

**SAVANNAH RIVER LABORATORY
HYDROGEOCHEMICAL AND STREAM
SEDIMENT RECONNAISSANCE**

**RAW DATA RELEASE IV
ORIENTATION STUDY IN THE
KINGS MOUNTAIN, NORTH CAROLINA, AREA**

NATIONAL URANIUM RESOURCE EVALUATION PROGRAM

by

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Approved by:

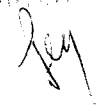
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ABSTRACT

An orientation study was conducted in the Kings Mountain, North Carolina, area in preparation for a hydrogeochemical and stream sediment reconnaissance. The study was conducted by the Savannah River Laboratory as part of the National Uranium Resource Evaluation (NURE) Program.

Ninety-nine surface sites and ninety-six ground water sites were sampled over an 800-square-mile area. Uranium concentrations ranged from 2 to 156 parts per million (ppm) in sediment and from 5 to 186,000 parts per trillion (pptr) in water. Symbol plots showing areal distribution of uranium and cumulative frequency plots of uranium concentrations in ground water, stream water, and stream sediment are presented. Tabular data for each site include temperature; alkalinity; conductivity; pH; dissolved oxygen; Eh; sulfate, nitrate, and phosphate ions; ammonia; site descriptors (e.g., well depth, stream width, etc.); and analyses for 27 supplementary elements in sediment.

CONTENTS

Introduction	5
Field Data	6
Uranium Analyses	8
Supplementary Analyses	9
Sample Localities	10
Figures, Tables, and Maps	11

RAW DATA RELEASE IV
ORIENTATION STUDY IN THE KINGS MOUNTAIN, NORTH CAROLINA, AREA

INTRODUCTION

The National Uranium Resource Evaluation (NURE) Program was established to evaluate domestic uranium resources in the continental United States and to identify areas favorable for uranium exploration. The Grand Junction Office (GJ) of the Energy Research and Development Administration (ERDA) is responsible for administering and coordinating NURE Program efforts. The Savannah River Laboratory (SRL) has responsibility for hydrogeochemical and stream sediment reconnaissance (HSSR) of twenty-five states in the eastern United States. Other ERDA laboratories have responsibility for similar reconnaissance in the rest of the continental United States, including Alaska (Figure 1).

A development program is in progress to assure that the SRL HSSR program will have a sound technical basis. Orientation or pilot studies of known uranium localities are being conducted in a variety of geologic and geographic settings. A survey of orientation studies conducted and discussions of field techniques can be found in SRL NURE quarterly reports (Series DPST-75-138-1 through 4, and DPST-76-1-138-1 and -2; available from ERDA-GJ, P. O. Box 2567, Grand Junction, CO 81501, as Documents GJB-X-5(76) through GJB-X-8(76), GJB-X-17(76), and GJB-X-26(76), respectively.

This paper presents raw data from an orientation study in the Kings Mountain, North Carolina, area. The area comprises parts of Cleveland, Gaston, and Lincoln counties, North Carolina (Figure 2), and has been referred to in previous SRL reports (cited above) as the North Carolina Inner Piedmont Study Area. Samples were collected from the Inner Piedmont, Kings Mountain, and Charlotte geologic belts. Samples collected in this study were assigned the four-letter designation, NCCL, and a serial number as described below.

The results presented here are preliminary. A supplemental report containing additional analytical data will be filed later. Topical reports will be published later to present conclusions of the study. The distribution of raw data reports is controlled by the ERDA-GJ Office.

This report includes sample locality maps, uranium distribution maps, tables of water quality and field measurement data, and tables of uranium and other elemental concentrations. Descriptions of these follow.

FIELD DATA

Field data are presented on microfiche. They are presented in two parts: a complete record of all field data (Table 1) and a convenient tabular listing of field measurements. The tabular summary is also given in hard copy (Table 2). Most entries are self-explanatory. Details may be obtained from SRL NURE Quarterly Reports DPST-75-138-2 and SRL DPST-75-138-3 [GJB-X-6(67) and GJB-X-7(76), respectively].

A brief explanation of each column in the field data tables follows.

SITE CODE

This is the field name used for each site according to the seven-character code described on page 10.

LAT AND LONG

Latitude and longitude were measured to four decimal places but are probably accurate to three decimal places; this is approximately equivalent to locating a point within a circle of radius less than 200 feet.

ALKA

Alkalinity as milliequivalents of sulfuric acid required per liter of sample (meq/l) to titrate to a pH of approximately 4.5.

COND

Conductivity, measured in $\mu\text{mhos/cm}$.

SO₄

Sulfate (ppm) by barium sulfate turbidimetry.

NO₃

Nitrate and nitrite (ppm) by colorimetry.

PO₄

Orthophosphate (ppm) by colorimetry. Based on least squares fit of standard curves. At very low concentrations (<0.1 ppm), negative values may be reported in the tables as a result of curve fittings.

NH₃

Ammonia (ppm) by colorimetry.

pH

Normally, pH will be in the range of 4.0 to 8.5. Values outside this range may suggest instrument malfunction or pollution.

Eh

Redox potential in millivolts (mV) versus standard calomel electrode. Normally, Eh will be in the range of ±400 mV. Values far outside this range may suggest instrument malfunction.

O₂

Dissolved oxygen (ppm) by electrometer.

FILT

Volume of water (ml) filtered.

RESIN

Volume of filtered water (ml) treated with mixed anion-cation exchange resin.

TEMP

Temperature, degrees Celsius (°C).

TEAM

A code designating the field sampling team.

Table 1 (microfiche only) includes information on type and depth of well, pipe composition, frequency of use, stream bottom sediment, flow stage, color or odor of water, activities (e.g., mining, farming, etc.) in area, and other information which might be useful in our exhaustive evaluation of analytical data. Values less than the detection limit (<0.02 meq/l alkalinity, <2 ppm SO_4^{2-} , <0.02 ppm NO_3^- , <0.1 ppm PO_4^{3-} , <0.01 ppm NH_3^+) are indicated by .00. Missing data are indicated by 0.0 or 0.00. Asterisks (*****) indicate high, off-scale instrument readings for which no estimate of concentration is available.

URANIUM ANALYSES

Uranium was determined by neutron activation analysis. Calibration is thought to be very good for uranium in sediment at the ppm level. The following table compares SRL's determination of uranium in analyzed rock samples with accepted values for these samples.

SRL Uranium Analyses of Rock Standards

<i>Rock Standard</i>	<i>Recommended</i>	<i>Found</i>	<i>n</i>	<i>Deviation, %</i>
AGV-1 ^a	1.88	1.83	2	-2.7
BCR-1 ^a	1.74	1.65	2	-5.2
G-2 ^a	2.0	2.25	4	12.5
GSP-1 ^a	1.96	2.61	2	33
SU-1 ^b	0.97	0.99	3	2.1
SY-2 ^b	280	272	3	-2.9
SY-3 ^b	619	596	3	-3.7

n = number of samples analyzed.

a. United States Geological Survey (USGS).

b. Spectroscopy Society of Canada.

At the part per trillion (pptr) level, the system background introduces a significant analytical uncertainty. For water samples, our zero concentration intercept has a 90% probability of being in the range of ± 17 pptr for one liter of water (Tables 3 and 4). In general, reported values below about 20 pptr are not considered reliable.

Figure 3 illustrates the statistical distribution of uranium in three sampling media: ground water (3A), stream water (3B), and stream sediments (3C).

Figures 4, 5, and 6 are, respectively, maps on which the uranium contents of ground water, stream water, and stream sediment samples are represented by a series of concentration symbols.

SUPPLEMENTARY ANALYSES

Supplementary elemental analyses (Tables 5-7) were performed by Barringer Exploration, LTD, Rexdale, Ontario, Canada.* Samples were dissolved in hydrofluoric-nitric acid mixtures and analyzed by a direct-reading emission spectrograph with a plasma source. Lithium was determined in the same solutions by atomic absorption spectrophotometry. Nineteen standards were randomly numbered and included with samples submitted for analysis. Precision and accuracy are generally good and the standard results are included for comparison. Unpublished SRL data suggest that dissolution of the samples (-100 mesh, unground) may not be as complete as that of the standards which were finely ground. Stream sediment standard SRL-2 was prepared by the Savannah River Laboratory; no recommended values have been established.

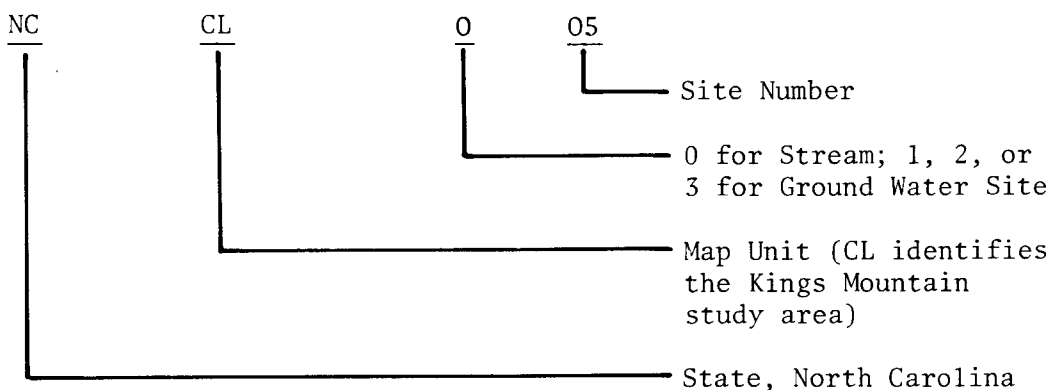
In addition to analyses reported in Tables 5 and 6, concentrations of several other elements including arsenic, gold, molybdenum, selenium, tin, and tungsten were measured in these samples. Due to various problems with analytical procedure, lack of proper standardization, and possible interferences, the numbers given in Table 7 should be considered as *relative* estimates of concentration only. Regional distribution patterns for several of these elements are similar and appear to relate to known mineralization patterns. The data are therefore presented in spite of possible inaccuracies.

* No endorsement of Barringer Exploration, LTD, is intended by this reference.

Thorium concentrations (Table 8) were determined by neutron activation analysis. Analysis of thorium standards is not complete; therefore, these values should be used cautiously. However, the reported thorium values appear to be correct on a relative scale.

SAMPLE LOCALITIES

Sample locality maps were prepared by tracing stream networks from USGS quadrangle maps and county road maps. This process facilitates the identification of drainage basins and road-stream intersections. Sampling sites are designated by a seven-character code, e.g.:



For convenience, only the last three characters are plotted on the maps.

LIST OF FIGURES

- 1 Areas of Responsibility for the NURE Hydro-geochemical Reconnaissance Program
- 2 Index Map of the Kings Mountain, North Carolina, Study Area
- 3 Cumulative Percent of Samples Versus Uranium Content for Ground Water, Surface Water, and Sediment Samples
- 4 Areal Distribution of Uranium in Ground Water
- 5 Areal Distribution of Uranium in Surface Water
- 6 Areal Distribution of Uranium in Stream Sediments

LIST OF TABLES

- 1 Field Measurement Data for Sampling Sites, Kings Mountain, North Carolina, Study Area (microfiche)
- 2 Tabulated Field Data for Sampling Sites, Kings Mountain, North Carolina, Study Area
- 3 Uranium Content of Stream Sediment and Water Samples, Kings Mountain, North Carolina, Study Area
- 4 Uranium in Ground Water Samples, Kings Mountain, North Carolina, Study Area
- 5 Emission Spectrographic Analyses of -100 to +200 Mesh Stream Sediment from the Kings Mountain, North Carolina, Study Area, and of Selected Rock Standards
- 6 Lithium Concentrations by Atomic Absorption in -100 to +200 Mesh Stream Sediment from the Kings Mountain, North Carolina, Study Area, and Selected Rock Standards
- 7 Estimates of Concentration for Selected Trace Metals in -100 to +200 Mesh Stream Sediment from the Kings Mountain, North Carolina, Study Area
- 8 Thorium Concentrations by Neutron Activation Analysis in -100 to +200 Mesh Stream Sediment from the Kings Mountain, North Carolina, Study Area
- 9 Resampled Ground Water Sites

LIST OF MAPS

- 1 Surface Water Sampling Sites for the Kings Mountain, North Carolina, Study Area (Cleveland, Gaston, and Lincoln Counties)
- 2 Ground Water Sampling Sites for the Kings Mountain, North Carolina, Study Area (Cleveland, Gaston, and Lincoln Counties)

