

Geology
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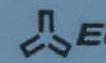
GJBX-103 '81

National Uranium Resource Evaluation

AERIAL GAMMA RAY AND MAGNETIC SURVEY
WAYCROSS AND BRUNSWICK QUADRANGLES
GEORGIA

FINAL REPORT

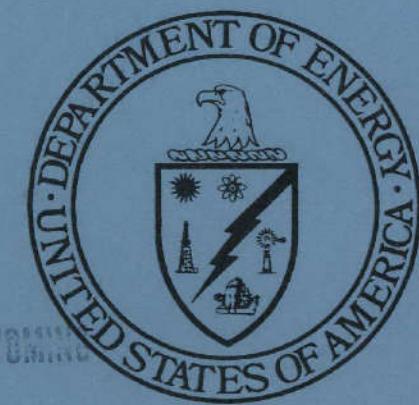
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 EG&G GEOMETRICS
Sunnyvale, California 94086

March 1981

GEOLOGY

GEOPHYSICAL SURVEY OF WYOMING



PREPARED FOR U.S. DEPARTMENT OF ENERGY

Grand Junction Office, Colorado

metadc1202330

This report is a result of work performed by EG&G geoMetrics through a Bendix Field Engineering Corporation Subcontract, as part of the National Uranium Resource Evaluation. NURE is a program of the U.S. Department of Energy's Grand Junction, Colorado, Office to acquire and compile geologic and other information with which to assess the magnitude and distribution of uranium resources and to determine areas favorable for the occurrence of uranium in the United States.

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WAYCROSS AND BRUNSWICK QUADRANGLES
GEORGIA

FINAL REPORT

Prepared by
EG&G geoMetrics
Sunnyvale, California

March 1981

Prepared for the U.S. Department of Energy
Grand Junction Office, Colorado
Under Contract No. DE-AC13-76GJ01664
and Bendix Field Engineering Corporation
Subcontract No. 80-426-L

ABSTRACT

The Waycross and Brunswick quadrangles cover approximately 11,000 square miles of land in southeast Georgia. The area overlies moderately thick sections of the Southeast Georgia Basin. Surficial exposures are entirely Tertiary to Recent deposits.

A search of available literature revealed no known significant uranium deposits.

A total of fifty-eight (58) uranium anomalies were detected and are discussed briefly in this report. None were considered significant and all appear to be related to cultural features.

Magnetic data poorly reflects existing structural interpretation. Numerous linear and isolated high gradient features dominate the area, and appear to express complexities in the Paleozoic and older basement material.

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INTRODUCTION

General

The Waycross and Brunswick quadrangles contain approximately 11,000 square miles of land area in southeastern Georgia (see Figure 1).

The geologic maps used in the interpretation were compiled by Martel Laboratories, Inc., in 1980. Both maps were compiled at a scale of 1:250,000 from a state geologic map of 1:500,000. Outlined units on the two maps do not register exactly (up to .5 km) along the common border, as well as inaccuracy due to approximate geologic contacts. This casts some doubt on the accuracy of the digitized units used in the interpretation. Geologic map unit descriptions, found in Appendix C, were taken directly from the Martel map legends. Supplementary geologic information was taken from Murray (1961), Fairbridge (ed.) 1975, Flint (1971), Florida Special Publication, No. 5, and Cohee and others (1962). Cultural and physiographic data were taken from the 1:250,000 scale Waycross (1966 version) and Brunswick (1968 version) topographic maps.

Radiometric and magnetic data for both Waycross and Brunswick quadrangles were acquired in January of 1981, and processed in March. A detailed summary of data acquisition, processing, interpretation, and presentation methods can be found in Appendix A of this report. Appendix B contains a flight summary report for the two quadrangles. It should be noted that although Appendixes C, D, E and H are presented as separate quadrangles, the interpretation reports, statistics, data tapes and microfiche are processed and presented as one area.

Physiography

The area defined by the two map sheets lies within the eastern plains of the Atlantic Coastal Physiographic Province. The gently-seaward dipping topography is dominated by agriculture and poorly forested land ("sand barren"). Barrier beaches with interior marshes and swamps are prominent along the coastal region. The region is largely drained by several rivers and bayous that flow southeastward directly into the Atlantic Ocean, with the exception of the western third of the region which essentially drains southward. The largest river in the region is the Altamaha River, which flows from the northcentral border (where the Ocmulgee and Oconee Rivers merge and form the Altamaha River) to the Atlantic Ocean. The Ocmulgee River controls drainage in most of the northwestern border area until it merges with the Oconee River, where it enters into the Altamaha River watershed to the east. West and south of the Ocmulgee and Altamaha Rivers is a series of smaller rivers draining the remaining 70 percent of the area. These include: Satilla, Alapaha, and Little River Rivers (from east to west respectively), noting that the inter-river regions are typified by slightly elevated terraces and rugged uplands.

The topography varies from flat to gently sloping in the coastal plains, to rough, irregular uplands in the west. Elevations range from sea level, to over 500 feet in the northwestern quadrant. Much

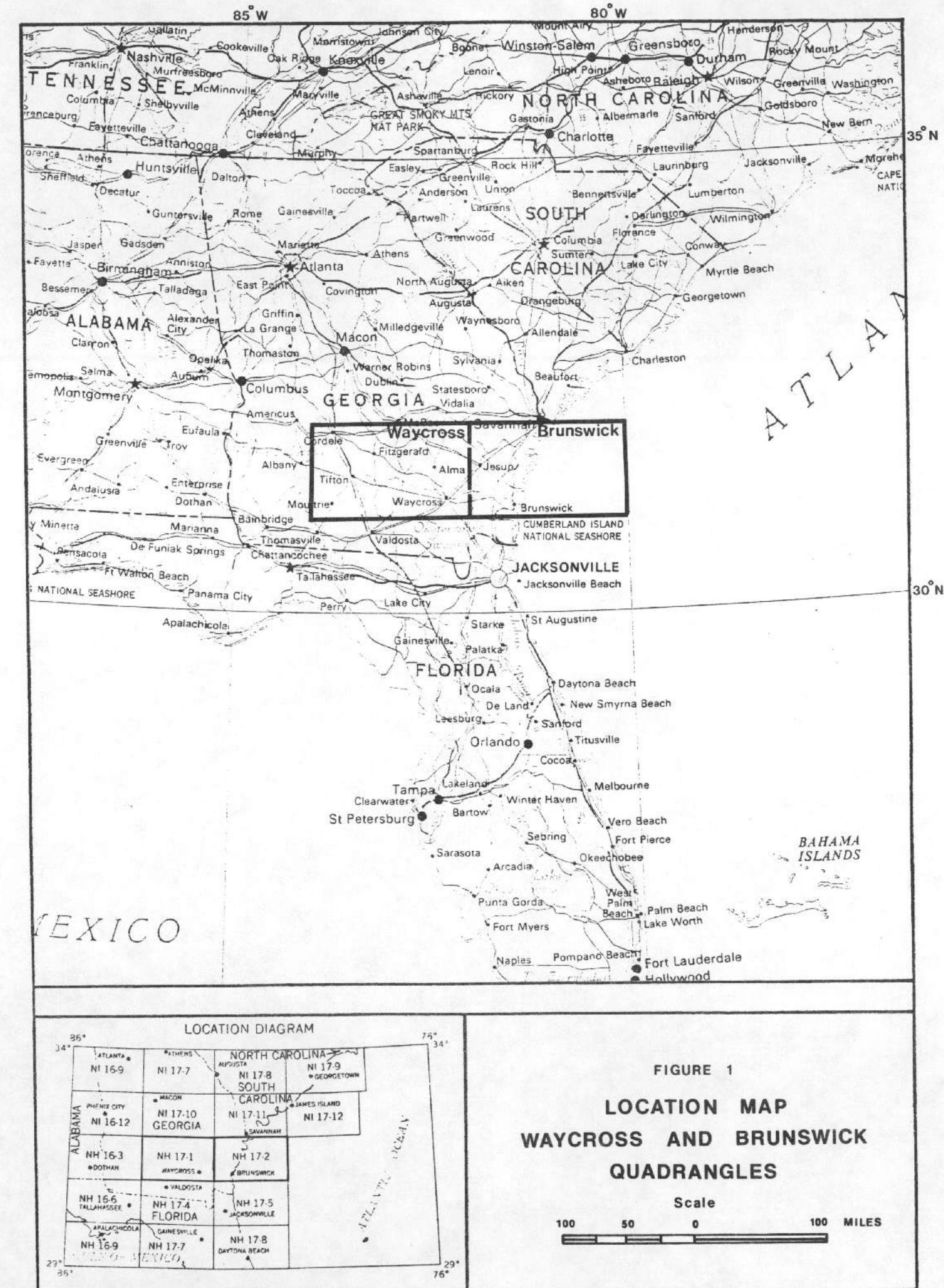


FIGURE 1
LOCATION MAP
WAYCROSS AND BRUNSWICK
QUADRANGLES

of the coastal plain lies below 50 feet, with the exception of a large barrier island deposit located in the southern portion of the coast. The area is moderately developed culturally. The largest cities are Waycross and Brunswick, both with populations exceeding 17,000. Fort Stewart overlies the northern half of the coastal area. The entire region is dotted with smaller cities and towns, and contains an extensive network of roads and railroads with numerous interstate highways extending across the quadrangle.

GEOLOGY

Structure

The region lies over the Southeast Georgia Embayment between the Pensular Arch to the southwest and the Appalachian Foldbelt to the northwest (see Figure 2). The structural picture of the region during Lower Cretaceous to Recent times defers markedly from the underlying older sequence, as shown by test well data. These Cretaceous and younger aged deposits appear to rest with angular unconformity, and onlap, on the Paleozoic and older basement material of the Appalachian and Ouachita foldbelts. The Cretaceous and younger age deposits range in thickness from 1500 feet in the northwest corner to over 4500 feet along the eastern coastline, with thicker sediments lying offshore.

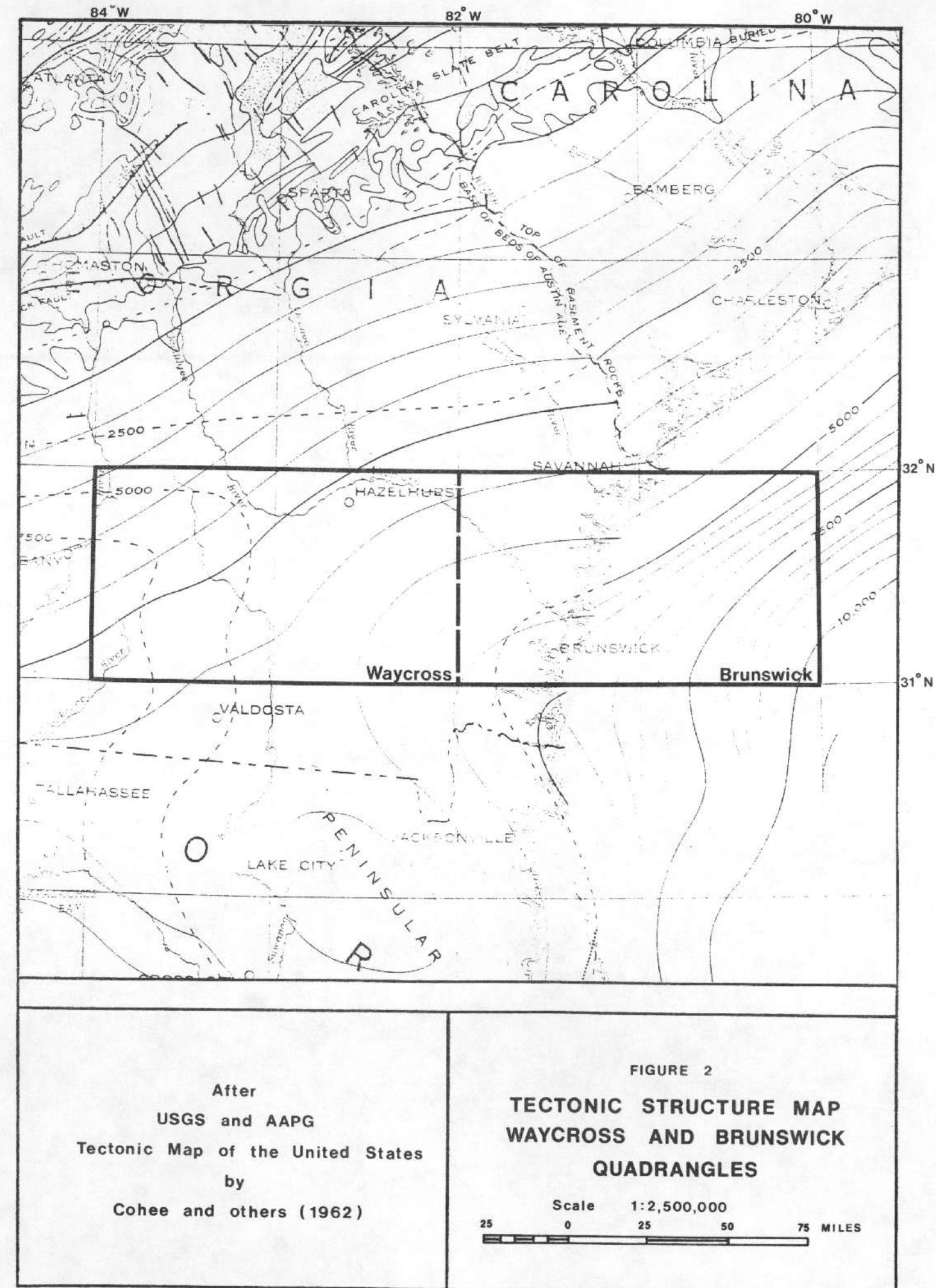
There are no known faults in surficial or Paleozoic deposits according to Martel Laboratories and Cohee and others (1962).

Surface Geology

As mapped by Martel Laboratories, Cenozoic sedimentary material covers the entire surface of the region, with Tertiary exposures accounting for 40 percent of the area and Quaternary exposures covering 30 percent.

Part of the Quaternary system consists of alluvial, loess, and eolian sand deposits, all of Holocene age. These deposits account for 5 percent of the surface. Alluvium is mapped only within the floodplains of the major river systems within the eastern two-thirds of the area. Pleistocene deposits consist of barrier island and marsh deposits and account for 15 percent of the surface. These Pleistocene sediments are alluvial deposits from interglacial periods ranging from early Sangamon to late Peorian stages. Pleistocene-Pliocene sands and gravels, undifferentiated, account for approximately 30 percent of the surface and was mapped within the low lying coastal plains in the eastern two-thirds of the area.

Tertiary deposits consists of Eocene to Miocene sands, clays, marls, and limestones. The Miocene Hawthorne Formation (southwest quadrant exclusively) contains minor to trace amounts of phosphate particles. This formation accounts for 15 percent of the total surface. The remaining 25 percent was mapped as undifferentiated Pliocene and Miocene sedimentary rocks. These sedimentary rocks dominate the northwestern quadrant.



Tertiary age materials were deposited in a series of alternating marine submergence and emergence. Eocene Ocala limestone is a major aquifer in the region. The environment ranges from shallow marine platform to low energy nearshore environments with intermittent emergence. The Hawthorne Formation was probably exposed during late Miocene time, forming karst topography and accumulations of phosphatic residuum, (Altschuler and others, 1960).

Uranium

According to available sources, there are no known significant uranium deposits, though phosphoritic sediments contain concentrations of uranium that are known to be higher than the adjacent rock units (Altschuler and others, 1960 and Cathcart, 1955).

INTERPRETATION OF GEOPHYSICAL DATA

Radiometric Data

A total of 58 groups of uranium (Bi^{214}) samples meet the minimum statistical requirements set forth in the data interpretation section of Appendix A. These are displayed, along with all other anomalous samples and pertinent data, on Figure 3 and 3a. The anomalies are summarized in a table in Appendix G. The potassium, uranium, thorium, and ratio pseudo-contour maps, which reflect radiometric responses for each quadrangle, are found in Appendix H. Discussion of the abundances of potassium, uranium, and thorium are in terms of apparent equivalent percent and apparent equivalent ppm. These equivalent units are derived from scaling of counts per second by the sensitivities calculated for the detection system and as such cannot be taken as directly determined geochemical values.

Concentrations of the three radioactive elements are extremely low. The overall average uranium concentration is 1.6 ppmeU. The average potassium and thorium concentrations are .2 percent and 4.0 ppmeT respectively. Map unit QAL (Recent alluvium) contains both the peak and highest average uranium concentrations at 4.65 ppmeU and 1.93 ppmeU respectively. Map units QTPAM (Quaternary Pamlico terrace marsh deposit) and TPMU (Pliocene and Miocene sedimentary rocks, undifferentiated) have only slightly less concentrations (~~averagely < 2 ppmeU~~).

Thorium concentrations reach a peak of 16.4 ppmeT in map unit QTPRAM (Quaternary Princess Anne terrace marsh deposits), and also map unit QTPAM contains the highest average thorium concentration at 6.0 ppmeT. Peak concentrations of potassium occurs in map unit QTPPS (Pleistocene - Pliocene sands and gravels, undifferentiated) at 1.54 percent, while map unit QAL contains the highest average concentration of 0.28 percent.

In general, highest concentrations of potassium, thorium, and uranium are confined along the northern border and most of the Brunswick quadrangle (see Appendix H). The remainder of the area contains somewhat uniform concentrations of the three elements and values generally less than the area-wide average concentrations. The higher concentrations along the northern border are mainly due to alluvium, with minor contributions by the adjacent map unit TPMU. The higher concentrations within the alluvium appears to contain source material from outside the area (probably Appalachians). In the Brunswick quadrangle all three elements moderately vary in concentrations over short lateral distances. The large variations in concentrations are partially due to marshes and other water bodies which cloud the distinction of the different terrace deposits (on the pseudo-contour map). The higher concentrations are mainly due to alluvium, and a couple of Pleistocene terrace deposits. In general the Pamlico and Princess Anne terrace deposits contain higher concentrations of all three radioactive elements and only slightly higher than the alluvium deposits.

Anomalies are scattered throughout the area, but tend to cluster in the northern border of the Waycross quadrangle and the south-central portion of the same quadrangle. Over half the anomalies are attributed to alluvium and map unit TPMU. Map units QTPPS is the next dominant unit, and is found mainly in the central portion of the Waycross quadrangle. Peak concentrations in these anomalies range from 1.8 to 4.6 ppmeU, with all anomalies above 3.8 ppmeU being attributed to alluvium. All of the anomalies appear to be associated with cultural features of some sort (such as roads, railroads, cities, etc.).

The low uranium concentrations, coupled with the correlation to culture, suggest that none of the anomalies depicted in this report should be considered as reflecting possible uranium concentrations.

Magnetic Data

The magnetic field pseudo-contour maps appear in Appendix H.

The region contains a thickening sequence of Mesozoic and Cenozoic deposits from west to east. Though the structural configuration of the underlying Paleozoic strata is not well known, it is thought to be of substantial thickness.

The magnetic field poorly represents the structural interpretation of the area. The northern border and most of the Atlantic coast show very low gradients, with lower gradients trending towards the north and the east. This partially substantiates a thickening of the non-magnetic platform deposits. The rest of the area contains some very high gradient, isolated and linear features. These features cannot be correlated with present structural information and may be attributed to lithologic and/or structural complexities in the underlying Paleozoic and older basement material.

URANIUM ANOMALY/
INTERPRETATION MAP

WAYCROSS QUADRANGLE

U.S. DEPARTMENT OF ENERGY

APPROXIMATE SCALE 1:500,000

EXPLANATION

□ - CITY OR TOWN
○ - URANIUM SAMPLE MEETING FOLLOWING CRITERIA:
(1) $1.0 \leq U \leq \infty$
(2) $-1.0 \leq T \leq \infty$
(3) $1.0 \leq U/T \leq \infty$
IN STANDARD DEVIATION UNITS.
EACH SQUARE REPRESENTS 1 STANDARD DEVIATION.

■ - URANIUM ANOMALY:
A SINGLE SAMPLE OF 2 OR MORE STANDARD DEVIATIONS, OR GROUPS OF ADJACENT SAMPLES WHICH HAVE A TOTAL 4 OR MORE STANDARD DEVIATIONS, $4.0 \leq \text{sum } S \leq \infty$, WITH AT LEAST ONE SAMPLE OF 2 OR MORE STANDARD DEVIATIONS.

SURVEY AND
COMPILED BY:

EGG GEOMETRICS

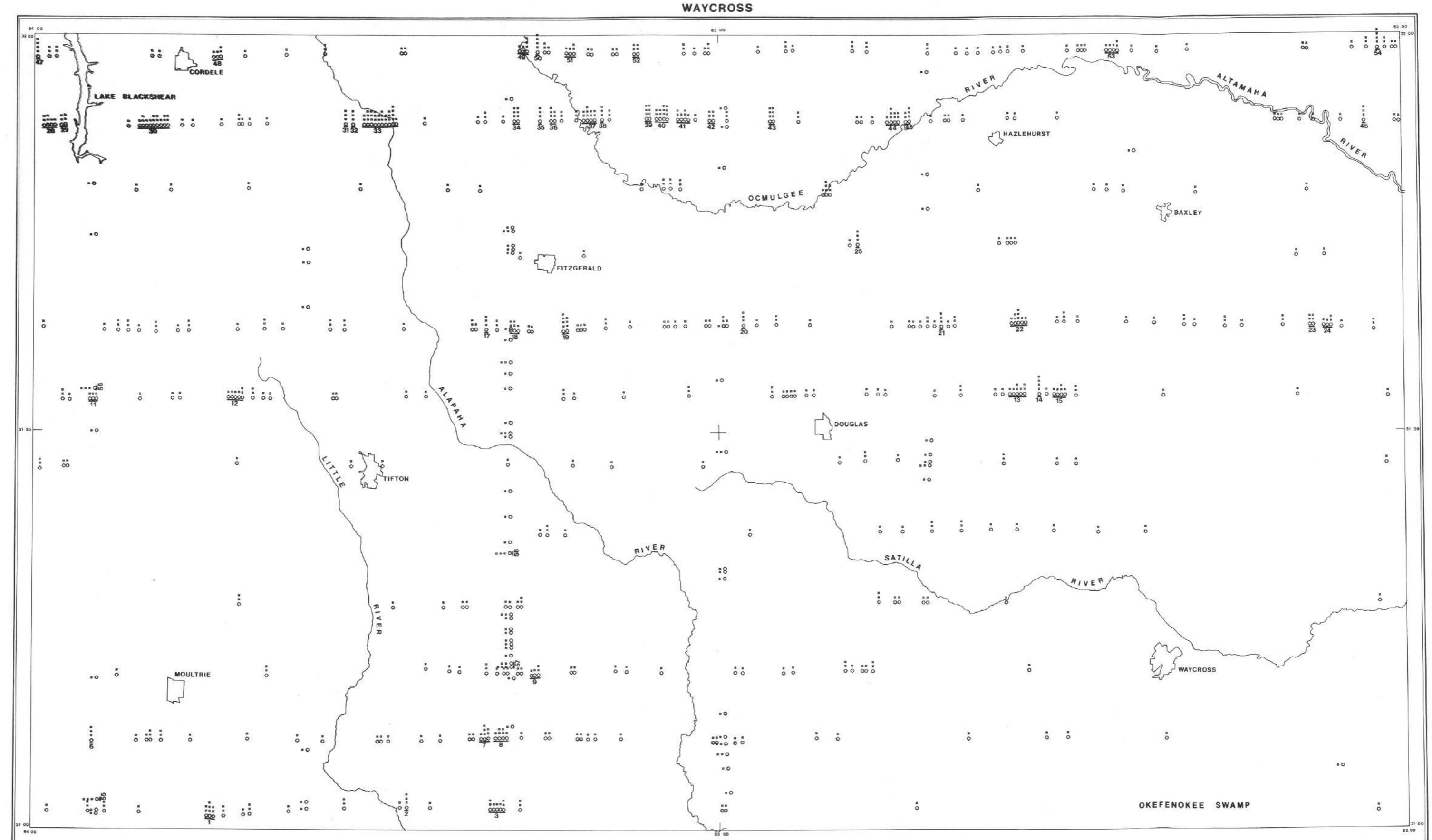


Figure 3 - Uranium Anomaly/Interpretation Map - Waycross Quadrangle

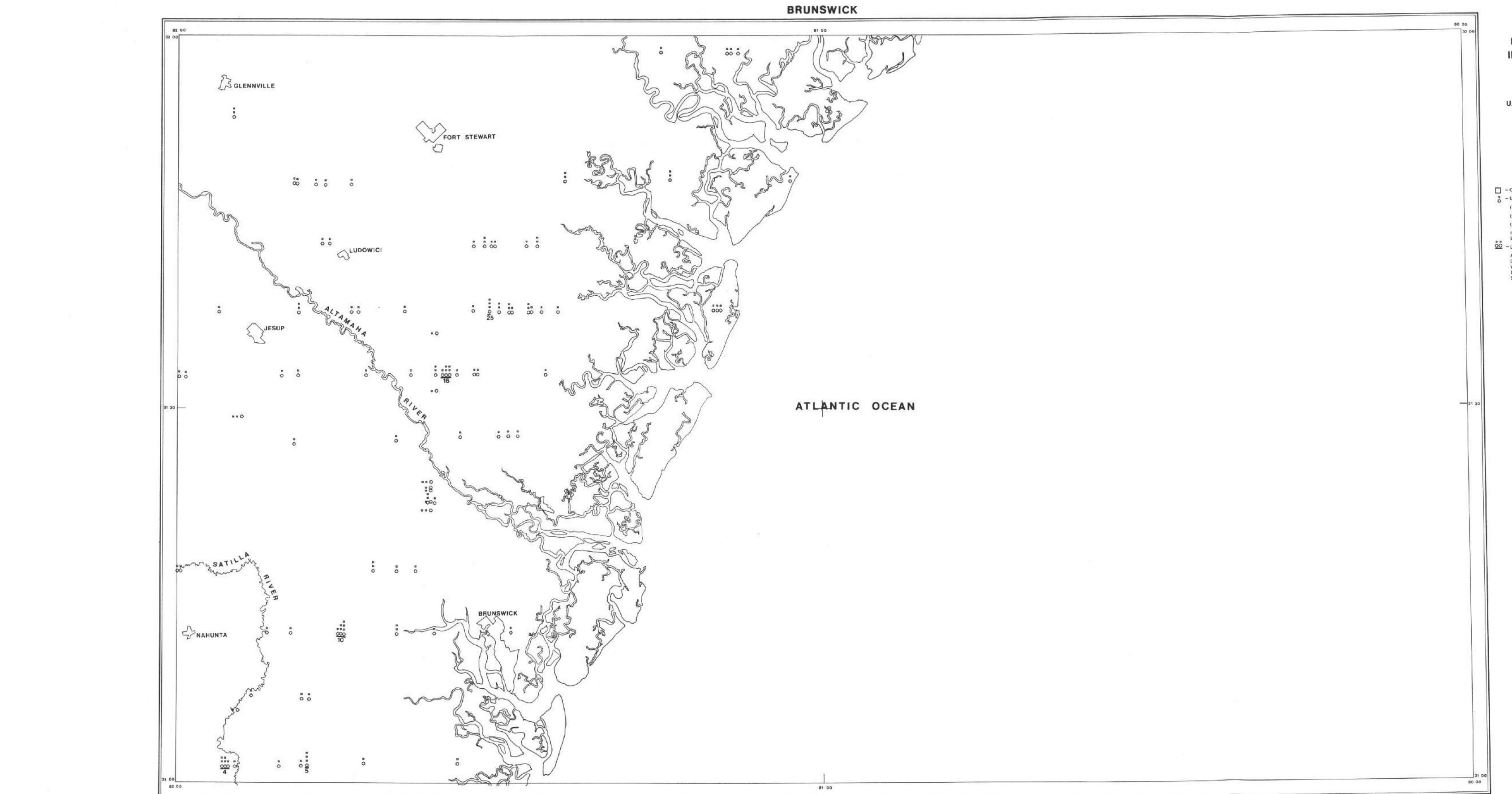


Figure 3a - Uranium Anomaly/Interpretation Map - Brunswick Quadrangle

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**APPENDIX A - Data Acquisition, Processing, and
Interpretation Methods**

INTRODUCTION

General

Under the U.S. Department of Energy's (DoE), National Uranium Resource Evaluation (NURE) Program, geoMetrics, Inc., conducted a high sensitivity airborne radiometric and magnetic survey. The data collection and processing were conducted under requirements set forth in Bendix Field Engineering Corporation specification 1200-C, dated February, 1979. The objectives of the (DoE)/NURE program, of which this project is a small part, may be summarized as follows:

"To develop and compile geologic and other information with which to assess the magnitude and distribution of uranium resources and to determine areas favorable for the occurrence of uranium in the United States." (DoE)

As an integral part of the DoE/NURE Program, the National Airborne Radiometric Program is designed to provide cost effective, semiquantitative reconnaissance radio element distribution information to aid in the assessment of regional distribution of uraniferous materials within the United States.

All Airborne data collected by geoMetrics during the course of this project were done so utilizing a Beechcraft B65 Queen Air Airplane (U.S. Registry No. N9AG) and a Rockwell Aero Commander (Registry No. N1213B). Both aircraft used 3584 cubic inches of NaI crystal and a high sensitivity proton magnetometer (0.25 gamma).

Each report contains a detailed geologic summary, interpretation report, reduced scale copies of all maps and profiles, histograms, and statistical tables for each quadrangle contained within the project. In addition, each report contains an appendix detailing the survey description, specifications, data collection and processing methods, and interpretation methods.

All data processing, statistical analyses, and interpretation were performed at the geoMetrics computer facility, Sunnyvale, California. After processing, the corrected data were statistically evaluated to define those areas which were radiometrically anomalous relative to other areas within each computer map unit. Standard deviation maps and radiometric and magnetic profile data were first evaluated individually and then integrated into a final interpretation map for each NTMS quadrangle.

Corrected profiles of all radiometric variables (total count, potassium, uranium, thorium, uranium/thorium, uranium/potassium, and thorium

/potassium, ratios), magnetic data, radar altimeter data, barometric altimeter data, air temperature, and airborne bismuth contributions are presented as profiles in this report. Single record and averaged data are presented on microfiche in report. These data are given at 1.0 second sample intervals, corrected for Compton Scatter, referenced to 400 foot mean terrain clearance as Standard Temperature and Pressure and corrected for atmospheric bismuth. Digital magnetic tapes are available containing raw spectral data, single record data, magnetic data, and statistical analysis results.

OPERATIONS

PRODUCTION SUMMARY

The production summary presented below describes the general procedures involved in gathering data for the entire project. The detailed daily production summary in Appendix B describes a portion of the total project.

Prior to the start of the survey operations, the airplanes were calibrated at the DoE test pads and Dynamic Test Range (the Queen Air in April 1980, and the Aero Commander in October 1980). Requirements for system calibrations are listed in the 1250-A specifications from BFEC.

Throughout the course of the overall project, the average ground speed maintained by the Queen Air was 140 mph. The Aero Commander averaged 150 mph.

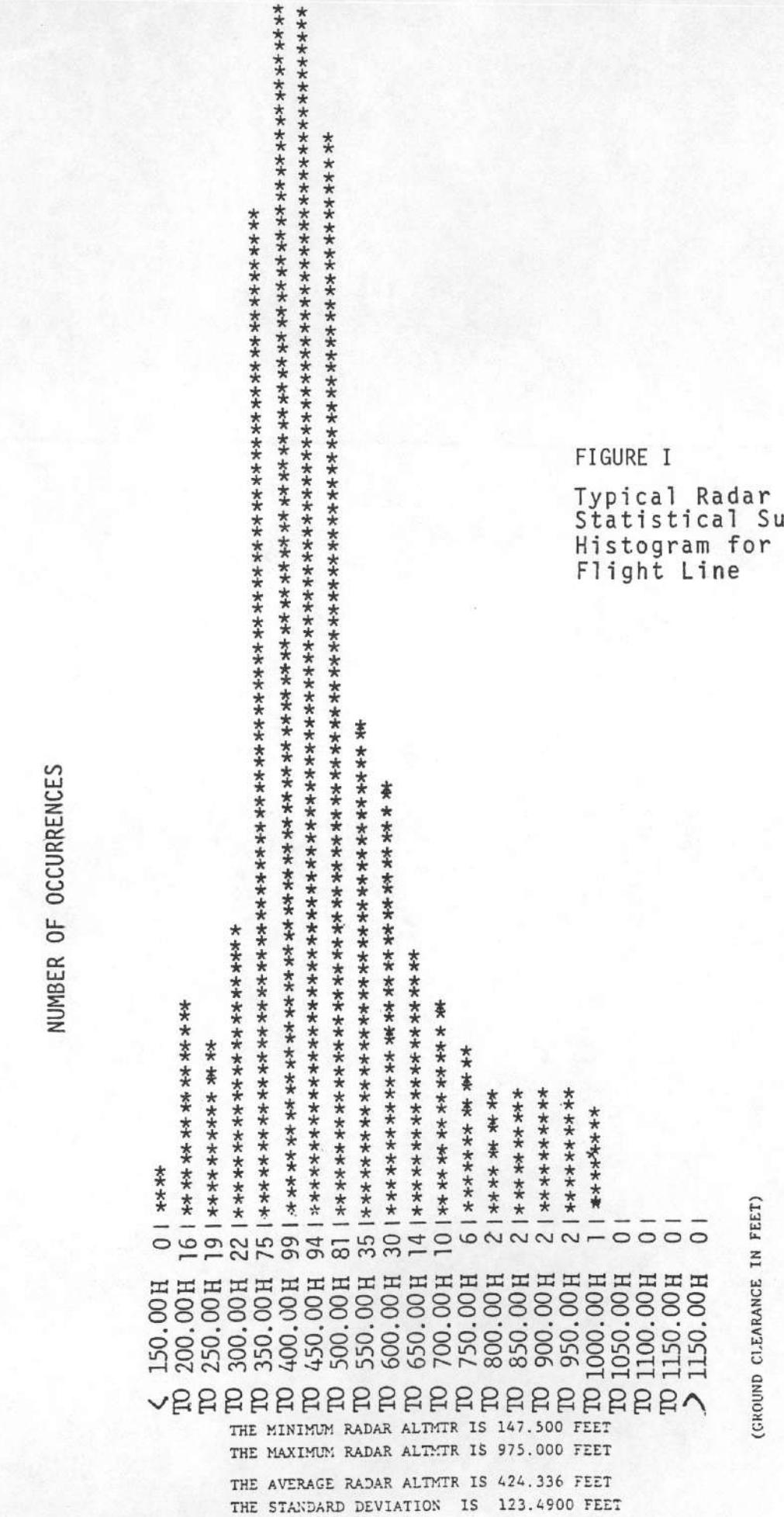
Nearly 100% of the data collected were within the specification limits of 200-700 feet. Several deviations over short distances were required to meet military regulations, FAA safety requirements, and to ensure that livestock were not endangered due to low flying aircraft. A sample altitude statistical distribution is shown in Figure I.

DATA COLLECTION PROCEDURES

Operating Parameters/Sampling Procedures

This survey was conducted using data collection parameters summarized below:

1. Data sampling was performed by a time-base system using 1.0 second sample intervals. All sensor data with analog output were digitally sampled at each scan based upon the clock timing rate of 1.0 seconds. The data so collected are the instantaneous values of the altimeter, temperature, pressure, and magnetometer parameters determined at the time of the data scan, but represent a count time of 1.0 seconds for the gamma ray spectrometer data.
2. The airplanes' objective ground speeds, mentioned previously, were not exceeded unless dictated by safety.
3. The airplane's downward looking crystal volume was 3,072 cubic inches providing an objective V/V (crystal volume in cubic inches divided by ground speed in miles per hour) of 22.0 at 140 m.p.h.
4. The upward looking crystal volume was 512 cubic inches.



Navigation/Flight Path Recovery

For all of the quadrangles, profiles were flown east-west at 6 mile (9.6 km) spacing. North-south tie lines were flown at 18 mile (28.8 km) spacing.

Navigation was accomplished using visual navigation techniques. Flight lines were drawn on 1:250,000 quadrangles and the pilot/navigator utilized these maps to provide visual navigation features.

Simultaneously, a 35 mm tracking camera was used to record actual flight position. This camera's fiducial numbering system was directly synchronized to the digital recording system such that a one-to-one correlation between position and data could be made. Upon completion of a data collection flight, the 35 mm film was processed and actual flight path positions located on the appropriate scale map sheets.

