH PERCENTILE OR 3RD QUARTILE						
80TH PERCENTILE						
90TH PERCENTILE						
95TH PERCENTILE						
98TH PERCENTILE						
99TH PERCENTILE						
MAXIMUM VALUE						

VARIABLE NAME U LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL
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HISTOGRAM

VARIABLE NAME U LKSM	UNIT OF MEASUREMENT PPM	DATA SUBSET TOTAL	SUMMARY STATISTICS						
**	*	*	*	*	*				TOTAL NUMBER OF SAMPLES 557
100 PPB *					*				NUMBER OF ZERO VALUE SAMPLES 0
200 PPB *					*				NUMBER OF NON-ZERO SAMPLES 557
500 PPB *					*				
1 PPM *					*				ARITHMETIC MEAN 12.8214
2 PPM *					*				VARIANCE 216.3013
5 PPM *	XXXXXXXXXXXX				*	130	23.34	23.34	STANDARD DEVIATION 14.7072
10 PPM *	XXXXXXXXXXXXXXXXXX				*	222	39.86	63.20	SKW 4.4509
20 PPM *	XXXXXXXXXX				*	108	19.39	82.59	EXCESS KURTOSIS 31.2152
50 PPM *	XXXXXXX				*	84	15.08	97.67	COEFFICIENT OF VARIANCE, % 114.7084
100 PPM *	X				*	11	1.97	99.64	STANDARD ERROR OF THE MEAN .6232
200 PPM *	I				*	2	.36	100.00	LOWER 95% LIMIT ON THE MEAN 11.5972
500 PPM *					*				UPPER 95% LIMIT ON THE MEAN 14.0455
1000 PPM *					*				
2000 PPM *					*				LOWER 95% LIMIT ON THE RANGE -16.0699
5000 PPM *					*				UPPER 95% LIMIT ON THE RANGE 41.7126
**	*	*	*	*	*				
0	20	40	60	80	100				

PERCENT

MINIMUM VALUE	2.4000
25TH PERCENTILE OR 1ST QUARTILE	5.3000
50TH PERCENTILE OR MEDIAN	7.4000
75TH PERCENTILE OR 3RD QUARTILE	15.1000
80TH PERCENTILE	17.7000
90TH PERCENTILE	28.1000
95TH PERCENTILE	39.0000
98TH PERCENTILE	50.6000
99TH PERCENTILE	75.2000
MAXIMUM VALUE	159.0000

VARIABLE NAME U-W LKWR	UNIT OF MEASUREMENT PPB	DATA SUBSET TOTAL
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HISTOGRAM

N % CUM %

**	*	*	*	*	*				SUMMARY STATISTICS
1 PPT *					*				TOTAL NUMBER OF SAMPLES 557
2 PPT *	X				*				NUMBER OF ZERO VALUE SAMPLES 0
5 PPT *	XX				*	18	3.23	4.67	NUMBER OF NON-ZERO SAMPLES 557
10 PPT *	XXX				*	38	6.82	11.49	ARITHMETIC MEAN .1347
20 PPT *	XXXXXXXX				*	103	18.49	29.98	VARIANCE .0196
50 PPT *	XXXXXXXXXX				*	132	23.70	53.68	STANDARD DEVIATION .1401
100 PPT *	XXXXXXXXXXXX				*	161	28.90	82.59	SKEW 3.0280
200 PPT *	XXXXXXXXXXXXX				*	82	14.72	97.31	EXCESS KURTOSIS 13.3728
500 PPT *	XXXXXXX				*	13	2.33	99.64	COEFFICIENT OF VARIANCE, % 103.9993
1 PPB *	I				*	2	.36	100.00	STANDARD ERROR OF THE MEAN .0059
2 PPB *					*				LOWER 95% LIMIT ON THE MEAN .1231
5 PPB *					*				UPPER 95% LIMIT ON THE MEAN .1464
10 PPB *					*				LOWER 95% LIMIT ON THE RANGE -.1405
20 PPB *					*				UPPER 95% LIMIT ON THE RANGE .4100
50 PPB *					*				GEOMETRIC MEAN .0875
**	*	*	*	*	*				LOG10 MEAN -.1.0579
0	20	40	60	80	100				LOG10 VARIANCE .1828
									LOG10 STANDARD DEVIATION .4276
									STANDARD ERROR ON THE MEAN .0181
									LOWER 95% LIMIT ON THE MEAN .0806
									UPPER 95% LIMIT ON THE MEAN .0950
									LOWER 95% LIMIT ON THE RANGE .0127
									UPPER 95% LIMIT ON THE RANGE .6053