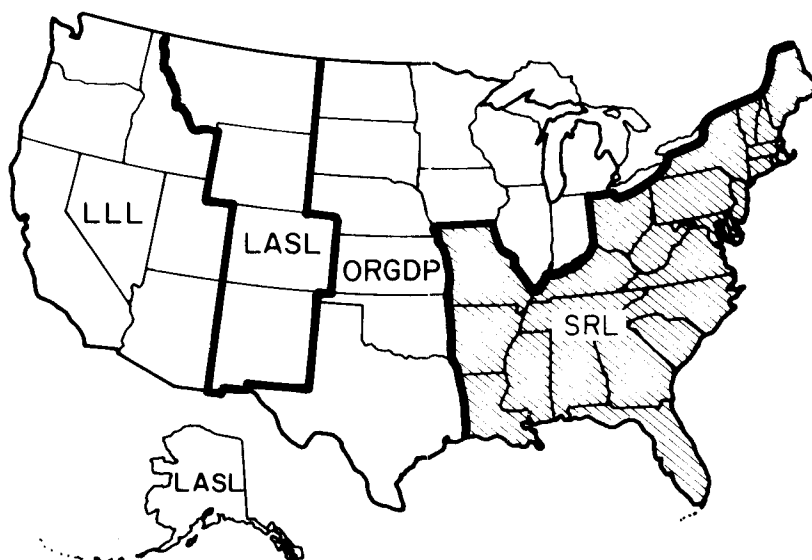


FIGURE 1. Areas of Responsibility for the NURE Hydrogeochemical Reconnaissance Program

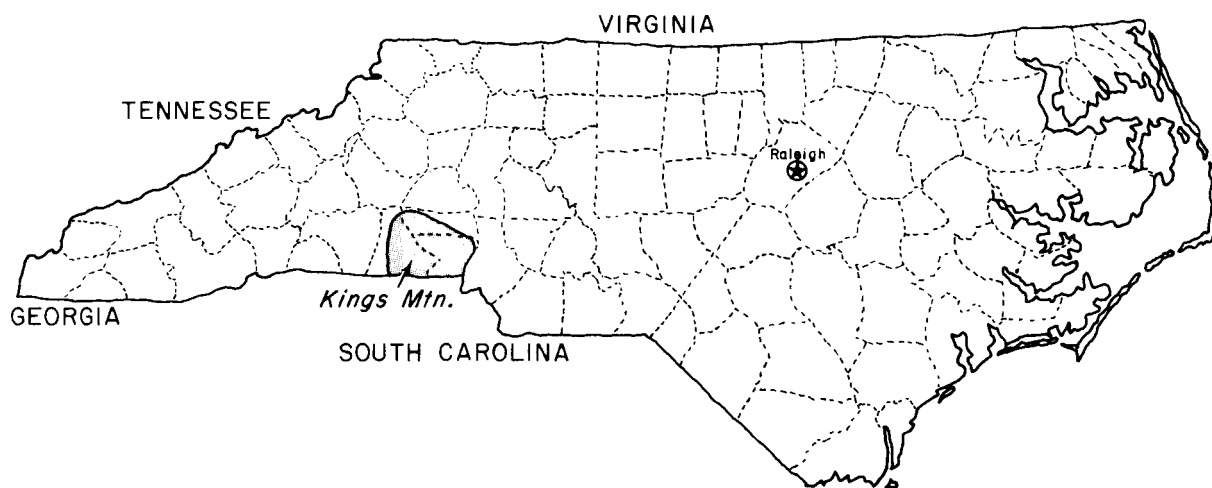
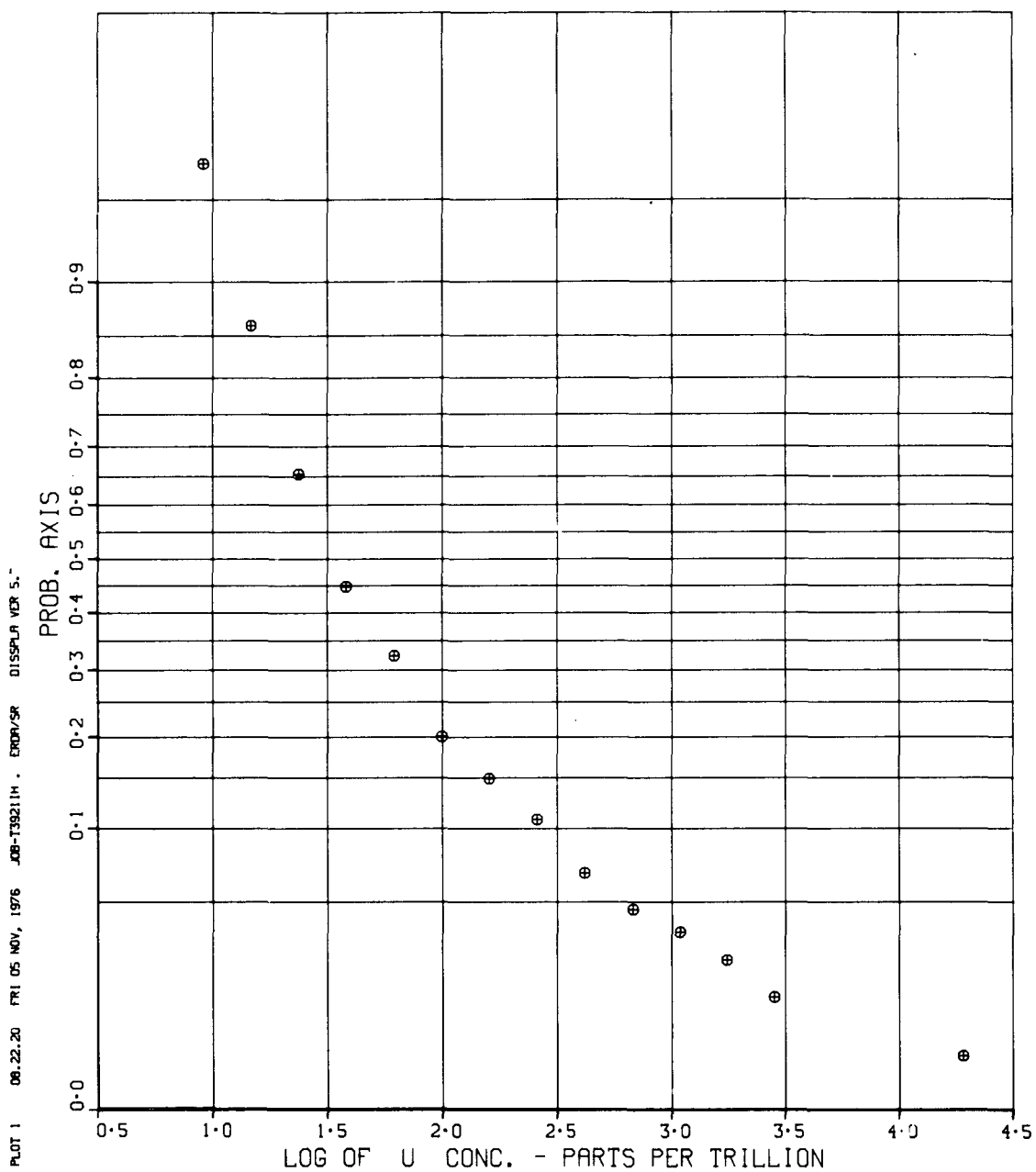
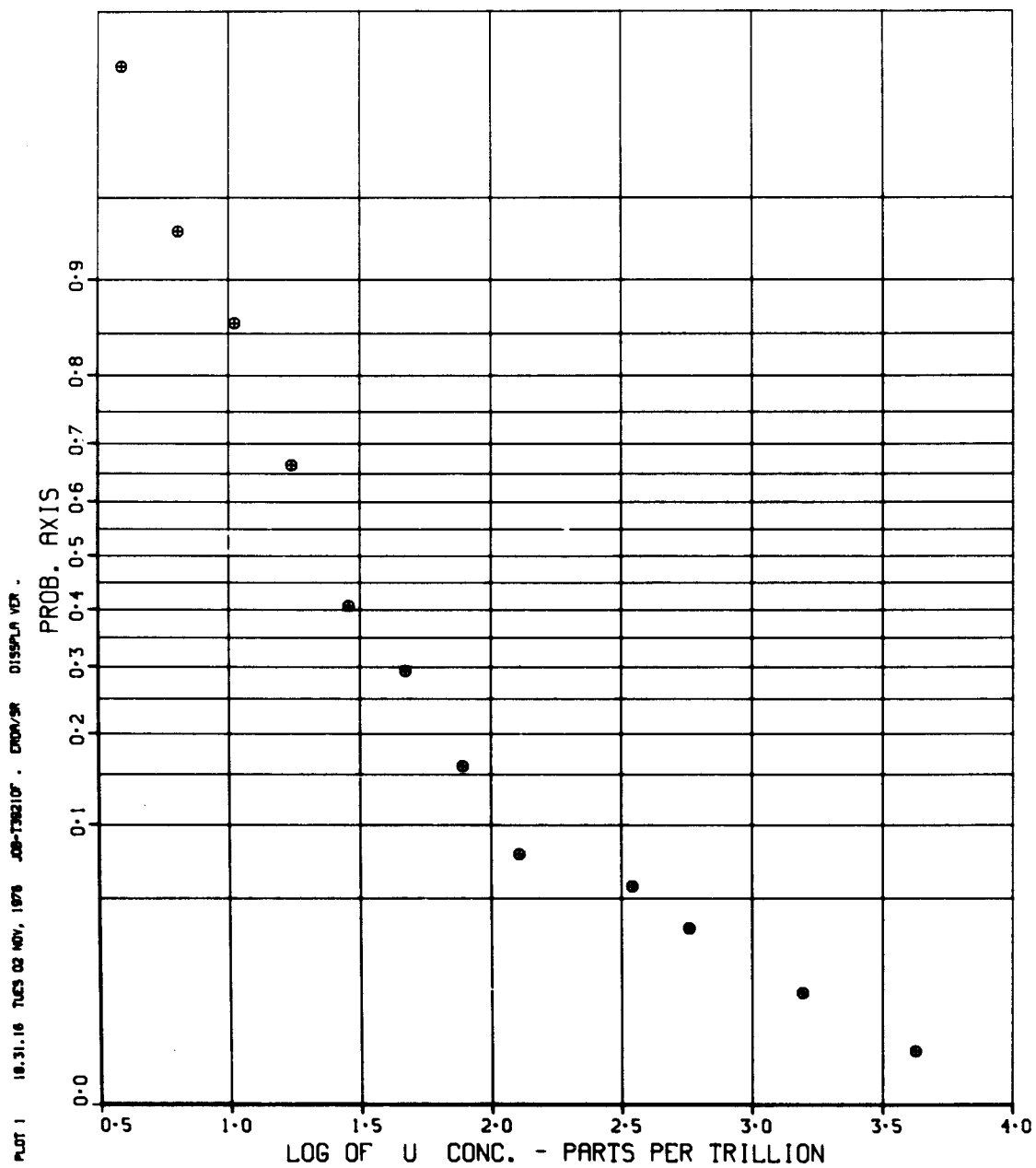


FIGURE 2. Index Map of the Kings Mountain, North Carolina Study Area



a. Ground Water

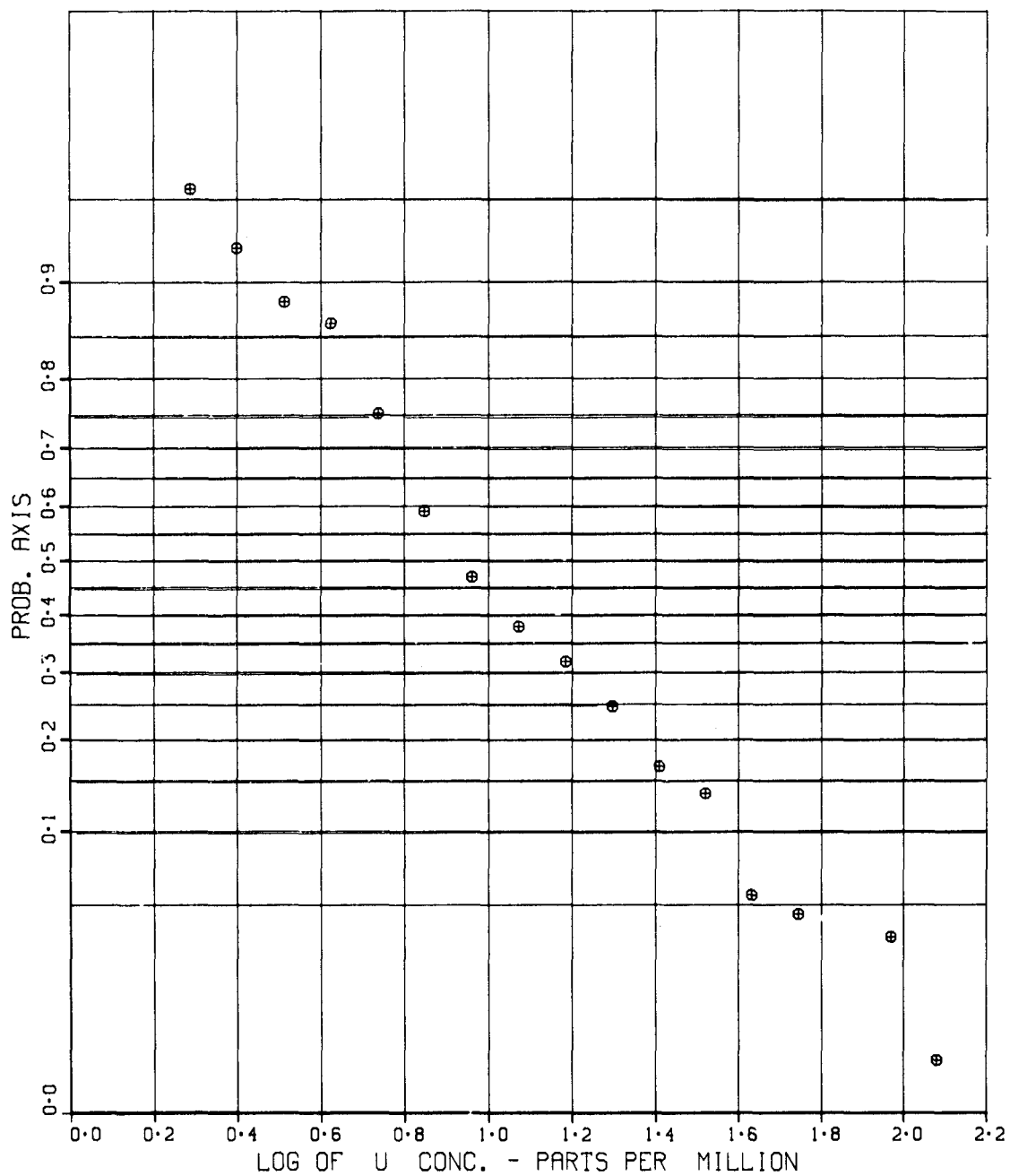
Figure 3. Cumulative Percent of Samples Versus Uranium Content for Ground Water, Surface Water, and Sediment Samples



b. Surface Water

FIGURE 3. (Continued)