Infield System Calibration

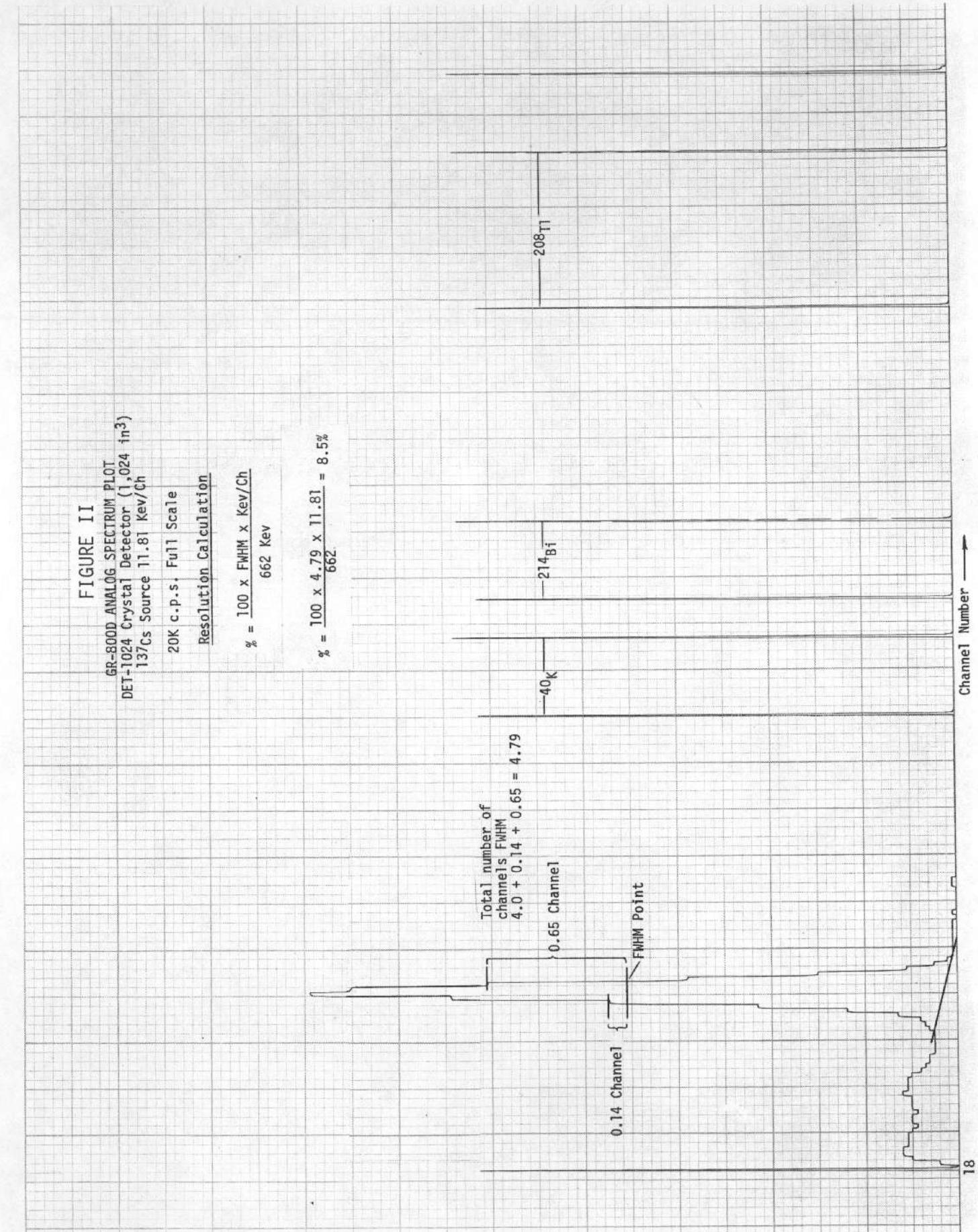
Due to the complex nature of both the system and the required data interpretation, much emphasis was placed on infield calibration of the data collection system. The objective of this calibration was to ensure continuous high quality of the data collected. The daily calibration procedures used are summarized below:

A. Pre Flight

1. Use cesium sources (same positioning on crystals every day), peak each Photomultiplier tube/crystal using the digital split-window detector of the GR-800. Then using thallium sources, repeat the tuning of the individual crystals.
2. Run full cesium spectrum on analog recorder for both down and up looking crystals. Calculate the cesium resolution (see sample in Figure II). Run spectrum out past the K40 peak on down crystals for evaluation of system tuning.
3. Finally run a full thorium analog spectrum of the down crystals and check for centering of K40 and Tl208 peaks in spectrum.
4. Repeat 1-3 until system is within contract specifications.

B. During Flight

1. Fly test line at survey altitude (400 ft), for approximately five miles, prior to production data collection (record both analog and digital).
2. Prior to production data collection, the above data are evaluated to ensure $\pm 20\%$ limits on total count compared to average of all test flights from that base of operations.



DATA COLLECTION SYSTEM

3. During production data collection, monitor radon analog data for unusual increases. Visually correlate these with temperature and barometric pressure.
4. Upon completion of production data collection, refly test line at survey altitude (400 ft). Record both analog and digital.

C. Post Flight

1. Verify test line total count within 20% of average for all test lines at that base of operations.
2. Using cesium sources (same position as pre-flight), run full cesium spectrum for both down and up crystals (allow it to record through the K40 peak in the down crystals). Repeat the procedure using thallium sources and examine the T1208 window.
3. Calculate the resolution of down and up crystal pack.
4. Determine shift, if any, in T1208 peak position.

Field Digital Data Verification

At the completion of each flight, the raw digital data tapes were checked for data quality and completeness on geoMetrics' G-725. The G-725 system is a totally portable mini computer (and peripherals) consisting of; an Interdata 516, two 9 track tape drives, a CRT, a line printer, and two floppy discs. Any digital problems encountered were immediately evaluated by the electronics operator and data man, thus assuring optimum data quality. In addition, histogram information for each measured variable was generated. Thus a summary display of altitude, etc., is available for immediate evaluation.

AIRCRAFT

Two aircraft were used for this survey: (1) a Beechcraft Queen Air - Model 65 (U.S. Reg. No. N9AG), and (2) a Rockwell Aero Commander 680F (U.S. Reg. No. N1213B). Both these aircraft, being medium size with twin engines, possess overall performance and safety features which make them ideal for low level, fixed-wing airborne geophysical surveys in areas of up to moderately high topographic relief. They can carry adequate payloads at low constant airspeeds, while maintaining economy and a wide envelope of safety. Performance data for the two craft in their present survey configuration are given below.

	<u>QUEEN AIR</u>	<u>AERO COMMANDER</u>
Maximum Aircraft Gross Weight	7,700 lbs.	8,500 lbs.
Aircraft Empty (dry)	4,640 lbs.	5,200 lbs.
Max. useful load including fuel	3,060 lbs.	3,300 lbs.
Geophysical Package	1,110 lbs.	1,110 lbs.
Navigation Equipment	125 lbs.	125 lbs.
Fuel Tanks Full	528 lbs.	1,338 lbs
Pilot & Electronics Operator	350 lbs.	350 lbs.
Total	2,113 lbs.	2,923 lbs.
Min. Control Speed at G.W. (IAS)	95 mph	NG
Safe Single Eng. Speed @ G.W. (IAS)	105 mph	NG
Rate of Climb 2 engines @ gross (FPM)	1,300	1,500
Rate of climb 1 engine @ gross (FPM)	210	250
Avgas consumption (ga/hr) at 75% power	36	38
Endurance (75% power)	6 hrs/6 mins.	5 hrs/30 mins.
Range (75% power - 45 min. reserve)	1,200 miles	1,100 miles
Cruise Configuration stalling speed at gross weight (IAS)		
0° bank	80 mph	80 mph
45° bank	95 mph	NG

Electronics

The major components of the airborne data collection system are summarized below (shown schematically in Figure III):

1. Gamma Ray Spectrometer, geoMetrics GR-800, utilizing a dual 256 channel capability to provide spectral data in the 0.4 to 3.0 MeV range for both the downward looking and the upward looking crystal packages and coverage in the 3.0 to 6.0 MeV range for cosmic background.
2. Crystal Detector, geoMetrics Model DET-3072/512R consisting of 3072 cubic inches in the downward looking configuration and 512 cubic inches appropriately shielded in an upward looking configuration.
3. A geoMetrics Digital Data Acquisition System, Model G-714 with "read-after-write" data verification, recording the following on magnetic tape:
 - a. 512 channels of gamma ray spectrometer data
 - b. Total magnetic intensity
 - c. Fiducial number from data system/camera
 - d. Manually inserted information, i.e. date, survey area, and flight line number
 - e. Altitude from radar altimeter and barometric altimeter (by analog-to-digital conversion)
 - f. Time in days, hours, minutes and seconds
 - g. Outside air temperature
4. Magnetometer, geoMetrics Airborne Model G-803, capable of 0.125 gamma sensitivity, but operated at 0.25 gamma sensitivity.
5. Radar Altimeter, Bonzer Model Mark 10 with recording output and display operating over an altitude range of 0 to 2,500 feet.
6. Rosemont Barometric Altimeter with recording output and display.
7. Recording Thermometer for monitoring outside air temperature.
8. Tracking Camera. Automax 35 mm framing camera with wide angle lens and 10 character fiducial/line number display to provide flight path recovery data.

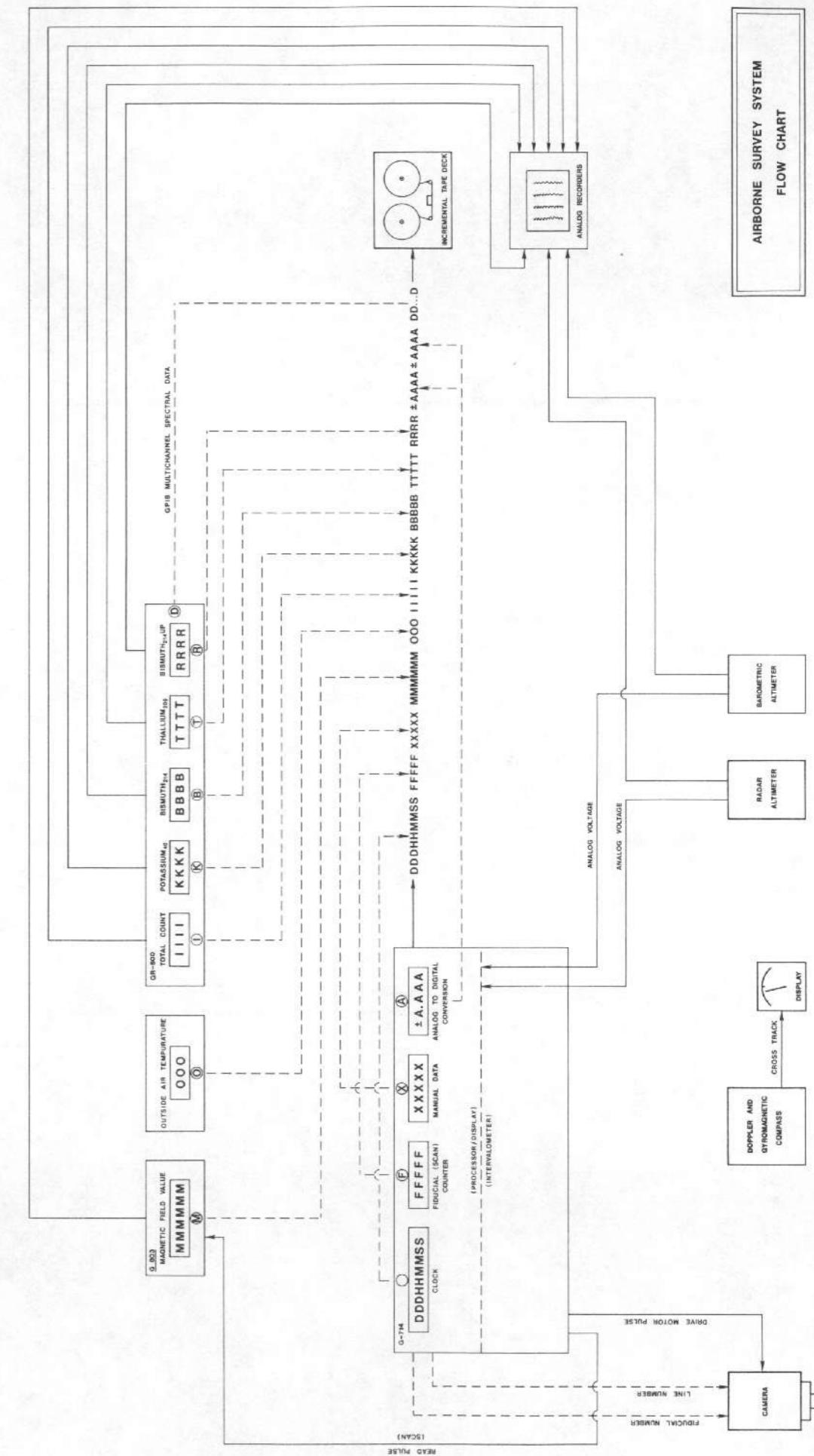


FIGURE III

SYSTEM CALIBRATION

9. Analog Recorder geoMetrics (MARS 6)to record the following data:
 - a. Bi214 using a window about the 1.76 MeV peak from the downward looking system.
 - b. Bi air background from the upward looking system.
 - c. Magnetometer
 - d. Radar Altitude
 - e. Total count for downward looking system (0.4 to 3.0 MeV)
 - f. Barometric Altitude
 - g. Time markers

10. HP 7155 single channel analog recorder during pre and post flight calibrations, this recorder is used to plot a full analog spectra for both the down and up crystal systems via the GR-800. Thus, a hard copy record of the data used for resolution, drift, etc., checks are available at all times. This approach provides instant verification of system parameters (refer to Figure II).

AIRCRAFT AND COSMIC BACKGROUND

Full spectral data are collected at five (5) altitudes over water (14,000 feet, 12,000 feet; 10,000 feet; 8,000 feet and 6,000 feet) in an area where the existence of no airborne Bi214 can be assured (off shore over the Pacific Ocean). This results in separate spectra as shown schematically in Figure 10. We define $S(12,000)$ to be the spectra at 12,000 feet from 0.4 MeV to 3.0 MeV with $S(8,000)$ the same spectra at a lower altitude (8,000) and $C_i(h)$ the total count between 3.0 and 6.0 MeV at respective altitudes.ⁱ Since the aircraft background is constant, the difference between any two altitudes separated sufficiently - typically, 2,000 feet - yields the cosmic spectral curve shape as shown schematically in Figure VI. Thus

$$\begin{aligned} S(12,000) - S(8,000) &= \Delta S \\ \text{and} \end{aligned}$$

$$\Sigma C_{12}(h_i) - \Sigma C_8(h_i) = \Delta C$$

This cosmic spectral curve is scaled back to 12,000 feet as follows:

$$\frac{C_{12}(h_i)}{\Delta C} \times \Delta S = \Delta C(12,000) \text{ the Cosmic Spectrum (shape and magnitude at 12,000 feet)}$$

The aircraft background is derived as follows:

$$S(12,000) - C(12,000) = A/C \text{ Background}$$

Since data were collected at five altitudes, this procedure was repeated for each combination of altitudes and results averaged. Typical aircraft and cosmic spectra are shown in Figures V, AND VI respectively.

SYSTEM CONSTANTS

System constants were determined by occupation of the DoE Walker Field Test Pads. (See Ward, 1978, and Stromswold, 1978, for complete descriptions of the building and monitoring of the pads). The five test pads contained varying concentrations of K, U, and T as presented by BFEC:

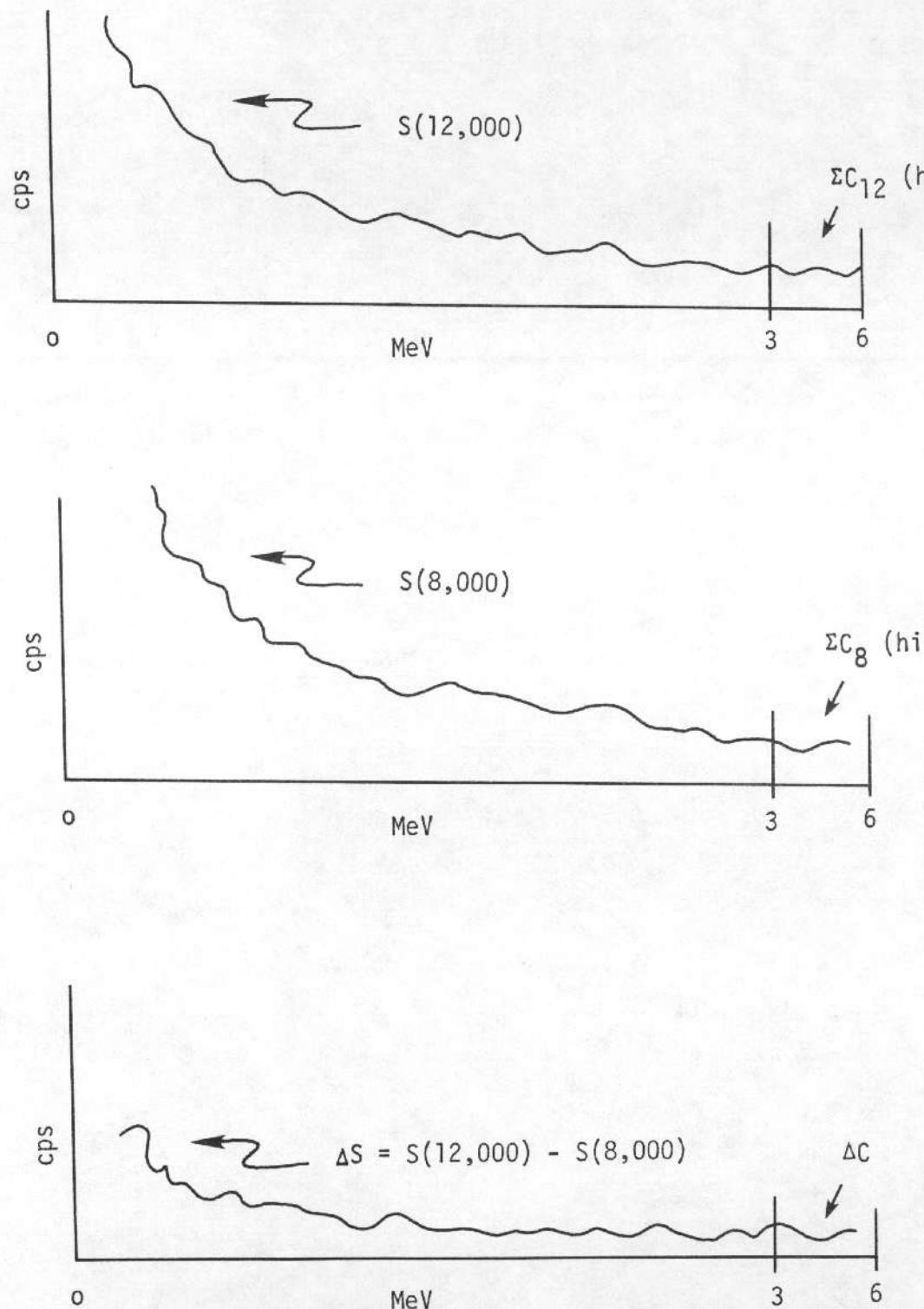


FIGURE IV - Multiple altitude spectra schematic

PAD	K	U	T
Matrix	1.45%	2.19 ppm	6.26 ppm
K	5.14%	5.09 ppm	8.48 ppm
U	2.03%	30.29 ppm	9.19 ppm
T	2.01%	5.14 ppm	45.33 ppm
Mixed	4.11%	20.39 ppm	17.52 ppm

Since the measurements were taken over a relatively short time period (a few hours), it was assumed that the matrix pad measurements contain not only the effects of the matrix pad itself, but also aircraft background (which is a constant), cosmic background (constant over the time period of interest), and all other local background (e.g. BiAir, etc.) effects. (The matrix pad is constructed with only the basic concrete mix without the additional elemental minerals). Thus, by subtracting the matrix pad count rates from the count rates in the four pads, we have eliminated aircraft and cosmic background and BiAir effects for the four pads. The pad concentrations are then modified in a similar fashion by the subtraction of the matrix pad concentrations. The differential concentrations in the pads are given in the table below.

PAD	K	U	T
K-Matrix	3.7%	2.9 ppm	2.2 ppm
U-Matrix	0.6%	28.5 ppm	2.9 ppm
T-Matrix	0.6%	3.0 ppm	39.0 ppm
Mixed-Matrix	2.7%	18.8 ppm	11.3 ppm

Considering the above, we can define a functional relationship between the differential concentrations and the residual count rates which will provide a method of determining the calibration constants for the spectrometer system. These calibration constants are the six (6) stripping coefficients which account for the interactions occurring between the elemental channels in the system (Compton scatter coefficients, etc.).

On the basis of an ideal situation, one would anticipate that some of these interactions should be negligible. This is not totally the case, since we are dealing with a system which has less than infinite resolving power (i.e. the energies are smeared to some extent).

DERIVED AIRCRAFT BACKGROUND SPECTRUM FROM PACIFIC OCEAN DATA

DOWNTWARD-LOOKING CRYSTAL SPECTRUM FOR LINE AC BQD, DATED 0725??

TC (0-6 MEV) 184.97 TC (8-4-3-0 MEV) 141.17 COSMIC (3-6 MEV) 0.00
U (1.12 MEV) 0.91 U (1.78 MEV) 14.54 U (2.62 MEV) 4.36 T (2.62 MEV) 4.20

CH 0 (0.000 MEV) 0.000 CPS **
CH 1 (0.024 MEV) 0.000 CPS **
CH 2 (0.035 MEV) 0.000 CPS **
CH 3 (0.047 MEV) 0.000 CPS **
CH 4 (0.059 MEV) 0.000 CPS **
CH 5 (0.071 MEV) 0.000 CPS **
CH 6 (0.083 MEV) 0.000 CPS **
CH 7 (0.095 MEV) 0.000 CPS **
CH 8 (0.107 MEV) 0.000 CPS **
CH 9 (0.118 MEV) 0.000 CPS **
CH 10 (0.130 MEV) 0.000 CPS **
CH 11 (0.142 MEV) 0.000 CPS **
CH 12 (0.154 MEV) 0.000 CPS **
CH 13 (0.165 MEV) 0.000 CPS **
CH 14 (0.177 MEV) 0.000 CPS **
CH 15 (0.189 MEV) 0.000 CPS **
CH 16 (0.201 MEV) 0.000 CPS **
CH 17 (0.213 MEV) 0.000 CPS **
CH 18 (0.225 MEV) 0.000 CPS **
CH 19 (0.236 MEV) 0.000 CPS **
CH 20 (0.248 MEV) 0.000 CPS **
CH 21 (0.260 MEV) 0.000 CPS **
CH 22 (0.272 MEV) 0.000 CPS **
CH 23 (0.284 MEV) 0.000 CPS **
CH 24 (0.296 MEV) 0.000 CPS **
CH 25 (0.307 MEV) 0.000 CPS **
CH 26 (0.319 MEV) 0.000 CPS **
CH 27 (0.331 MEV) 0.000 CPS **
CH 28 (0.343 MEV) 0.000 CPS **
CH 29 (0.355 MEV) 0.000 CPS **
CH 30 (0.366 MEV) 0.000 CPS **
CH 31 (0.378 MEV) 0.000 CPS **
CH 32 (0.390 MEV) 0.000 CPS **
CH 33 (0.402 MEV) 0.000 CPS **
CH 34 (0.414 MEV) 0.000 CPS ** TOTAL COUNT

CH 35 (0.414 MEV) 0.121 CPS *****
CH 36 (0.426 MEV) 0.070 CPS *****
CH 37 (0.437 MEV) 0.076 CPS *****
CH 38 (0.449 MEV) 0.096 CPS *****
CH 39 (0.461 MEV) 0.182 CPS *****
CH 40 (0.473 MEV) 0.092 CPS *****
CH 41 (0.485 MEV) 0.083 CPS *****
CH 42 (0.496 MEV) 0.165 CPS *****
CH 43 (0.508 MEV) 0.158 CPS *****
CH 44 (0.520 MEV) 0.120 CPS *****
CH 45 (0.532 MEV) 0.217 CPS *****
CH 46 (0.544 MEV) 0.997 CPS *****
CH 47 (0.556 MEV) 0.447 CPS *****
CH 48 (0.568 MEV) 0.292 CPS *****
CH 49 (0.579 MEV) 0.582 CPS *****
CH 50 (0.591 MEV) 0.276 CPS *****
CH 51 (0.603 MEV) 0.481 CPS *****
CH 52 (0.615 MEV) 0.248 CPS *****
CH 53 (0.626 MEV) 1.861 CPS *****
CH 54 (0.638 MEV) 1.684 CPS *****
CH 55 (0.650 MEV) 1.661 CPS *****
CH 56 (0.662 MEV) 0.949 CPS *****
CH 57 (0.674 MEV) 1.474 CPS *****
CH 58 (0.686 MEV) 1.447 CPS *****
CH 59 (0.698 MEV) 1.429 CPS *****
CH 60 (0.709 MEV) 1.429 CPS *****
CH 61 (0.721 MEV) 1.453 CPS *****
CH 62 (0.733 MEV) 1.467 CPS *****
CH 63 (0.745 MEV) 1.517 CPS *****
CH 64 (0.757 MEV) 1.597 CPS *****
CH 65 (0.768 MEV) 1.548 CPS *****
CH 66 (0.780 MEV) 1.421 CPS *****
CH 67 (0.792 MEV) 1.200 CPS *****
CH 68 (0.804 MEV) 0.955 CPS *****
CH 69 (0.816 MEV) 1.846 CPS *****
CH 70 (0.827 MEV) 1.245 CPS *****
CH 71 (0.839 MEV) 1.165 CPS *****
CH 72 (0.851 MEV) 1.253 CPS *****
CH 73 (0.863 MEV) 1.231 CPS *****
CH 74 (0.875 MEV) 1.425 CPS *****
CH 75 (0.887 MEV) 1.543 CPS *****
CH 76 (0.898 MEV) 1.543 CPS *****
CH 77 (0.910 MEV) 1.444 CPS *****
CH 78 (0.922 MEV) 1.364 CPS *****
CH 79 (0.934 MEV) 1.364 CPS *****
CH 80 (0.946 MEV) 1.159 CPS *****
CH 81 (0.957 MEV) 1.144 CPS *****
CH 82 (0.969 MEV) 1.085 CPS *****
CH 83 (0.981 MEV) 1.075 CPS *****
CH 84 (0.993 MEV) 0.941 CPS *****
CH 85 (1.005 MEV) 0.919 CPS ***
CH 86 (1.017 MEV) 0.826 CPS ***
CH 87 (1.028 MEV) 0.766 CPS ***
CH 88 (1.040 MEV) 0.853 CPS ***
CH 89 (1.052 MEV) 0.961 CPS *** BISMUTH 214
CH 90 (1.064 MEV) 0.961 CPS ***
CH 91 (1.076 MEV) 0.867 CPS ***
CH 92 (1.087 MEV) 0.961 CPS ***
CH 93 (1.099 MEV) 0.851 CPS ***
CH 94 (1.111 MEV) 0.985 CPS ***
CH 95 (1.123 MEV) 0.847 CPS ***
CH 96 (1.135 MEV) 0.861 CPS ***
CH 97 (1.147 MEV) 0.886 CPS ***
CH 98 (1.159 MEV) 0.816 CPS ***
CH 99 (1.170 MEV) 0.751 CPS *** BISMUTH 214
CH 100 (1.182 MEV) 0.607 CPS *** BISMUTH 214
CH 101 (1.194 MEV) 0.662 CPS ***
CH 102 (1.206 MEV) 0.909 CPS ***
CH 103 (1.217 MEV) 0.833 CPS ***
CH 104 (1.229 MEV) 0.719 CPS ***
CH 105 (1.241 MEV) 0.671 CPS ***
CH 106 (1.253 MEV) 0.650 CPS ***
CH 107 (1.265 MEV) 0.601 CPS ***
CH 108 (1.277 MEV) 0.661 CPS ***
CH 109 (1.288 MEV) 0.669 CPS ***
CH 110 (1.300 MEV) 0.909 CPS ***
CH 111 (1.312 MEV) 0.836 CPS ***
CH 112 (1.324 MEV) 0.658 CPS ***
CH 113 (1.336 MEV) 0.644 CPS ***
CH 114 (1.348 MEV) 0.644 CPS ***
CH 115 (1.360 MEV) 0.791 CPS ***
CH 116 (1.371 MEV) 0.787 CPS *** POTASSIUM 40
CH 117 (1.383 MEV) 0.874 CPS ***
CH 118 (1.395 MEV) 0.884 CPS ***
CH 119 (1.407 MEV) 0.672 CPS ***
CH 120 (1.418 MEV) 1.124 CPS ***
CH 121 (1.430 MEV) 1.985 CPS ***
CH 122 (1.442 MEV) 0.909 CPS ***
CH 123 (1.454 MEV) 1.231 CPS ***
CH 124 (1.466 MEV) 1.207 CPS ***
CH 125 (1.478 MEV) 0.995 CPS ***
CH 126 (1.489 MEV) 0.867 CPS ***
CH 127 (1.501 MEV) 0.682 CPS ***
CH 128 (1.513 MEV) 0.635 CPS ***
CH 129 (1.525 MEV) 0.514 CPS ***
CH 130 (1.537 MEV) 0.488 CPS ***
CH 131 (1.548 MEV) 0.409 CPS **
CH 132 (1.560 MEV) 0.369 CPS ** POTASSIUM 40
CH 133 (1.572 MEV) 0.369 CPS **
CH 134 (1.584 MEV) 0.438 CPS **
CH 135 (1.596 MEV) 0.310 CPS **
CH 136 (1.608 MEV) 0.259 CPS **
CH 137 (1.620 MEV) 0.205 CPS **
CH 138 (1.631 MEV) 0.353 CPS **
CH 139 (1.643 MEV) 0.323 CPS **
CH 140 (1.655 MEV) 0.332 CPS **
CH 141 (1.667 MEV) 0.275 CPS *** BISMUTH 214
CH 142 (1.678 MEV) 0.267 CPS ***
CH 143 (1.690 MEV) 0.275 CPS ***
CH 144 (1.702 MEV) 0.245 CPS ***
CH 145 (1.714 MEV) 0.245 CPS ***
CH 146 (1.726 MEV) 0.352 CPS ***
CH 147 (1.738 MEV) 0.293 CPS ***
CH 148 (1.749 MEV) 0.359 CPS ***
CH 149 (1.761 MEV) 0.359 CPS ***
CH 150 (1.773 MEV) 0.334 CPS ***
CH 151 (1.785 MEV) 0.245 CPS ***
CH 152 (1.797 MEV) 0.255 CPS ***
CH 153 (1.809 MEV) 0.255 CPS ***
CH 154 (1.820 MEV) 0.228 CPS ***
CH 155 (1.832 MEV) 0.188 CPS ***
CH 156 (1.844 MEV) 0.118 CPS ***
CH 157 (1.856 MEV) 0.118 CPS ***
CH 158 (1.868 MEV) 0.147 CPS *** BISMUTH 214
CH 159 (1.879 MEV) 0.147 CPS ***
CH 160 (1.891 MEV) 0.147 CPS ***
CH 161 (1.903 MEV) 0.093 CPS ***
CH 162 (1.915 MEV) 0.091 CPS ***
CH 163 (1.927 MEV) 0.151 CPS ***
CH 164 (1.939 MEV) 0.151 CPS ***
CH 165 (1.950 MEV) 0.136 CPS ***
CH 166 (1.962 MEV) 0.157 CPS ***
CH 167 (1.974 MEV) 0.119 CPS ***
CH 168 (1.986 MEV) 0.119 CPS ***
CH 169 (1.998 MEV) 0.113 CPS ***
CH 170 (2.009 MEV) 0.106 CPS ***
CH 171 (2.020 MEV) 0.147 CPS ***
CH 172 (2.032 MEV) 0.163 CPS ***
CH 173 (2.045 MEV) 0.171 CPS ***
CH 174 (2.057 MEV) 0.154 CPS ***
CH 175 (2.068 MEV) 0.168 CPS ***
CH 176 (2.080 MEV) 0.171 CPS ***
CH 177 (2.092 MEV) 0.184 CPS ***
CH 178 (2.104 MEV) 0.138 CPS ***
CH 179 (2.116 MEV) 0.137 CPS ***
CH 180 (2.128 MEV) 0.142 CPS ***
CH 181 (2.139 MEV) 0.169 CPS ***
CH 182 (2.151 MEV) 0.148 CPS ***
CH 183 (2.163 MEV) 0.161 CPS ***
CH 184 (2.175 MEV) 0.144 CPS ***
CH 185 (2.187 MEV) 0.088 CPS ***
CH 186 (2.199 MEV) 0.161 CPS ***
CH 187 (2.211 MEV) 0.161 CPS ***
CH 188 (2.222 MEV) 0.138 CPS ***
CH 189 (2.234 MEV) 0.117 CPS ***
CH 190 (2.246 MEV) 0.113 CPS ***
CH 191 (2.258 MEV) 0.095 CPS ***
CH 192 (2.269 MEV) 0.083 CPS ***
CH 193 (2.281 MEV) 0.097 CPS ***
CH 194 (2.293 MEV) 0.095 CPS ***
CH 195 (2.305 MEV) 0.095 CPS ***
CH 196 (2.317 MEV) 0.059 CPS ***
CH 197 (2.329 MEV) 0.018 CPS ***
CH 198 (2.340 MEV) 0.041 CPS ***
CH 199 (2.352 MEV) 0.025 CPS ***
CH 200 (2.364 MEV) 0.087 CPS ***
CH 201 (2.376 MEV) 0.085 CPS ***
CH 202 (2.388 MEV) 0.084 CPS ***
CH 203 (2.400 MEV) 0.084 CPS ***
CH 204 (2.411 MEV) 0.123 CPS *** THALLIUM 208
CH 205 (2.423 MEV) 0.076 CPS ***
CH 206 (2.435 MEV) 0.115 CPS ***
CH 207 (2.447 MEV) 0.053 CPS ***
CH 208 (2.459 MEV) 0.103 CPS ***
CH 209 (2.470 MEV) 0.128 CPS ***
CH 210 (2.482 MEV) 0.087 CPS ***
CH 211 (2.494 MEV) 0.127 CPS ***
CH 212 (2.506 MEV) 0.169 CPS ***
CH 213 (2.518 MEV) 0.206 CPS ***
CH 214 (2.530 MEV) 0.161 CPS ***
CH 215 (2.541 MEV) 0.184 CPS ***
CH 216 (2.553 MEV) 0.206 CPS ***
CH 217 (2.565 MEV) 0.195 CPS ***
CH 218 (2.577 MEV) 0.195 CPS ***
CH 219 (2.589 MEV) 0.001 CPS ***
CH 220 (2.600 MEV) 0.329 CPS ***
CH 221 (2.612 MEV) 0.232 CPS ***
CH 222 (2.624 MEV) 0.104 CPS ***
CH 223 (2.636 MEV) 0.171 CPS ***
CH 224 (2.648 MEV) 0.177 CPS ***
CH 225 (2.660 MEV) 0.099 CPS ***
CH 226 (2.671 MEV) 0.128 CPS ***
CH 227 (2.683 MEV) 0.124 CPS ***
CH 228 (2.695 MEV) 0.131 CPS ***
CH 229 (2.707 MEV) 0.059 CPS ***
CH 230 (2.719 MEV) 0.059 CPS ***
CH 231 (2.730 MEV) 0.012 CPS ***
CH 232 (2.742 MEV) 0.022 CPS ***
CH 233 (2.754 MEV) 0.025 CPS ***
CH 234 (2.766 MEV) 0.038 CPS ***
CH 235 (2.778 MEV) 0.003 CPS ***
CH 236 (2.790 MEV) 0.068 CPS ***
CH 237 (2.802 MEV) 0.023 CPS ***
CH 238 (2.813 MEV) 0.003 CPS ***
CH 239 (2.825 MEV) 0.005 CPS ***
CH 240 (2.837 MEV) 0.078 CPS ***
CH 241 (2.849 MEV) 0.005 CPS ***
CH 242 (2.860 MEV) 0.047 CPS ***
CH 243 (2.872 MEV) 0.039 CPS ***
CH 244 (2.884 MEV) 0.084 CPS ***
CH 245 (2.896 MEV) 0.056 CPS ***
CH 246 (2.908 MEV) 0.025 CPS ***
CH 247 (2.920 MEV) 0.015 CPS ***
CH 248 (2.932 MEV) 0.005 CPS ***
CH 249 (2.943 MEV) 0.065 CPS ***
CH 250 (2.955 MEV) 0.042 CPS ***
CH 251 (2.967 MEV) 0.002 CPS ***
CH 252 (2.979 MEV) 0.031 CPS ***
CH 253 (2.990 MEV) 0.031 CPS ***
CH 254 (2.992 MEV) 0.106 CPS *** TOTAL COUNT
CH 255 (3.014 MEV) 0.008 CPS ***