PERCENT

MINIMUM VALUE	.0050
25TH PERCENTILE OR 1ST QUARTILE	.0500
50TH PERCENTILE OR MEDIAN	.1000
75TH PERCENTILE OR 3RD QUARTILE	.1700
80TH PERCENTILE	.1900
90TH PERCENTILE	.2800
95TH PERCENTILE	.4000
98TH PERCENTILE	.5500
99TH PERCENTILE	.7800
MAXIMUM VALUE	1.1000

	VARIABLE NAME F-W LKWR	UNIT OF MEASUREMENT PPB	DATA SUBSET TOTAL
HISTOGRAM			
**	*	*	N % CUM %
100 PPT *			*
200 PPT *			*
500 PPT *			*
1 PPB *			*
2 PPB *			*
5 PPB *	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX		*
10 PPB *	XXXXX	476 85.46 85.46	STANDARD ERROR OF THE MEAN .7419
20 PPB *	XX	55 9.87 95.33	LOWER 95% LIMIT ON THE MEAN 11.2140
50 PPB *	I	23 4.13 99.46	UPPER 95% LIMIT ON THE MEAN 14.1289
100 PPB *		2 .36 99.82	LOWER 95% LIMIT ON THE RANGE -21.7260
200 PPB *			UPPER 95% LIMIT ON THE RANGE 47.0689
500 PPB *			GEOMETRIC MEAN 11.3237
1 PPM *			LOG10 MEAN 1.0540
2 PPM *			LOG10 VARIANCE .0218
5 PPM *			LOG10 STANDARD DEVIATION .1476
**	*	*	
0 20 40 60 80 100			
PERCENT			
MINIMUM VALUE 10.0000			
25TH PERCENTILE OR 1ST QUARTILE 10.0000			
50TH PERCENTILE OR MEDIAN 10.0000			
75TH PERCENTILE OR 3RD QUARTILE 10.0000			
80TH PERCENTILE 10.0000			
90TH PERCENTILE 20.0000			
95TH PERCENTILE 20.0000			
98TH PERCENTILE 32.0000			
99TH PERCENTILE 38.0000			
MAXIMUM VALUE 400.0000			

TABLE OF SAMPLES WITH VALUES IN EXCESS OF THE 90TH PERCENTILE

MAP	ID	ROCK	RATING	DISPLAY IS - BLANK 90TH + 95TH * 98TH ** 99TH ***													
				ZN	CU	PB	NI	CO	AG	MN	AS	MO	FE	LOI	U	U-W	F-W
37A	783125		6			*						+			**		
37A	783130		4									*					*
37A	783132		4											***			
37A	783135		5			***								+			
37A	783136		6			**								+			*
37A	783138		8	+		***						+		*			
37A	783140		6			**						+		*			
37A	783148		4			**								+			
37A	783149		5	+			+							+			*
37A	783150		12	***	*		+	***		+							
37A	783152		4	**		+											
37A	783162		4									+		**			
37A	783164		11					**							***	***	
37A	783166		5												*	**	
37A	783167		6												**	**	
37A	783171		6								***			*			
37A	783172		4	*	+							+					
37A	783199		14	***			+	*			***			**			
37A	783219		6				+				**	+	+				
37A	783220		10		+						***	+		***			
37A	783228		5		+		+	+			*						
37A	783229		11				*				***	+		***			
37A	783243		6	*				**			+						