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c. Sediment

FIGURE 3. (Continued)

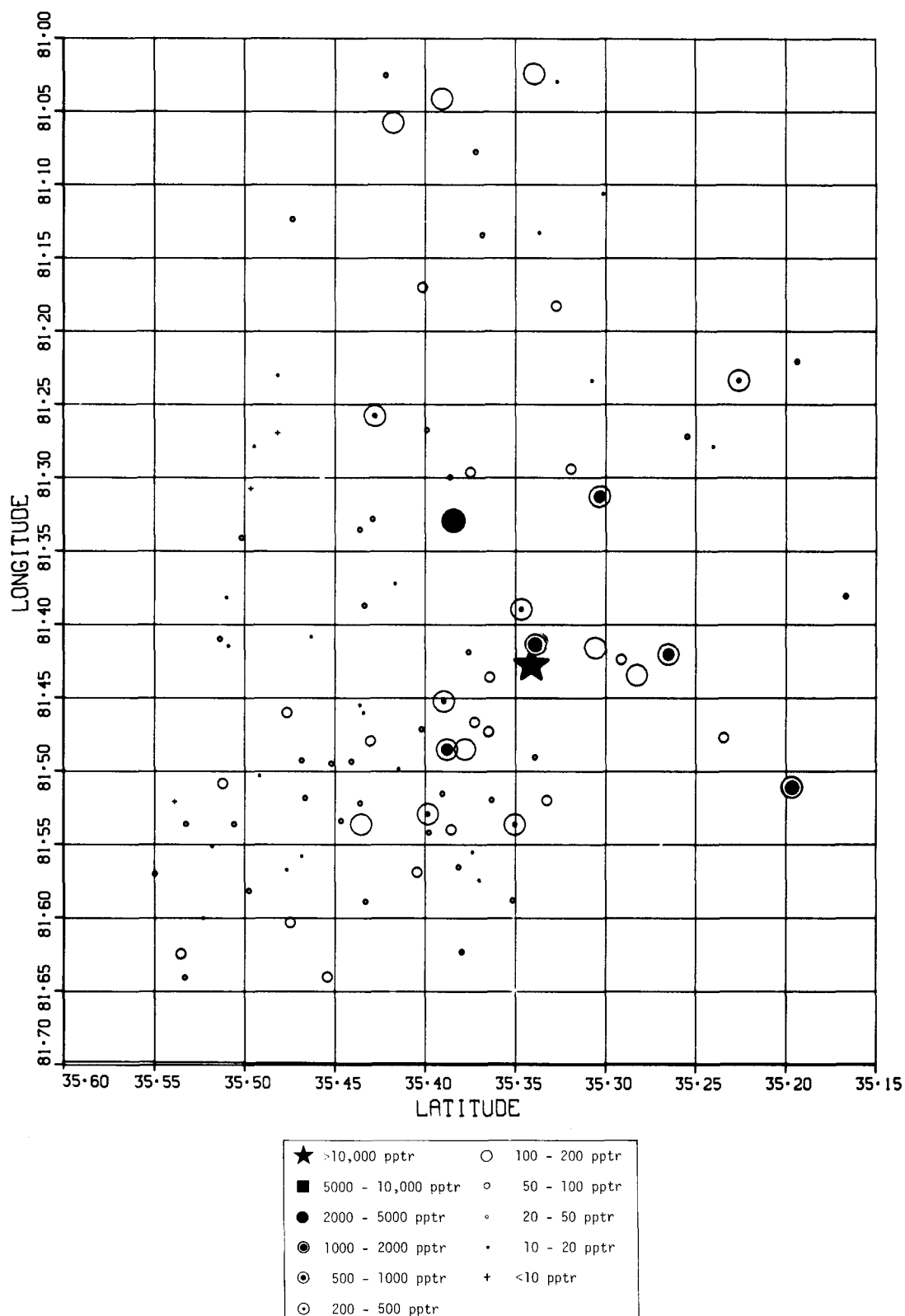


FIGURE 4. Areal Distribution of Uranium in Ground Water

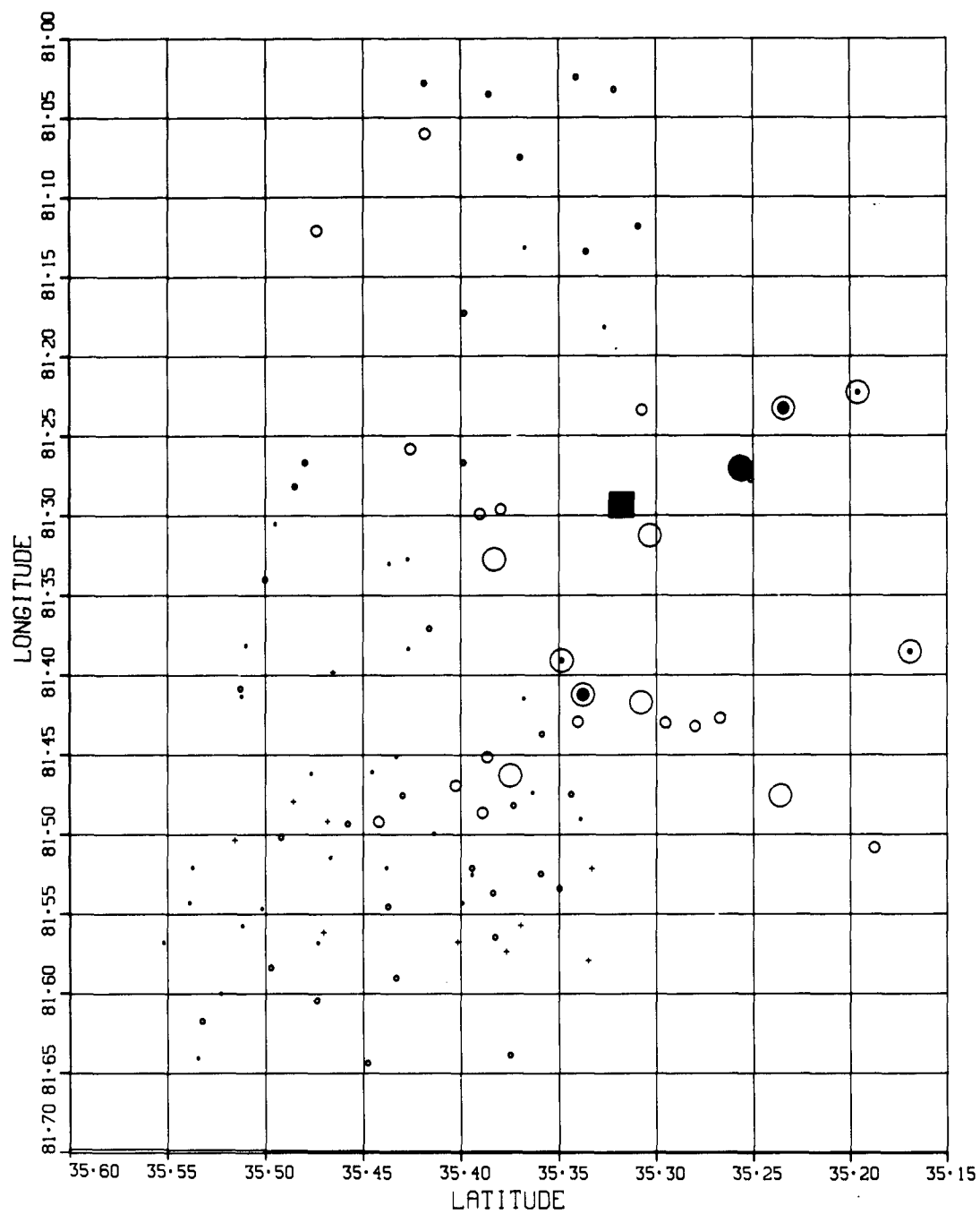


FIGURE 5. Areal Distribution of Uranium in Surface Water

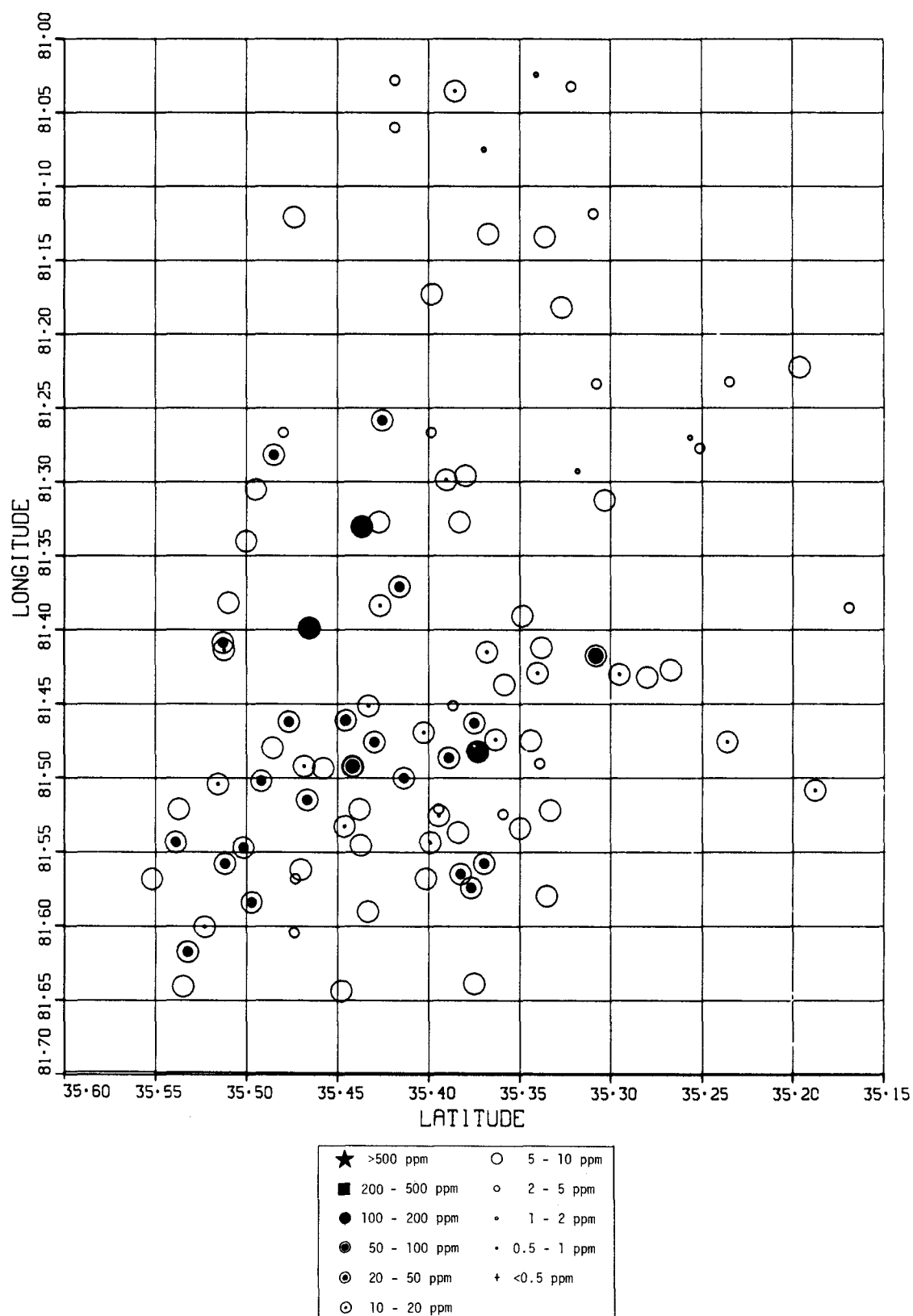


FIGURE 6. Areal Distribution of Uranium in Stream Sediments

TABLE 1. Field Measurement Data for Sampling Sites,
Kings Mountain, North Carolina, Study Area