AIRCRAFT BACKGROUND
ROTARY WING AIRCRAFT
DOWNWARD LOOKING CRYSTAL
2048 CUBIC INCHES
DATE: 25 JULY 1977

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TC (.0-6 MEV) 5275.09 TC (.4-3.0 MEV) 3245.27 COSMIC (.3-6 MEV) 1000.00
U (.12 MEV) 165.91 K (.1.46 MEV) 181.83 U (.1.76 MEV) 157.56 T (.2.62 MEV) 213.66
CH   0  (0.000 MEV)  0.000 CPS *
CH   1  (0.024 MEV)  0.000 CPS *
CH   2  (0.024 MEV)  0.000 CPS *
CH   3  (0.035 MEV)  0.000 CPS *
CH   4  (0.047 MEV)  0.000 CPS *

```

2048 CUBIC INCHES
DATE: 25 JULY 1977

CH 5 (0.059 MEV) 0.000 CPS *
 CH 6 (0.071 MEV) 0.000 CPS *
 CH 7 (0.083 MEV) 0.000 CPS *
 CH 8 (0.095 MEV) 0.000 CPS *
 CH 9 (0.106 MEV) 0.000 CPS *
 CH 10 (0.118 MEV) 0.000 CPS *
 CH 11 (0.130 MEV) 0.000 CPS *
 CH 12 (0.142 MEV) 0.000 CPS *
 CH 13 (0.154 MEV) 0.000 CPS *
 CH 14 (0.165 MEV) 0.000 CPS *
 CH 15 (0.176 MEV) 0.000 CPS *
 CH 16 (0.189 MEV) 0.000 CPS *
 CH 17 (0.201 MEV) 0.000 CPS *
 CH 18 (0.213 MEV) 1.091 CPS ***
 CH 19 (0.225 MEV) 1.313 CPS ***
 CH 20 (0.235 MEV) 2.226 CPS ***
 CH 21 (0.248 MEV) 36.345 CPS *****
 CH 22 (0.260 MEV) 89.243 CPS *****
 CH 23 (0.272 MEV) 100.516 CPS *****
 CH 24 (0.284 MEV) 103.520 CPS *****
 CH 25 (0.295 MEV) 54.923 CPS *****
 CH 26 (0.307 MEV) 88.893 CPS *****
 CH 27 (0.319 MEV) 95.032 CPS *****
 CH 28 (0.331 MEV) 80.528 CPS *****
 CH 29 (0.343 MEV) 78.271 CPS *****
 CH 30 (0.355 MEV) 72.498 CPS *****
 CH 31 (0.367 MEV) 76.972 CPS *****
 CH 32 (0.378 MEV) 65.560 CPS *****
 CH 33 (0.390 MEV) 65.965 CPS *****
 CH 34 (0.402 MEV) 63.180 CPS *****
 CH 35 (0.414 MEV) 62.598 CPS *****
 CH 36 (0.426 MEV) 64.008 CPS *****
 CH 37 (0.437 MEV) 67.602 CPS *****
 CH 38 (0.449 MEV) 69.116 CPS *****
 CH 39 (0.461 MEV) 70.972 CPS *****
 CH 40 (0.473 MEV) 84.879 CPS *****
 CH 41 (0.485 MEV) 96.049 CPS *****
 CH 42 (0.496 MEV) 94.167 CPS *****
 CH 43 (0.508 MEV) 86.786 CPS *****
 CH 44 (0.520 MEV) 69.916 CPS *****
 CH 45 (0.532 MEV) 48.444 CPS *****
 CH 46 (0.544 MEV) 49.965 CPS *****
 CH 47 (0.556 MEV) 30.512 CPS *****
 CH 48 (0.567 MEV) 33.160 CPS *****
 CH 49 (0.579 MEV) 31.892 CPS *****
 CH 50 (0.591 MEV) 25.907 CPS *****
 CH 51 (0.603 MEV) 35.781 CPS *****
 CH 52 (0.615 MEV) 27.055 CPS *****
 CH 53 (0.626 MEV) 27.982 CPS *****
 CH 54 (0.638 MEV) 25.776 CPS *****
 CH 55 (0.650 MEV) 26.599 CPS *****
 CH 56 (0.662 MEV) 27.787 CPS *****
 CH 57 (0.674 MEV) 25.274 CPS *****
 CH 58 (0.686 MEV) 23.240 CPS *****
 CH 59 (0.697 MEV) 23.489 CPS *****
 CH 60 (0.709 MEV) 24.769 CPS *****
 CH 61 (0.721 MEV) 22.350 CPS *****
 CH 62 (0.733 MEV) 22.242 CPS *****
 CH 63 (0.745 MEV) 22.424 CPS *****
 CH 64 (0.757 MEV) 22.201 CPS *****
 CH 65 (0.768 MEV) 20.938 CPS *****
 CH 66 (0.780 MEV) 18.821 CPS *****
 CH 67 (0.792 MEV) 20.493 CPS *****
 CH 68 (0.804 MEV) 19.339 CPS *****
 CH 69 (0.816 MEV) 19.021 CPS *****
 CH 70 (0.827 MEV) 17.949 CPS *****
 CH 71 (0.839 MEV) 20.238 CPS *****
 CH 72 (0.851 MEV) 17.491 CPS *****
 CH 73 (0.863 MEV) 18.370 CPS *****
 CH 74 (0.875 MEV) 16.244 CPS *****
 CH 75 (0.887 MEV) 17.270 CPS *****
 CH 76 (0.898 MEV) 17.519 CPS *****
 CH 77 (0.910 MEV) 16.689 CPS *****
 CH 78 (0.922 MEV) 17.159 CPS *****
 CH 79 (0.934 MEV) 19.230 CPS *****
 CH 80 (0.946 MEV) 17.111 CPS *****
 CH 81 (0.957 MEV) 16.248 CPS *****
 CH 82 (0.969 MEV) 14.954 CPS *****
 CH 83 (0.981 MEV) 17.324 CPS *****
 CH 84 (0.993 MEV) 14.632 CPS *****
 CH 85 (1.005 MEV) 14.813 CPS *****
 CH 86 (0.917 MEV) 15.903 CPS *****
 CH 87 (1.028 MEV) 13.767 CPS *****
 CH 88 (1.040 MEV) 16.414 CPS *****
 CH 89 (1.052 MEV) 13.642 CPS *****
 CH 90 (1.064 MEV) 13.624 CPS *****
 CH 91 (1.076 MEV) 13.517 CPS *****
 CH 92 (1.087 MEV) 13.706 CPS *****
 CH 93 (1.099 MEV) 14.632 CPS *****
 CH 94 (1.111 MEV) 13.380 CPS *****
 CH 95 (1.123 MEV) 13.468 CPS *****
 CH 96 (1.135 MEV) 14.949 CPS *****
 CH 97 (1.147 MEV) 13.503 CPS *****
 CH 98 (1.158 MEV) 13.481 CPS *****
 CH 99 (1.178 MEV) 13.189 CPS *****
 CH 100 (1.189 MEV) 13.600 CPS *****
 CH 101 (1.194 MEV) 12.965 CPS ***** BISMUTH 214
 CH 102 (1.206 MEV) 12.538 CPS *****
 CH 103 (1.217 MEV) 14.061 CPS *****
 CH 104 (1.229 MEV) 11.345 CPS *****
 CH 105 (1.241 MEV) 11.113 CPS *****
 CH 106 (1.253 MEV) 13.669 CPS *****
 CH 107 (1.265 MEV) 11.918 CPS *****
 CH 108 (1.277 MEV) 12.345 CPS *****
 CH 109 (1.288 MEV) 10.738 CPS *****
 CH 110 (1.300 MEV) 11.444 CPS *****
 CH 111 (1.312 MEV) 11.433 CPS *****
 CH 112 (1.324 MEV) 11.927 CPS *****
 CH 113 (1.336 MEV) 11.846 CPS *****
 CH 114 (1.347 MEV) 11.895 CPS *****
 CH 115 (1.359 MEV) 11.745 CPS *****
 CH 116 (1.371 MEV) 11.864 CPS *****
 CH 117 (1.383 MEV) 10.286 CPS *****
 CH 118 (1.395 MEV) 12.984 CPS *****
 CH 119 (1.407 MEV) 9.542 CPS *****
 CH 120 (1.418 MEV) 11.778 CPS *****
 CH 121 (1.430 MEV) 12.636 CPS *****
 CH 122 (1.442 MEV) 10.601 CPS *****
 CH 123 (1.454 MEV) 9.140 CPS *****
 CH 124 (1.466 MEV) 11.144 CPS *****
 CH 125 (1.478 MEV) 10.765 CPS *****
 CH 126 (1.489 MEV) 9.259 CPS *****
 CH 127 (1.501 MEV) 11.961 CPS *****
 CH 128 (1.513 MEV) 10.296 CPS *****
 CH 129 (1.525 MEV) 10.900 CPS *****
 CH 130 (1.537 MEV) 9.022 CPS *****
 CH 131 (1.549 MEV) 10.311 CPS *****
 CH 132 (1.560 MEV) 10.151 CPS *****
 CH 133 (1.572 MEV) 9.361 CPS *****
 CH 134 (1.584 MEV) 8.752 CPS *****
 CH 135 (1.596 MEV) 10.178 CPS *****
 CH 136 (1.608 MEV) 10.049 CPS *****
 CH 137 (1.620 MEV) 10.551 CPS *****
 CH 138 (1.631 MEV) 9.204 CPS *****
 CH 139 (1.643 MEV) 9.158 CPS *****
 CH 140 (1.655 MEV) 8.738 CPS *****
 CH 141 (1.667 MEV) 8.679 CPS *****
 CH 142 (1.678 MEV) 10.154 CPS *****
 CH 143 (1.690 MEV) 9.743 CPS *****
 CH 144 (1.702 MEV) 9.453 CPS *****
 CH 145 (1.714 MEV) 9.418 CPS *****
 CH 146 (1.726 MEV) 9.225 CPS *****
 CH 147 (1.738 MEV) 9.293 CPS *****
 CH 148 (1.750 MEV) 9.653 CPS *****
 CH 149 (1.761 MEV) 9.412 CPS *****
 CH 150 (1.773 MEV) 9.019 CPS *****
 CH 151 (1.785 MEV) 9.329 CPS *****
 CH 152 (1.797 MEV) 10.232 CPS *****
 CH 153 (1.808 MEV) 9.686 CPS *****
 CH 154 (1.820 MEV) 7.911 CPS *****
 CH 155 (1.832 MEV) 8.184 CPS *****
 CH 156 (1.844 MEV) 8.175 CPS *****
 CH 157 (1.856 MEV) 9.775 CPS *****
 CH 158 (1.868 MEV) 8.568 CPS *****
 CH 159 (1.880 MEV) 8.195 CPS *****
 CH 160 (1.891 MEV) 8.014 CPS *****
 CH 161 (1.903 MEV) 8.365 CPS *****
 CH 162 (1.915 MEV) 8.759 CPS *****
 CH 163 (1.927 MEV) 6.994 CPS *****
 CH 164 (1.938 MEV) 8.477 CPS *****
 CH 165 (1.950 MEV) 8.144 CPS *****
 CH 166 (1.962 MEV) 7.701 CPS *****
 CH 167 (1.974 MEV) 8.214 CPS *****
 CH 168 (1.986 MEV) 9.246 CPS *****
 CH 169 (1.998 MEV) 7.945 CPS *****
 CH 170 (2.009 MEV) 7.615 CPS *****
 CH 171 (2.021 MEV) 6.816 CPS *****
 CH 172 (2.033 MEV) 8.408 CPS *****
 CH 173 (2.045 MEV) 7.198 CPS *****
 CH 174 (2.057 MEV) 7.231 CPS *****
 CH 175 (2.068 MEV) 7.473 CPS *****
 CH 176 (2.080 MEV) 9.082 CPS *****
 CH 177 (2.092 MEV) 8.656 CPS *****
 CH 178 (2.104 MEV) 8.235 CPS *****
 CH 179 (2.116 MEV) 8.211 CPS *****
 CH 180 (2.128 MEV) 8.233 CPS *****
 CH 181 (2.140 MEV) 8.055 CPS *****
 CH 182 (2.152 MEV) 7.825 CPS *****
 CH 183 (2.163 MEV) 7.662 CPS *****
 CH 184 (2.175 MEV) 8.536 CPS *****
 CH 185 (2.187 MEV) 8.895 CPS *****
 CH 186 (2.199 MEV) 7.785 CPS *****
 CH 187 (2.210 MEV) 8.211 CPS *****
 CH 188 (2.222 MEV) 8.233 CPS *****
 CH 189 (2.234 MEV) 8.055 CPS *****
 CH 190 (2.246 MEV) 7.825 CPS *****
 CH 191 (2.258 MEV) 7.662 CPS *****
 CH 192 (2.269 MEV) 8.435 CPS *****
 CH 193 (2.281 MEV) 7.448 CPS *****
 CH 194 (2.293 MEV) 7.686 CPS *****
 CH 195 (2.305 MEV) 7.118 CPS *****
 CH 196 (2.317 MEV) 7.320 CPS *****
 CH 197 (2.329 MEV) 7.998 CPS *****
 CH 198 (2.340 MEV) 7.771 CPS *****
 CH 199 (2.352 MEV) 7.147 CPS *****
 CH 200 (2.364 MEV) 6.729 CPS *****
 CH 201 (2.376 MEV) 6.264 CPS *****
 CH 202 (2.388 MEV) 6.318 CPS *****
 CH 203 (2.399 MEV) 7.058 CPS *****
 CH 204 (2.411 MEV) 6.506 CPS ***** THALLIUM 208
 CH 205 (2.423 MEV) 6.486 CPS *****
 CH 206 (2.435 MEV) 6.709 CPS *****
 CH 207 (2.447 MEV) 7.633 CPS *****
 CH 208 (2.459 MEV) 6.515 CPS *****
 CH 209 (2.470 MEV) 6.852 CPS *****
 CH 210 (2.482 MEV) 6.871 CPS *****
 CH 211 (2.494 MEV) 6.573 CPS *****
 CH 212 (2.506 MEV) 6.417 CPS *****
 CH 213 (2.518 MEV) 5.845 CPS *****
 CH 214 (2.529 MEV) 6.127 CPS *****
 CH 215 (2.541 MEV) 6.355 CPS *****
 CH 216 (2.553 MEV) 6.344 CPS *****
 CH 217 (2.565 MEV) 6.829 CPS *****
 CH 218 (2.577 MEV) 6.676 CPS *****
 CH 219 (2.589 MEV) 6.808 CPS *****
 CH 220 (2.600 MEV) 5.949 CPS *****
 CH 221 (2.612 MEV) 6.177 CPS *****
 CH 222 (2.624 MEV) 6.176 CPS *****
 CH 223 (2.636 MEV) 6.105 CPS *****
 CH 224 (2.648 MEV) 6.347 CPS *****
 CH 225 (2.660 MEV) 6.045 CPS *****
 CH 226 (2.672 MEV) 5.620 CPS *****
 CH 227 (2.683 MEV) 6.645 CPS *****
 CH 228 (2.695 MEV) 5.229 CPS *****
 CH 229 (2.707 MEV) 5.415 CPS *****
 CH 230 (2.719 MEV) 6.198 CPS *****
 CH 231 (2.730 MEV) 6.092 CPS *****
 CH 232 (2.742 MEV) 6.468 CPS *****
 CH 233 (2.754 MEV) 7.032 CPS *****
 CH 234 (2.766 MEV) 5.533 CPS *****
 CH 235 (2.778 MEV) 6.305 CPS *****
 CH 236 (2.790 MEV) 5.059 CPS *****
 CH 237 (2.801 MEV) 6.268 CPS ***** THALLIUM 208
 CH 238 (2.813 MEV) 6.045 CPS *****
 CH 239 (2.825 MEV) 5.257 CPS *****
 CH 240 (2.837 MEV) 5.646 CPS *****
 CH 241 (2.849 MEV) 5.835 CPS *****
 CH 242 (2.860 MEV) 5.348 CPS *****
 CH 243 (2.872 MEV) 4.804 CPS *****
 CH 244 (2.884 MEV) 4.748 CPS *****
 CH 245 (2.896 MEV) 5.055 CPS *****
 CH 246 (2.908 MEV) 5.248 CPS *****
 CH 247 (2.920 MEV) 6.036 CPS *****
 CH 248 (2.931 MEV) 5.711 CPS *****
 CH 249 (2.943 MEV) 5.513 CPS *****
 CH 250 (2.955 MEV) 5.018 CPS *****
 CH 251 (2.967 MEV) 5.572 CPS *****
 CH 252 (2.979 MEV) 6.256 CPS *****
 CH 253 (2.990 MEV) 5.267 CPS *****
 CH 254 (3.002 MEV) 9.302 CPS ***** TOTAL COUNT
 CH 255 (3.014 MEV) 1000.000 CPS *****

Thus, energy peaks within a spectrum of a given element are Gaussian shaped rather than pure line spectra. Additionally, we are dealing with finite spectral windows, multiple peaked spectra, and pulse pileup; all tend to couple each window's response to the other.

Keeping in mind that we are dealing with the count rates corresponding to the concentrations presented in the last table, we define the following:

KC_i = uncorrected system count rate for the K channel

UC_i = uncorrected system count rate for the U channel

TC_i = uncorrected system count rate for the T channel

K_i = the percent differential concentration of potassium

U_i = ppm differential concentration of uranium

T_i = ppm differential concentration of thorium

where "i" refers to the i th pad.

We also define the following:

ζ_{kk} = sensitivity of KC_i to concentrations of K_i

ζ_{ku} = sensitivity of KC_i to concentrations of U_i

ζ_{kt} = sensitivity of KC_i to concentrations of T_i

ζ_{uk} = sensitivity of UC_i to concentrations of K_i

ζ_{uu} = sensitivity of UC_i to concentrations of U_i

ζ_{ut} = sensitivity of UC_i to concentrations of T_i

ζ_{tk} = sensitivity of TC_i to concentrations of K_i

ζ_{tu} = sensitivity of TC_i to concentrations of U_i

ζ_{tt} = sensitivity of TC_i to concentrations of T_i

Using the above definitions, we now construct the functional relationship by means of the following nine (9) equations in sets of three (3) per pad.

<u>K pad</u>	$KC_k = \zeta_{kk}K + \zeta_{ku}U + \zeta_{kt}T$
	$UC_k = \zeta_{uk}K + \zeta_{uu}U + \zeta_{ut}T$
	$TC_k = \zeta_{tk}K + \zeta_{tu}U + \zeta_{tt}T$
<u>U pad</u>	$KC_u = \zeta_{kk}K + \zeta_{ku}U + \zeta_{kt}T$
	$UC_u = \zeta_{uk}K + \zeta_{uu}U + \zeta_{ut}T$
	$TC_u = \zeta_{tk}K + \zeta_{tu}U + \zeta_{tt}T$