TABLE 2. Tabulated Field Data for Sampling Sites,
Kings Mountain, North Carolina, Study Area

RUN TIME 10/22/76 14:22
PAGE 1

FIELD MEASUREMENT DATA

SITE CODE	LAT	LONG	ALKA	COND	SO4	NO3	PO4	NH3	PH	EH	O2	FILT	RESIN	TEMP	TEAM
NCCL001	35.3351	81.5791	.14	42.	40.59	.04	.37	.10	7.50	110.	7.41	2000.	1000.	15.69	K01
NCCL002	35.3498	81.5335	.20	45.	30.85	.04	.26	.11	7.11	189.	7.69	2000.	1000.	14.45	K01
NCCL003	35.3333	81.5214	.22	53.	37.65	.02	.74	.15	6.90	195.	7.67	2000.	1000.	14.75	K01
NCCL004	35.3392	81.4900	.24	54.	25.37	.07	.40	0.00	6.51	147.	7.49	2000.	1000.	18.10	K01
NCCL005	35.3439	81.4744	.14	36.	29.62	.08	.30	0.00	6.71	190.	7.23	2000.	1000.	16.52	K01
NCCL006	35.3424	81.4288	.26	65.	38.58	.03	.71	.04	6.56	255.	7.56	2000.	1000.	18.66	K01
NCCL007	35.3380	81.4117	.22	60.	22.70	.03	.93	.14	6.98	227.	6.57	2000.	1000.	16.06	K01
NCCL008	35.3486	81.3903	.16	41.	32.17	.04	1.13	.12	6.91	226.	7.35	2000.	1000.	16.22	K01
NCCL009	35.3768	81.5734	.08	31.	32.17	.07	.79	.22	7.10	172.	8.06	2000.	1000.	17.45	K01
NCCL010	35.3697	81.5570	.12	39.	48.32	.06	.74	.02	6.70	138.	8.54	2000.	1000.	15.81	K01
NCCL011	35.3502	81.5242	.20	52.	29.04	.05	.60	.12	7.02	285.	7.64	2000.	1000.	16.96	K01
NCCL012	35.3732	81.4815	.16	42.	29.62	.04	.34	.15	7.19	206.	7.55	2000.	1000.	15.49	K01
NCCL013	35.3633	81.4736	.10	38.	29.62	.08	.44	.10	7.06	223.	7.38	2000.	1000.	16.78	K01
NCCL014	35.3586	81.4366	.22	45.	35.11	.02	1.34	0.00	5.21	176.	6.64	2000.	1000.	17.99	K01
NCCL015	35.3680	81.4145	.16	42.	33.58	.01	.51	0.00	6.75	199.	7.97	2000.	1000.	18.30	K01
NCCL016	35.3826	81.5641	.14	43.	41.68	.06	.37	.04	6.64	148.	8.43	2000.	1000.	17.53	K01
NCCL017	35.3838	81.5353	.14	38.	29.04	.04	.84	.09	5.20	57.	8.20	2000.	1000.	14.61	K01
NCCL018	35.3944	81.5207	.14	44.	11.60	.02	1.25	.06	6.45	211.	7.85	2000.	1000.	14.52	K01
NCCL019	35.3944	81.5249	.14	40.	38.58	.06	.96	.18	5.62	205.	7.50	2000.	1000.	14.71	K01
NCCL020	35.3891	81.4858	.16	47.	40.59	.09	.08	0.00	6.43	251.	7.61	2000.	1000.	17.60	K01
NCCL021	35.3750	81.4623	.12	32.	26.86	.06	1.17	.03	6.82	220.	6.95	2000.	1000.	16.25	K01
NCCL022	35.3867	81.4509	.12	38.	37.65	.08	.58	1.31	6.48	196.	8.88	2000.	1000.	16.95	K01
NCCL023	35.4015	81.5673	.10	35.	45.38	.06	.60	0.00	5.69	141.	8.08	2000.	1000.	18.15	K01
NCCL024	35.3991	81.5427	.14	38.	25.37	.07	.87	.24	7.51	129.	8.70	2000.	1000.	11.13	K01
NCCL025	35.4137	81.4993	.14	46.	45.38	.18	2.21	.84	7.15	193.	7.68	2000.	1000.	15.47	K01
NCCL026	35.4326	81.5897	.16	40.	14.45	.00	.27	0.00	6.99	200.	7.53	2000.	1000.	16.62	K01
NCCL027	35.4331	81.5897	.04	35.	35.11	.08	.69	.22	5.45	278.	8.38	2000.	1000.	14.52	K01
NCCL028	35.4372	81.5449	.12	42.	26.35	0.00	.44	0.00	3.55	202.	8.24	2000.	1000.	12.74	K01
NCCL029	35.4378	81.5207	.14	42.	29.62	.00	.46	0.00	4.20	214.	7.38	2000.	1000.	14.47	K01
NCCL030	35.4296	81.4761	.14	41.	38.58	.02	.39	0.00	6.81	197.	7.32	2000.	1000.	16.55	K01
NCCL031	35.4454	81.4608	.12	42.	23.55	.18	.66	.84	6.53	131.	7.47	2000.	1000.	18.57	K01
NCCL032	35.4460	81.5321	.14	44.	14.45	.08	1.25	.24	3.08	227.	8.05	2000.	1000.	11.95	K01
NCCL033	35.4419	81.4915	.24	56.	29.04	.03	.48	.08	6.22	254.	7.18	2000.	1000.	17.32	K01
NCCL034	35.4579	81.4309	.12	41.	26.35	.04	.81	.17	6.83	281.	7.09	2000.	1000.	18.25	K01
NCCL035	35.4736	81.6040	.10	36.	39.56	.20	.35	.89	6.80	211.	7.65	2000.	1000.	18.37	K01
NCCL036	35.4730	81.5677	.12	32.	30.85	.03	.81	.43	5.48	170.	7.05	2000.	1000.	17.17	K01
NCCL037	35.4701	81.5613	.12	32.	28.47	.04	.64	.19	5.77	186.	7.44	2000.	1000.	17.89	K01
NCCL038	35.4666	81.5142	.14	59.	33.58	.12	.74	.71	1.10	293.	7.54	2000.	1000.	17.34	K01
NCCL039	35.4683	81.4915	.14	42.	26.35	.06	2.00	.62	26.1	7.20	2000.	1000.	18.61	K01	
NCCL040	35.4971	81.5833	.10	29.	35.11	.02	1.75	.02	7.01	186.	7.82	2000.	1000.	15.92	K01
NCCL041	35.5018	81.5453	.08	25.	38.58	.07	.79	.29	6.24	111.	7.30	2000.	1000.	17.41	K01
NCCL042	35.4918	81.5014	.08	38.	34.33	.07	.50	0.00	6.39	139.	7.70	2000.	1000.	16.18	K01
NCCL043	35.5247	81.5862	.08	27.	24.44	.04	.94	.53	6.88	177.	7.64	2000.	1000.	17.35	K01
NCCL044	35.5120	81.5572	.04	19.	29.62	.06	.84	.29	6.21	133.	6.61	2000.	1000.	17.21	K01
NCCL045	35.5158	81.5036	.08	25.	45.38	.12	.88	.81	6.52	200.	7.52	2000.	1000.	18.25	K01
NCCL046	35.5346	81.6403	.14	37.	27.92	0.00	1.13	0.00	6.99	172.	7.07	2000.	1000.	17.81	K01
NCCL047	35.5323	81.6168	.10	29.	29.62	.07	1.10	0.00	7.48	142.	7.78	2000.	1000.	16.95	K01
NCCL048	35.5387	81.5427	.08	28.	35.92	.13	.96	.76	6.55	192.	7.60	2000.	1000.	18.01	K01
NCCL049	35.5370	81.5207	.10	28.	16.63	.12	.74	.53	6.68	414.	7.62	2000.	1000.	18.05	K01

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PAGE 2

FIELD MEASUREMENT DATA

SITE CODE	LAT	LONG	ALKA	COND	SO4	NO3	PO4	NH3	PH	EH	O2	FILT	RESIN	TEMP	TEAM
NCCL050	35.5522	81.5655	.10	28.	40.59	.13	.69	.66	5.98	296.	7.40	2000.	1000.	17.88	K01
NCCL051	35.4478	81.6432	.12	31.	28.47	.04	.96	.04	7.25	160.	7.70	2000.	1000.	15.70	K01
NCCL052	35.3751	81.6382	.08	30.	41.68	.06	.69	.08	7.08	159.	7.71	2000.	1000.	16.27	K01
NCCL053	35.1878	81.5078	.58	76.	45.38	.05	.58	0.00	7.82	119.	7.31	2000.	1000.	16.55	K01
NCCL054	35.2359	81.4751	.36	79.	26.35	.02	1.25	.24	7.95	98.	7.93	2000.	1000.	16.49	K01
NCCL055	35.2670	81.4266	.34	51.	15.81	.06	1.17	.15	8.20	65.	7.60	2000.	1000.	17.73	K01
NCCL056	35.2799	81.4316	.34	48.	14.72	.05	2.48	0.00	7.65	82.	8.82	2000.	1000.	16.84	K01
NCCL057	35.2952	81.4295	.36	54.	9.03	.03	.53	.11	7.92	84.	8.32	2000.	1000.	15.34	K01
NCCL058	35.3081	81.4167	.38	55.	26.35	.07	.48	.10	8.13	81.	7.49	2000.	1000.	14.31	K01
NCCL059	35.4853	81.4793	.14	42.	35.11	.13	1.68	.40	5.51	107.	6.49	2000.	1000.	18.22	K01
NCCL060	35.4454	81.4605	.14	44.	44.07	.13	.34	0.00	7.50	132.	6.05	2000.	1000.	16.69	K01
NCCL061	35.4765	81.4615	.20	32.	32.17	.02	.62	.08	6.15	144.	6.91	2000.	1000.	12.93	K01
NCCL062	35.1690	81.3848	.74	342.	61.54	.07	.96	.14	8.60	366.	8.98	2000.	1000.	18.99	K01
NCCL063	35.4329	81.4509	.16	42.	36.77	.10	1.44	0.00	6.80	169.	7.45	2000.	1000.	14.96	K01
NCCL064	35.5123	81.4131	.14	38.	18.95	.01	.19	.38	4.88	110.	5.62	2000.	1000.	18.32	K01
NCCL065	35.5129	81.4081	.14	39.	16.08	.11	.90	0.00	6.97	123.	6.05	2000.	1000.	17.34	K01
NCCL066	35.5141	81.4010	.12	36.	40.59	.03	.79	0.00	7.09	82.	7.55	2000.	1000.	16.21	K01
NCCL067	35.4654	81.3981	.20	24.	6.27	.01	1.68	.02	5.74	125.	8.14	2000.	1000.	11.03	K01
NCCL068	35.4161	81.3704	.26	82.	15.81	.49	1.03	1.14	7.21	60.	6.08	2000.	1000.	16.51	K01
NCCL069	35.4366	81.3298	.26	52.	0.00	.04	.42	.08	6.37	70.	7.48	2000.	1000.	17.18	K01
NCCL070	35.4272	81.3269	.18	56.	11.60	.03	1.68	.16	6.54	67.	5.85	2000.	1000.	18.48	K01
NCCL071	35.3832	81.3269	.28	80.	4.06	.04	2.48	.84	6.99	95.	6.83	2000.	1000.	19.13	K01
NCCL072	35.3903	81.2984	.28	75.	20.37	.16	1.10	.53	6.90	198.	6.57	2000.	1000.	17.79	K01
NCCL073	35.3797	81.2956	.18	49.	0.00	0.00	1.83	.38	5.16	90.	7.22	2000.	1000.	18.55	K01
NCCL074	35.3034	81.3120	.22	57.	29.04	.00	.79	.43	7.27	76.	6.62	2000.	1000.	19.01	K01
NCCL075	35.3181	81.2927	.22	55.	28.47	.00	.13	0.00	7.06	106.	6.68	2000.	1000.	17.41	K01
NCCL076	35.2512	81.2771	.44	192.	19.65	.05	4.49	.15	8.47	61.	7.75	2000.	1000.	18.25	K01
NCCL077	35.2585	81.2699	.74	699.	325.08	.05	.96	1.24	7.20	18.	3.21	2000.	1000.	16.42	K01
NCCL078	35.1960	81.2222	.72	298.	183.84	0.00	.30	.10	7.18	46.	4.70	2000.	1000.	16.37	K01
NCCL079	35.2344	81.2322	.74	342.	214.20	.06	.79	.24	9.95	38.	3.45	2000.	1000.	15.85	K01
NCCL080	35.3076	81.2334	.28	71.	29.62	0.00	2.87	0.00	7.82	127.	7.51	2000.	1000.	16.00	K01
NCCL081	35.4255	81.2578	.18	58.	15.27	.06	.87	.24	7.09	150.	6.28	2000.	1000.	18.19	K01
NCCL082	35.3995	81.2664	.36	46.	23.55	.04	.79	0.00	7.68	126.	0.00	2000.	1000.	8.46	K01
NCCL083	35.4947	81.3048	.28	35.	21.12	.02	.51	.08	6.82	94.	8.45	2000.	1000.	9.40	K01
NCCL084	35.4847	81.2813	.24	44.	12.77	.04	.84	.10	6.18	106.	6.30	2000.	1000.	13.33	K01
NCCL085	35.3269	81.1916	.28	63.	36.77	.03	1.34	0.00	0.04	94.	4.98	2000.	1000.	16.37	K01
NCCL086	35.3981	81.1726	.42	49.	24.44	.02	.64	0.00	7.22	57.	6.91	2000.	1000.	14.87	K01
NCCL087	35.3093	81.1182	.58	83.	48.94	.04	2.34	.08	8.70	92.	8.13	2000.	1000.	12.30	K01
NCCL088	35.3363	81.1339	.50	101.	11.39	.03	1.39	.51	6.69	126.	7.71	2000.	1000.	14.88	K01
NCCL089	35.3674	81.1318	.32	65.	15.27	.00	1.17	0.00	6.64	116.	8.56	2000.	1000.	10.80	K01
NCCL090	35.4736	81.1204	.40	42.	18.95	.02	1.56	.04	7.19	112.	6.28	2000.	1000.	12.24	K01
NCCL091	35.4184	81.0598	.40	38.	16.90	.02	.90	.02	7.28	61.	9.04	2000.	1000.	12.97	K01
NCCL092	35.3697	81.0740	.40	46.	28.47	.03	.44	.08	7.78	106.	8.27	2000.	1000.	11.16	K01
NCCL093	35.3217	81.0321	.40	71.	0.00	.03	.34	.04	6.61	106.	6.30	2000.	1000.	16.66	K01
NCCL094	35.3410	81.0242	.58	71.	18.62	.02	.56	.02	7.52	75.	7.65	2000.	1000.	12.62	K01
NCCL095	35.3856	81.0349	.58	62.	10.68	.04	.90	.04	7.45	98.	8.09	2000.	1000.	11.50	K01
NCCL096	35.4184	81.0278	.54	68.	21.50	.03	.56	.02	7.68	75.	8.07	2000.	1000.	14.35	K01
NCCL097	35.4261	81.0132	.22	39.	15.27	.01	1.34	.04	7.14	126.	7.11	2000.	1000.	11.03	K01
NCCL098	35.5000	81.3397	.12	39.	15.54	.05	.34	0.00	6.24	90.	8.87	2000.	1000.	18.18	K01