<u>T pad</u>	$KC_t = \zeta_{kk}K + \zeta_{ku}U + \zeta_{kt}T$
	$UC_t = \zeta_{uk}K + \zeta_{uu}U + \zeta_{ut}T$
	$TC_t = \zeta_{tk}K + \zeta_{tu}U + \zeta_{tt}T$

Separating these equations into consistent groups, we get for the uncorrected count rates in the K channel

$$(K \text{ pad}) \quad KC_k = \zeta_{kk}K_k + \zeta_{ku}U_k + \zeta_{kt}T_k$$

$$(U \text{ pad}) \quad KC_u = \zeta_{kk}K_u + \zeta_{ku}U_u + \zeta_{kt}T_u$$

$$(T \text{ pad}) \quad KC_t = \zeta_{kk}K_t + \zeta_{ku}U_t + \zeta_{kt}T_t$$

The equations can be expressed in matrix notation

$$\begin{bmatrix} KC_k \\ KC_u \\ KC_t \end{bmatrix} = \begin{bmatrix} K_k & U_k & T_k \\ K_u & U_u & T_u \\ K_t & U_t & T_t \end{bmatrix} \cdot \begin{bmatrix} \zeta_{kk} \\ \zeta_{ku} \\ \zeta_{kt} \end{bmatrix}$$

Where the k, u and t subscripts represent the K, U and T pads.

In a similar manner we can write two other matrix equations for UC_i and TC_i respectively.

$$\begin{bmatrix} UC_k \\ UC_u \\ UC_t \end{bmatrix} = \begin{bmatrix} K_k & U_k & T_k \\ K_u & U_u & T_u \\ K_t & U_t & T_t \end{bmatrix} \cdot \begin{bmatrix} \zeta_{uk} \\ \zeta_{uu} \\ \zeta_{ut} \end{bmatrix}$$

$$\begin{bmatrix} TC_k \\ TC_u \\ TC_t \end{bmatrix} = \begin{bmatrix} K_k & U_k & T_k \\ K_u & U_u & T_u \\ K_t & U_t & T_t \end{bmatrix} \cdot \begin{bmatrix} \zeta_{tk} \\ \zeta_{tu} \\ \zeta_{tt} \end{bmatrix}$$

Collecting the above, these equations can be expressed in matrix form as

$$\begin{bmatrix} KC_k & UC_k & TC_k \\ KC_u & UC_u & TC_u \\ KC_t & UC_t & TC_t \end{bmatrix} = \begin{bmatrix} K_k & U_k & T_k \\ K_u & U_u & T_u \\ K_t & U_t & T_t \end{bmatrix} \cdot \begin{bmatrix} \zeta_{kk} & \zeta_{uk} & \zeta_{tk} \\ \zeta_{ku} & \zeta_{uu} & \zeta_{tu} \\ \zeta_{kt} & \zeta_{ut} & \zeta_{tt} \end{bmatrix}$$

or

$$\bar{A} = \bar{B} \cdot \bar{\zeta}$$

where \bar{A} is the residual count rate matrix, \bar{B} is the matrix of the known differential concentrations and $\bar{\zeta}$ the sensitivity matrix.

Rearranging the above equations we have

$$\bar{B} = \bar{A} \cdot \bar{\zeta}^{-1}$$

We now define

$$\bar{\zeta}^{-1} = \bar{\Delta}$$

Eliminating $\bar{\zeta}$, we get

$$\bar{B} = \bar{A} \cdot \bar{\Delta}$$

We can now solve for $\bar{\Delta}$ by matrix inversion.

Therefore, the differential concentrations in the mixed pad can be derived from the k,u,t pads to check the computed $\bar{\Delta}$.

$$\begin{bmatrix} K_m \\ U_m \\ T_m \end{bmatrix} = \begin{bmatrix} \Delta_{kk} & \Delta_{ku} & \Delta_{kt} \\ \Delta_{uk} & \Delta_{uu} & \Delta_{ut} \\ \Delta_{tk} & \Delta_{tu} & \Delta_{tt} \end{bmatrix} \cdot \begin{bmatrix} KC_m \\ UC_m \\ TC_m \end{bmatrix}$$

where the subscript m refers to the mixed pad. Expanding this in algebraic form we obtain the following set of equations:

$$K_m = \Delta_{kk}(KC_m + \frac{\Delta_{ku}}{\Delta_{kk}} UC_m + \frac{\Delta_{kt}}{\Delta_{kk}} TC_m)$$

$$U_m = \Delta_{uu}(UC_m + \frac{\Delta_{ut}}{\Delta_{uu}} TC_m + \frac{\Delta_{uk}}{\Delta_{uu}} KC_m)$$

$$T_m = \Delta_{tt}(TC_m + \frac{\Delta_{tu}}{\Delta_{tt}} UC_m + \frac{\Delta_{tk}}{\Delta_{tt}} KC_m)$$

The terms in parentheses in the above 3 equations are the "corrected stripped count rates" for the system, and the stripping coefficients are as follows:

$$S_{ku} = \frac{\Delta_{ku}}{\Delta_{kk}} \quad (\text{effect of uranium on potassium})$$

$$S_{kt} = \frac{\Delta_{kt}}{\Delta_{kk}} \quad (\text{effect of thorium on potassium})$$

$$S_{ut} = \frac{\Delta_{ut}}{\Delta_{uu}} \quad (\text{effect of thorium on uranium})$$

$$S_{uk} = \frac{\Delta_{uk}}{\Delta_{uu}} \quad (\text{effect of potassium on uranium})$$

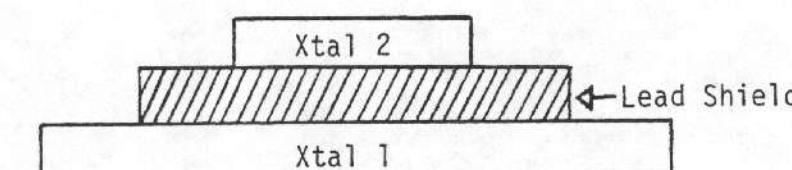
$$S_{tu} = \frac{\Delta_{tu}}{\Delta_{tt}} \quad (\text{effect of uranium on thorium})$$

$$S_{tk} = \frac{\Delta_{tk}}{\Delta_{tt}} \quad (\text{effect of potassium on thorium})$$

These stripping coefficients are defined in terms of S_{ij} in order to eliminate confusion with α , β , and γ , which are sometimes defined slightly differently.

ATMOSPHERIC RADON CORRECTION

Consider the crystal configuration shown below:



Let 1 and 2 designate the down and up crystal respectively. The down crystal sees radiation rates of I_1 composed of the air signal I_a and the ground signal I_g plus aircraft and cosmic background.

$$\text{Therefore } I_1 = I_g + I_a + A_1 + C_1$$

Similarly, the up crystal sees the air signal and ground signal (both somewhat attenuated) plus an aircraft and cosmic background.

$$\text{Therefore } I_2 = \ell I_g + mI_a + A_2 + C_2$$

Where m is the response to the air signal and ℓ is the % of the ground signal getting through to the up detector.

Using the test pad data, the factor ℓ can be determined. Consider the two previous equations. When we subtract the matrix pad data from the K, U, and T pad data, we have essentially set A_1 , A_2 , C_1 , and C_2 and I_a equal to zero.

$$\text{Therefore } I_1 = I_g$$

$$I_2 = \ell I_g$$

$$= \left(\frac{I_2}{I_1} \right)$$

Instead of using the count rates we can use the resultant sensitivities $1/\Delta_{uu}$ to determine ℓ for the elemental channel U.

$$= \frac{1/\Delta_{uu} \text{ (up)}}{1/\Delta_{uu} \text{ (down)}}$$

It should be noted that due to "shine around" (since the shielding is not an infinite plane, the upward looking crystal responds to the surrounding terrain) on the test pads, as altitude increases, should decrease, thus $\ell = f(h)$.

Only the factor m remains to be determined. This unfortunately cannot be determined from test pad data. It can however be determined by flying over water (e.g. use of the Lake Mead over-water data).

Consider the equations for I_1 and I_2 again

$$I_1 = I_g + I_a + A_1 + C_1$$

$$I_2 = \ell I_g + mI_a + A_2 + C_2$$

$$\text{Over water } I_g = 0$$

We have A_1 , A_2 , C_1 , and C_2 defined.

Removing the aircraft and cosmic background from the over water data and we are left with

$$I_1 = I_a$$

$$I_2 = mI_a$$

Since m is the shielding factor response to the air signal, we should have an air signal to "shield". Thus m is best determined if there is radon present.

Both up and down counting rates are corrected for aircraft and cosmic background and so we can solve the following two equations for I_a :

$$I_1 = I_g + I_a$$

$$I_2 = \ell I_g + mI_a$$

$$mI_a = I_2 - \ell I_g$$

$$\text{but } I_g = I_1 - I_a$$

$$\text{then } I_a (m - \ell) = I_2 - \ell I_1$$

$$\text{or } I_a = \frac{I_2 - \ell I_1}{m - \ell} = \text{Bi Air}$$

and I_a is then the Bi Air contribution from the surrounding air. This is then subtracted from the down looking U count resulting in corrected data.

DATA PROCESSING

DATA PREPARATION

The following sections summarize the techniques used for reduction and processing of the airborne data collected by geoMetrics.

Field Tape Verification and Edit

The field data tapes containing the airborne data are read on a computer to verify the recording and data quality. Data recovery is essentially 100% from the field tapes. During this phase, statistics are generated summarizing all the variables recorded for each flight line. Simultaneously, the spectral peaks are evaluated for shifts using a centroid calculation and the particular window's peak channel. The data are also checked for correct scan lengths and proper justification of data fields within each scan and live time calculations are made. During this process, the desired window data fields are extracted from each spectrum and rewritten as a reformatted copy tape. (Portions of this operation were performed in the field using the G-725 field computer system.)

The reformatted raw data for each flight line (with aborted or unnecessary flight line data edited out) are then checked for consistency, data spikes, gradients, etc. Every correction suggested by the computer is evaluated by the data processing personnel prior to implementation. Upon completion of the phase, the data on the output tape are "clean" and ready for subsequent correction of the radiometrics and tieing of the magnetics.

Flight Line Location

A single frame 35 mm camera is used for obtaining position recovery information. The photo locations are spotted or transferred to a suitable base map and are digitized. The fiducial numbers of the spotted points along each line are entered during the digitizing process. A computer program is used to check the consistency of these data using calculated intersections from tie line to tie line and from traverse to traverse. This program allows easy detection of entry errors as well as potential flight path recovery errors.

A computer program then calculates the map location for each intersection and the beginning and end of each line based on the fiducial numbers and the control line/tie grid. A computer plot is made of these locations to check against the field plot and correct editing

information. These flight lines are then overlain on the geologic base map and each map unit is digitized such that each sample falls within a single unit. This resulting location information is then merged with the geophysical data using the fiducial numbers as common reference.

RADIOMETRIC DATA REDUCTION

Reduction of the raw window data was carried out utilizing system calibration constants as derived from high altitude over water flights, Lake Mead Dynamic Test Range, and the Walker Field Test Pads. The data reduction sequence used is summarized in Figure VII. Processing of the data was performed using the window energies given below:

Total count - 0.4 to 3.0 MeV

K - 1.37 to 1.57 MeV

U - 1.66 to 1.87 MeV (downward looking system)

U_{up} - 1.04 to 1.21 MeV and 1.65 to 2.42 MeV (upward looking system)

T - 2.41 to 2.81 MeV

Cosmic - 3 to 6 MeV (downward and upward looking system)

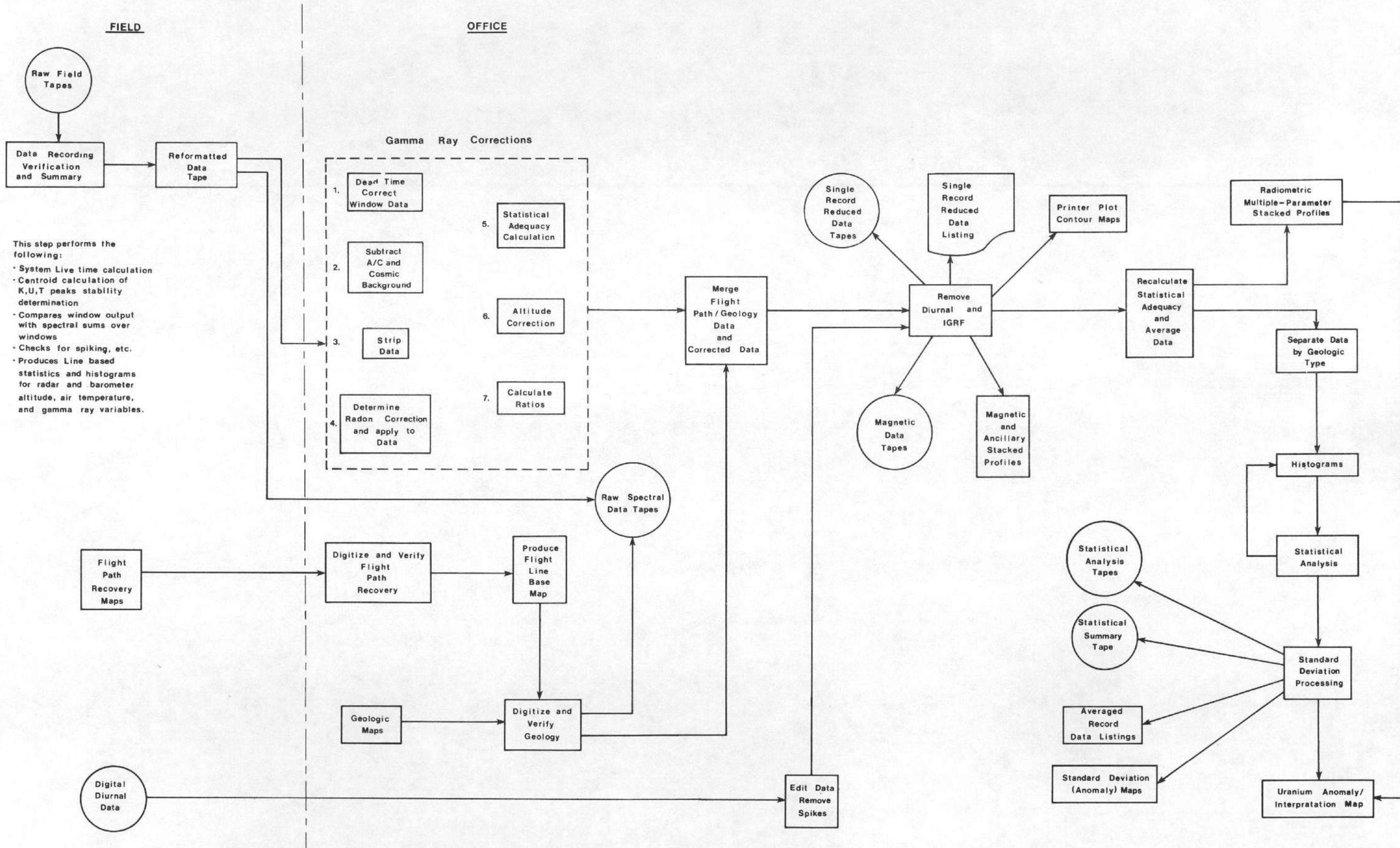
Aircraft and Cosmic background for the Queen Air/Aero Commander over these windows are as follows:

	<u>QUEEN AIR</u>		<u>AERO COMMANDER</u>	
	Aircraft	Cosmic*	Aircraft	Cosmic*
TC (cps)	152.04	2.3833	220.37	2.3915
K (cps)	16.06	0.1322	18.82	0.1334
U_{dn} (cps)	6.50	0.1098	10.85	0.1082
U_{up} (cps)	3.17	0.5540	5.35	0.5915
T (cps)	3.42	0.1503	4.35	0.1513

*Cosmic background values are in cps per 1.0 cps in the 3-6 MeV window.

DATA PROCESSING FLOW DIAGRAM

FIGURE VI



Compton corrections to the down data were made using the following constants:

<u>S_{ij}</u>	QUEEN AIR	AERO COMMANDER
S _{ku}	0.8437	0.8717
S _{kt}	0.1584	0.1408
S _{ut}	0.2703	0.2877
S _{uk}	0.0	0.0
S _{tu}	0.05614	0.09453
S _{tk}	0.0	0.0

The ij subscripts represent the influence of the j^{th} window on the i^{th} window.

All parameters except for S_{ut} are considered constants. S_{ut} was considered an altitude dependent parameter utilizing the following expression (after Grasty, 1975).

$$S_{ut} = S_{ut_0} + 0.0076h, \text{ where } h \text{ is the altitude in hundreds of feet.}$$

Altitude attenuation coefficients used are defined as follows:

ALTITUDE ATTENUATION COEFFICIENTS		
	QUEEN AIR	AERO COMMANDER
TC (per foot)	0.002011	0.001688
K (per foot)	0.002740	0.002800
U (per foot)	0.002479	0.002536
T (per foot)	0.002048	0.002102

All radiometric data presented in the strip charts have been normalized to 400 feet mean terrain clearance at STP using the expression:

$$\exp - u_i \frac{273.15}{760} \times \frac{P}{T} (h - 400)$$