TABLE 2. [continued]

RUN TIME 10/22/76 14:22
PAGE 3

FIELD MEASUREMENT DATA

SITE CODE	LAT	LONG	ALKA	COND	SO4	NO3	PO4	NH3	PH	EH	O2	FILT	RESIN	TEMP	TEAM
NCC1099	35.4795	01.2684	.72	263.	21.12	.04	3.94	.87	6.28	87.	6.47	2000.	1000.	12.11	K01
NCC1101	35.3457	01.5876	.54	123.	15.00	.02	1.30	.02	8.39	190.	7.04	2000.	1000.	17.94	K01
NCC1102	35.3524	01.5396	.22	105.	35.92	.06	1.06	0.00	6.15	305.	1.75	2000.	1000.	16.71	K01
NCC1103	35.3327	01.5192	.64	161.	31.50	.03	.42	0.00	7.60	164.	4.25	2000.	1000.	19.64	K01
NCC1104	35.3392	01.4900	.58	129.	38.58	.03	.99	.12	7.45	81.	1.06	2000.	1000.	18.28	K01
NCC1106	35.3416	01.4266	.12	95.	35.11	.10	.69	.08	4.96	305.	5.85	2000.	1000.	17.58	K01
NCC1107	35.3380	01.4117	.02	101.	29.04	.01	.26	0.00	4.84	341.	1.82	2000.	1000.	15.33	K01
NCC1108	35.3468	01.3809	.82	190.	26.35	.13	.96	.15	6.27	256.	5.02	2000.	1000.	14.18	K01
NCC1109	35.3709	01.5748	.10	60.	26.35	.33	.13	.12	5.94	179.	7.32	2000.	1000.	15.85	K01
NCC1110	35.3738	01.5548	.02	62.	35.11	.13	2.00	.40	5.92	224.	7.12	2000.	1000.	17.32	K01
NCC1111	35.3633	01.5192	.34	212.	24.90	.45	.42	.17	5.84	343.	4.06	2000.	1000.	17.58	K01
NCC1112	35.3779	01.4843	.24	74.	23.12	.14	.60	.24	5.40	260.	7.53	2000.	1000.	15.81	K01
NCC1113	35.3650	01.4722	.20	52.	29.62	.13	.74	0.00	5.80	242.	6.50	2000.	1000.	19.09	K01
NCC1114	35.3644	01.4352	.28	67.	22.70	.07	.30	.22	5.81	210.	7.05	2000.	1000.	16.57	K01
NCC1115	35.3762	01.4181	.34	99.	24.44	.07	.80	0.00	6.85	217.	7.17	2000.	1000.	17.80	K01
NCC1116	35.3815	01.5648	.10	75.	36.77	.14	.27	.45	4.95	162.	4.35	2000.	1000.	19.61	K01
NCC1117	35.3856	01.5392	.20	604.	25.55	2.09	.69	0.00	4.27	167.	6.78	2000.	1000.	16.64	K01
NCC1118	35.3920	01.5221	.12	62.	20.37	.25	.24	.02	4.40	201.	5.29	2000.	1000.	16.25	K01
NCC1119	35.3905	01.5295	.48	186.	46.80	.21	1.03	0.00	6.80	156.	4.71	2000.	1000.	15.93	K01
NCC1120	35.3879	01.4843	0.00	673.	4.70	8.25	.42	0.00	4.03	279.	5.30	2000.	1000.	15.26	K01
NCC1121	35.3727	01.4658	.18	104.	26.86	.42	1.25	0.00	5.42	217.	6.98	2000.	1000.	16.90	K01
NCC1122	35.3897	01.4516	.78	117.	33.58	.09	.48	.23	6.35	183.	6.50	2000.	1000.	17.41	K01
NCC1123	35.3721	01.5712	.94	200.	25.37	.38	1.34	0.00	5.60	172.	7.03	2000.	1000.	18.38	K01
NCC1124	35.3979	01.5413	.38	102.	39.56	.09	.42	.33	5.55	192.	6.05	2000.	1000.	16.05	K01
NCC1125	35.4149	01.4979	.06	141.	30.85	.23	1.83	.97	5.50	287.	4.81	2000.	1000.	15.35	K01
NCC1126	35.4120	01.4708	.04	93.	35.11	.72	.60	0.00	6.28	260.	6.92	2000.	1000.	18.46	K01
NCC1127	35.4331	01.5883	.18	47.	26.35	.02	.69	0.00	4.80	290.	3.87	2000.	1000.	16.14	K01
NCC1128	35.4354	01.5356	.56	126.	48.32	.40	.90	.35	6.02	253.	7.46	2000.	1000.	14.98	K01
NCC1129	35.4360	01.5214	.02	144.	11.29	.49	.21	.02	4.06	280.	6.35	2000.	1000.	16.87	K01
NCC1130	35.4302	01.4786	.66	117.	28.62	.02	.62	.02	5.81	244.	2.25	2000.	1000.	15.90	K01
NCC1132	35.4466	01.5335	.06	44.	25.37	.34	.90	.10	4.00	288.	7.14	2000.	1000.	17.33	K01
NCC1133	35.4407	01.4929	.60	122.	23.99	.03	1.68	1.31	6.54	159.	2.72	2000.	1000.	15.70	K01
NCC1134	35.4519	01.4943	.64	294.	15.00	1.65	.79	.04	5.37	287.	6.05	2000.	1000.	15.02	K01
NCC1135	35.4748	01.6026	.62	116.	24.90	.47	.44	.84	6.10	236.	5.90	2000.	1000.	16.92	K01
NCC1136	35.4765	01.5670	.02	42.	29.04	.18	.39	0.00	4.31	312.	7.39	2000.	1000.	15.50	K01
NCC1137	35.4683	01.5577	.62	125.	28.47	.05	.74	.12	5.69	257.	4.74	2000.	1000.	16.11	K01
NCC1138	35.4666	01.5178	.30	160.	41.68	.66	.35	.04	6.07	256.	1.45	2000.	1000.	16.52	K01
NCC1139	35.4823	01.4822	.13	13.	15.27	.15	.29	0.00	5.68	260.	5.23	2000.	1000.	15.22	K01
NCC1140	35.4977	01.5812	.10	36.	15.27	.09	.81	0.00	5.41	264.	5.65	2000.	1000.	17.04	K01
NCC1141	35.5059	01.5356	.52	117.	45.38	.07	1.03	.06	5.15	157.	4.99	2000.	1000.	17.11	K01
NCC1142	35.4918	01.5028	.08	52.	41.68	.95	1.50	0.00	4.77	214.	4.15	2000.	1000.	16.70	K01
NCC1143	35.5235	01.5876	.60	104.	23.23	.25	.66	0.00	6.40	221.	7.14	2000.	1000.	16.32	K01
NCC1144	35.5188	01.5556	.04	18.	42.64	.05	.93	.33	4.19	206.	2.15	2000.	1000.	15.92	K01
NCC1145	35.5123	01.5078	.58	232.	26.86	.36	1.34	.50	6.05	162.	5.71	2000.	1000.	16.71	K01
NCC1146	35.5329	01.6403	.26	54.	34.33	.14	1.68	.36	8.03	228.	6.57	2000.	1000.	18.40	K01
NCC1147	35.5352	01.6239	.16	75.	31.60	.30	1.17	.30	5.15	177.	5.95	2000.	1000.	18.90	K01
NCC1148	35.5376	01.5399	.34	96.	38.58	.39	.90	.78	5.93	247.	5.70	2000.	1000.	17.34	K01
NCC1149	35.5387	01.5207	.18	67.	20.37	.33	.96	.53	5.08	455.	6.20	2000.	1000.	17.56	K01
NCC1150	35.5505	01.5662	.54	113.	33.58	.18	2.00	0.00	6.56	226.	1.85	2000.	1000.	19.27	K01