where h is the height in feet, u_i is the appropriate altitude attenuation coefficient, P is in mm of Hg, and T is in degrees Kelvin. In cases where the altitude exceeds 1,000 feet, the correction coefficients were limited to the 1,000 foot value.

Bi Air calculations are made using the following expressions:

$$U_{\text{up}} = (R_{us} + \frac{C'_{uk}}{C'_{uu}} R_{ks} + \frac{C'_{ut}}{C'_{uu}} R_{ts}) \ell$$

$$Bi_{\text{Air}} = \frac{U_{\text{up}}}{m - \ell}$$

Where U_{up} = count rate from upward detectors

ℓ = crystal coupling constant

m = crystal geometric factor

C'_{uk} , C'_{ut} , C'_{uu} , = stripping coefficients relating down data to up data

R_{us} = stripped uranium count rate - down system

R_{ks} = stripped potassium count rate - down system

R_{ts} = stripped thorium count rate - down system

The numerical values for the constants ℓ , m , C'_{uk} , and C'_{uu} are given below:

	QUEEN AIR	AERO COMMANDER
ℓ	0.1101	0.0890
m	0.596	0.445
C'_{uk}	0.00947	0.00964
C'_{uu}	0.07136	0.08562
C'_{ut}	0.04636	0.05644
$\mu\ell$	-0.000032	-0.00019
μm	-0.000192	-0.000112

μ_l & μ_m are altitude dependent as follows:

$$l = l - \mu_l \times h, \text{ where } h \text{ is in feet}$$

$$m = m - \mu_m \times h, \text{ where } h \text{ is in feet}$$

These Bi Air data are filtered and the filtered results are then removed on a point by point basis from the corrected uranium window data.

The window data are then evaluated for statistical adequacy prior to altitude correction to ensure they are significant within the context of the anticipated errors in count statistics.

Statistical Adequacy Test

The statistical adequacy test is made to determine whether the corrected data sample is sufficiently greater than the "noise" to represent the "signal" of interest.

We can define three separate criteria for detection thresholds (ref. Currie, Analytical Chemistry, Volume 40, No. 3, March 1968) of which only one is directly applicable to our case; this is the "critical level". This is the level at which the decision is made that a signal is "detected". We thus define this critical level as that level at which the data are statistically adequate.

Setting the actual levels in counts per second, "a priori" for each elemental window is difficult at best since the full effect of all parameters affecting the counts is not known to a sufficient degree of certainty. If the corrections to the data are a significant portion of the count rate, most of the error (exclusive of systematic errors due to electronics, etc.) in the corrected data can be ascribed to random errors within the applied corrections. The corrections are basically the results of counting radioactive decay products (gamma rays) and are therefore assumed to follow the classical Poisson distribution. The following assumptions concerning these corrections are:

1. In the best case, the error in each correction is additive.
2. The sum of these corrections also follows a Poisson distribution.
3. The uncertainty in the correction itself is equal to the square root of the correction applied.
4. This uncertainty is directly reflected in the corrected single record count rate.

With these assumptions in mind, the criterion for determining the statistical adequacy of a given data sample is defined as follows:

"If a corrected single record data sample exceeds 1.5 times the square root of the summed correction applied to that data sample, then that data sample is statistically adequate."

Since any calculation using statistically inadequate data (such as ratios) is also inadequate, the adequacy of each element of the single sample record data is tested prior to the calculation. This is done during the course of the processing by retaining all corrections applied to each data sample and determining its adequacy as explained above.

Not only are the results of this statistical adequacy test used to insure that calculated ratios will be meaningful but they are also utilized to determine the optimum interval over which the data should be averaged (e.g. 5 seconds or 7 seconds, etc.) to improve the overall data statistical adequacy. In the case of this project, the resulting averaging sample interval was 7 seconds.

Conversion to Equivalent ppm and Percent

At this point the data are single record corrected samples in units of counts per second. These data are then converted to equivalent ppm (parts per million) uranium, thorium and percent potassium. The conversion factors are the sensitivities derived from the Lake Mead Dynamic Test Range data at 400 feet mean terrain clearance.

Radioelement	Equivalent Percent/ppm	Queen Air Counts/Second	Aero Commander Counts/Second
K	1%K	91.5	96.3
U	1 ppmeu	10.4	9.2
T	1 ppmet	6.4	6.7

DATA PRESENTATION

MAGNETIC DATA REDUCTION

The magnetic data reduction processes are: correction for diurnal variation, tieing to a common magnetic datum, and subtraction of the regional magnetic field as defined by the International Geomagnetic Reference Field (IGRF). During data acquisition, the magnetic field is monitored by a ground-based diurnal magnetometer that samples every four seconds at a sensitivity of one-quarter gamma. These data are recorded on magnetic tape along with the time for synchronization with the airborne data.

The diurnal data are edited to keep only samples taken during flight time and remove spikes and man-made magnetic events. After editing, these data are displayed in profile form to ensure that all corrections necessary have been made. Next, the data are synchronized in time with the airborne data, interpolated, and subtracted from the airborne magnetic data.

The diurnally corrected magnetic data are then processed by a tieing program that compares the magnetic differences at intersections of flight lines and tie lines. This program calculates individual magnetic field biases for each flight tie line based on tie line intersections. This allows miss-ties to be minimized throughout the survey. These biases usually represent, after diurnal correction, systematic magnetic changes caused by such things as heading error, changes in location of the ground-based magnetometer, or changes in the airborne equipment. The biases are manually evaluated and selectively applied.

General

The majority of the data products are presented in this report. These include the uranium anomaly/interpretation maps and pseudo-contour maps of potassium, uranium, thorium, and magnetic data which are integrated as part of the text in the interpretation section. In addition to these data, this report contains data presented in the form of radiometric profiles, flight path recovery maps, standard deviation maps, and histograms. Microfiche data are contained in the back cover of each report. Data tapes are available separately.

Radiometric Profiles

Stacked profiles were prepared from the averaged data for each traverse and tie line. These stacked profiles, plotted at a linear scale of 1:250,000, contain the following parameters: corrected Total Count, percent potassium, equivalent ppm uranium, equivalent ppm thorium, eU/eT, eU/%K, and eT/%K ratios, equivalent ppm Bi Air, radar altimeter, and magnetometer data. Each of the stacked profile sheets contains a plot of the flight path superimposed on a geologic strip map. Included along these profiles are the fiducial numbers which correspond to flight path position as displayed on the flight path recovery maps. Each of the stacked profiles represents the data contained on the specific flight line within the boundaries of the specified NTMS Quadrangle sheet.

Radiometric traces on the stacked profiles contain an indicator showing those data which are statistically inadequate. These statistically inadequate data are marked by a small vertical tick at the sample location. The altitude profile has been limited in display to 1,000 feet. A dashed line at the 700 foot level is presented to show those data which do not meet the altitude specifications. The vertical scale of each variable remains constant on all stacked profiles. When overranging occurs, the trace is stepped and the step labeled showing the actual value. A pictorial representation of such a stepping profile is shown in Figure VIII. At the end of each stacked profile, a statistical summary of the minimum value, maximum value, mean, and standard deviation for that variable is presented.

This report contains an equivalent set of stacked profiles for each quadrangle, photographically reduced to an approximate scale of 1:500,000.

MAGNETIC PROFILES

A set of profiles containing the magnetic data (corrected, with IGRF removed), barometric altimeter data, radar altimeter data, diurnal monitor data, and temperature data are available at a linear scale of 1:250,000. Each of the stacked profiles contains a plot of the flight path superimposed on the geology over which the aircraft flew. Reduced scale (1:500,000) copies of these are presented in of this report.

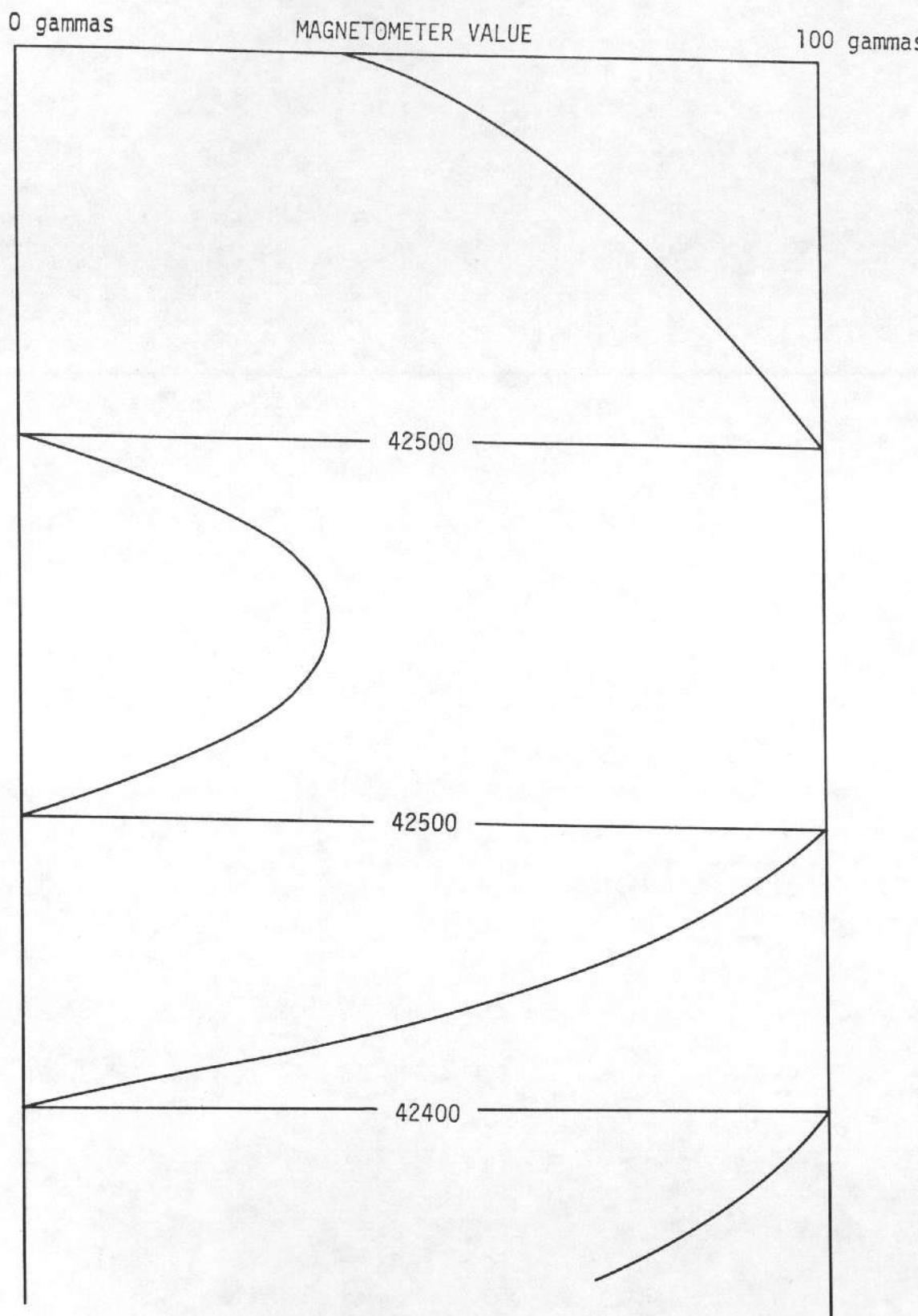


FIGURE VIII Plotter Step Value Labeling

FLIGHT PATH MAP

For each of the NTMS quadrangle sheets covered by this survey, a flight path position map is available at a scale of 1:250,000. The actual flight path has been superimposed on the geologic quadrangle maps. Flight lines and tie lines are annotated along with fiducial numbers of located positions. Reduced scale (1:500,000) copies of these can be found in this report.

STANDARD DEVIATION MAP

Gamma ray standard deviation maps have been prepared for each NTMS quadrangle included in this survey. The six maps generated represent the following parameters: percent potassium, equivalent ppm uranium, equivalent ppm thorium, and eU/eT, eU/%K and eT/%K ratios. The data contained in each map represent only those data which are considered statistically adequate. This automatically excludes all data collected over water or data which falls outside of altitude specifications (i.e. altitude greater than 700 and less than 200 feet). The symbolism of each of the six maps is identical. The center of each circle represents the central averaged sample since the data had been averaged over a 7 second interval. The small boxes adjacent to each of the circles represents one standard deviation from the mean for that specific data sample. In order to determine whether the data shown are represented by positive or negative standard deviations, consider each map with north pointing away from the viewer. For east/west lines (traverse lines) positive standard deviations lie above or to the north of the traverse line with negative standard deviation below or to the south. On the north/south lines (tie lines) positive standard deviations are to the left of the viewer (west) with negative standard deviations to the right (east).

These maps were generated at a scale of 1:250,000 for each NTMS sheet and in addition, are presented in each report at a reduced scale of approximately 1:500,000.

HISTOGRAM

Computer generated histograms, showing the equivalent ppm and percent distributions for the three gamma ray emitters and their ratios measured and calculated as a function of computer map unit are presented in this report (See Figure IX). Information contained on these histograms includes the standard deviation as calculated about the arithmetic mean (or median), and the total number of samples from which the statistics were derived.

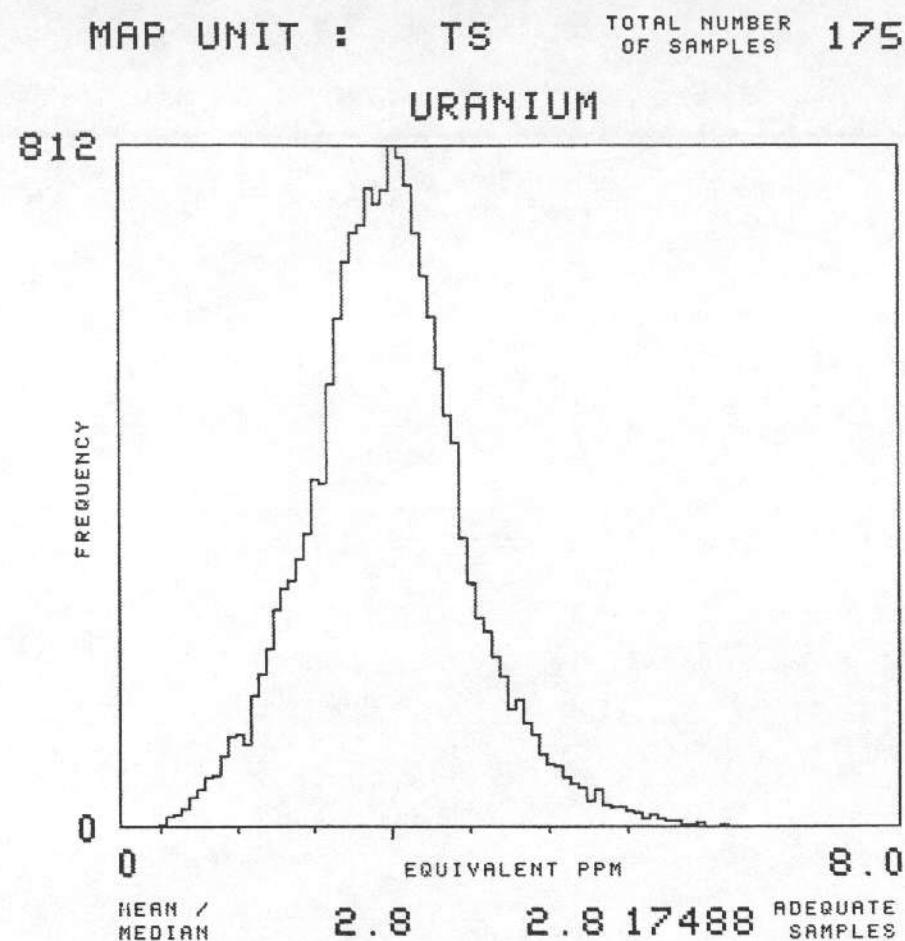