RUN TIME 10/22/76 14:22
PAGE 4

FIELD MEASUREMENT DATA

SITE CODE	LAT	LONG	ALKA	COND	SO4	NO3	PO4	NH3	PH	EH	O2	FILT	RESIN	TEMP	TEAM
NCC1151	35.4542	01.6300	1.00	199.	28.86	.05	2.00	.04	6.45	237.	5.19	2000.	1000.	15.75	K01
NCC1152	35.3797	01.6225	.18	120.	30.23	.07	1.91	0.00	6.42	203.	1.25	2000.	1000.	15.99	K01
NCC1153	35.1972	01.5100	.14	133.	12.48	.02	2.00	0.00	6.12	78.	7.90	2000.	1000.	17.70	K01
NCC1154	35.2342	01.4765	.24	58.	14.45	.33	1.34	0.00	7.30	78.	6.85	2000.	1000.	17.68	K01
NCC1155	35.2653	01.4195	.62	75.	9.32	.07	1.56	0.00	7.50	94.	4.81	2000.	1000.	17.94	K01
NCC1156	35.2829	01.4318	.56	59.	18.62	.04	.69	.02	6.50	108.	7.88	2000.	1000.	16.92	K01
NCC1157	35.2917	01.4231	.82	111.	15.27	.16	.96	.10	7.08	124.	7.41	2000.	1000.	17.38	K01
NCC1158	35.3058	01.4152	.28	69.	6.27	.23	.64	0.00	7.32	123.	6.99	2000.	1000.	15.72	K01
NCC1159	35.4815	01.2298	.04	78.	48.32	.18	1.03	0.00	4.10	199.	4.77	2000.	1000.	16.42	K01
NCC1161	35.4765	01.4594	.76	105.	9.71	.02	.37	.06	6.90	136.	.38	2000.	1000.	15.69	K01
NCC1164	35.5088	01.4145	.12	138.	40.59	.24	1.44	0.00	4.80	132.	3.31	2000.	1000.	15.25	K01
NCC1165	35.5135	01.4095	.36	149.	23.55	1.51	1.91	0.00	4.65	181.	5.49	2000.	1000.	16.42	K01
NCC1166	35.5141	01.4017	.14	42.	29.62	.18	1.13	.45	5.80	187.	6.48	2000.	1000.	17.17	K01
NCC1167	35.4830	01.4081	.12	57.	4.70	.16	.13	.04	5.26	171.	5.55	2000.	1000.	16.80	K01
NCC1168	35.4167	01.3718	.04	32.	5.79	.15	.84	0.00	5.45	164.	5.95	2000.	1000.	17.56	K01
NCC1169	35.4360	01.3348	.24	48.	10.36	.18	2.21	.19	5.15	100.	7.33	2000.	1000.	16.05	K01
NCC1170	35.4290	01.3276	.12	58.	26.35	.29	1.39	0.00	4.52	127.	5.68	2000.	1000.	18.62	K01
NCC1171	35.3844	01.3283	.26	47.	0.00	.20	4.49	.11	5.29	109.	6.90	2000.	1000.	18.10	K01
NCC1172	35.3862	01.2991	.20	74.	18.08	.95	.81	0.00	4.73	129.	6.95	2000.	1000.	17.60	K01
NCC1173	35.3750	01.2956	.02	15.	0.00	.02	.71	0.00	4.75	152.	6.93	2000.	1000.	15.97	K01
NCC1174	35.3034	01.3120	.40	189.	32.86	.00	.27	0.00	5.90	178.	4.40	2000.	1000.	16.42	K01
NCC1175	35.3193	01.2934	.18	59.	38.77	.12	.90	.56	6.75	155.	3.52	2000.	1000.	20.26	K01
NCC1176	35.2506	01.2792	.52	70.	15.54	.15	1.75	.08	7.62	103.	7.45	2000.	1000.	19.28	K01
NCC1177	35.2547	01.2714	.92	106.	6.27	.00	1.34	0.00	7.15	90.	6.61	2000.	1000.	16.17	K01
NCC1178	35.1937	01.2201	.38	50.	13.81	.07	.69	.09	8.82	122.	8.12	2000.	1000.	18.23	K01
NCC1179	35.2259	01.2329	.84	160.	18.08	.28	.90	.11	8.37	178.	6.12	2000.	1000.	16.24	K01
NCC1180	35.3078	01.2334	.28	297.	18.08	3.30	2.48	0.00	5.80	185.	6.35	2000.	1000.	17.14	K01
NCC1181	35.4278	01.2571	.32	108.	13.33	.35	.96	.22	5.25	93.	7.05	2000.	1000.	17.40	K01
NCC1182	35.3891	01.2671	.22	39.	27.38	.04	1.13	.06	8.72	129.	5.70	2000.	1000.	15.85	K01
NCC1183	35.4895	01.3070	.20	41.	23.12	.05	.34	.05	6.25	122.	6.88	2000.	1000.	17.58	K01
NCC1184	35.4947	01.2785	.34	91.	7.94	.58	.44	0.00	6.20	132.	5.90	2000.	1000.	13.85	K01
NCC1185	35.5275	01.1823	.32	72.	48.32	.12	2.10	.47	5.11	119.	4.90	2000.	1000.	17.60	K01
NCC1186	35.4014	01.1895	.38	48.	5.78	0.00	.87	0.00	3.30	144.	8.02	2000.	1000.	18.60	K01
NCC1187	35.3218	01.1916	.32	44.	21.39	.08	1.34	0.00	6.30	122.	6.12	2000.	1000.	16.30	K01
NCC1188	35.3369	01.1325	.60	118.	9.32	1.55	.24	.10	6.28	158.	4.81	2000.	1000.	15.65	K01
NCC1189	35.3895	01.1339	.38	60.	28.47	.04	.30	0.00	5.95	114.	8.32	2000.	1000.	16.31	K01
NCC1190	35.4736	01.1232	.52	88.	7.14	.02	1.10	.02	6.61	139.	7.55	2000.	1000.	15.15	K01
NCC1191	35.4178	01.0710	.48	147.	8.32	.32	1.58	.04	6.04	166.	8.21	2000.	1000.	16.88	K01
NCC1192	35.3721	01.0770	.92	80.	28.31	.02	.69	.44	5.85	166.	8.21	2000.	1000.	16.88	K01
NCC1193	35.3269	01.0292	.72	180.	3.31	1.60	1.75	0.00	6.83	97.	5.40	2000.	1000.	16.42	K01
NCC1194	35.3398	01.0275	1.22	159.	13.89	.11	1.03	.02	6.82	102.	6.18	2000.	1000.	18.58	K01
NCC1195	35.3508	01.0406	.144	227.	27.92	.08	.86	0.00	6.32	117.	3.78	2000.	1000.	16.00	K01
NCC1196	35.4220	01.0204	.80	121.	6.81	.02	1.68	0.00	6.26	126.	6.26	2000.	1000.	16.30	K01
NCC1197	35.4375	01.3864	0.00	104.	11.79	.22	.26	.07	7.03	152.	4.43	2000.	1000.	15.67	K01
NCC1198	35.5018	01.3705	.08	80.	38.58	.58	1.25	0.00	4.05	174.	6.00	2000.	1000.	16.90	K01
NCC1199	35.4818	01.2682	.30	29.	15.27	.03	.96	.08	6.43	111.	6.93	2000.	1000.	13.81	K01
NCC1200	35.4182	01.1987	.34	112.	3.71	.11	.82	.34	5.85	180.	6.30	2000.	1000.	16.19	K01
NCC1201	35.4360	01.4744	.30	89.	35.92	.06	.21	.25	5.25	184.	3.70	2000.	1000.	16.19	K01
NCC1202	35.4740	01.4598	.14	62.	30.85	.05	.48	0.00	4.85	185.	5.90	2000.	1000.	17.85	K01

TABLE 3. Uranium Content of Stream Sediment and Water Samples from
Kings Mountain, North Carolina, Study Area

SRL Site Code	<i>In Bottom Sediment, ppm</i>			<i>In Water, pptr</i>	Site Code	<i>In Bottom Sediment, ppm</i>			<i>In Water, pptr</i>
	<i>40-100 Mesh</i>	<i>100-200 Mesh</i>	<i>-200 Mesh</i>			<i>40-100 Mesh</i>	<i>100-200 Mesh</i>	<i>-200 Mesh</i>	
NCCL									
001		8.0		5	051		6.0		35
002	1.7	5.1	14.7	25	052		9.8		35
003	4.1	6.3	25.4	5	053		16.0		70
004	2.7	3.2	20.5	20	054		10.0		140
005	2.1	7.1	10.6	25	055		9.3		60
006	2.3	11.0	12.8	100	056		8.4		65
007	3.7	9.9	37.3	860	057		14.0		75
008	12.2	6.5	33.8	200	058		68.0		100
009		25.0		5	059		8.1		5
010		21.0		10	060		31.0		20
011	1.4	2.1	12.0	30	061		34.0		10
012	94	101.0	59.4	25	062		4.5		460
013	12	19.0	15.8	10	063		11.0		15
014		8.1		20	064		11.0		15
015		17.0		15	065		34.0		25
016		21.0		20	066		5.7		10
017		6.0		25	067		156.0		5
018		3.2		25	068		20.0		30
019		17.0		15	069		110.0		15
020		23.0		50	070		6.0		20
021		40.0		110	071		7.6		115
022		4.9		65	072		10.0		85
023		9.4		5	073		5.6		60
024		15.0		15	074		6.4		120
025		41.0		15	075		1.9		6985
026		12.0		70	076		2.1		50
027		5.7		30	077		1.8		2545
028		8.5		20	078		5.3		410
029		8.2		15	079		3.2		660
030		40.0		25	080		3.6		65
031		2.3			081		38.0		75
032		14.0			082		3.8		45
033		57.0		50	083		6.9		15
034		5.7		20	084		21.0		30
035		4.7		20	085		6.1		15
036		4.8		20	086		5.5		25
037		8.1		5	087		4.6		35
038		25.0		15	088		6.3		35
039		14.0		0	089		8.6		15
040		21.0		30	090		5.9		85
041		34.0		15	091		4.3		85
042		32.0		30	092		1.5		40
043		15.0		15	093		3.2		20
044		30.0		15	094		1.8		25
045		16.0		5	095		17.0		20
046		5.2		15	096		4.9		35
047		34.0		45	097		10.0		15
048		43.0		15	098		7.3		20
049		6.3		10	099		4.5		50
050		8.6		15					

TABLE 4. Uranium in Ground Water Samples, Kings Mountain,
North Carolina, Study Area

<i>SRL Site Code</i>	<i>Uranium, pptr</i>	<i>SRL Site Code</i>	<i>Uranium, pptr</i>	<i>SRL Site Code</i>	<i>Uranium, pptr</i>
NCCL 101	30	NCCL 136	15	NCCL 171	3175
102	320	137	10	172	40
103	70	138	35	173	60
104	30	139	35	174	540
106	31,000	140	20	175	80
107	1,600	141	40	176	15
108	390	142	15	177	35
109	10	143	15	178	40
110	15	144	15	179	265
111	20	145	50	180	20
112	135	146	25	181	225
113	85	147	95	182	30
114	65	148	35	183	5
115	50	149	5	184	15
116	35	150	50	185	55
117	55	151	65	186	80
118	35	152	30	187	15
119	325	153	1780	188	15
120	570	154	50	189	20
121	65	155	760	190	20
122	205	156	115	191	125
123	70	157	70	192	30
124	35	158	180	193	15
125	20	159	15	194	110
126	40	161	60	195	145
127	35	164	15	196	20
128	165	165	20	197	30
129	20	166	20	198	30
130	85	167	15	199	10
132	20	168	15	200	20
133	35	169	30	201	15
134	30	170	45	202	15
135	75				

TABLE 5. Emission Spectrographic Analyses^a of -100 +200 Mesh Stream Sediment from the Kings Mountain, North Carolina, Study Area, and of Selected Rock Standards

Sample Number	Element, ppm											Oxide, %							
	Ag ^g	Ba	Be	Co ^h	Cr	Cu	Ni	Pb	Sr	V	Zn	Al ₂ O ₃	CaO	Σ Fe as Fe ₂ O ₃	MgO	MnO	Na ₂ O	P ₂ O ₅	TiO ₂
NCCL																			
1	ND	190	0.2	7	58	33	13	8	10	37	42	4.70	0.068	1.77	0.35	0.0188	ND	ND	0.737
2	ND	210	0.4	ND	56	ND	13	12	13	27	30	3.12	ND	1.52	0.47	0.0104	ND	ND	0.344
3	ND	140	0.2	3	48	ND	14	8	ND	25	26	2.94	0.089	1.25	0.35	0.0092	ND	ND	0.426
4	ND	80	0.2	ND	50	4.4	14	4	ND	26	22	3.00	0.033	1.25	0.32	0.0091	ND	ND	0.388
5	ND	380	0.9	18	53	4.4	13	18	19	42	61	5.91	0.052	2.67	0.46	0.0308	ND	ND	0.736
6	ND	250	1.9	21	97	17	30	18	35	98	87	5.66	0.508	4.44	1.22	0.0883	1.0	ND	2.11
7	ND	230	2.1	26	47	3.8	10	20	21	43	50	5.54	0.261	2.87	0.26	0.103	ND	ND	2.94
8	ND	240	3.2	ND	39	3.8	9	26	31	40	45	6.51	0.348	2.22	0.34	0.0721	0.7	ND	1.76
10	ND	240	0.5	30	68	31	11	10	11	39	55	4.51	0.119	2.18	0.42	0.0239	ND	ND	1.32
11	ND	240	0.2	ND	63	ND	21	8	14	28	48	3.88	0.135	1.55	0.55	0.0089	ND	ND	0.357
12	16	430	1.6	170	87	9.6	13	44	10	58	70	4.07	0.144	4.58	0.32	0.0816	0.4	ND	1.58
15	ND	250	1.3	32	75	11	16	12	18	65	63	6.16	0.314	3.95	0.37	0.118	ND	ND	2.96
16	ND	760	0.6	7	39	7.3	6	20	165	58	56	6.63	0.400	2.75	0.26	0.0549	0.4	ND	1.14
17	ND	220	0.3	14	78	7.6	25	8	7.4	36	37	4.82	0.068	1.98	0.46	0.0084	ND	ND	0.479
19	ND	180	0.5	9	65	3.8	14	8	7.7	27	96	3.51	0.102	1.43	0.43	0.0110	ND	ND	0.458
21	ND	230	0.7	39	62	4.7	9	20	8.4	59	45	5.54	ND	1.76	0.24	0.0218	ND	0.3	1.57
23	ND	210	0.4	5	52	3.6	11	12	12	34	36	4.75	ND	1.69	0.42	0.0147	ND	ND	0.950
24	ND	360	0.6	23	113	10	39	29	18	53	59	6.96	0.204	2.96	0.79	0.0223	ND	ND	0.687
25	ND	180	0.6	19	55	3.8	18	14	ND	28	35	3.14	0.041	1.60	0.32	0.0190	ND	ND	0.756
26	ND	320	0.5	28	61	4.4	6	14	23	53	45	6.93	0.105	1.98	0.34	0.0160	ND	ND	1.36
27	ND	290	0.5	15	67	4.9	25	14	16	42	54	5.96	0.162	2.24	0.70	0.0186	ND	ND	0.716
28	ND	160	0.6	ND	62	4.1	8	14	9.1	30	27	4.18	ND	1.69	0.42	0.0098	ND	ND	0.630
29	ND	190	0.7	ND	51	ND	5	12	14	26	25	5.14	ND	1.23	0.20	0.0050	ND	ND	0.325
30	ND	370	0.8	31	63	9.6	5	26	39	48	47	6.97	0.017	2.74	0.35	0.0285	ND	0.3	1.96
31	ND	180	0.3	ND	38	ND	5	6	12	19	21	3.26	ND	0.939	0.30	0.0046	ND	ND	0.347
32	ND	200	0.4	3	50	ND	2	14	15	24	22	3.58	ND	1.16	0.28	0.0210	ND	ND	0.766
33	17	530	1.8	105	130	9.9	12	46	56	84	68	7.14	0.661	6.46	1.06	0.119	0.7	0.6	4.03
35	ND	250	0.3	21	46	2.6	10	14	19	29	30	3.90	0.089	1.84	0.23	0.0371	ND	ND	1.45
36	ND	260	0.2	4	35	ND	9	14	21	30	29	5.45	0.086	1.32	0.19	0.0110	ND	ND	0.570

TABLE 5 (Continued)

Sample Number	Element, ppm											Oxide, %							
	Ag ^g	Ba	Be	Co ^h	Cr	Cu	Ni	Pb	Sr	V	Zn	Al ₂ O ₃	CaO	Σ Fe as Fe ₂ O ₃	MgO	MnO	Na ₂ O	P ₂ O ₅	TiO ₂
NCCL																			
38	ND	280	0.6	30	75	11	24	18	11	43	57	4.88	0.051	3.05	0.56	0.0391	ND	ND	2.06
39	ND	490	0.6	20	50	3.2	9	22	53	38	46	6.54	0.161	2.14	0.32	0.0329	0.4	ND	1.68
41	ND	370	0.9	22	71	9.0	9	16	22	74	70	9.51	0.044	4.34	0.32	0.0614	0.5	ND	3.22
43	ND	240	0.5	18	68	6.0	13	14	16	46	47	5.90	0.223	2.04	0.67	0.0222	ND	ND	1.14
44	ND	240	0.8	32	77	10	13	14	9.7	67	86	8.30	0.048	4.12	0.20	0.0490	ND	ND	2.74
46	ND	310	0.7	ND	63	4.4	8	20	56	42	43	6.92	0.297	2.30	0.64	0.0272	ND	ND	0.817
47	ND	320	0.4	30	43	3.8	9	20	34	30	34	5.43	0.157	1.40	0.32	0.0277	ND	ND	0.909
48	ND	280	0.7	22	40	3.6	ND	22	34	27	33	5.51	ND	1.29	0.27	0.0136	ND	ND	0.753
49	ND	510	0.7	ND	29	ND	ND	28	63	25	32	8.26	0.058	1.46	0.22	0.0050	ND	ND	0.439
51	ND	400	0.6	17	59	3.8	14	12	62	48	43	6.05	0.627	2.29	0.59	0.0624	0.4	ND	1.58
52	ND	180	0.3	21	45	3.8	11	8	7.4	27	32	3.32	0.083	1.56	0.26	0.0190	ND	ND	0.909
54	ND	250	1.3	21	49	3.8	8	22	19	39	50	5.67	0.300	2.60	0.47	0.0867	0.4	ND	2.03
55	ND	250	5.4	18	53	3.8	10	32	20	46	60	6.69	0.492	3.11	0.66	0.127	0.8	ND	2.40
56	ND	180	3.8	ND	49	ND	11	22	27	13	41	7.01	0.249	3.40	0.40	0.117	0.5	ND	0.177
58	14	220	2.2	69	142	11	21	26	23	53	122	5.33	0.760	12.3	0.71	0.613	0.8	ND	5.20
59	ND	330	0.9	19	54	5.5	11	18	22	68	64	7.99	0.083	2.94	0.56	0.0160	ND	ND	1.30
61	ND	250	0.4	31	47	3.8	9	18	16	27	28	3.32	0.043	1.23	0.34	0.0146	ND	0.2	1.05
64	ND	130	0.6	4	65	4.4	8	8	7.7	44	39	3.83	0.010	2.75	0.47	0.0283	ND	ND	1.81
65	ND	160	0.9	22	79	9.0	8	8	9.1	69	45	3.90	0.078	3.97	0.43	0.0492	ND	ND	2.19
66	ND	270	1.0	8	71	3.8	14	20	15	46	50	5.72	0.144	2.41	0.38	0.0391	ND	ND	1.26
67	15	300	1.0	175	180	9.6	16	32	ND	39	110	2.15	0.188	12.4	0.43	0.183	0.4	0.3	1.70
68	ND	300	2.3	23	59	5.0	9	22	34	45	73	5.01	0.373	3.41	0.32	0.152	ND	ND	2.55
69	38	420	2.6	215	230	28	32	30	19	214	120	2.73	0.516	13.7	0.37	0.303	0.7	0.9	13.1
70	ND	270	1.6	5	91	9.6	13	20	27	75	69	11.1	0.123	3.54	0.60	0.0311	ND	ND	1.17
72	ND	200	5.4	7	78	ND	2	20	24	25	97	6.42	0.249	10.1	0.52	0.449	0.4	ND	0.580
73	12	190	16	31	95	13	11	16	15	91	78	7.57	0.256	8.77	0.73	0.301	0.8	ND	5.77
74	ND	110	8.5	26	140	6.8	19	12	23	11	103	4.28	0.775	16.0	0.71	0.543	0.5	ND	0.131
75	ND	310	9.2	4	41	ND	10	8	39	30	32	5.98	0.543	1.84	0.40	0.0549	0.7	ND	0.838

TABLE 5 (Continued)

Sample Number	Element, ppm											Oxide, %							
	Ag ^g	Ba	Be	Co ^h	Cr	Cu	Ni	Pb	Sr	V	Zn	Al ₂ O ₃	CaO	Σ Fe As Fe ₂ O ₃	MgO	MnO	Na ₂ O	P ₂ O ₅	TiO ₂
NCCL																			
76	ND	110	2.3	15	68	7.3	6	6	33	82	54	4.31	0.628	4.78	0.40	0.0788	ND	ND	1.42
77	ND	90	1.2	14	243	211	ND	2	185	72	17	0.044	0.010	0.462	0.27	0.545	ND	0.3	0.235
79	ND	640	0.6	15	47	3.8	7	12	137	61	49	6.87	0.673	2.89	0.31	0.0358	0.5	ND	0.757
81	13	280	2.8	66	96	10	16	14	19	77	83	4.98	0.512	6.35	0.47	0.181	0.5	0.3	4.90
82	12	220	18.2	43	100	9.6	11	6	20	89	101	6.30	0.884	8.03	0.94	0.346	0.9	ND	6.68
83	ND	300	0.5	18	72	4.7	13	6	22	39	50	4.48	0.394	4.11	0.62	0.0960	ND	ND	1.35
85	ND	1800	0.6	21	43	4.4	7	24	495	56	58	11.3	0.631	2.49	0.50	0.0483	0.5	0.2	1.72
86	ND	1140	1.2	4	37	16	10	30	257	53	70	9.92	0.970	2.71	0.38	0.0325	0.8	ND	0.672
87	ND	1240	2.0	11	48	7.6	13	28	303	73	63	8.30	0.897	3.38	0.59	0.0790	0.8	ND	1.50
88	ND	780	0.6	12	52	4.9	15	44	261	75	55	6.80	1.07	3.59	0.47	0.104	1.0	ND	1.21
89	ND	760	0.6	7	39	7.3	6	20	166	58	56	6.63	0.400	2.75	0.26	0.0549	0.4	ND	1.14
90	ND	390	2.1	32	117	11	25	4	107	77	146	7.64	1.70	6.26	0.88	0.174	0.6	ND	2.37
91	ND	570	0.8	ND	45	4.7	5	10	174	49	47	7.13	0.958	2.70	0.50	0.0688	0.9	ND	1.18
92	ND	270	0.5	19	55	7.9	8	4	180	77	52	6.17	1.67	4.53	0.43	0.146	1.1	ND	1.49
93 ^f	16	240	1.7	105	557	37	65	1	91	1040	133	4.48	1.48	41.2	0.77	0.358	0.6	0.3	6.16
94	ND	210	0.9	22	130	13	21	1	250	40	76	81.1	2.65	10.8	1.71	0.168	1.5	ND	0.446
95	ND	820	1.0	19	88	6.6	8	14	455	144	55	6.64	2.32	7.61	0.77	0.160	0.7	ND	1.97
96	ND	1440	0.9	18	65	4.9	16	18	532	69	54	8.50	1.96	2.89	0.79	0.0651	0.8	ND	0.917
97	ND	220	0.5	33	73	4.4	13	14	11	60	39	4.23	0.132	2.85	0.26	0.0350	ND	ND	1.76
98	ND	160	0.5	7	56	ND	1	10	9.6	42	38	3.84	ND	2.34	0.26	0.0353	ND	ND	2.07
99	ND	390	2.8	23	93	10	17	16	66	82	76	6.38	1.19	4.24	0.85	0.0938	0.7	ND	2.24

TABLE 5 (continued)

	Element, ppm											Oxide, %								
Standard	Ag	Ba	Be	Co	Cr	Cu	Ni	Pb	Sr	V	Zn	Al ₂ O ₃	CaO	Σ Fe as Fe ₂ O ₃	MgO	MnO	Na ₂ O	P ₂ O ₅	TiO ₂	
SRL-2, n ^b = 10																				
$\bar{x}$ =	ND	36	0.3	6.0	6.96	25.4	2.2	18	0.44	26.7	21.57	1.48	0.0067	0.804	0.037	0.00989	ND	ND	1.28	
S =		5.16	0.18	5.91	0.42	3.81	2.35	3.53	0.44	2.16	1.65	0.10	0.0073	0.031	0.0095	0.0014			0.17	
V(%) =		14	60	99 ^d	6.03	15	107 ^d	20	100 ^d	8.1	7.65	6.8	110 ^d	3.9	26	14			13	
G-2, n = 2																				
Obtained, $\bar{x}$	ND	1755	1.8	2.5	5.6	6.9	3.5	31	427	35	94	13.95	1.75	2.42	0.87	0.022	4.05	ND	0.49	
Literature Value ^c	0.049	1870	2.6	5.5	7	11.7	5.1	31.2	479	35.4	85	15.40	1.94	2.65	0.76	0.034	4.07	0.14	0.50	
AGV-1, n = 2																				
Obtained, $\bar{x}$	ND	1085	2.0	23	10.8	55	19	33	579	114	110	16.15	4.72	6.49	1.78	0.08	4.3	0.5	1.11	
Literature Value ^c	0.11	1208	3	14	12.2	59.7	18.5	35.1	657	125	84	17.25	4.90	6.76	1.53	0.097	4.26	0.49	1.04	
GSP-1, n = 1																				
Obtained, $\bar{x}$	ND	1340	2.5	25	9.8	28	17	50	211	55	140	13.1	1.97	4.09	1.04	0.03	2.7	0.4	0.71	
Literature Value ^c	0.10	1300	1.5	6.4	12.5	33.3	12.5	51.3	233	52.9	98	15.25	2.02	4.33	0.96	0.042	2.80	0.28	0.66	
SY-2, n = 3																				
Obtained, $\bar{x}$	ND	477	20	55	12	ND	20	83	253	52	278	11.43	8.1	6.0	3.19	0.30	4.37	0.5	0.11	
Literature Value ^e	<0.05	460	25	11	12	7	11	83	270	46	250	12.15	8.03	6.32	2.66	0.32	4.37	0.44	0.15	
BCR-1, n = 1																				
Obtained, $\bar{x}$	ND	650	2.0	54	18.8	14.5	20	8	305	367	154	13.2	6.9	14	4.01	0.17	3.4	0.4	2.5	
Literature Value ^c	0.04	675	1.7	38	17.6	18.4	15.8	17.6	330	399	120	13.61	6.92	13.40	3.46	0.18	3.27	0.36	2.20	

a. With inductively coupled ion plasma torch source.

b. n = number of replicates; $\bar{x}$ = average; S = standard deviation; V = coefficient of variation expressed as a percentage.

c. F. J. Flannagan. "1972 Values for International Geochemical Reference Standards." *Geochim. et Cosmochim. Acta*, 37, 1189-1200 (1973).

d. Near detection limits for Ni, Co, Sr, CaO.

e. S. Abbey. *Studies of "Standard" Samples of Silicate Rocks and Minerals. Part 4: 1974 Edition of "Usable" Values.* Paper 74-41. Geol. Survey of Canada, Ottawa (1974).

f. 90 ppm Cd reported for sample NCCL 093.

g. Silver values probably result from Zr spectral interference.

h. Spectral interference suspected in high Co values.