FIGURE IX Sample Computer Map Unit Histogram

DATA LISTINGS

Single record reduced and averaged record (statistical analysis) data listings have been prepared on microfiche. The microfiche are contained in each report. Each of the single record and averaged record data listings are presented for the data contained in a single quadrangle. The data contained in the single record data listings are summarized below:

1. Fiducial number
2. System/Quality (SAKUT) - The first digit identifies the system used to collect the sample. The remaining digits define the results of statistical adequacy testing for altitude, potassium, uranium, and thorium. A value of 0 indicated that the data are statistically adequate. A value of 1 indicates that the data are statistically inadequate. All data collected in excess of 700 feet and less than 200 feet are considered statistically inadequate.
3. Time - time presented in hours, minutes, and seconds
4. Altitude - altitude presented in feet above terrain
5. LAT/LONG - Latitude and Longitude presented in terms of decimal degrees
6. Magnetic field expressed in residual gammas
7. Geology - code representing geologic units
8. %K, eU, eT - percent potassium, equivalent ppm of uranium and thorium
9. eU/eTH, eU/%K, eTH/%K - calculated ratios of the three parameters
10. Total count - corrected total count data (0.4 to 3.0 MeV)
11. COS - downward looking cosmic count rate in the 3-6 MeV channel
12. Uair - atmospheric Bi-214 equivalent ppm
13. Temperature - outside air temperature in degrees centigrade
14. Press - barometric pressure in mm of mercury

The averaged record (statistical analysis) data listings are summarized below:

1. Fiducial number
2. System/Quality (SAKUT) - The first digit identifies the system used to collect the sample. The remaining digits define the results of statistical adequacy testing for altitude, potassium, uranium, and thorium. A value of 0 indicated that the data are statistically adequate. A value of 1 indicates that the data are statistically inadequate. All data collected in excess of 700 feet and less than 200 feet are considered statistically inadequate.
3. LAT/LONG - Latitude and longitude presented in terms of decimal degrees
4. Magnetic field expressed in residual gammas
5. Geology - code representing geologic formations
6. %K, eU, eT - percent potassium, equivalent ppm of uranium and thorium data and the number of (\pm) standard deviations from the mean
7. eU/eTh, eU/%K, eTh/%K - calculated ratios of the three parameters, and the number of (\pm) standard deviations from the mean
8. Total count - corrected total count data (0.4 to 3.0 MeV)
9. COS - downward looking cosmic count rate in the 3-6 MeV channel
10. Uair - atmospheric Bi-214 in equivalent ppm

DATA TAPES

Data tape files have been generated for each of the 1:250,000 NTMS quadrangle sheets. The tapes are IBM compatible and recorded on 9 track EBCDIC at 800 bpi. Five separate types of data tapes are presented: raw spectral data tapes, single record reduced data tapes, statistical analysis tapes, magnetic data tapes and a statistical analysis summary tape. Detailed descriptions of the data tape formats follow this discussion.

DATA INTERPRETATION METHODS

General

The stated objective of the NURE Program is the evaluation of the uranium potential of the United States. In support of this goal, high sensitivity airborne radiometric and magnetic surveys have been implemented to obtain reconnaissance information pertaining to regional distribution of uraniferous materials. Within this context, data interpretation has been oriented toward regional detection and description of anomalously high concentrations of uranium.

By far the most significant natural sources of gamma radiation in the geologic environment are the radioactive decay series of potassium 40 (K40), thorium 232 (Th232) and uranium 238 (U238) of which 0.7% is uranium 235. Potassium 40 is the largest contributor to natural radioactivity, accounting for nearly 98%, as it is the most abundant gamma ray emitter-.012% of all potassium in nature. (Refer to GSA Memoir 97 for abundances of uranium, thorium, and potassium).

Potassium 40 is directly identified by the airborne spectrometer from a single clear peak at 1.46 mev (million electron volts) in its gamma ray spectrum. However, thorium 232 and uranium 238 do not have any clear, distinct peaks at sufficiently high energies to allow direct detection from airborne systems. Instead, daughter products which do have distinct peaks are measured as representing the abundance of the parent element. For thorium 232, the daughter nuclide thallium 208 (Tl208) has a distinct peak at 2.62 meV while uranium 238 has a daughter, bismuth 214 (Bi214) possessing a clear peak at 1.76 meV (see Figure 7 for a composite decay series spectrum). Consequently the fundamental assumption implicit to airborne uranium and thorium measurements is that the measured daughter products are in radioactive equilibrium - the number of atoms of disintegrating daughter nuclides are equal to the number being formed (see Adams and Gasparini, 1970).

An airborne gamma ray measurement is the sum of photons counted during a specified time interval from a multitude of gamma ray sources which include the three geologic emitters that are being sought plus other interfering sources. These others include, but are not limited to higher energy cosmic rays, aircraft and instruments, contributions from overlapping decay series and airborne radon 222. (See Burson, 1974 and McSharry, 1973 for a more complete discussion of airborne radiometric measurements, and Radiometric Data Reduction in this volume for a complete description of data correction procedures).

When correlating ground data (geochemical, geological, etc.) with the corrected data derived from raw airborne measurements, the interpreter must remember what an individual airborne gamma ray sample physically measures. First, the terrestrial component of the gamma radiation measured by the airborne detector emanated primarily from the upper 18 inches of material on the earth's surface (Gregory and

Horwood, 1963). The airborne measurement cannot "see" any deeper into the underlying rock material and is essentially a measurement of the soil's or exposed (weathered) rock's radioactivity. Secondly, since each airborne sample is an accumulation of gamma rays measured on a moving platform over a fixed period of time, the individual sample represents a large areal extent of surficial material. For this survey, with specifications of 400 feet mean terrain clearance and an average ground speed of 140 miles per hour, a one second sample corresponds to an oval approximately 750 feet long by 600 feet wide (assuming an infinite, uniformly distributed source). Accordingly, averaged samples represent tremendous volumes of surficial materials.

Methodology

As described previously, the gamma ray data were located by computer map units, histograms were produced and statistical analyses performed. The basic unit for interpretation then is the averaged sample and its attendant deviations about a particular map unit's mean.

The uranium anomaly/interpretation map displays each individual averaged sample that meets the following criteria:

1. The averaged uranium sample must be greater than or equal to 1 standard deviation above its map unit mean.
2. The sample must have a U/T ratio greater than or equal to 1 standard deviation above its unit mean.
3. Each U/T ratio defined in (2) must have a corresponding thorium value lying at least greater than minus one (-1) standard deviation below the mean. If the thorium sample is less than one standard deviation below the mean, the U/T ratio is considered questionable.

All the possible anomalies displayed on the map are then examined for clusters, trends, and comparisons with all other available data.

Minimum requirements in the subsequent interpretation discussions of each quadrangle for anomalies listed in the uranium anomaly summary are defined as follows:

Two (2) consecutive averaged U samples lying two or more standard deviations above the mean or three (3) consecutive averaged U samples, two of which are one (1) or more standard deviations and the third of which is two (2) or more standard deviations above the mean.

Statistical anomalies which meet the above criteria can result from several factors or circumstances including: (1) true concentration of uraniferous minerals, (2) differential surface cover (soils and/or

vegetation) within a lithologic unit, (3) local weather conditions such as rain and snow, (4) extreme facies variation within a mapped unit, and (5) differential weathering of rocks within mapped units. Obviously an averaged sample which lies on the boundary between two map units is not truly reflecting either one, but is rather an average of both. Thus, for two markedly different units, such a sample would be anomalous relative to one of the units and not be a true indication of radioactive differences within the unit.

The percent potassium, equivalent ppm thorium and uranium, the three ratios and residual magnetic data were plotted as separate pseudo-contour maps and overlain on the geologic base map and standard deviation maps. Regional trends of each variable and average values could thus be easily and quickly determined and compared with the associated geological, magnetic, and statistical trends. Only the long wavelengths within each variable would show any line-to-line continuity on the pseudo-contour maps and thus, only regional trends will appear.

Each quadrangle's stacked profiles were also overlain on the corresponding geologic and standard deviation maps and anomaly map to further delineate trends and to allow a more detailed analysis of individual anomalies. Since the interpretation was concentrated on detection of anomalous uranium, subtle trends present in the potassium and thorium channels and ratios were only examined in a cursory manner. Even during such a brief examination of the profiles, it was evident that the spectrometer system was highly sensitive to changes in surface materials even in areas of low counting rates such as glacial drift. Thus radiometrics have a real potential for performing general superficial mapping "geochemical analysis" on a geologic unit (or soils) basis in addition to merely radioactive mineral "anomaly hunting".

TAPE FORMATS			ITEM	FORMAT	DESCRIPTION
SINGLE RECORD REDUCED DATA TAPE			13	I3	NUMBER OF CHANNELS (0-3 MEV) IN 4PI SYSTEM FOR FIRST AERIAL SYSTEM
REFERENCE: Paragraphs 4.7.6 and 6.1.6, BFEC 1200-C			14	I3	NUMBER OF CHANNELS (0-3 MEV) IN 2PI SYSTEM FOR FIRST AERIAL SYSTEM
The Single Record Tape is an unlabeled, nine track, 800 BPI, NRZI. All data are recorded as EBCDIC characters. Each tape contains but one file of format, header, data, and trailer records for no more than one quadrangle. The tape is divided into 6900-character blocks containing the following information.			15-24	(SAME)	REPEAT OF ITEMS 5-14 FOR SECOND AERIAL SYSTEM
			*	*	*
			*	*	*
			*	*	*
			85-94	(SAME)	REPEAT OF ITEMS 5-14 FOR NINTH AERIAL SYSTEM
			95	I3	NUMBER OF FLIGHT LINES ON THIS TAPE
			96	I4	FIRST FLIGHT LINE NUMBER ON THIS TAPE
			97	I6	FIRST RECORD NUMBER OF FIRST FLIGHT LINE
			98	I3	JULIAN DATE (DAY OF YEAR) FIRST FLIGHT-LINE DATA WAS COLLECTED