TABLE 6. Lithium Concentrations by Atomic Absorption in -100 +200 Mesh Stream Sediment from the Kings Mountain, North Carolina, Study Area (A) and Selected Rock Standards (B)

A. Specimen Analyses

Sample Number	Lithium, ppm	Sample Number	Lithium, ppm	Sample Number	Lithium, ppm
NCCL					
1	9	33	21	70	27
2	13	35	6	72	58
3	12	36	10	73	97
4	11	38	17	74	61
5	21	39	18	75	48
6	49	41	16	76	25
7	18	43	7	77	30
8	35	44	14	79	24
10	10	46	25	81	22
11	16	47	14	82	81
12	10	48	10	83	7
15	33	49	17	85	9
16	13	51	9	86	32
17	18	52	8	87	27
19	14	54	24	88	6
21	12	55	5	89	8
23	11	56	22	90	6
24	30	58	24	91	12
25	12	59	22	92	3
26	12	61	10	93	8
27	28	64	11	94	6
28	20	65	12	95	7
29	16	66	17	96	7
30	14	67	7	97	7
31	12	68	23	98	7
32	12	69	9	99	31

B. Standard Analyses

Sample Number	Lithium	Sample Number	Lithium
SRL-2 n = 10 ^a			
$\bar{X}$ =	4.9 ppm	GSP-1, n = 1	
S =	0.69	Literature Value ^b	32.1
V(%) =	14	Obtained, $\bar{X}$	34
G-2, n = 2		SY-2, n = 3	
Literature Value ^b	34.8	Literature Value ^c	86
Obtained, $\bar{X}$	40	Obtained, $\bar{X}$	60
AGV-1, n = 2		BCR-1, n = 1	
Literature Value ^b	12	Literature Value ^b	12.8
Obtained, $\bar{X}$	16.5	Obtained, $\bar{X}$	20

a. n = number of replicates; $\bar{X}$ = average; S = standard deviation; V = coefficient of variance, expressed as a percentage.

b. F. J. Flannagan. "1972 Values for International Geochemical Reference Standards." *Geochim. Cosmochim. Acta*, 37, 1189-1200 (1973).

c. S. Abbey. *Studies of "Standard" Samples of Silicate Rocks and Minerals. Part 4: 1974 Edition of "Usable" Values.* Paper 74-41. Geol. Survey of Canada, Ottawa (1974).

TABLE 7. Estimates of Concentration for Selected Trace Metals in -100 to +200 Mesh Stream Sediment from the Kings Mountain, North Carolina, Study Area

Site Code	Elemental Concentrations ^a						Site Code	Elemental Concentrations ^a						Site Code	Elemental Concentrations ^a					
	As	Au	Se	Sn	Te	W		As	Au	Se	Sn	Te	W		As	Au	Se	Sn	Te	W
1	260	5	50	65	200	928	33	340	26	ND	160	1000	170	70	510	11	130	80	500	230
2	160	3	48	37	ND	170	35	260	9	ND	69	ND	1150	72	340	39	150	80	1600	190
3	170	3	60	96	100	510	36	260	6	70	48	ND	280	73	460	39	160	175	1600	1160
4	170	4	120	40	100	150	38	200	12	60	85	100	1520	74	320	57	150	195	1000	160
5	270	9	70	65	100	540	39	450	5	70	81	200	1040	75	360	9	60	73	100	200
6	580	15	150	141	700	550	41	500	15	150	121	500	1110	76	280	16	100	85	600	470
7	360	19	100	125	200	1240	43	370	8	70	73	200	710	77	7020	ND	510	927	15,000	150
8	470	10	120	89	300	500	44	80	13	ND	121	600	430	79	300	12	110	85	200	330
10	280	21	150	81	200	1140	46	340	5	130	76	400	400	81	360	31	140	185	800	3660
11	220	4	ND	48	100	150	47	200	8	90	73	100	1930	82	470	44	70	246	1500	1880
12	270	21	130	81	700	6650	48	200	ND	ND	38	ND	1540	83	260	15	170	77	700	500
15	300	20	100	125	500	1430	49	360	ND	ND	38	ND	800	85	580	12	100	125	500	570
16	710	6	300	42	500	6300	51	170	12	120	81	300	710	86	810	11	260	121	300	240
17	220	5	60	40	200	330	52	180	9	ND	40	ND	630	87	540	14	160	117	600	340
19	170	4	48	36	ND	300	54	350	?	60	?	ND	840	88	470	16	160	121	300	470
21	200	11	140	88	500	6750	55	450	16	150	121	300	770	89	370	18	90	91	200	440
23	200	4	90	44	ND	470	56	340	12	-	42	500	150	90	520	30	160	161	900	930
24	420	10	150	73	300	690	58	450	64	160	202	1000	3010	91	360	14	100	84	500	260
25	170	10	ND	40	600	780	59	460	10	120	85	100	710	92	400	27	140	125	200	470
26	360	10	100	81	ND	1240	61	190	9	ND	38	200	1750	93	540	129	330	391	7000	1470
27	350	10	68	44	ND	360	64	190	7	ND	46	600	740	94	510	31	160	130	1600	220
28	170	ND	ND	30	ND	360	65	30	12	ND	84	600	1410	95	460	25	130	145	1600	740
29	190	3	ND	ND	ND	410	66	270	12	120	77	200	460	96	550	20	200	125	600	450
30	350	12	50	80	500	2070	67	200	44	130	121	3100	7130	97	250	13	60	77	500	1630
31	120	ND	ND	15	ND	120	68	860	18	120	99	600	1140	98	170	12	ND	46	500	700
32	140	3	ND	30	ND	100	69	460	67	280	444	2300	11,300	99	360	19	180	135	500	730

ND = not detectable.

a. No units are given to emphasize the questionable quality of the data; units are approximately ppm x 100 (see text for discussion of data quality). Missing samples that were not analyzed are Numbers 9, 13, 14, 18, 20, 22, 34, 37, 40, 42, 45, 50, 53, 57, 60, 62, 63, 71, 78, 80, and 84.

TABLE 8. Thorium Concentrations by Neutron Activation Analysis in -100 to +200 Mesh Stream Sediment from the Kings Mountain, North Carolina, Study Area

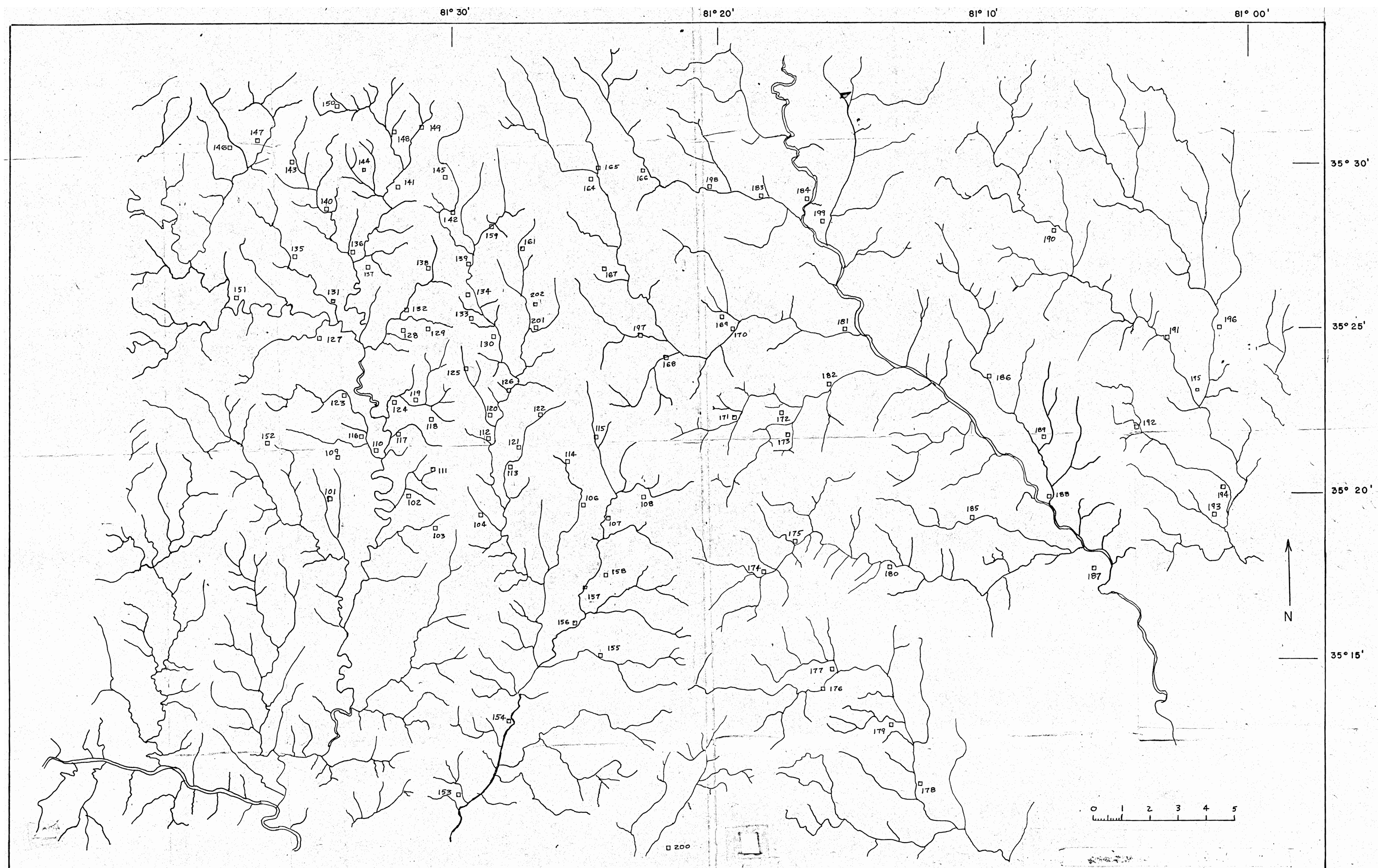
<i>Site Code</i>	<i>Thorium ppm</i>	<i>Site Code</i>	<i>Thorium ppm</i>	<i>Site Code</i>	<i>Thorium ppm</i>
NCCL		NCCL		NCCL	
001	38	034	28	069	957
002	31	035	33	070	25
003	64	036	17	071	20
004	14	037	61	072	24
005	64	038	298	073	14
006	21	039	111	074	18
007	42	040	128	075	11
008	8	041	256	076	<4
009	142	042	231	077	4
010	155	043	64	078	24
011	22	044	127	079	7
012	1250	045	125	080	7
013	280	046	35	081	242
014	48	047	180	082	<50
015	124	048	346	083	41
016	114	049	43	084	104
017	37	050	41	085	19
018	25	051	39	086	29
019	126	052	50	087	16
020	242	053	50	088	19
021	530	054	33	089	30
022	34	055	28	090	27
023	71	056	27	091	13
024	92	057	51	092	<4
025	377	058	374	093	22
026	101	059	66	094	<5
027	27	061	347	095	86
029	56	064	106	096	17
030	434	065	184	097	78
031	11	066	27	098	46
032	100	067	1276	099	16
033	369	068	182		

TABLE 9. Resampled Ground Water Sites

<i>Sample Code^a</i>	<i>Uranium Conc., pptr</i>	<i>pH</i>	<i>Specific Cond., μmhos</i>
NCCL 106	182,610	7.2	115
	186,950		
	191,300		
	182,610		
	186,960		
NCCL 108	180	6.9	220
	150		
	220		
	210		
NCCL 153	1,490	7.4	135
	1,410		
	1,400		
	1,490		
NCCL 171	2,700	7.6	55
	2,900		
	2,910		
	2,830		
	2,720		

^a. These sites (originally sampled during October 1975) were resampled in replicate on 9/7/76 through 9/9/76. Multiple samples were taken and analyzed. The values reported above are not reflected in computer tables, on symbol plots, or on cumulative frequency curves.

- Map 1. Surface Water Sampling Sites for the Kings Mountain,
North Carolina, Study Area (Cleveland, Gaston, and
Lincoln Counties)
- Map 2. Ground Water Sampling Sites for the Kings Mountain,
North Carolina, Study Area (Cleveland, Gaston, and
Lincoln Counties)



KINGS MOUNTAIN STUDY AREA (Cleveland, Gaston and Lincoln Counties, N.C.)
GROUND WATER SAMPLING SITES
Map 2