			99-101	I4,I6,I3	REPEAT OF ITEMS 96-98 FOR SECOND FLIGHT LINE ON THIS TAPE
			*	*	*
			*	*	*
			*	*	*
02 0978 (DATA TAPE TYPE AND FORMAT SPECIFICATION DATE CODES)			390-392	I4,I6,I3	REPEAT OF ITEMS 96-98 FOR 99th FLIGHT LINE ON THIS TAPE
SINGLE RECORD REDUCED DATA TAPE					
FORMAT FOR TAPE IDENTIFICATION BLOCK (SECOND BLOCK)					
ITEM	FORMAT	DESCRIPTION	FORMAT FOR SINGLE RECORD REDUCED DATA RECORD (THIRD THRU LAST BLOCK)		
1.	A40	QUADRANGLE NAME AS PROJECT IDENTIFICATION	1	I1	AERIAL SYSTEM IDENTIFICATION CODE
2.	A20	NAME OF SUBCONTRACTOR	2	I4	FLIGHT LINE NUMBER
3.	I4	APPROXIMATE DATE OF SURVEY (MONTH, YEAR)	3	I6	RECORD IDENTIFICATION NUMBER
4.	I1	NUMBER OF AERIAL SYSTEMS USED TO COLLECT DATA FOR THIS QUADRANGLE	4	I6	GMT TIME OF DAY (HHMMSS)
5.	I1	AERIAL SYSTEM IDENTIFICATION CODE FOR FIRST SYSTEM	5	F8.4	LATITUDE TO FOUR DECIMAL PLACES IN DEGREES
6.	A20	AIRCRAFT IDENTIFICATION BY TYPE AND FAA NUMBER FOR FIRST SYSTEM	6	F8.4	LONGITUDE TO FOUR DECIMAL PLACES IN DEGREES
7.	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO TERRESTRIAL POTASSIUM (K-40) TO ONE DECIMAL PLACE IN CPS PER PERCENT K	7	F6.1	TERRAIN CLEARANCE TO ONE DECIMAL PLACE IN METERS
8.	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO TERRESTRIAL URANIUM (BI-214) TO ONE DECIMAL PLACE IN CPS PER PPM EQUIVALENT U	8	F7.1	RESIDUAL (IGRF REMOVED) MAGNETIC FIELD INTENSITY TO ONE DECIMAL PLACE IN GAMMAS
9.	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO TERRESTRIAL THORIUM (TL-208) TO ONE DECIMAL PLACE IN CPS PER PPM EQUIVALENT TH	9	A8	SURFACE GEOLOGIC MAP UNIT CODE
			10	I4	QUALITY FLAG CODES
			11	F6.1	APPARENT CONCENTRATION OF TERRESTRIAL POTASSIUM (K-40) TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
			12	F4.1	UNCERTAINTY IN TERRESTRIAL POTASSIUM TO ONE DECIMAL PLACE IN PERCENT K
			13	F6.1	APPARENT CONCENTRATION OF TERRESTRIAL URANIUM (BI-214) TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
			14	F4.1	UNCERTAINTY IN TERRESTRIAL URANIUM TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
			15	F6.1	APPARENT CONCENTRATION OF TERRESTRIAL THORIUM (TL-208) TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH
			16	F4.1	UNCERTAINTY IN TERRESTRIAL THORIUM TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH

<u>ITEM</u>	<u>FORMAT</u>	<u>DESCRIPTION</u>
17	F6.1	URANIUM-TO-THORIUM RATIO TO ONE DECIMAL PLACE IN PPM EQUIVALENT U PER PPM EQUIVALENT TH
18	F6.1	URANIUM-TO-POTASSIUM RATIO TO ONE DECIMAL PLACE IN PPM EQUIVALENT U PER PERCENT K
19	F5.1	THORIUM-TO-POTASSIUM RATIO TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH PER PERCENT K
20	F8.1	GROSS GAMMA (0.4-3.0 MEV) COUNT RATE TO ONE DECIMAL PLACE IN COUNTS PER SECOND
21	F6.1	UNCERTAINTY IN GROSS GAMMA COUNT RATE TO ONE DECIMAL PLACE IN COUNTS PER SECOND
22	F5.1	ATMOSPHERIC BI-214 4PI CORRECTION TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
23	F4.1	UNCERTAINTY IN ATMOSPHERIC BI-214 4PI CORRECTION TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
24	F4.1	OUTSIDE AIR TEMPERATURE TO ONE DECIMAL PLACE IN DEGREES CELSIUS
25	F5.1	OUTSIDE AIR PRESSURE TO ONE DECIMAL PLACE IN MMHG

This description serves to identify the format of data on subsequent blocks on the tape. The remaining 132 characters on this block are blanks.

Block 2 - Single Record Reduced Identification Data

The second block contains the identifier information for the data contained in subsequent blocks. The identification information is written according to the format description in the first half of the first block. The remaining 4978 characters on this block are blanks.

Block 3 - Single Record Reduced Data

These blocks contain data written according to the format description in the second half of the first block. There will be 50 logical records per physical block. As of August 1979, the method for determining uncertainties specified in the data blocks remains undefined, and those values are filled with 9's under format control.

STATISTICAL ANALYSIS TAPE

REFERENCE: Paragraphs 4.7.7 and 6.1.6, BFEC 1200-C

The statistical analysis data tape is an unlabeled, nine track, 800 BPI, NRZI. All data is recorded as EBCDIC characters. The block length is 8000 characters long. Each tape contains one file of data for no more than one quadrangle.

Block 1 - Format Description Data

The first physical block on this tape contains a format description for data on subsequent blocks. The first 7560 characters on this block contains 105 lines of 72 characters exactly as written below:

03 0978 (DATA TAPE TYPE AND FORMAT SPECIFICATION DATE CODES)

STATISTICAL ANALYSIS DATA TAPE

FORMAT FOR TAPE IDENTIFICATION BLOCK (SECOND BLOCK)

<u>ITEM</u>	<u>FORMAT</u>	<u>DESCRIPTION</u>
1	A40	QUADRANGLE NAME AS PROJECT IDENTIFICATION
2	A20	NAME OF SUBCONTRACTOR
3	I4	APPROXIMATE DATE OF SURVEY (MONTH, YEAR)
4	I1	NUMBER OF AERIAL SYSTEMS USED TO COLLECT DATA FOR THIS QUADRANGLE
5	I1	AERIAL SYSTEM IDENTIFICATION CODE FOR FIRST SYSTEM
6	A20	AIRCRAFT IDENTIFICATION BY TYPE AND FAA NUMBER FOR FIRST SYSTEM
7	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO TERRESTRIAL POTASSIUM (K-40) TO ONE DECIMAL PLACE IN CPS PER PERCENT K
8	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO TERRESTRIAL URANIUM (BI-214) TO ONE DECIMAL PLACE IN CPS PER PPM EQUIVALENT U
9	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO TERRESTRIAL THORIUM (TL-208) TO ONE DECIMAL PLACE IN CPS PER PPM EQUIVALENT TH
10	I6	BLANK FIELD (99999)
11	F6.3	4PI-SYSTEM DATA COLLECTION INTERVAL TO THREE DECIMAL PLACES IN SECONDS FOR FIRST SYSTEM
12	F6.3	2PI-SYSTEM DATA COLLECTION INTERVAL TO THREE DECIMAL PLACES IN SECONDS FOR FIRST SYSTEM
13	I3	NUMBER OF CHANNELS (0-3 MEV) IN 4PI SYSTEM FOR FIRST AERIAL SYSTEM
14	I3	NUMBER OF CHANNELS (0-3 MEV) IN 2PI SYSTEM FOR FIRST AERIAL SYSTEM

<u>ITEM</u>	<u>FORMAT</u>	<u>DESCRIPTION</u>	<u>ITEM</u>	<u>FORMAT</u>	<u>DESCRIPTION</u>
15-24	(SAME)	REPEAT OF ITEMS 5-14 FOR SECOND AERIAL SYSTEM	20	F8.1	GROSS GAMMA (0.4-3.0 MEV) COUNT RATE TO ONE DECIMAL PLACE IN COUNTS PER SECOND
*	*	*	21	F6.1	UNCERTAINTY IN GROSS GAMMA COUNT RATE TO ONE DECIMAL PLACE IN COUNTS PER SECOND
*	*	*	22	F5.1	ATMOSPHERIC BI-214 4PI CORRECTION TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
*	*	*	23	F4.1	UNCERTAINTY IN ATMOSPHERIC BI-214 4PI CORRECTION TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
85-94	(SAME)	REPEAT OF ITEMS 5-14 FOR NINTH AERIAL SYSTEM	24	F4.1	AVERAGED URANIUM-TO-THORIUM RATIO TO ONE DECIMAL PLACE IN PPM EQUIVALENT U PER PPM EQUIVALENT TH
95	I3	NUMBER OF FLIGHT LINES ON THIS TAPE	25	F5.1	URANIUM-TO-THORIUM RATIO STANDARD DEVIATION FROM THE MEAN TO ONE DECIMAL PLACE AND ALGEBRAICALLY SIGNED
96	I4	FIRST FLIGHT LINE NUMBER ON THIS TAPE	26	F6.1	AVERAGED URANIUM-TO-POTASSIUM RATIO TO ONE DECIMAL PLACE IN PPM EQUIVALENT U PER PERCENT K
97	I6	FIRST RECORD NUMBER OF FIRST FLIGHT LINE	27	F5.1	THORIUM-TO-POTASSIUM RATIO STANDARD DEVIATION FROM THE MEAN TO ONE DECIMAL PLACE AND ALGEBRAICALLY SIGNED
98	I3	JULIAN DATE (DAY OF YEAR) FIRST FLIGHT-LINE DATA WAS COLLECTED	D8	F6.1	AVERAGED THORIUM-TO-POTASSIUM RATIO TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH PER PERCENT K
99-101	I4,I6,I3	REPEAT OF ITEMS 96-98 FOR SECOND FLIGHT LINE ON THIS TAPE	29	F5.1	THORIUM-TO-POTASSIUM RATIO STANDARD DEVIATION FROM THE MEAN TO ONE DECIMAL PLACE AND ALGEBRAICALLY SIGNED
*	*	*			
*	*	*			
*	*	*			
390-392	I4,I6,I3	REPEAT OF ITEMS 96-98 FOR 99th FLIGHT LINE ON THIS TAPE			
FORMAT FOR STATISTICAL ANALYSIS DATA RECORD (THIRD THRU LAST BLOCK)					
<u>ITEM</u>	<u>FORMAT</u>	<u>DESCRIPTION</u>			
1	I1	AERIAL SYSTEM IDENTIFICATION CODE			
2	I4	FLIGHT LINE NUMBER			
3	I6	RECORD IDENTIFICATION NUMBER			
4	I6	GMT TIME OF DAY (HHMMSS)			
5	F8.4	LATITUDE TO FOUR DECIMAL PLACES IN DEGREES			
6	F8.4	LONGITUDE TO FOUR DECIMAL PLACES IN DEGREES			
7	F6.1	TERRAIN CLEARANCE TO ONE DECIMAL PLACE IN METERS			
8	F7.1	RESIDUAL (IGRF Removed) MAGNETIC FIELD INTENSITY TO ONE DECIMAL PLACE IN GAMMAS			
9	A8	SURFACE GEOLOGIC MAP UNIT CODE			
10	I4	QUALITY FLAG CODES			
11	F6.1	APPARENT CONCENTRATION OF TERRESTRIAL POTASSIUM (K-40) TO ONE DECIMAL PLACE IN PERCENT K			
12	F4.1	UNCERTAINTY IN TERRESTRIAL POTASSIUM TO ONE DECIMAL PLACE IN PERCENT K			
13	F5.1	POTASSIUM STANDARD DEVIATION FROM THE MEAN TO ONE DECIMAL PLACE AND ALGEBRAICALLY SIGNED			
14	F6.1	AVERAGED CONCENTRATION OF TERRESTRIAL URANIUM (BI-214) TO ONE DECIMAL PLACE IN PPM EQUIVALENT U			
15	F4.1	UNCERTAINTY IN TERRESTRIAL URANIUM TO ONE DECIMAL PLACE IN PPM EQUIVALENT U			
16	F5.1	URANIUM STANDARD DEVIATION FROM THE MEAN TO ONE DECIMAL PLACE AND ALGEBRAICALLY SIGNED			
17	F6.1	AVERAGED CONCENTRATION OF TERRESTRIAL THORIUM (TL-208) TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH			
18	F4.1	UNCERTAINTY IN TERRESTRIAL THORIUM TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH			
19	F5.1	THORIUM STANDARD DEVIATION FROM THE MEAN TO ONE DECIMAL PLACE AND ALGEBRAICALLY SIGNED.			

The remaining 440 characters in this block are blanks.

Block 2 - Statistical Analysis Identification Data

The second block contains the identifier information for the data contained in subsequent blocks according to the format specification in the first part of Block 1. The final 6078 characters on this block are blanks.

Block 3 - Statistical Analysis Data

The third and subsequent blocks contain statistical analysis data in the format specified by the second part of the Block 1. Fifty logical records are allowed per block. The method for determining uncertainty values shown, as of August 1979, remains undefined. These values are filled with 9's under format control.

MAGNETIC DATA TAPE

REFERENCE: Paragraphs 4.7.8 and 6.1.6, BFEC 1200-C

The Magentic Data Tape is an unlabeled, nine track, 800 BPI, NRZI. All data are recorded as EBCDIC characters. Each tape contains data for no more than one quadrangle and are divided into 8000-character blocks as described below.

Block 1 - Tape Format Description

The first block contains 3384 characters of format information in exactly the following format:

04 0978 (DATA TAPE TYPE AND FORMAT SPECIFICATION DATE CODES)

MAGNETIC DATA TAPE

FORMAT FOR TAPE IDENTIFICATION BLOCK (SECOND BLOCK)

<u>ITEM</u>	<u>FORMAT</u>	<u>DESCRIPTION</u>
1	A40	QUADRANGLE NAME AS PROJECT IDENTIFICATION
2	A20	NAME OF SUBCONTRACTOR
3	I4	APPROXIMATE DATE OF SURVEY (MONTH., YEAR)
4	I3	NUMBER OF FLIGHT LINES ON THIS TAPE
5	I4	FIRST FLIGHT LINE ON THIS TAPE
6	I6	FIRST RECORD NUMBER OF FIRST FLIGHT LINE
7	I3	JULIAN DATE (DAY OF YEAR) FIRST FLIGHT-LINE DATA WAS COLLECTED
8	F8.4	LATITUDE OF GROUND BASE STATION TO FOUR DECIMAL PLACES IN DEGREES FOR FIRST FLIGHT LINE
9	F8.4	LONGITUDE OF GROUND BASE STATION TO FOUR DECIMAL PLACES IN DEGREES FOR FIRST FLIGHT LINE
10-14	(SAME)	REPEAT OF ITEMS 5-9 FOR SECOND FLIGHT LINE ON THIS TAPE
*	*	*
*	*	*
*	*	*
495-499	(SAME)	REPEAT OF ITEMS 5-9 FOR 99th FLIGHT LINE ON THIS TAPE

FORMAT FOR MAGNETIC DATA RECORD (THIRD THRU LAST BLOCK)

<u>ITEM</u>	<u>FORMAT</u>	<u>DESCRIPTION</u>
1	I1	AERIAL SYSTEM IDENTIFICATION CODE
2	I4	FLIGHT LINE NUMBER
3	I6	RECORD IDENTIFICATION NUMBER
4	I6	GMT TIME OF DAY (HHMMSS)
5	F8.4	LATITUDE TO FOUR DECIMAL PLACES IN DEGREES

<u>ITEM</u>	<u>FORMAT</u>	<u>DESCRIPTION</u>
6	F8.4	LONGITUDE TO FOUR DECIMAL PLACES IN DEGREES
7	F6.1	TERRAIN CLEARANCE TO ONE DECIMAL PLACE IN METERS
8	F5.1	OUTSIDE AIR PRESSURE TO ONE DECIMAL PLACE IN MMHG
9	A8	SURFACE GEOLOGIC MAP UNIT CODE
10	F7.1	TOTAL MAGNETIC FIELD INTENSITY TO ONE DECIMAL PLACE IN GAMMAS
11	F7.1	RESIDUAL (IGRF REMOVED) MAGNETIC FIELD INTENSITY TO ONE DECIMAL PLACE IN GAMMAS
12	F7.1	DIURNAL MAGNETIC INTENSITY VARIATION TO ONE DECIMAL PLACE IN GAMMAS
13	F7.1	MAGNETIC DEPTH-TO-BASEMENT TO ONE DECIMAL PLACE IN METERS (IF REQUIRED)

The remaining 4616 characters in this block are blanks.

Block 2 - Magnetic Tape Identification Data

This block contains information about the data in subsequent blocks organized according to the format specification in the first half of Block 1.

Block 3 - Magnetic Data

This block and subsequent block contains magnetic data for the quadrangle organized according to the format specifications in the second half of Block 1. There will be 100 logical records per physical block.

STATISTIC ANALYSIS SUMMARY TAPE

REFERENCE: Paragraphs 4.7.9, BFEC 1200-C

The statistical analysis summary tape is an unlabeled, nine track, 800 BPI, NRZI. All data is recorded as EBCDIC characters. The block length is 700 characters long. Each tape contains one file of data for no more than one quadrangle.

Block 1 - Format Description Data

The first physical block on this tape contains a format description for data on subsequent blocks. The first 4320 characters on this block contains 60 lines of 72 characters exactly as written below:

05 0978 (DATA TAPE TYPE AND FORMAT SPECIFICATION DATE CODE)

STATISTICAL ANALYSIS SUMMARY TAPE (OR FILE)

FORMAT FOR TAPE IDENTIFICATION BLOCK (SECOND BLOCK)

ITEM	FORMAT	DESCRIPTION
1	A40	QUADRANGLE NAME AS PROJECT IDENTIFICATION
2	A20	NAME OF SUBCONTRACTOR
3	I4	APPROXIMATE DATE OF SURVEY (MONTH, YEAR)
4	I6	NUMBER OF GEOLOGIC MAP UNITS USED FOR THIS QUADRANGLE

FORMAT FOR STATISTICAL ANALYSIS SUMMARY DATA RECORD (THIRD THRU LAST BLOCK)

ITEM	FORMAT	DESCRIPTION
1	A8	SURFACE GEOLOGIC MAP UNIT IDENTIFYING CODE
2	I6	TOTAL RECORDS FOR GEOLOGIC MAP UNIT
3	I6	NUMBER OF POTASSIUM RECORDS COMPUTED FOR GEOLOGIC UNIT
4	F6.1	POTASSIUM CONCENTRATION MEAN TO ONE DECIMAL PLACE IN PERCENT K
5	F6.1	POTASSIUM CONCENTRATION STANDARD DEVIATION TO ONE DECIMAL PLACE IN PERCENT K
6	A3	POTASSIUM CONCENTRATION DISTRIBUTION CODE
7	I6	NUMBER OF URANIUM RECORDS COMPUTED FOR GEOLOGIC UNIT
8	F6.1	URANIUM CONCENTRATION MEAN TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
9	F6.1	URANIUM CONCENTRATION STANDARD DEVIATION TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
10	A3	URANIUM CONCENTRATION DISTRIBUTION CODE
11	I6	NUMBER OF THORIUM RECORDS COMPUTED FOR GEOLOGIC UNIT
12	F6.1	THORIUM CONCENTRATION MEAN TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH
13	F6.1	THORIUM CONCENTRATION STANDARD DEVIATION TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH
14	A3	THORIUM CONCENTRATION DISTRIBUTION CODE
15	I6	NUMBER OF URANIUM-TO-THORIUM RATIO RECORDS COMPUTED FOR GEOLOGIC UNIT

16	F6.1	URANIUM-TO-THORIUM RATIO MEAN TO ONE DECIMAL PLACE IN PPM EQUIVALENT U PER PPM EQUIVALENT TH
17	F6.1	URANIUM-TO-THORIUM RATIO STANDARD DEVIATION TO ONE DECIMAL PLACE IN PPM EQUIVALENT U PER PPM EQUIVALENT TH
18	A3	URANIUM-TO-THORIUM RATIO DISTRIBUTION CODE
19	I6	NUMBER OF URANIUM-TO-POTASSIUM RATIO RECORDS COMPUTED FOR GEOLOGIC UNIT
20	F6.1	URANIUM -TO-POTASSIUM RATIO MEAN TO ONE DECIMAL PLACE IN PPM EQUIVALENT U PER PERCENT K
21	F6.1	URANIUM-TO-POTASSIUM RATIO STANDARD DEVIATION TO ONE DECIMAL PLACE IN PPM EQUIVALENT U PER PERCENT K
22	A3	URANIUM-TO-POTASSIUM RATIO DISTRIBUTION
23	I6	NUMBER OF THORIUM-TO-POTASSIUM RATIO RECORDS COMPUTED FOR GEOLOGIC UNIT
24	F6.1	THORIUM-TO-POTASSIUM RATIO MEAN TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH PER PERCENT K
25	F6.1	THORIUM-TO-POTASSIUM RATIO STANDARD DEVIATION TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH PER PERCENT K
26	A3	THORIUM-TO-POTASSIUM RATIO DISTRIBUTION CODE

The remaining 2680 characters on this block shall be blanks.

Block 2 - Statistical Analysis Identification Data

The second block contains the identifier information for the data contained in subsequent blocks according to the format specification in the first part of Block 1. The final 6930 characters on this block are blanks.

Block 3 - Statistical Analysis Summary Data

The third and subsequent blocks contain statistical analysis data in the format specified by the second part of the Block 1. Fifty logical records are allowed per block.

BIBLIOGRAPHY

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- Burson, Z. G., 1974, Airborne Surveys of Terrestrial Gamma Radiation in Environmental Research; IEEE Trans. Nucl. Sci., NS-21, No. 1, p. 558-571.
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- Grasty, R. L., Uranium Measurement by Airborne Gamma-Ray Spectrometry; Geophysics, Vol. 40, No. 3, June 1975, p. 503-519.
- Gregory, A. F., and Horwood, J. L., 1963, A Spectrometric Study of the Attenuation in Air of Gamma Rays from Mineral Resources; U.S. Atomic Energy Commission Report CEX-60-3, Washington, D.C.
- McSharry, P. J. and Emerson, D. W., The Collection and Processing of Gamma Ray Spectrometer Data; 2nd International Conference on Geophysics of the Earth and Oceans, Sydney, Australia, January 1973.

APPENDIX B - Flight Summary

APPENDIX B

DAILY PRODUCTION SUMMARY

JANUARY, FEBRUARY, 1981

QUEEN AIR N9AG

Jan. 12-13 Aircraft Mobilization
 14-15 Radar Compensation, Magnetometer Calibration
 16-17 Weather - Nil production
 18 988 Line Miles - Valdosta, Jacksonville
 19 940 Line Miles - Valdosta, Jacksonville
 20 716 Line Miles - Valdosta, Gainesville, Daytona Beach
 21 Weather - Nil production
 22 818 Line Miles - Valdosta, Gainesville, Daytona Beach
 23 749 Line Miles - Valdosta, Gainesville, Daytona Beach, Jacksonville
 24 721 Line Miles - Daytona Beach, Orlando, Tarpon Springs
 25 652 Line Miles - Gainesville, Daytona Beach, Orlando, Tarpon Springs
 26-28 Base Mobilization
 29 994 Line Miles - Tarpon Springs, Tampa, Fort Pierce
 30 923 Line Miles - West Palm Beach, Tampa, Fort Pierce
 31 867 Line Miles - West Palm Beach, Tampa, Fort Pierce
 Feb. 1 858 Line Miles - West Palm Beach, Tampa, Miami
 2-3 Weather - Nil production
 4 766 Line Miles - West Palm Beach, Orlando, Miami, Fort Pierce
 5 Magnetometer repair
 6-8 Weather - Nil production
 9 771 Line Miles - Tampa, West Palm Beach, Fort Pierce, Miami
 10 362 Line Miles - Tampa, West Palm Beach, Fort Pierce, Miami, Key West
 11-12 Base Mobilization
 13 480 Line Miles - Andalusia
 14 Weather - Nil production
 15 719 Line Miles - Dothan
 16-18 Weather - Nil production
 19 720 Line Miles - Tallahassee
 20 845 Line Miles - Andalusia
 21 1075 Line Miles - Andalusia, Dothan
 22 Weather - Nil production
 23 541 Line Miles - Dothan, Tallahassee
 24 792 Line Miles - Tallahassee
 25 665 Line Miles - Pensacola, Andalusia
 26 682 Line Miles - Pensacola, Andalusia, Dothan

Total for the above period = 17,644.0 miles

Total miles for the included quadrangles:

Valdosta	1907.0	West Palm Beach	1709.0
Jacksonville	566.0	Miami	508.0
Gainesville	1251.0	Key West	114.0
Daytona Beach	840.0	Dothan	1897.0
Tarpon Springs	737.0	Pensacola	914.0
Orlando	1279.0	Andalusia	1897.0
Tampa	624.0	Tallahassee	1811.0
Fort Pierce	1590.0		

Jan. 10-11 Base Mobilization
 12 Weather - Nil production
 13-19 Magnetometer replaced and calibrated
 20-22 Weather - Nil production
 23 365 Line Miles - Brunswick, Waycross
 24 568 Line Miles - Brunswick, Waycross
 25 Equipment Check
 26 452 Line Miles - Brunswick, Waycross
 27-28 Weather - Nil production
 29 501 Line Miles - Brunswick, Waycross
 30 468 Line Miles - Brunswick, Waycross
 31 310 Line Miles - Brunswick, Waycross
 Feb. 1-2 Weather - Nil production
 3-5 Base Mobilization and Maintenance
 6-7 Weather - Nil production
 8-12 Equipment repairs and testing
 13 225 Line Miles - Apalachicola

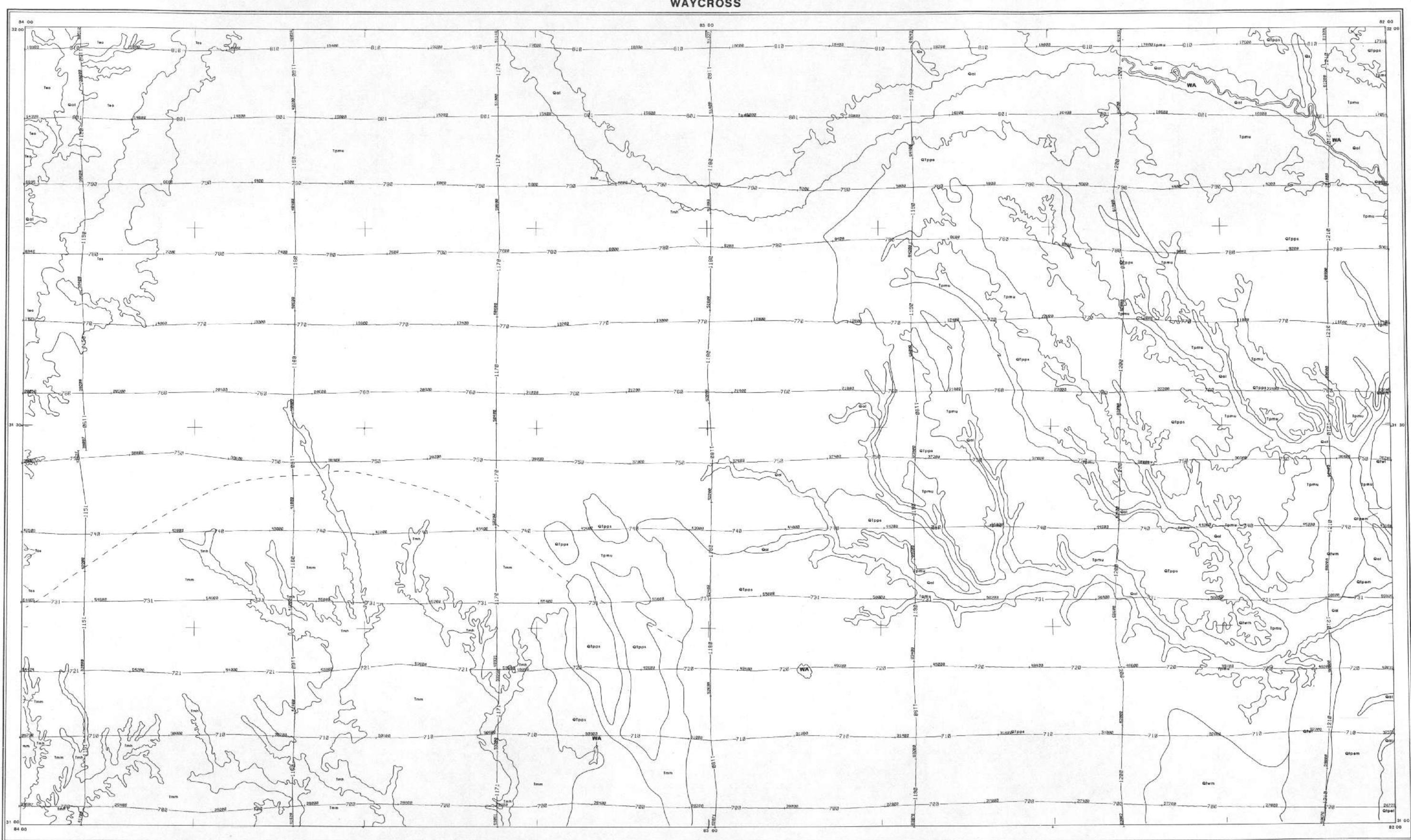
Total for the above period = 2889.0 miles

Total miles for the included quadrangles:

Waycross	1897.0
Brunswick	767.0
Apalachicola	225.0

AERO COMMANDER N1213B

APPENDIX C - Flight Path and Geologic Map

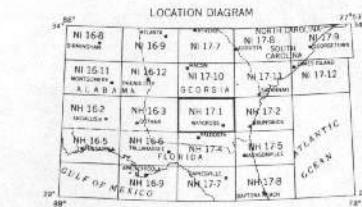


SCALE 1:500,000



0.0 MILE(S)
400 FEET AMT
FLOWN AND COMPILED 1980

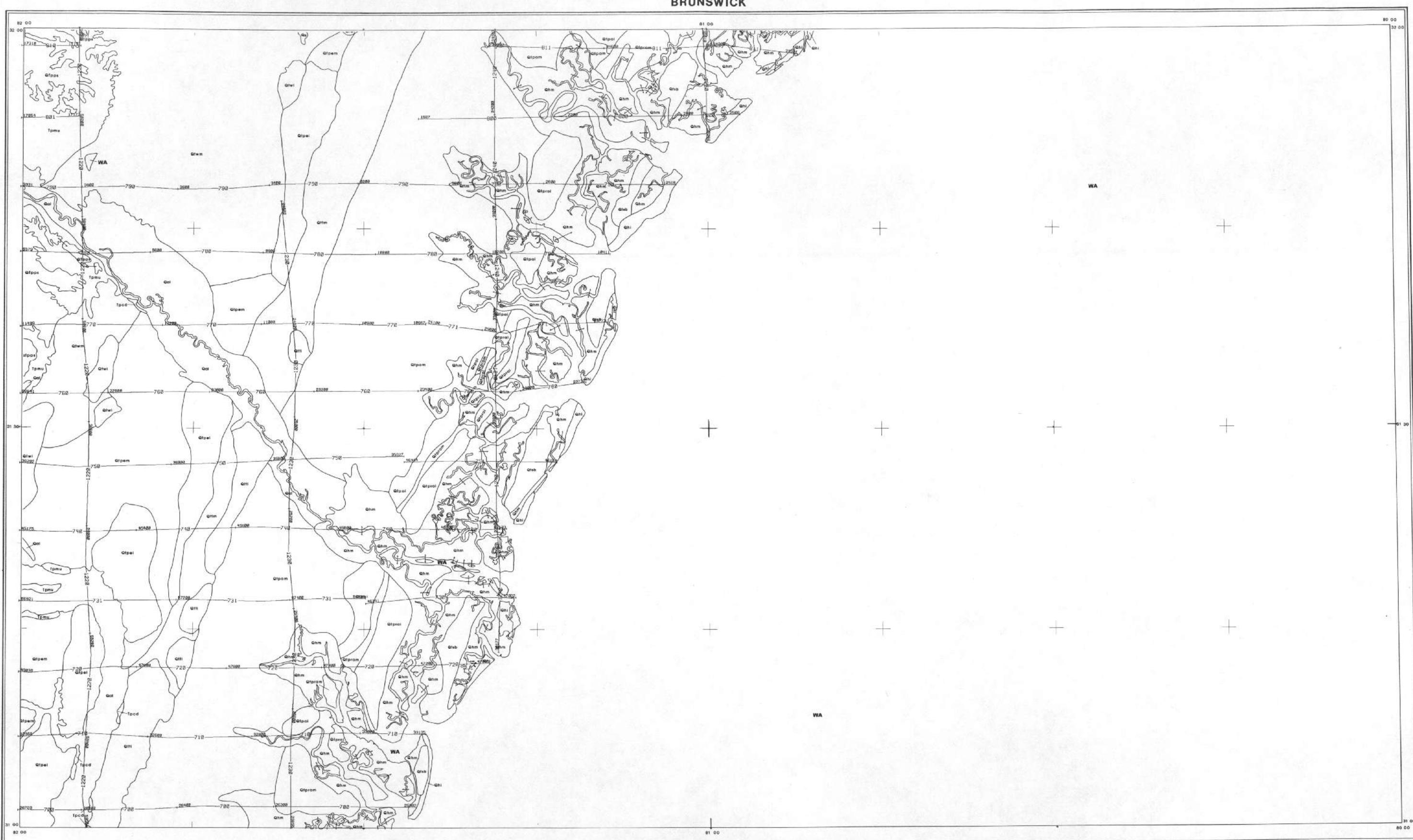
FLIGHT LINE SPACING 6.0 MILE(S)
FLIGHT ALTITUDE 400 FEET AMT
FLOWN AND COMPILED 1980



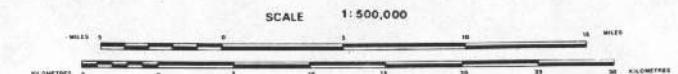
FLIGHT PATH RECOVERY

MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY

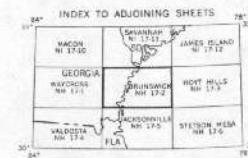


SCALE 1:500,000



FIDUCIAL NUMBER 053-0 LINE NUMBER 123456

FLIGHT LINE SPACING 6.0 MILES
FLIGHT ALTITUDE 400 FEET AMT
FLOWN AND COMPILED 1980



FLIGHT PATH RECOVERY

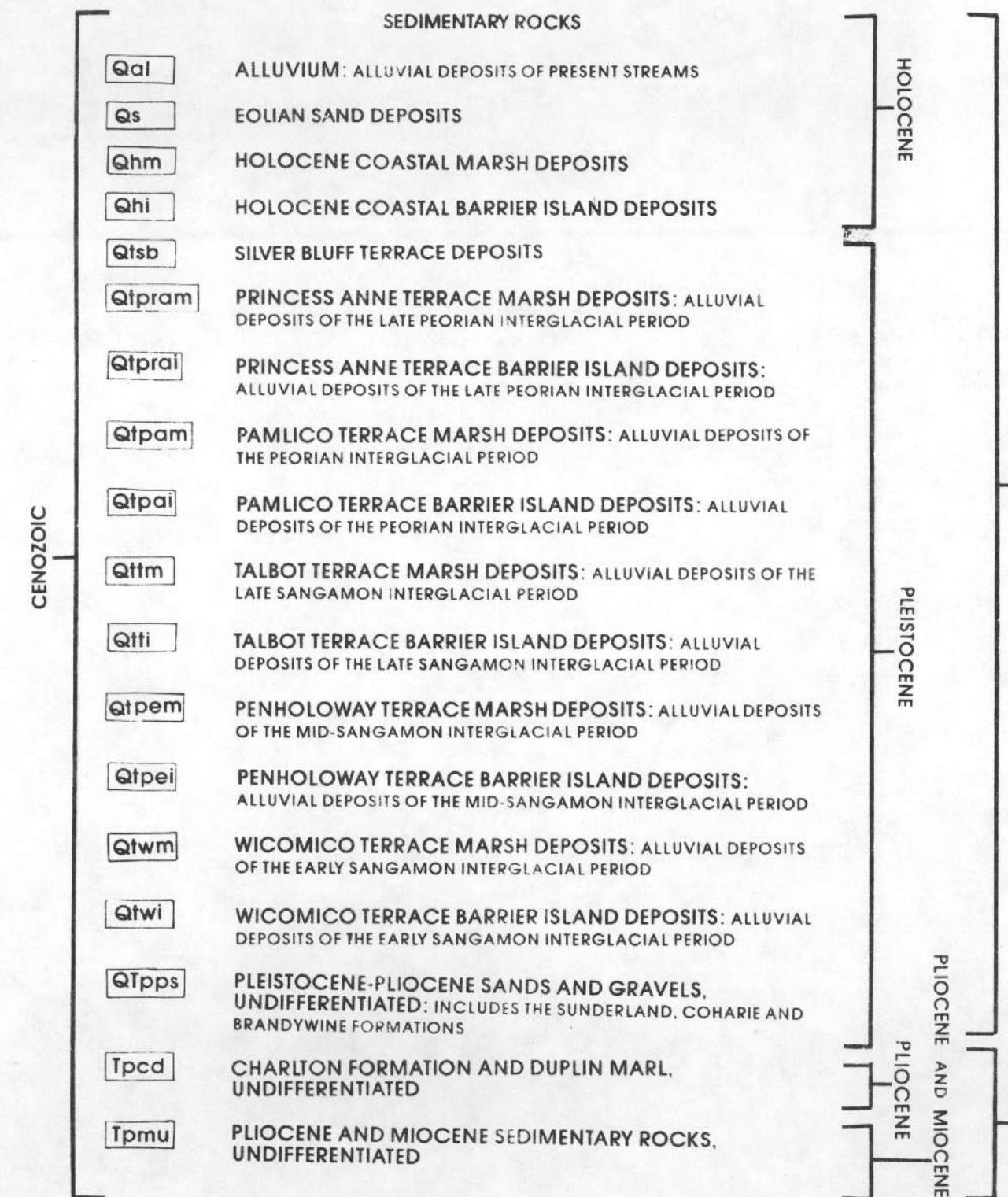
MISSISSIPPI / FLORIDA PROJECT

SURVEY AND
COMPILE BY:

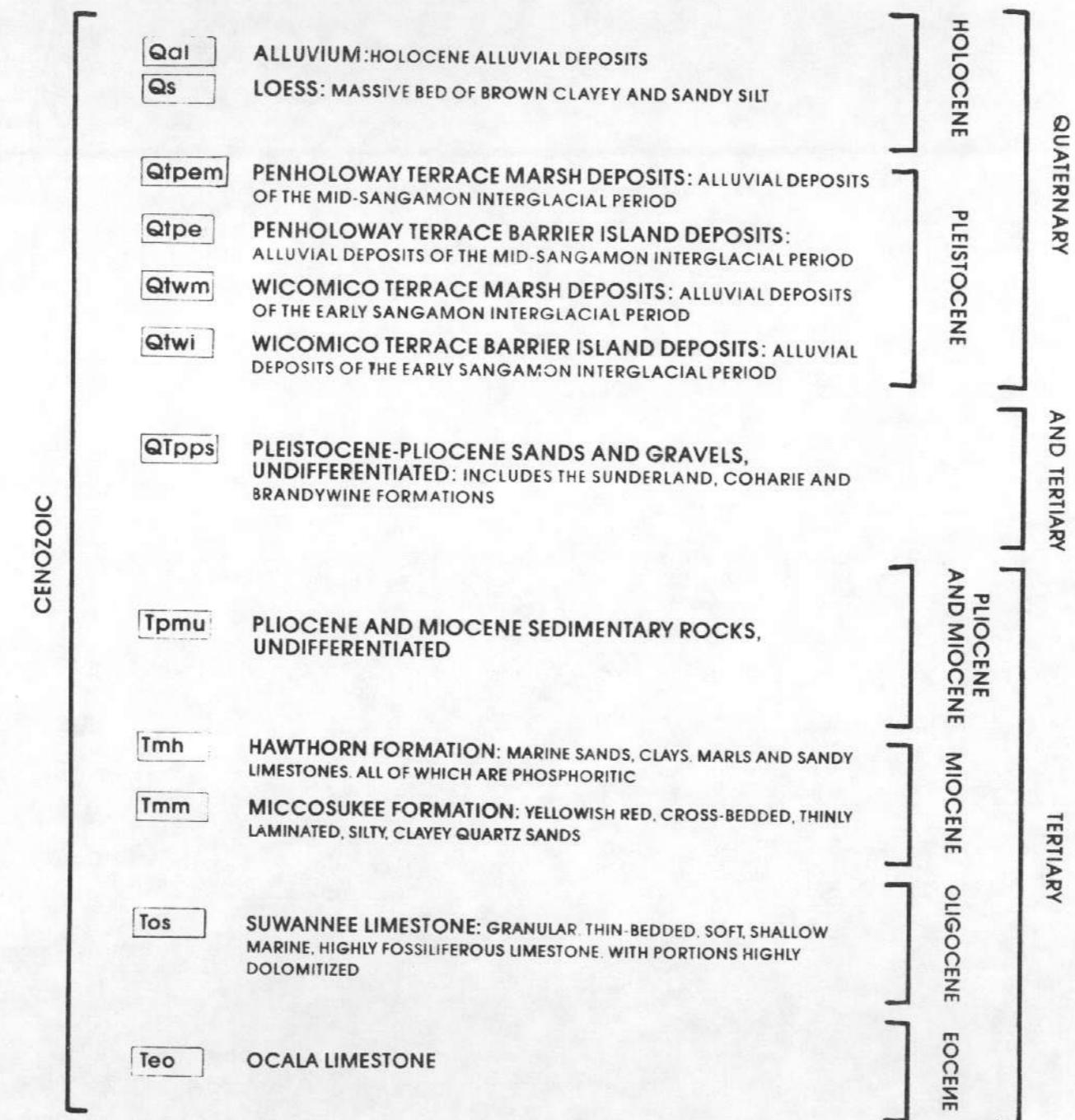
EG&G GEOMETRICS

U. S. DEPARTMENT OF ENERGY

WAYCROSS QUADRANGLE
GEOLOGIC MAP EXPLANATION
(Martel Laboratories, 1981)



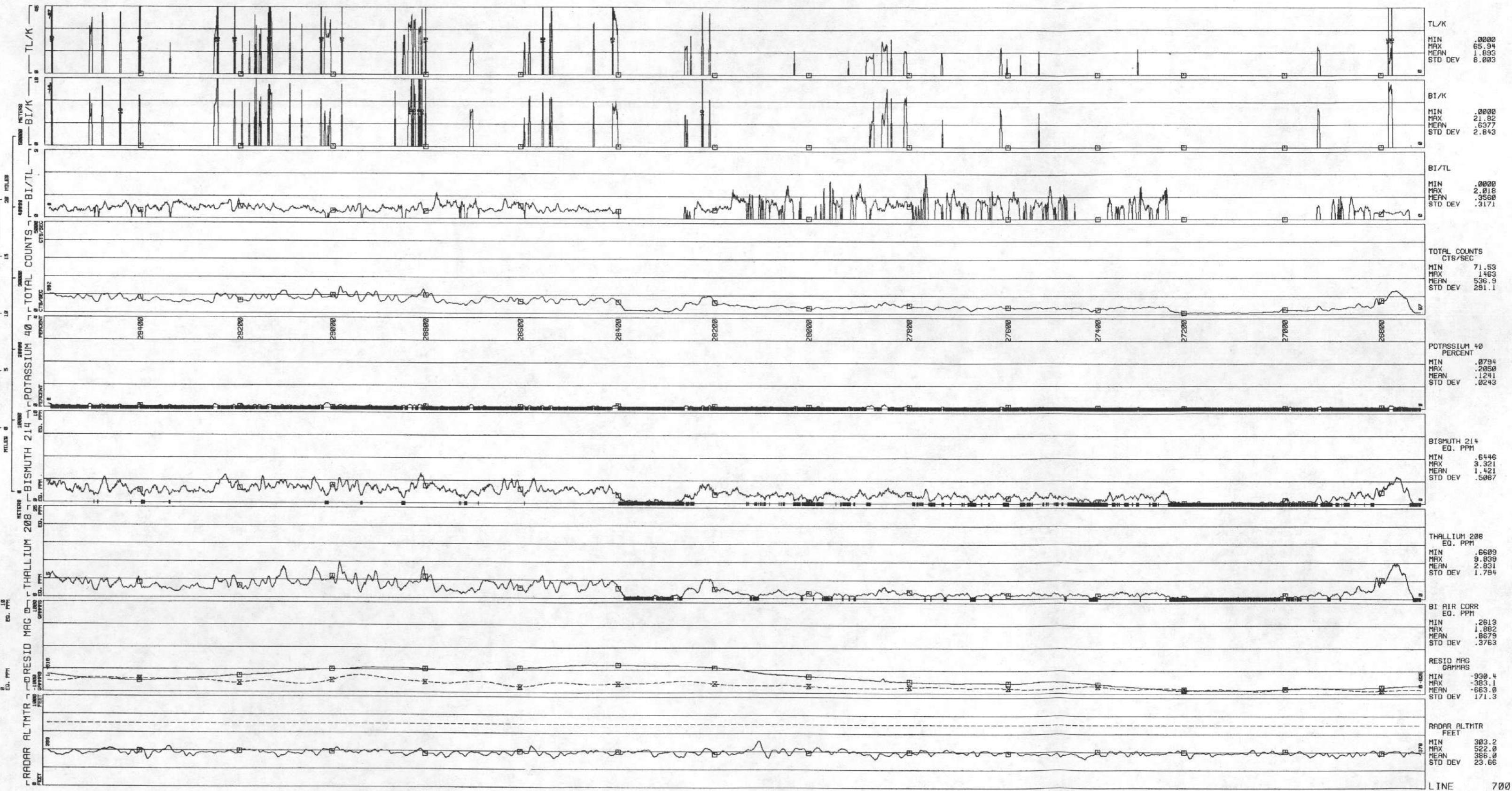
BRUNSWICK QUADRANGLE
GEOLOGIC MAP EXPLANATION
(Martel Laboratories, 1981)

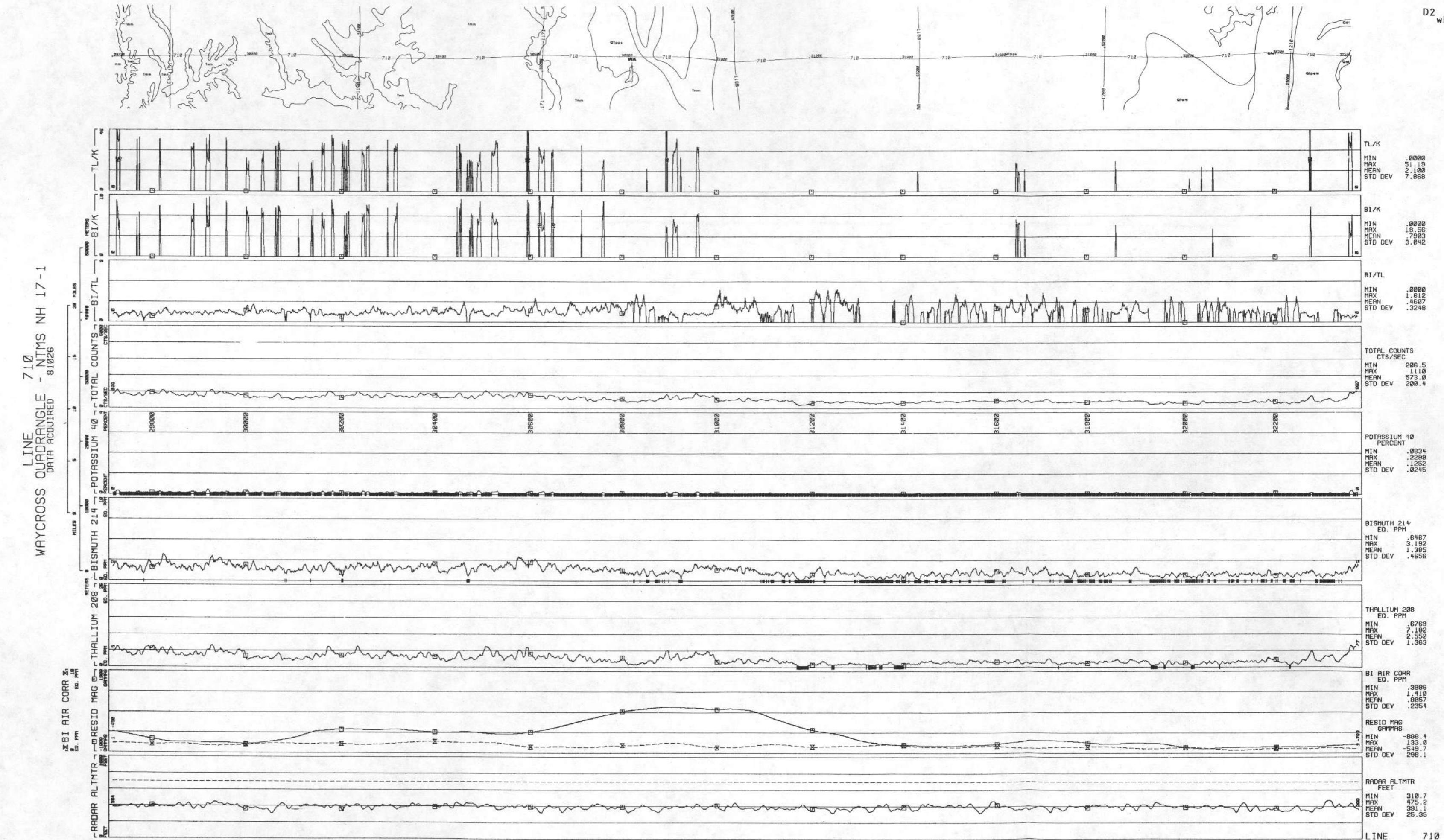


APPENDIX D – Profiles



LINE 700 WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 81026



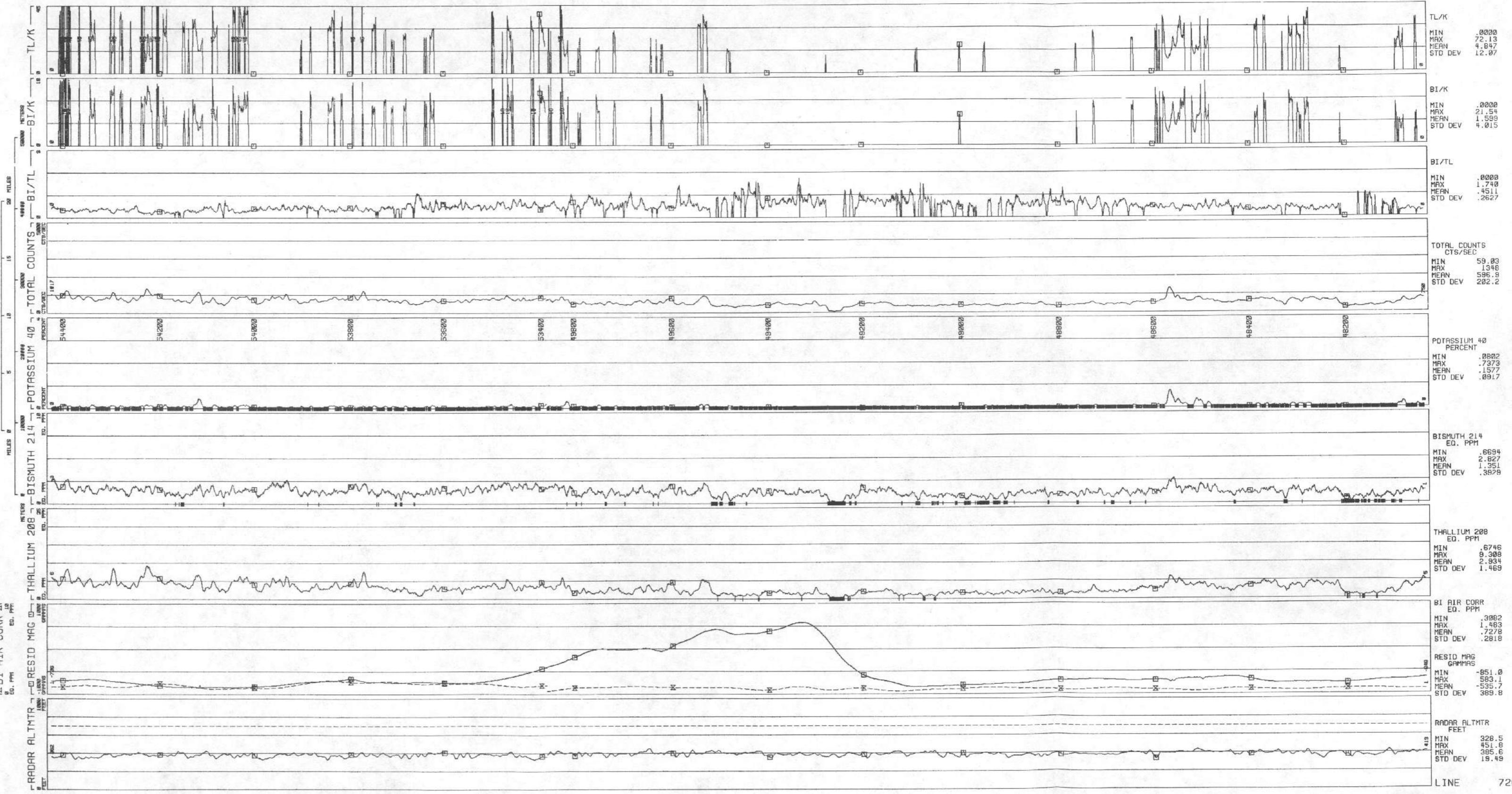


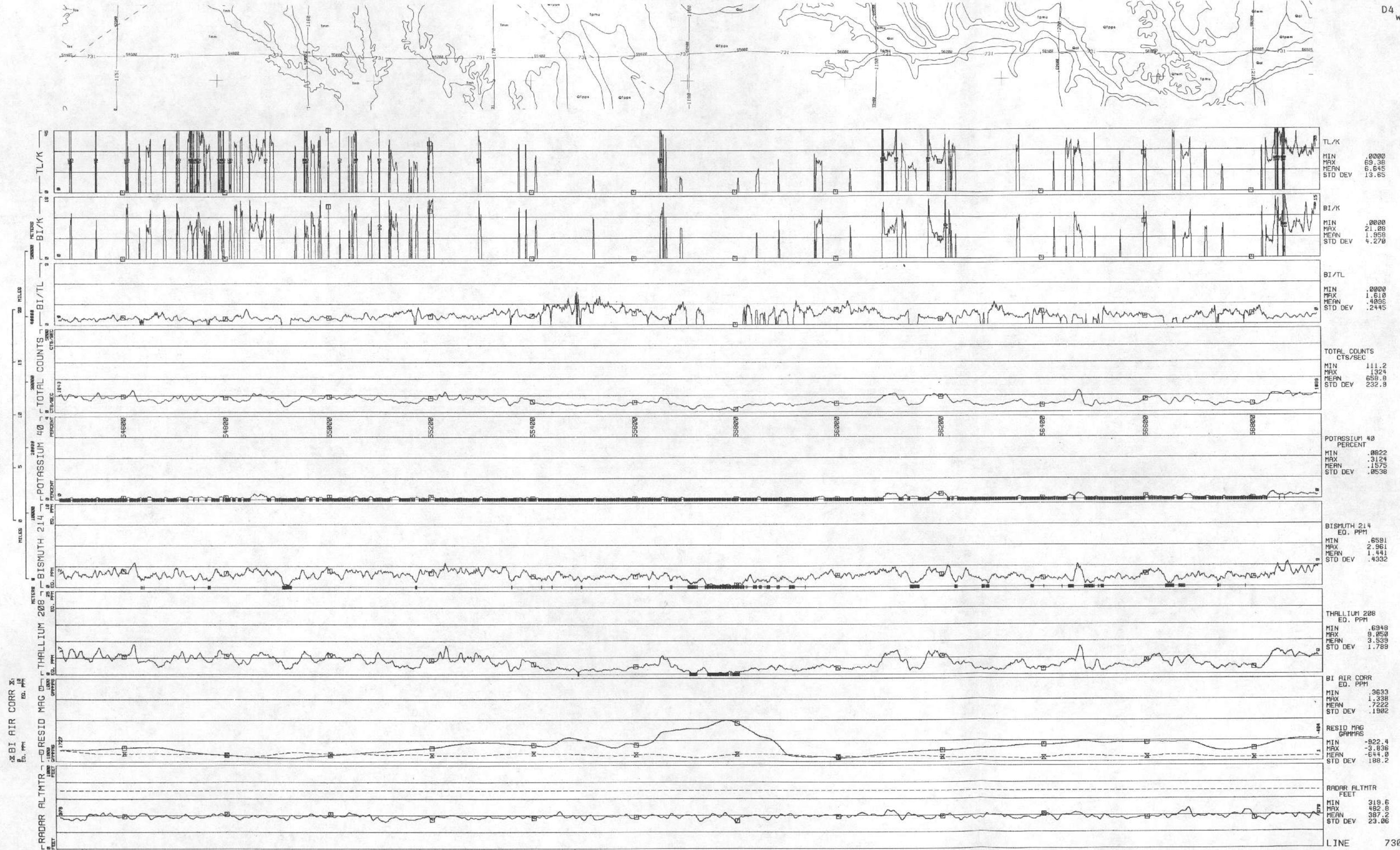
D3

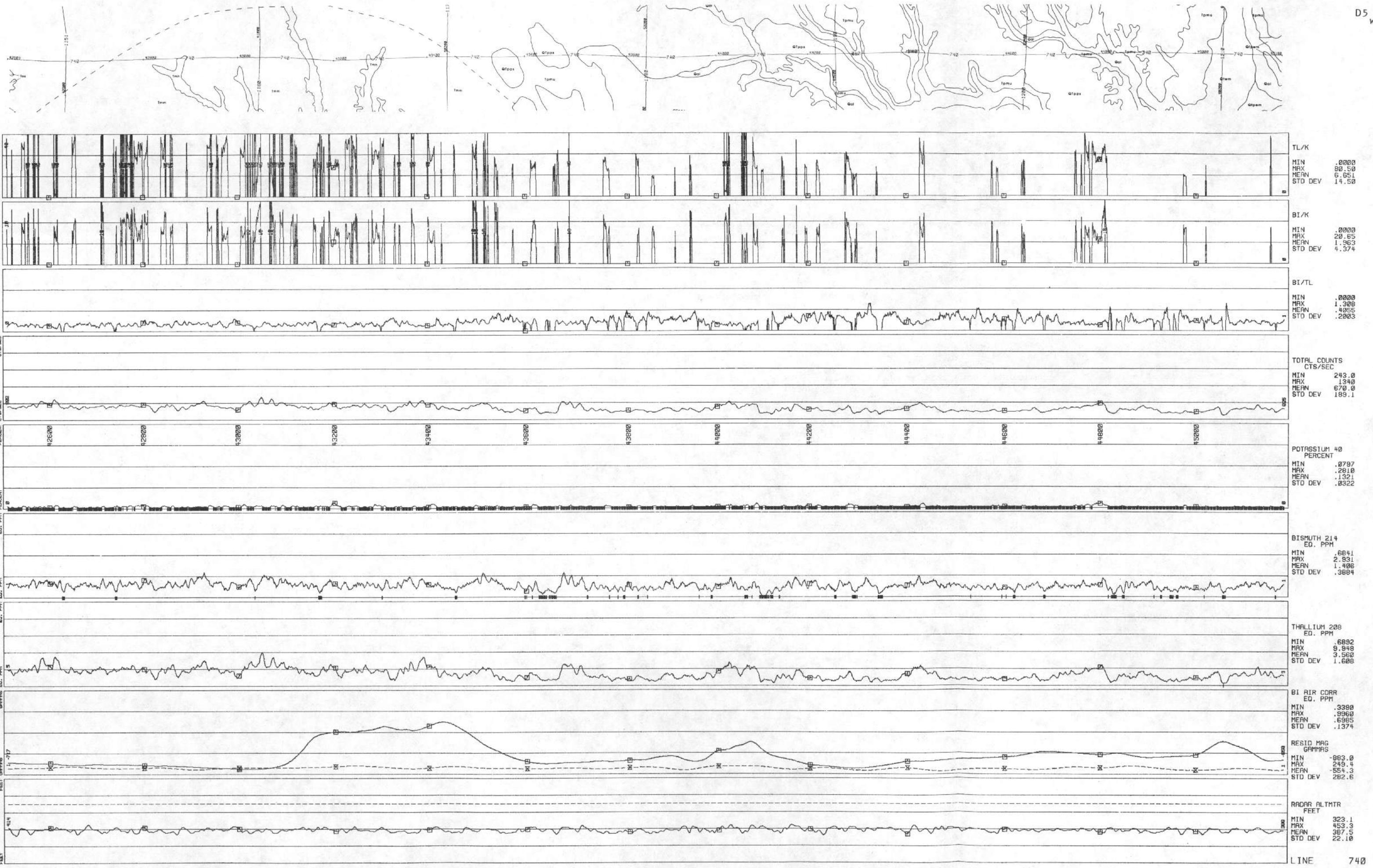
wb

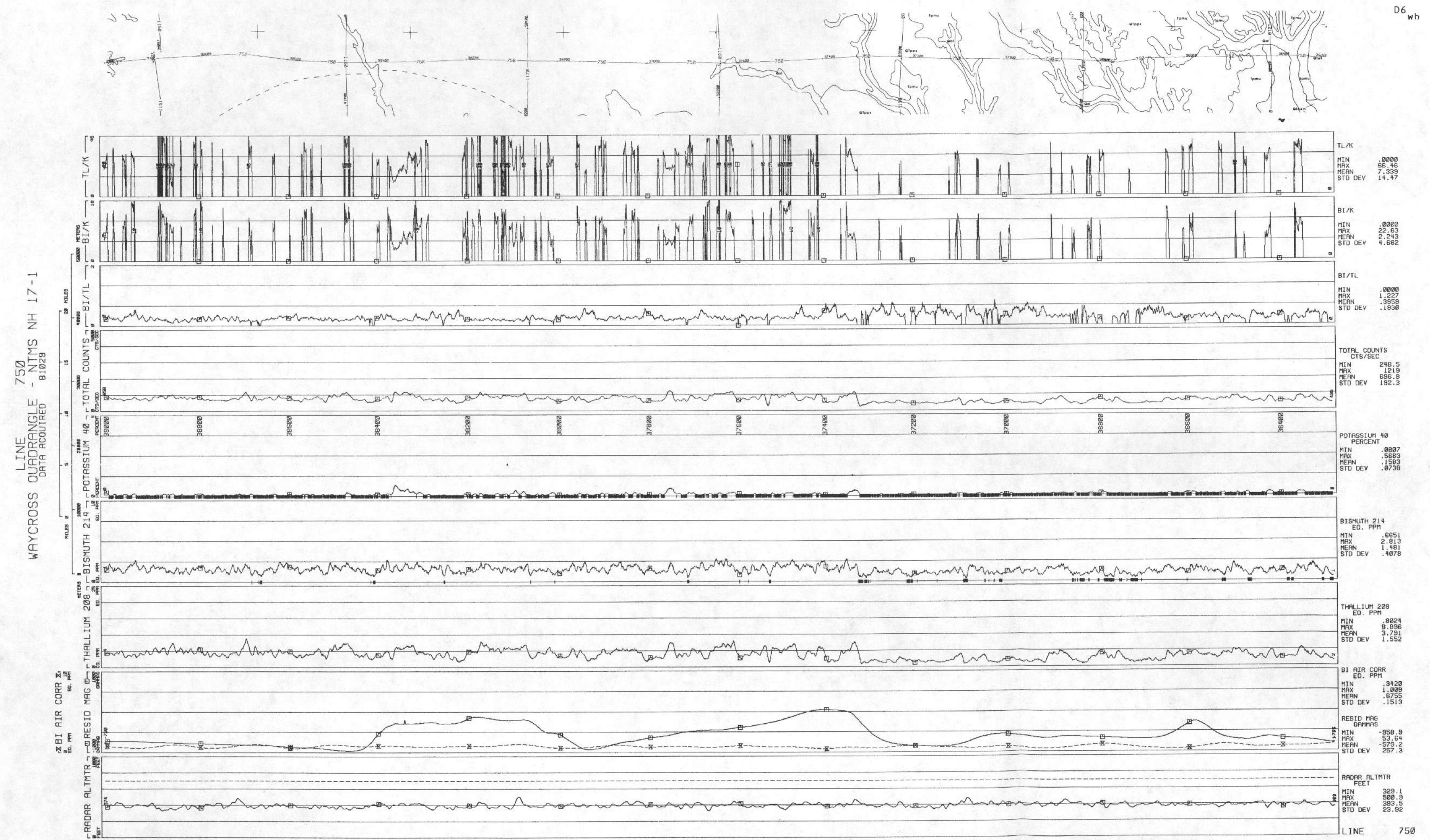


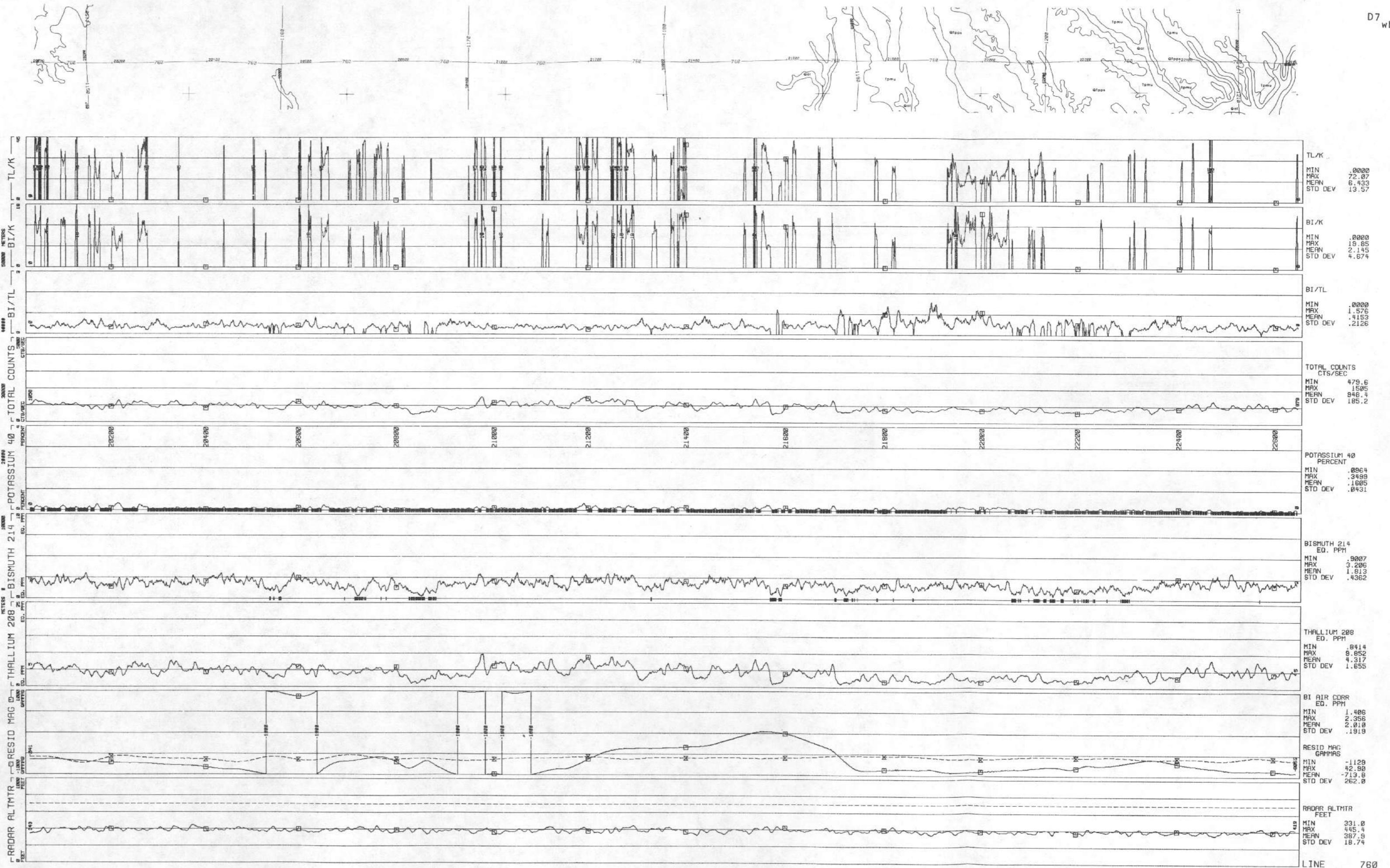
LINE 720
WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 8/10/30



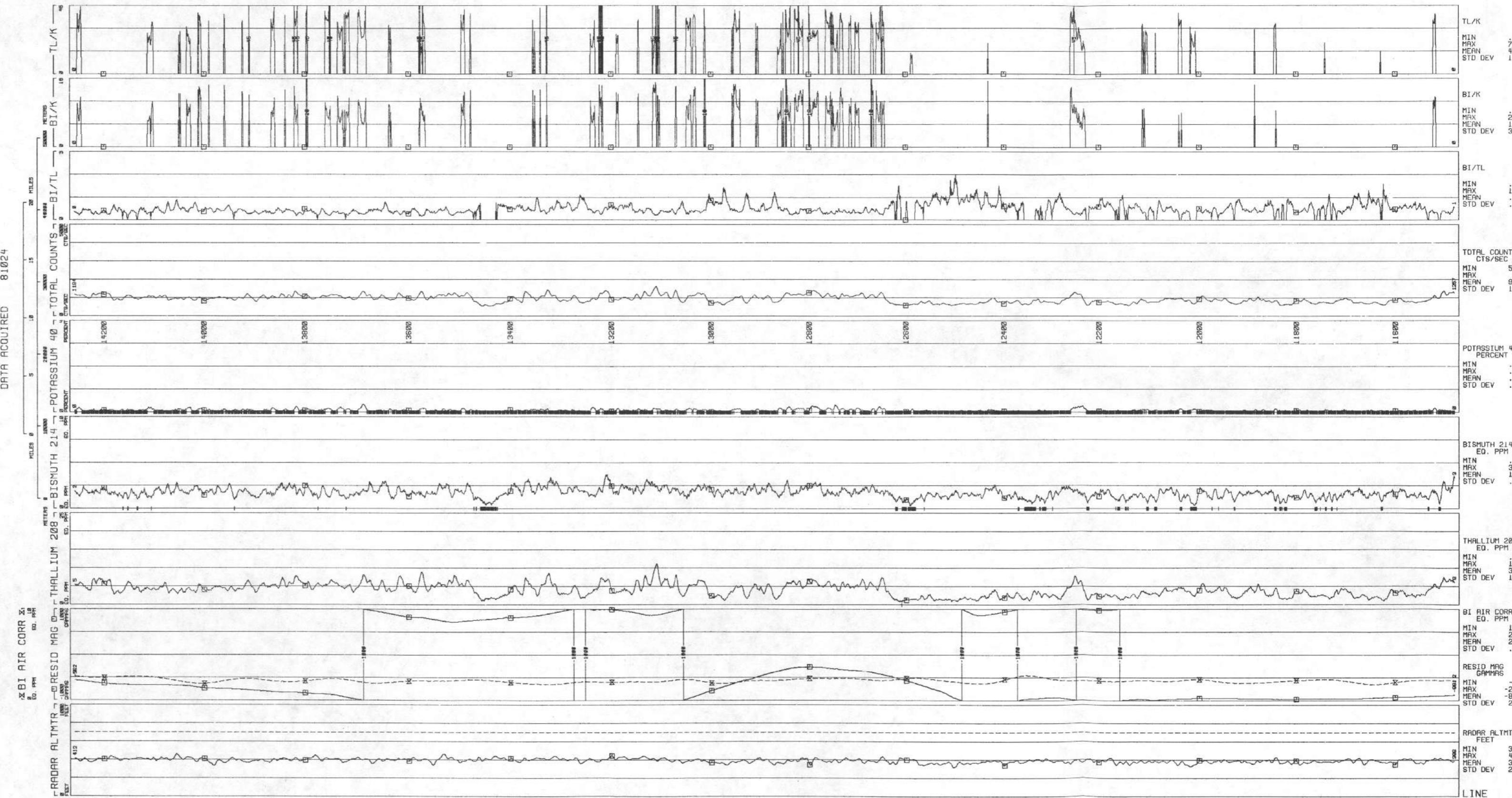


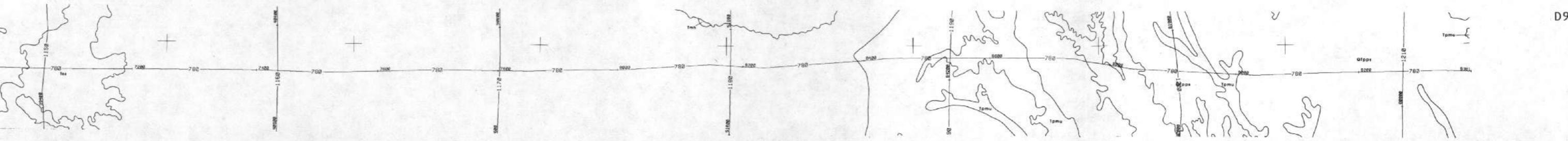






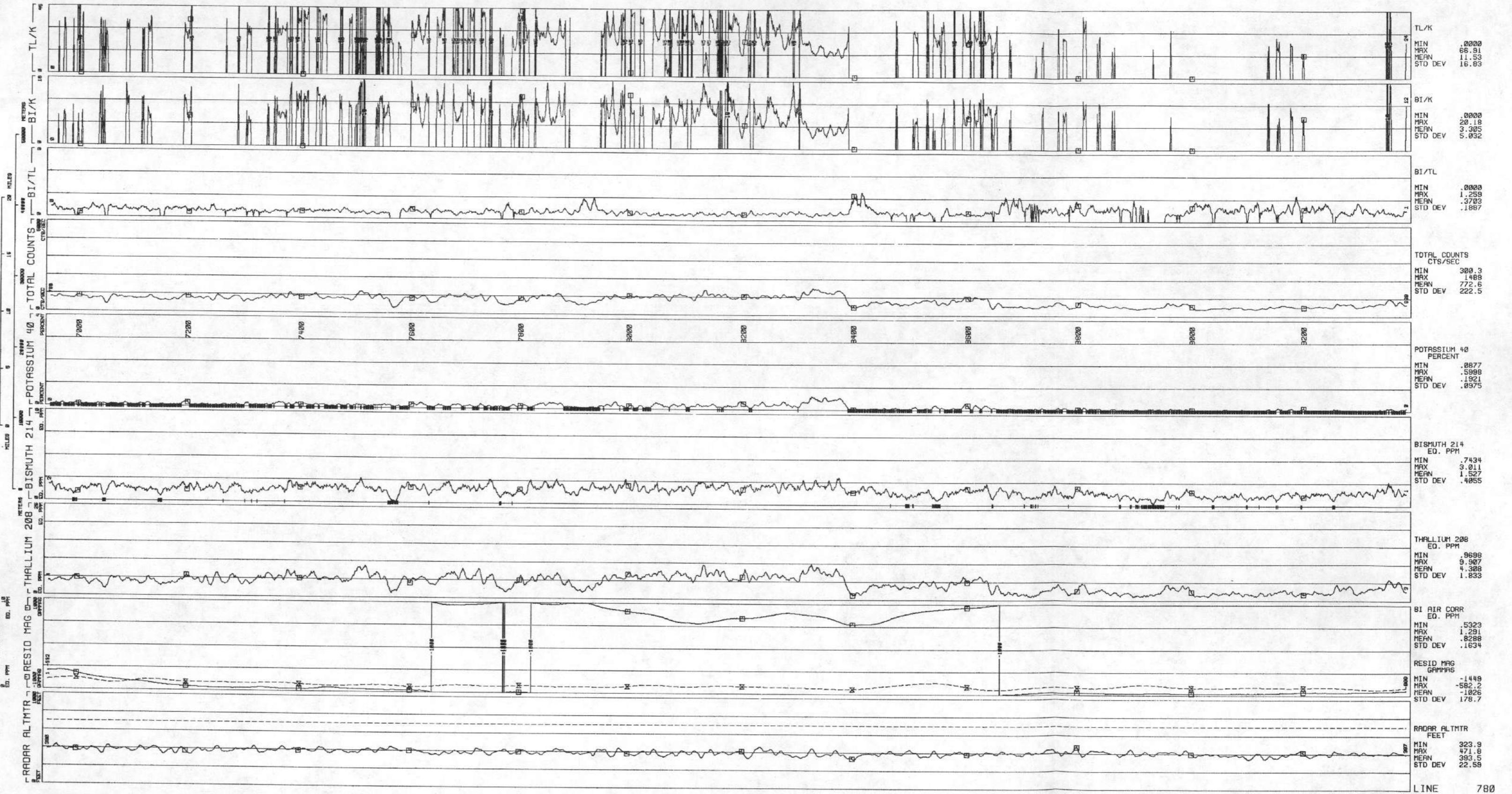
LINE 770
WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 8/10/24





wb

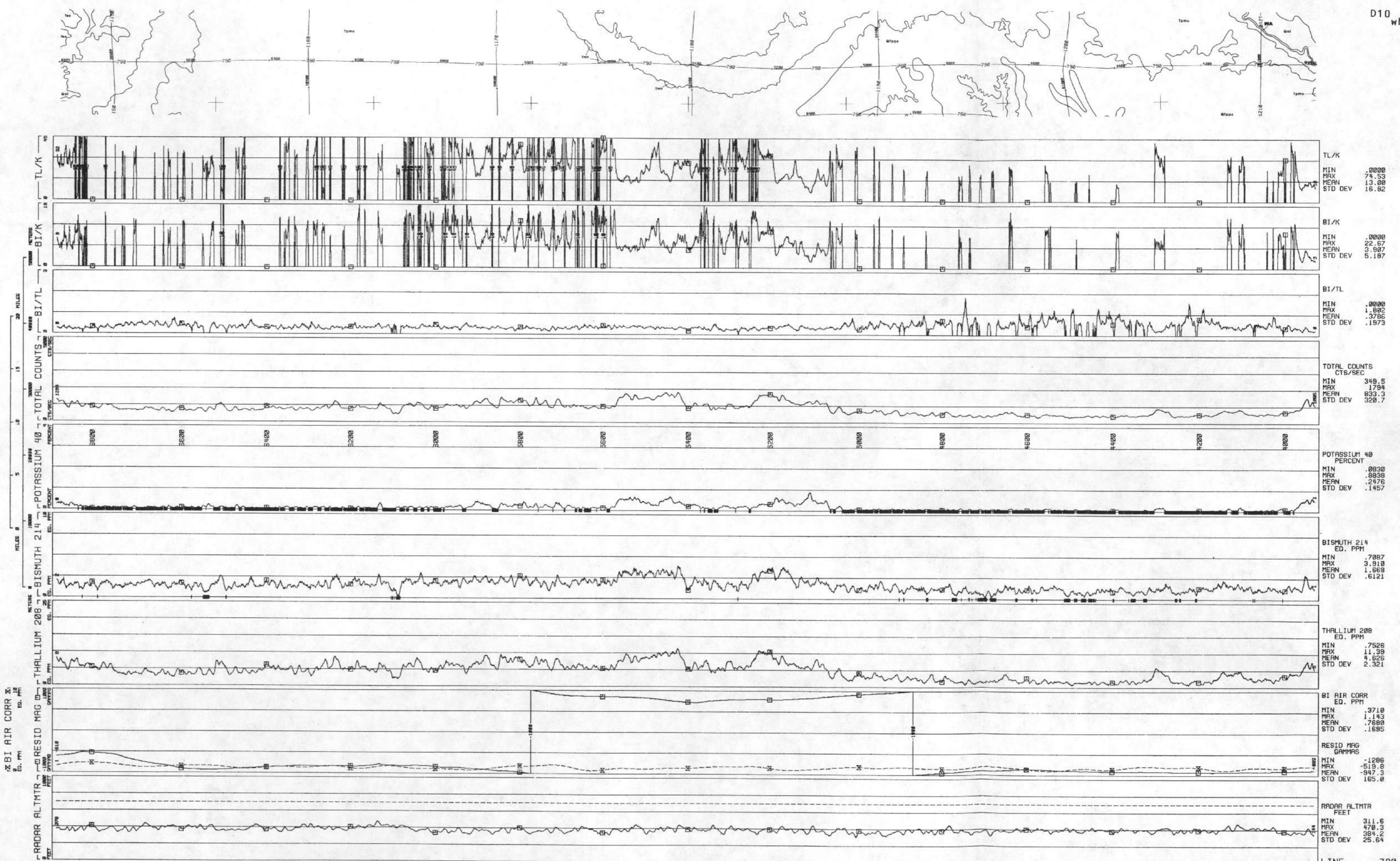
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DATA ACQUIRED 81023



D10

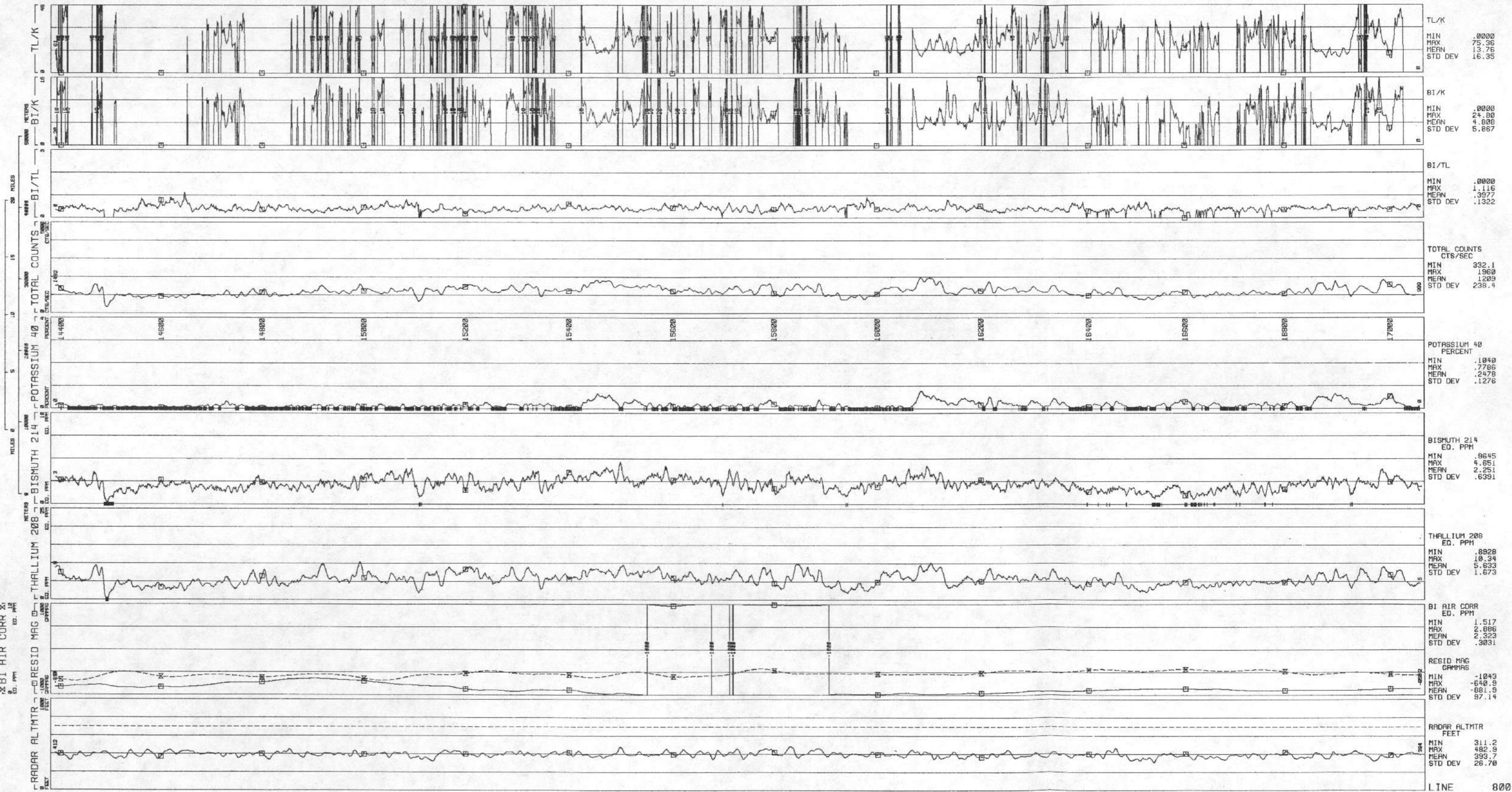
wb

LINE /90 WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 8/023

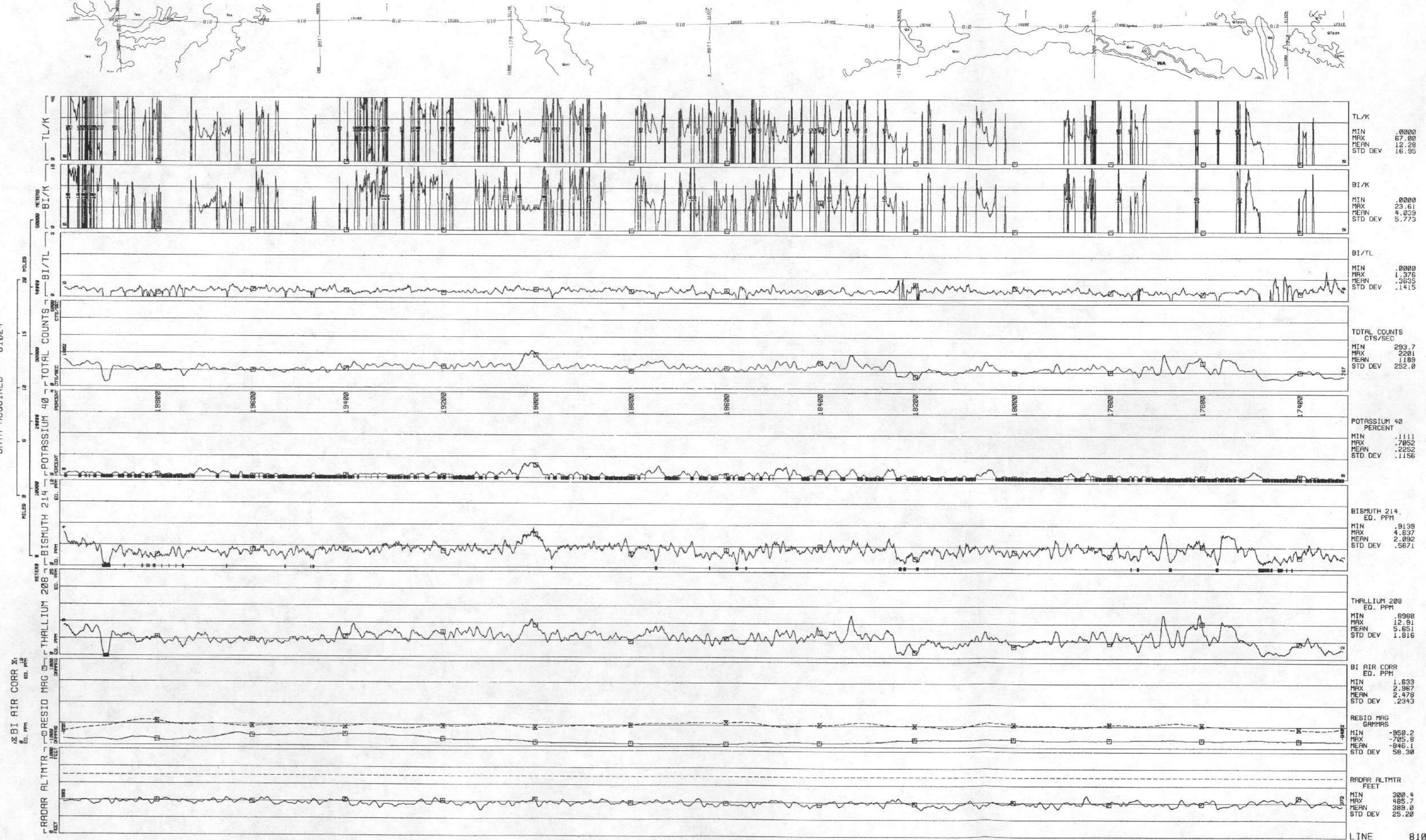


D11
wb

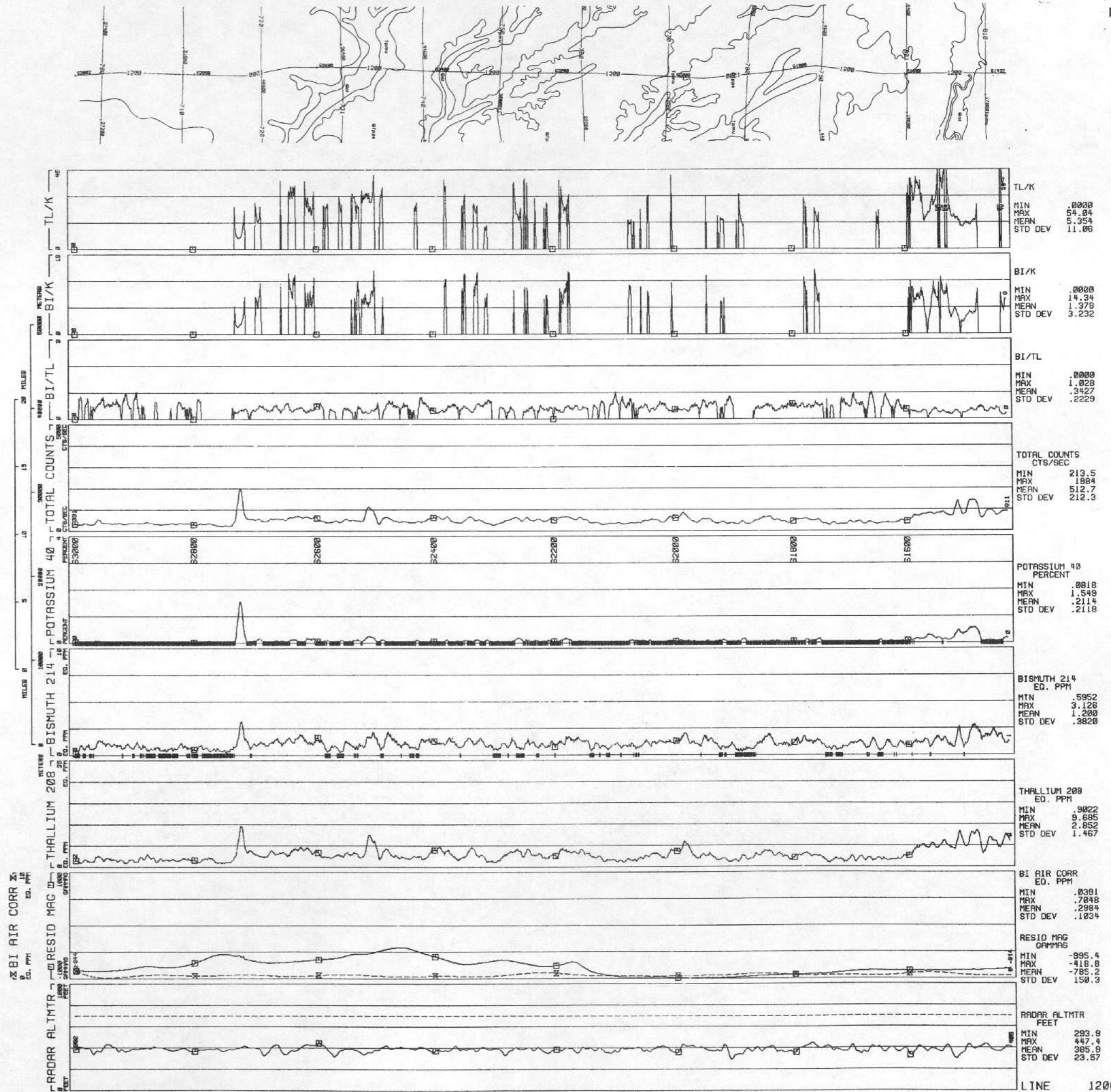
LINE 800
WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 81023



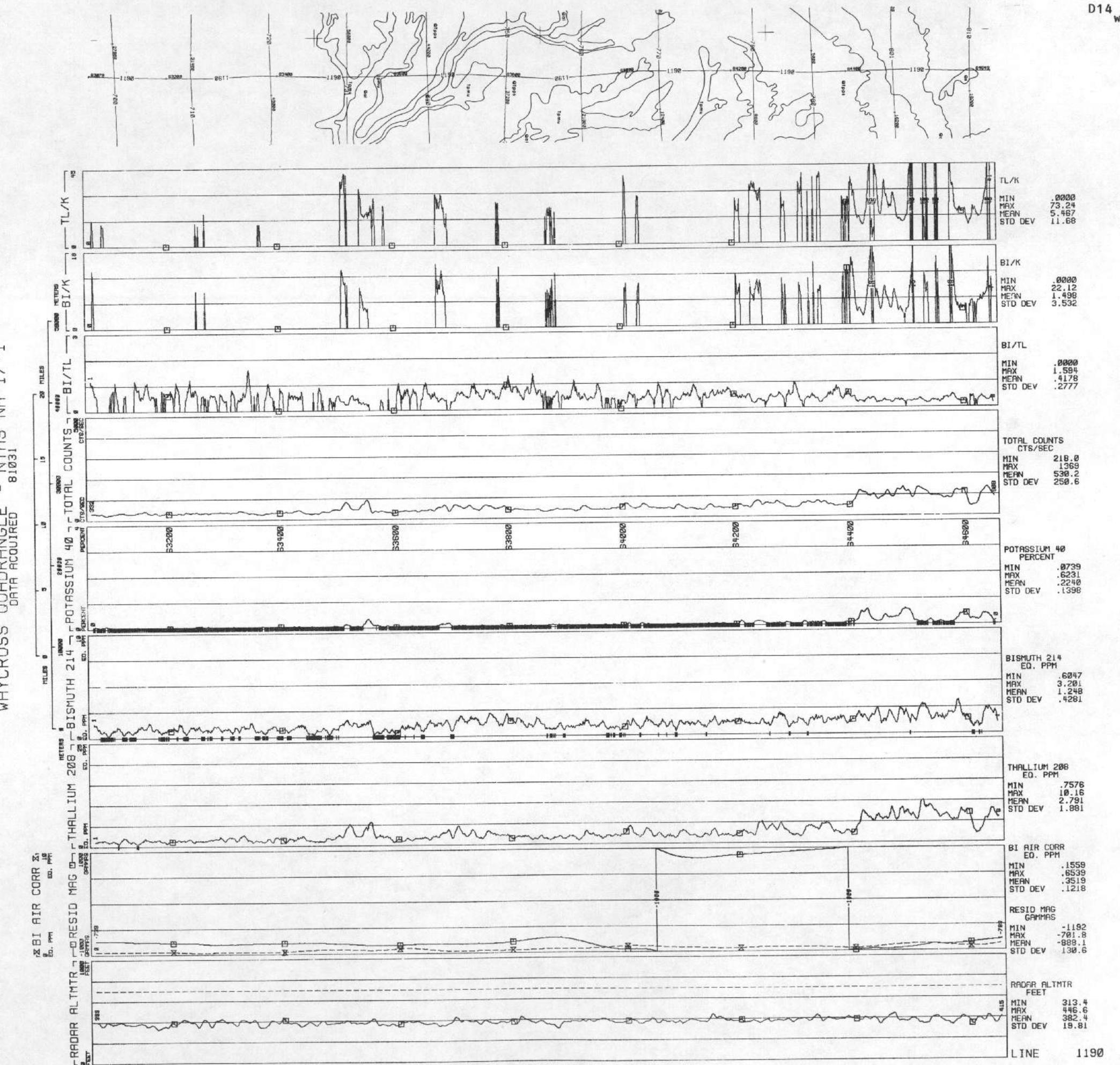
LINE 810
WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 81024

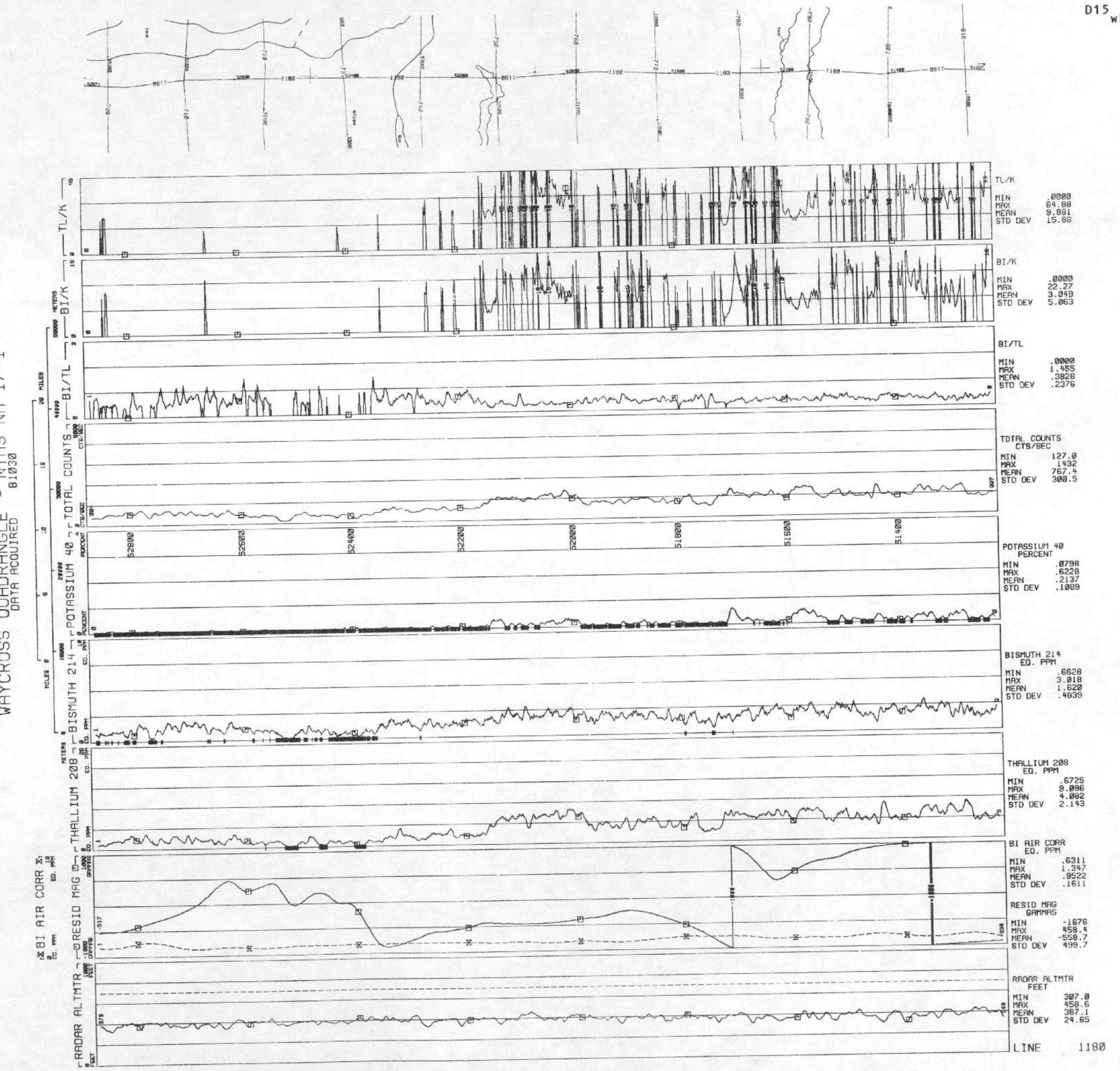


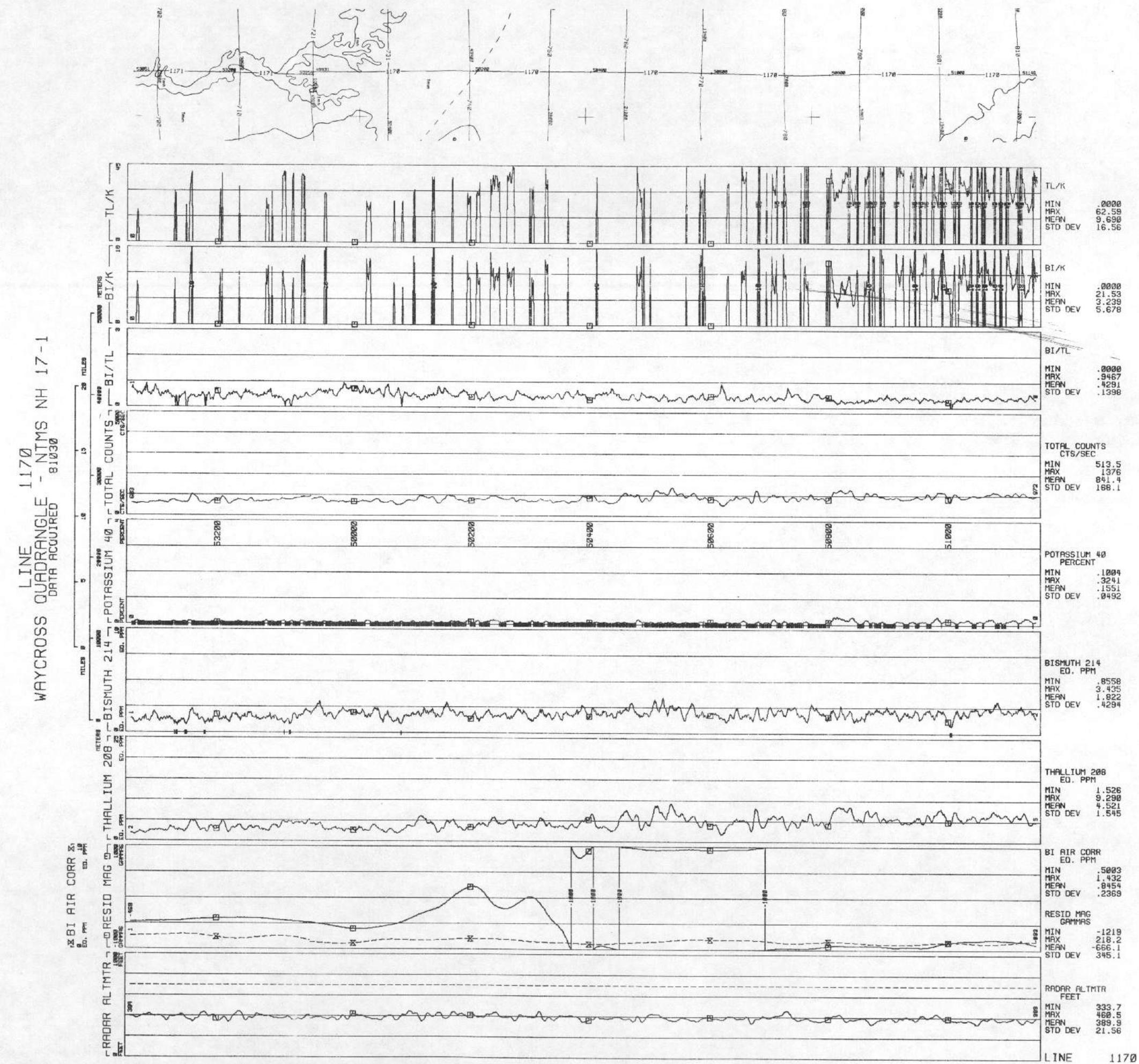
LINE 1200 QUADRANGLE - NTMS NH 17-1
WAYCROSS DATA ACQUIRED 81031

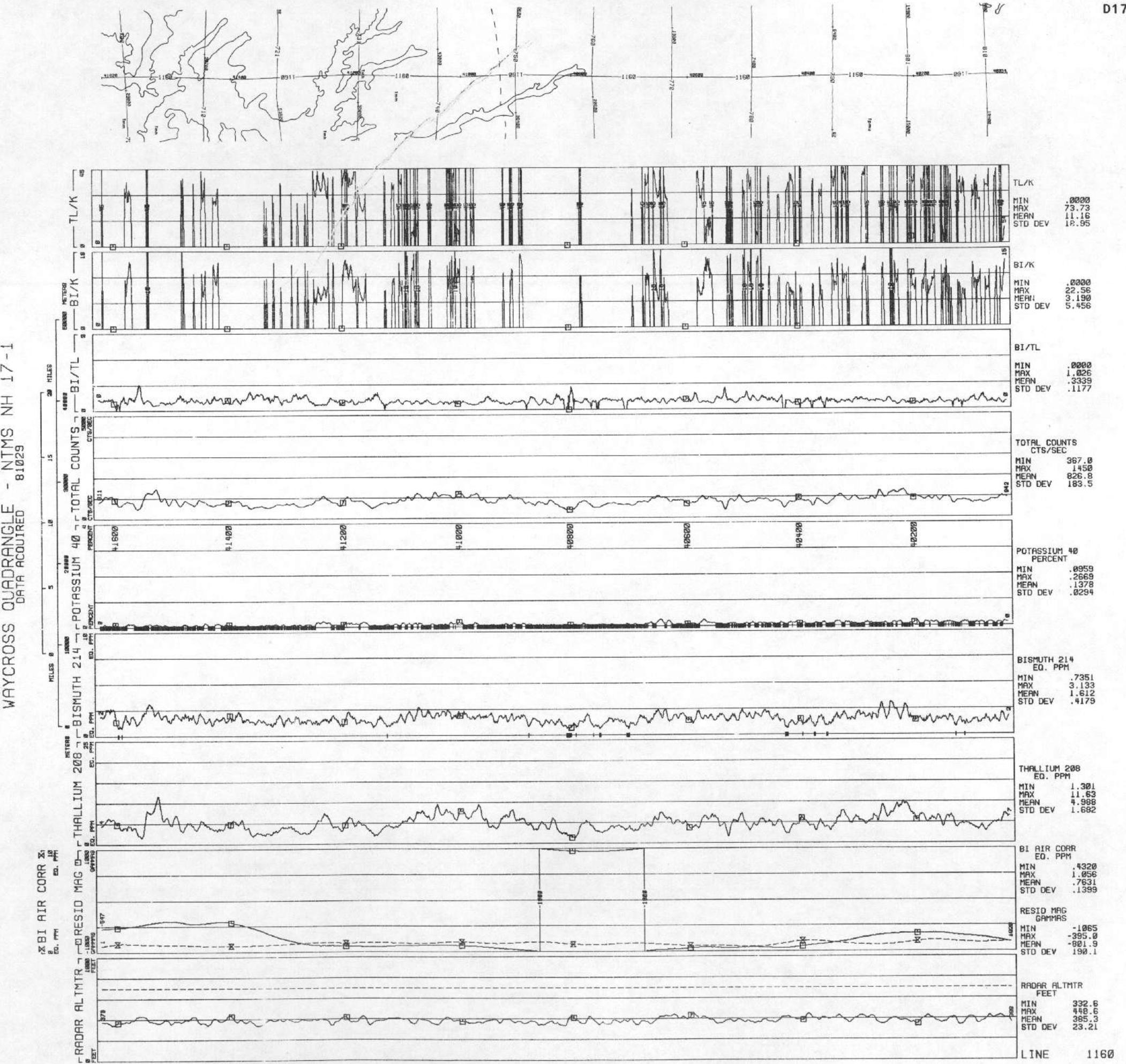


D14 wb

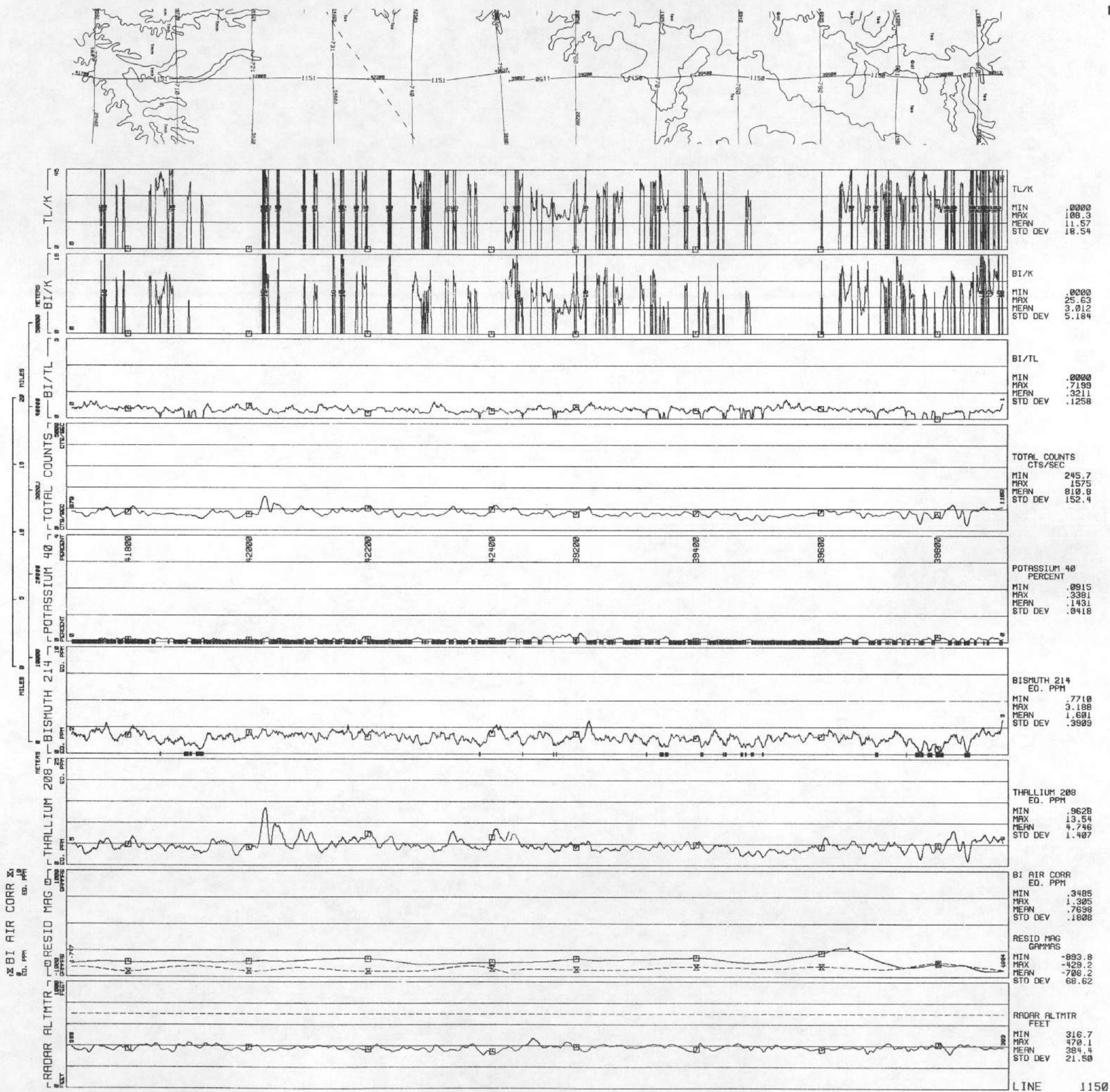


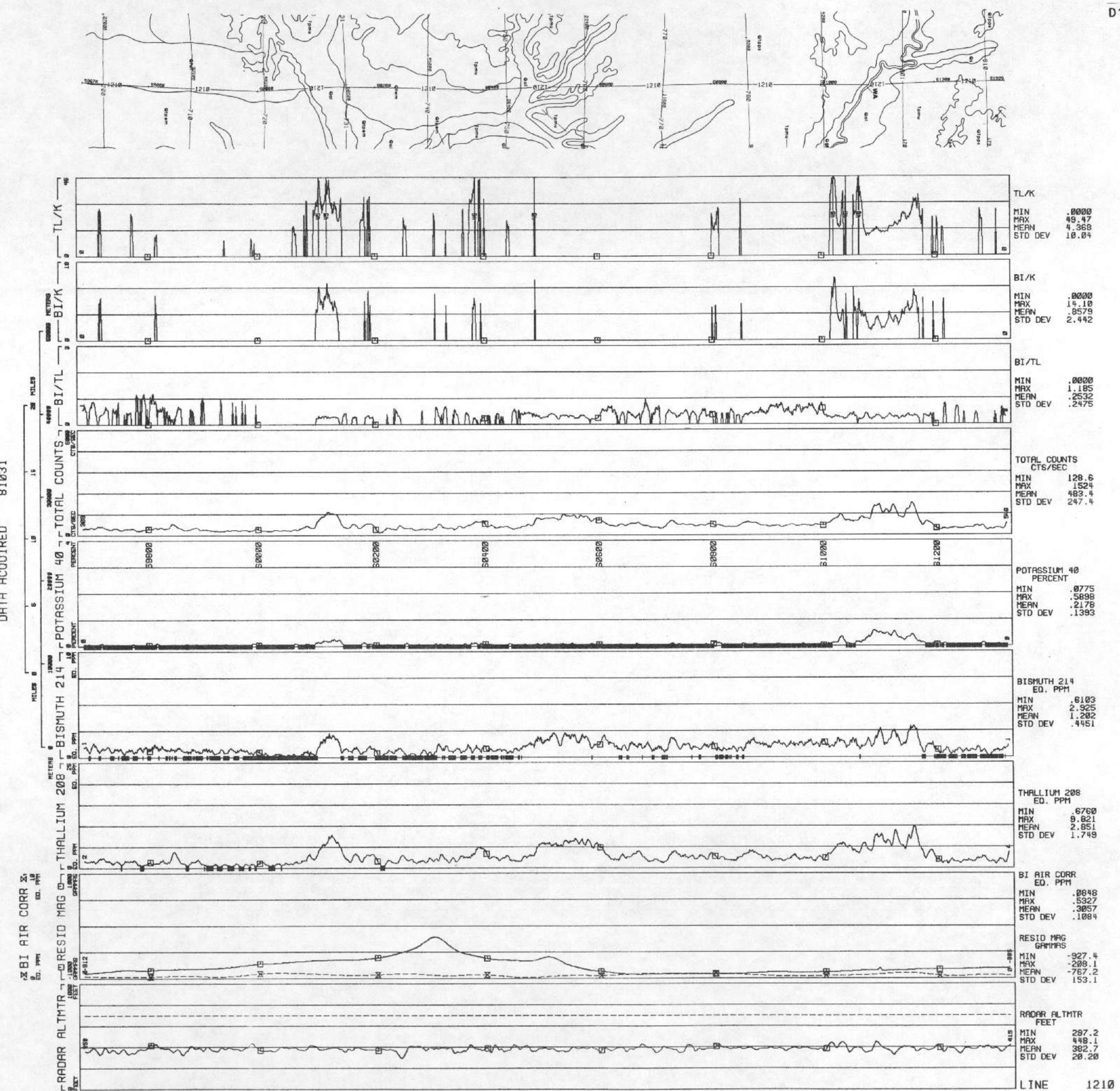


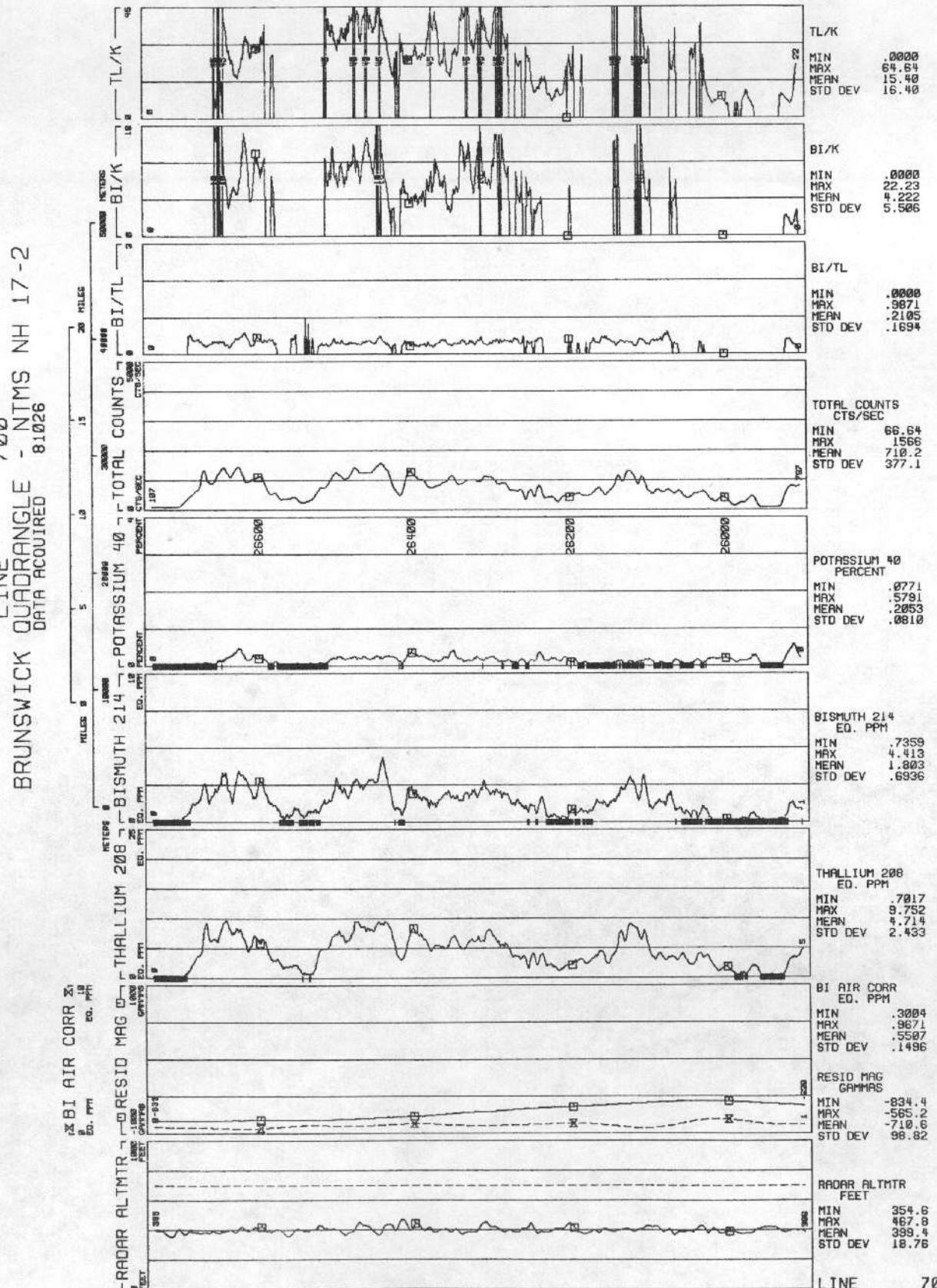
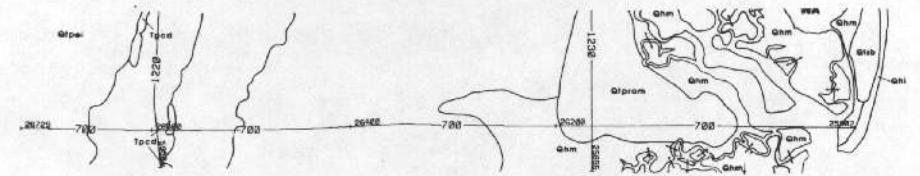


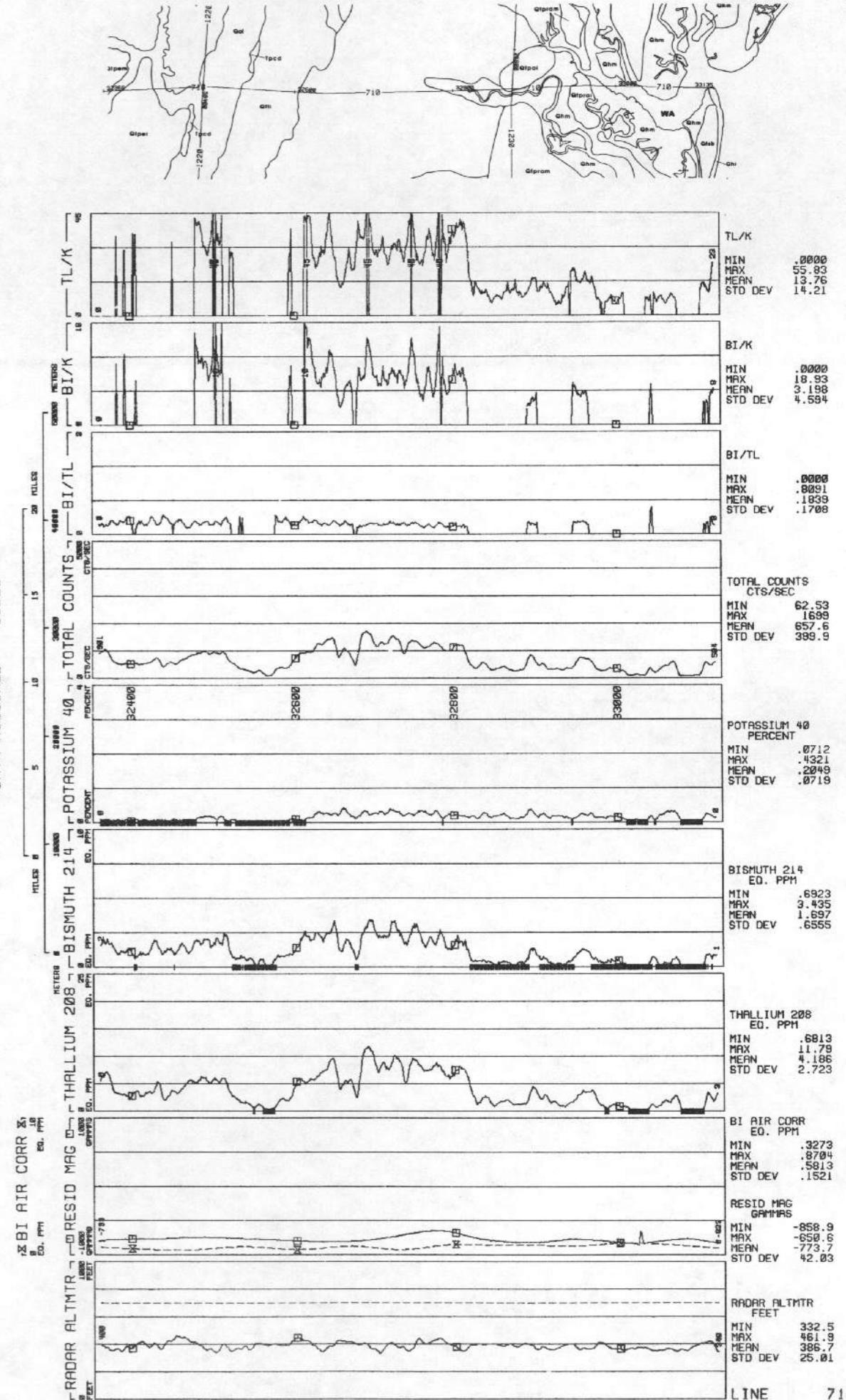


LINE 1150
WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 81029

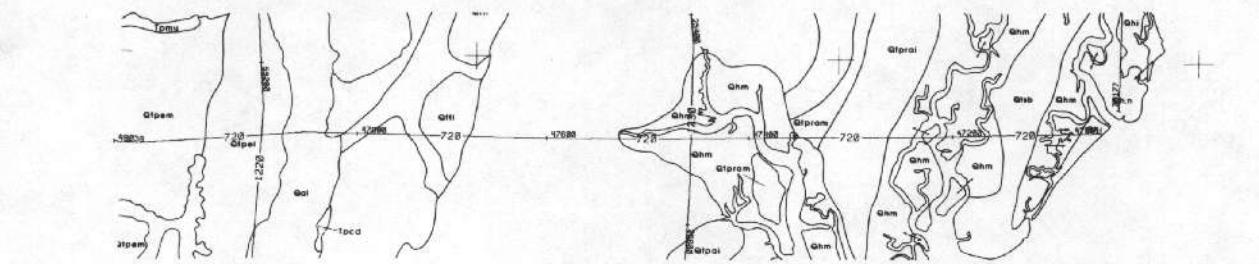




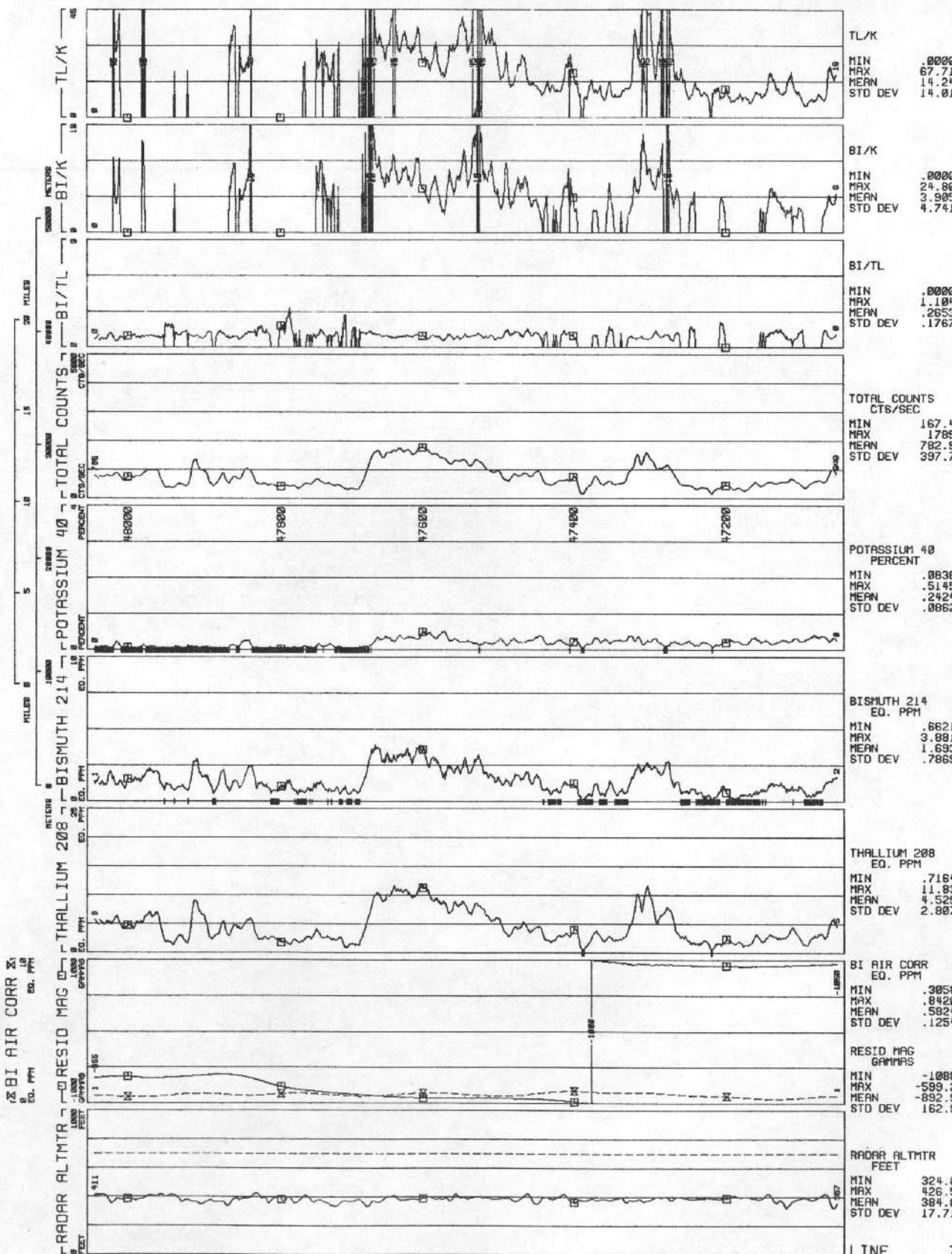




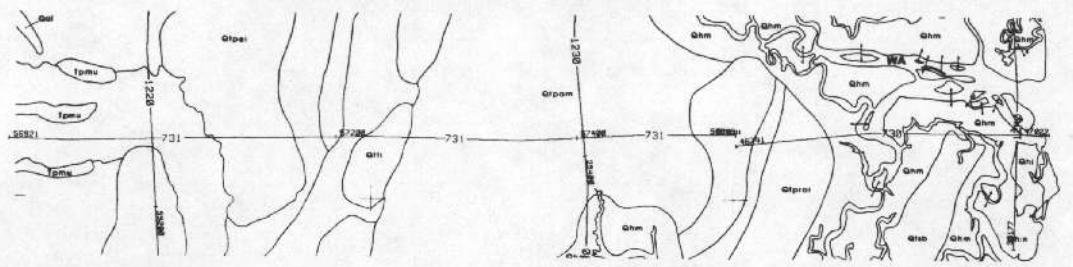
D22 wb



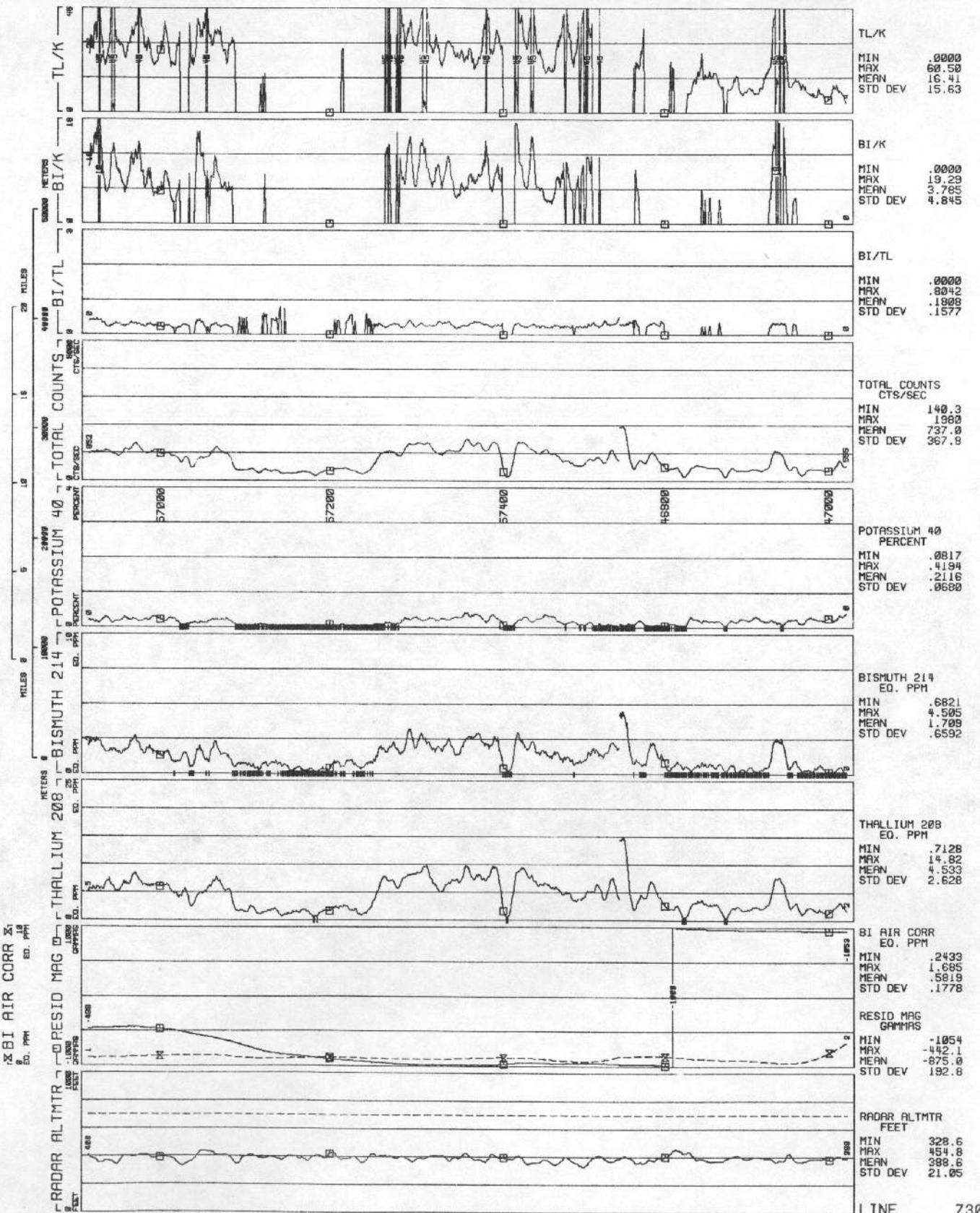
BRUNSWICK LINE QUADRANGLE 720 - NTMS NH 17-2
DATA ACQUIRED 81030



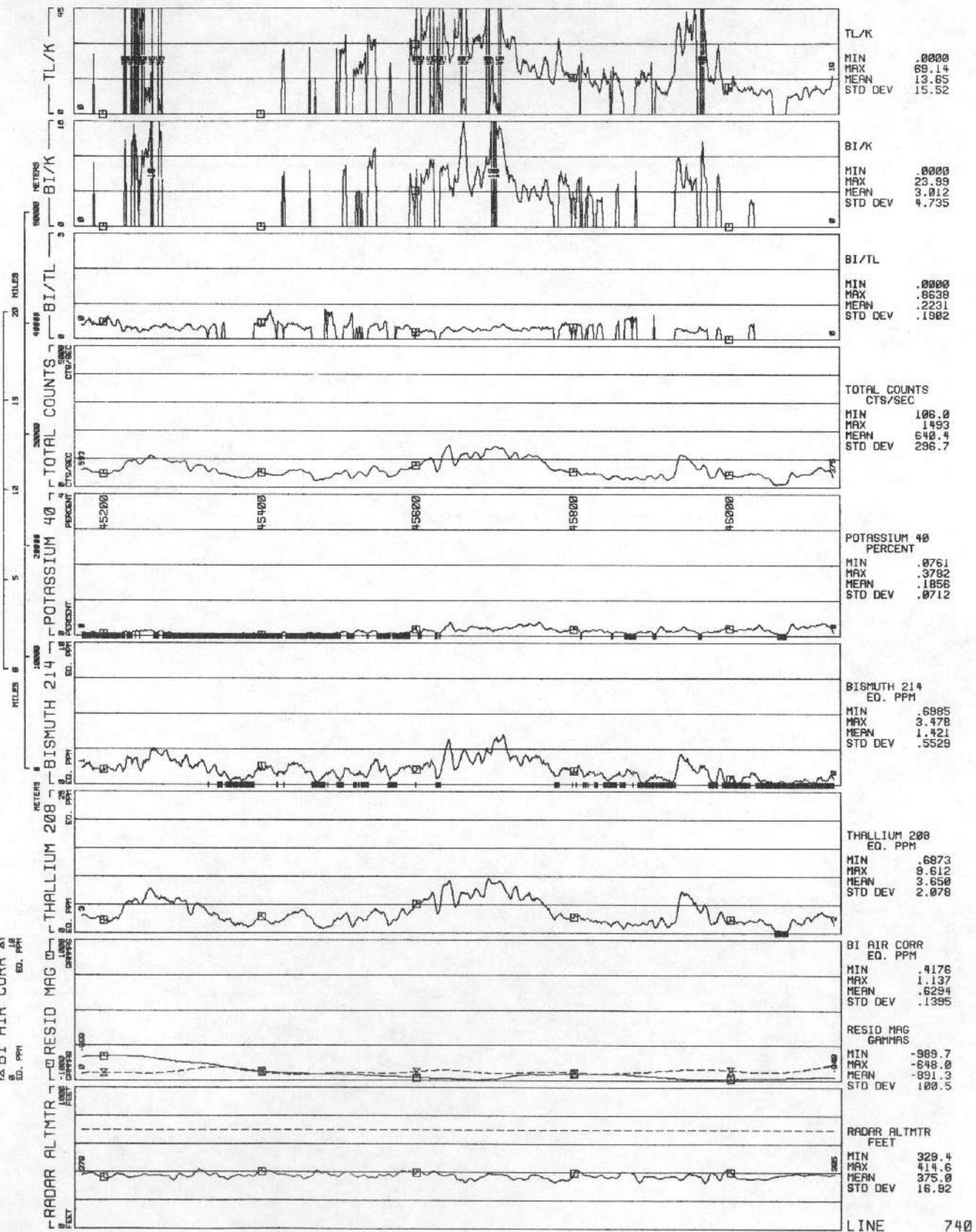
D23 wb



BRUNSWICK LINE QUADRANGLE 730 - NTMS NH 17-2
DATA ACQUIRED 81030

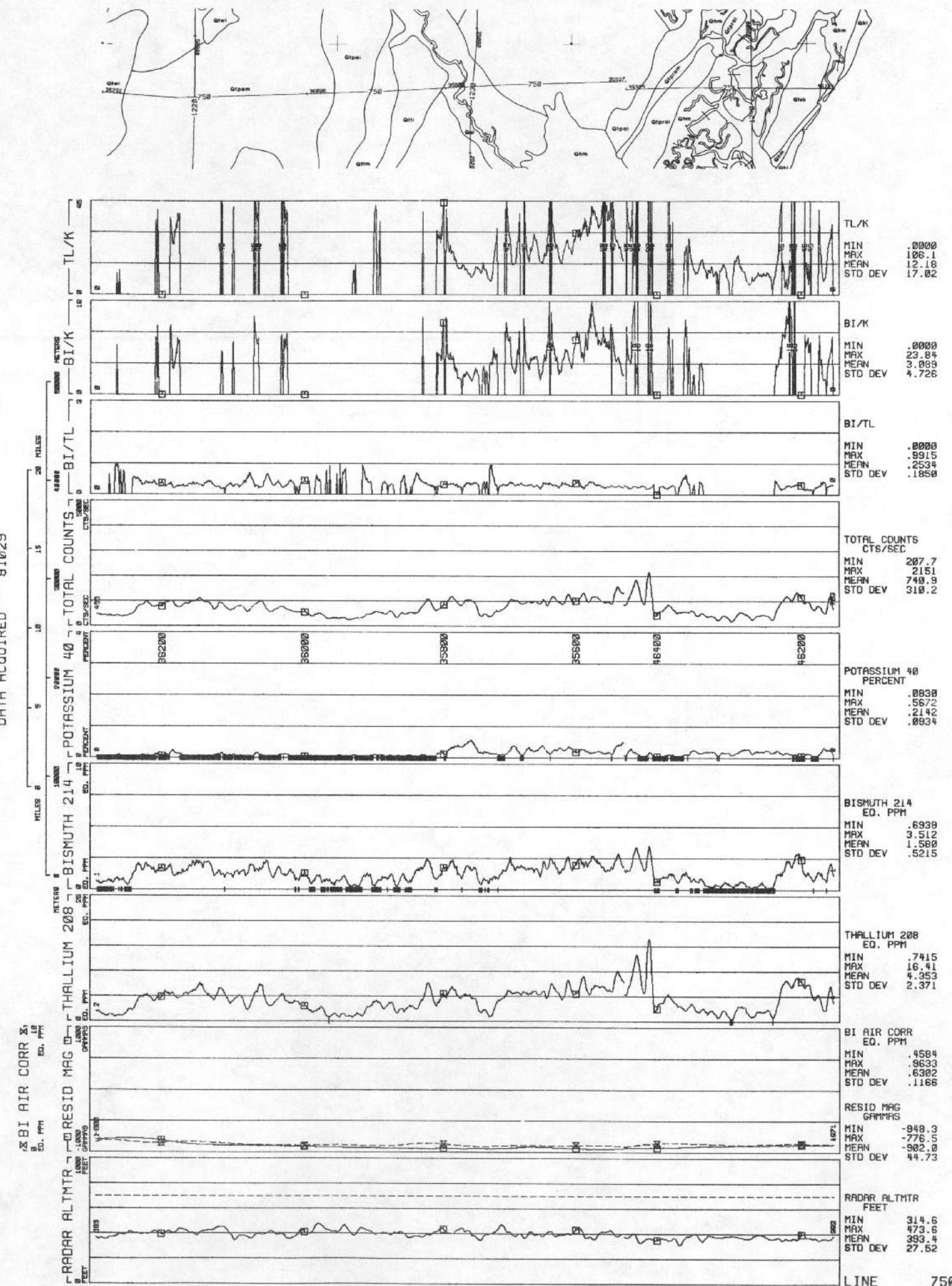


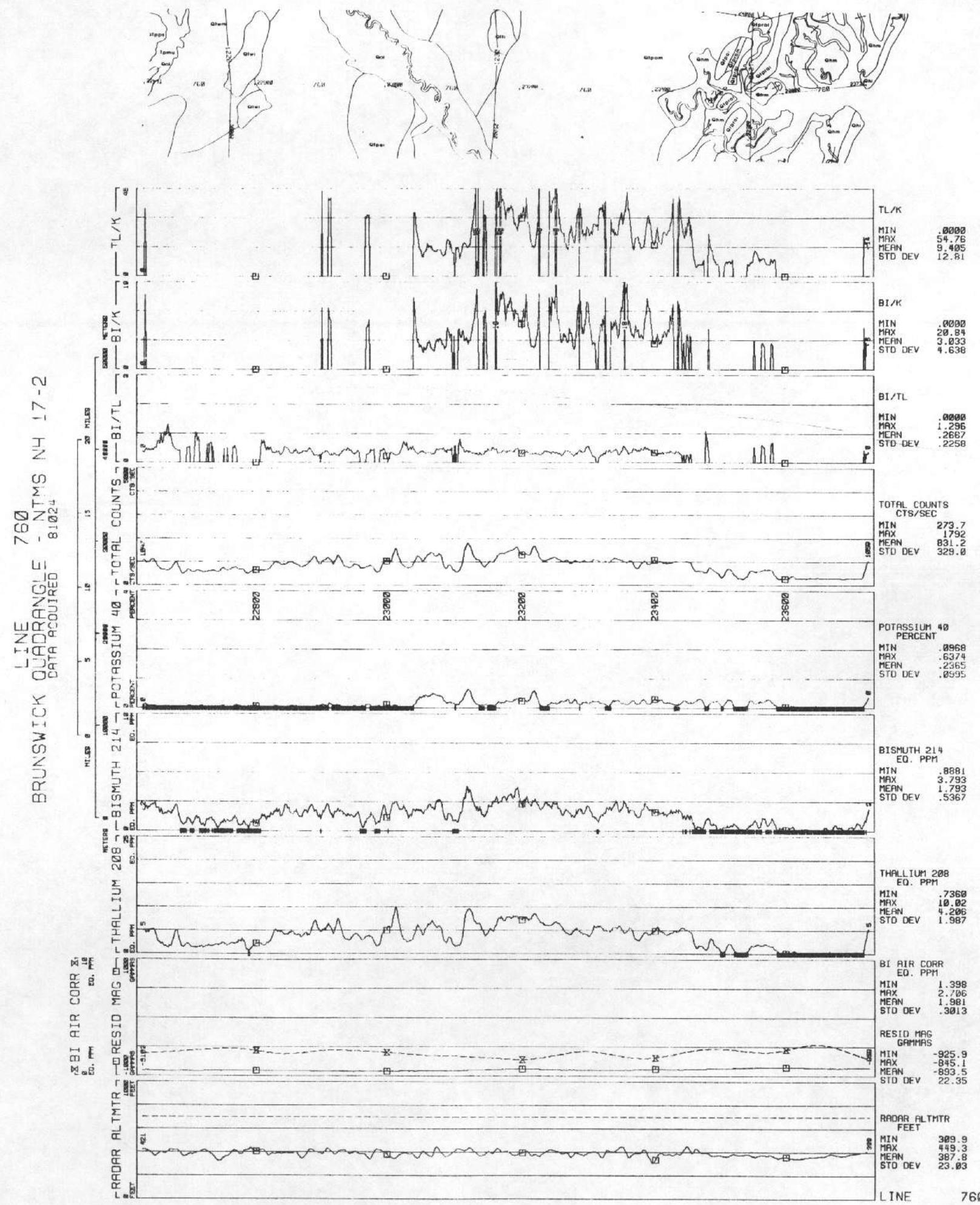
LINE 740 QUADRANGLE - NTMS NH 17-2
DATA ACQUIRED 8/10/29

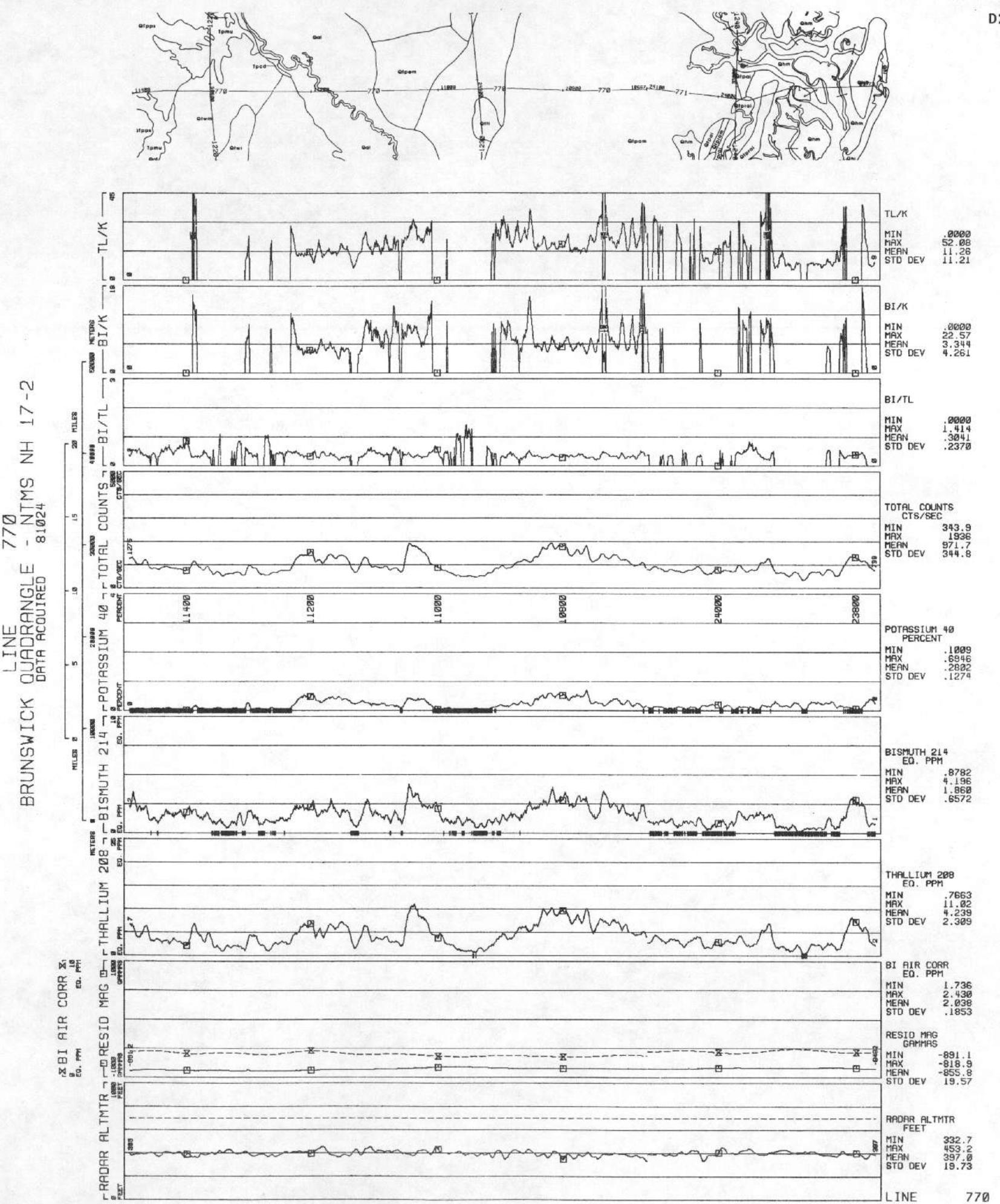


LINE 740

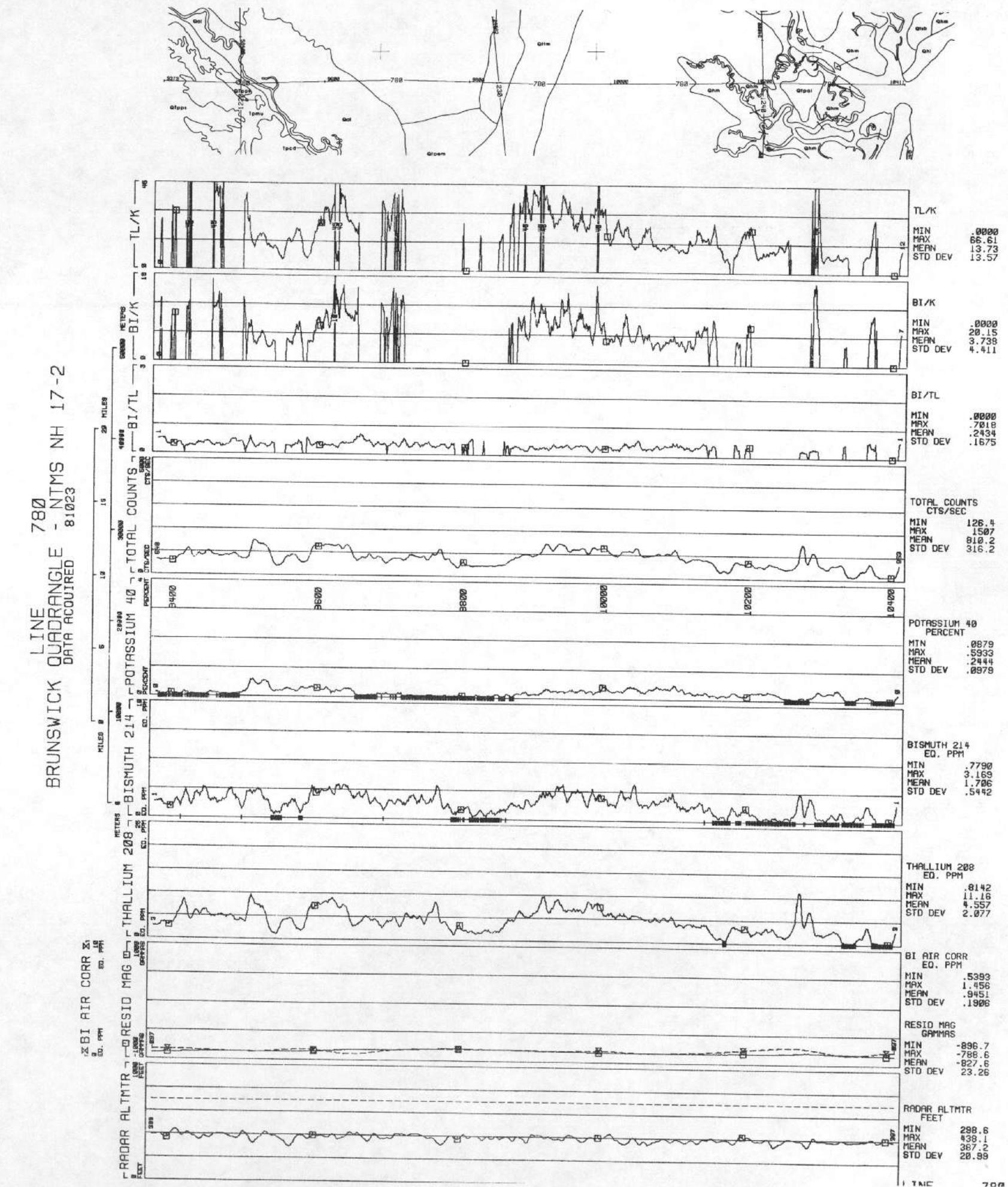
D25 wb

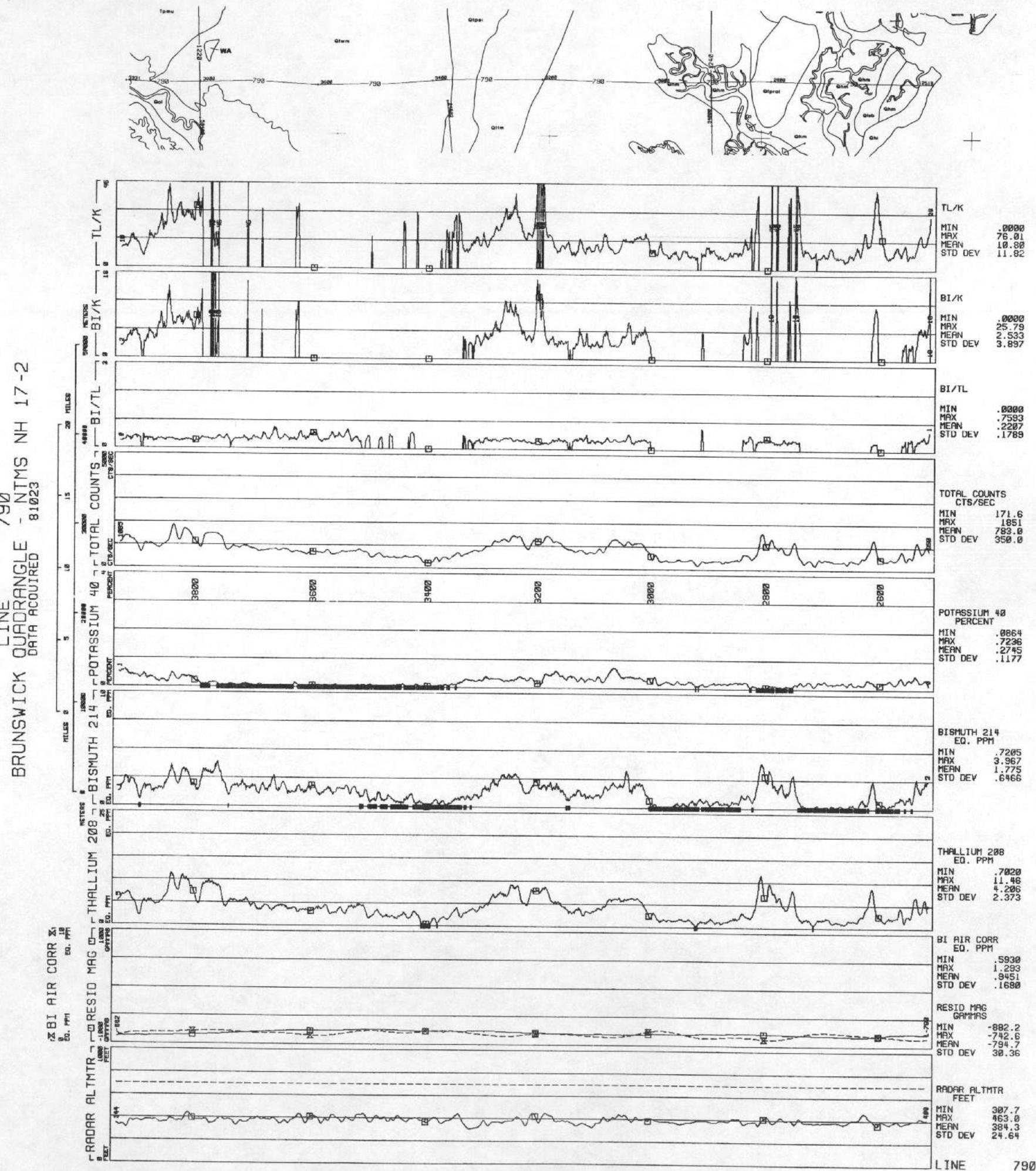




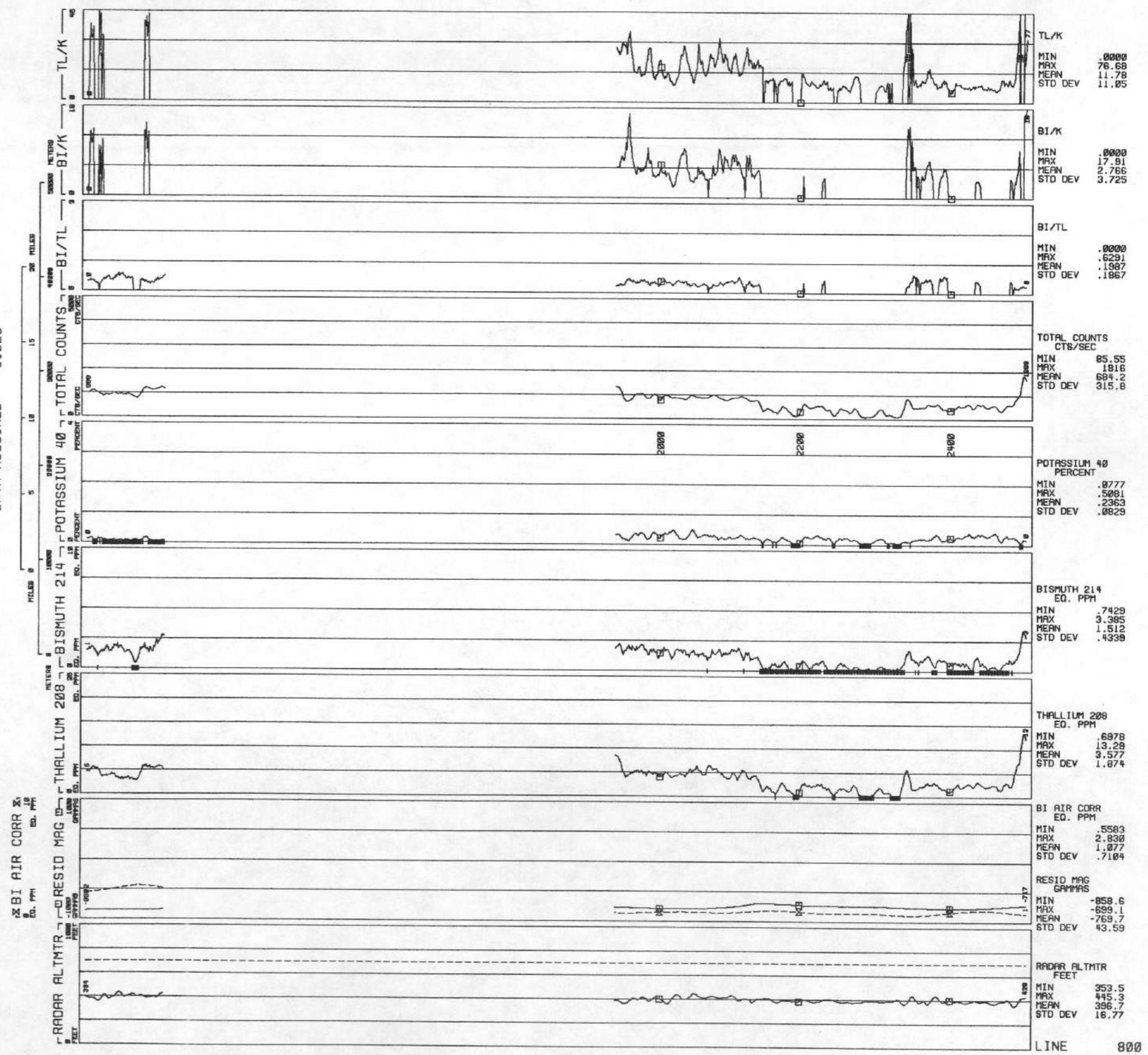


D28 wb

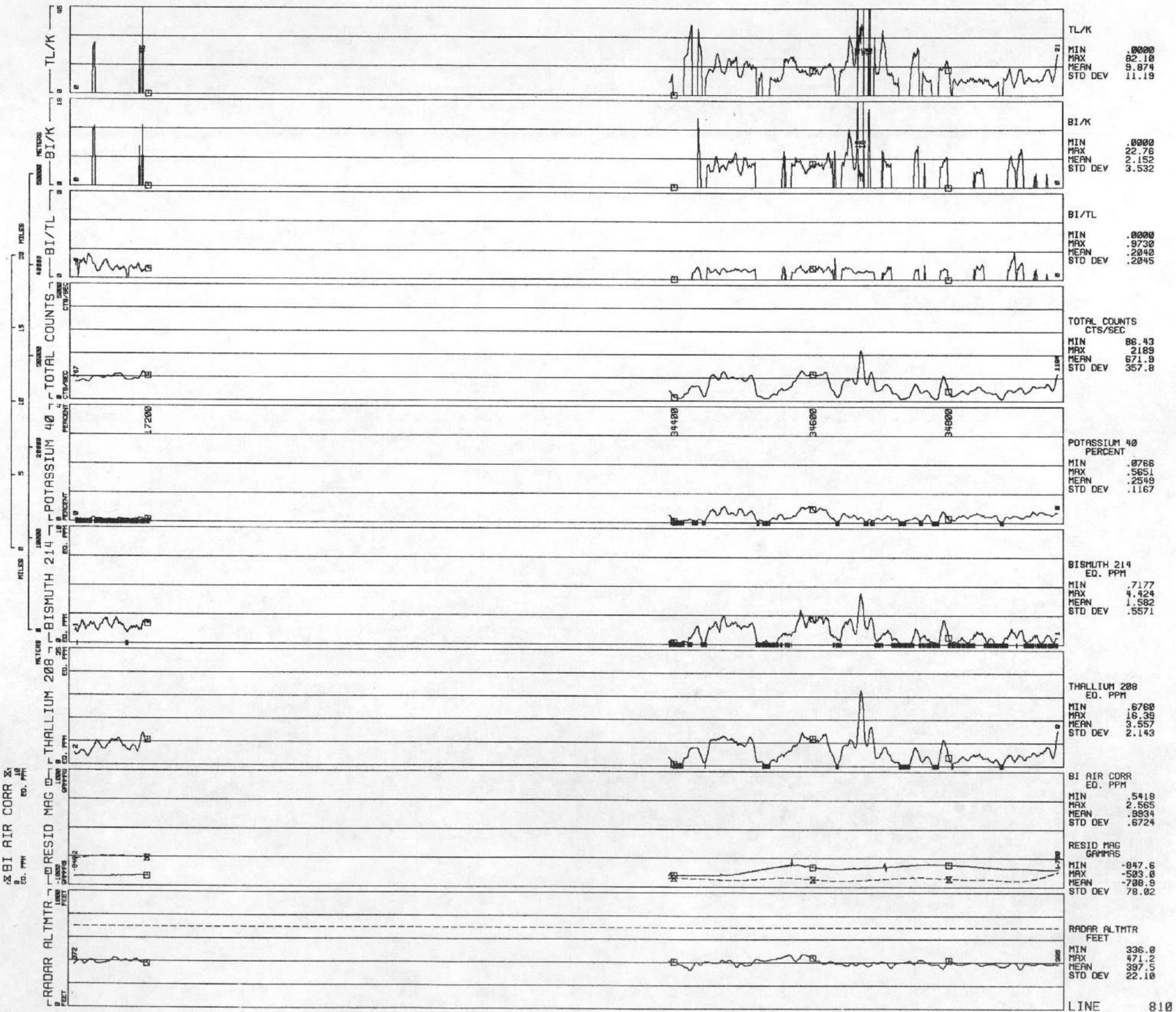




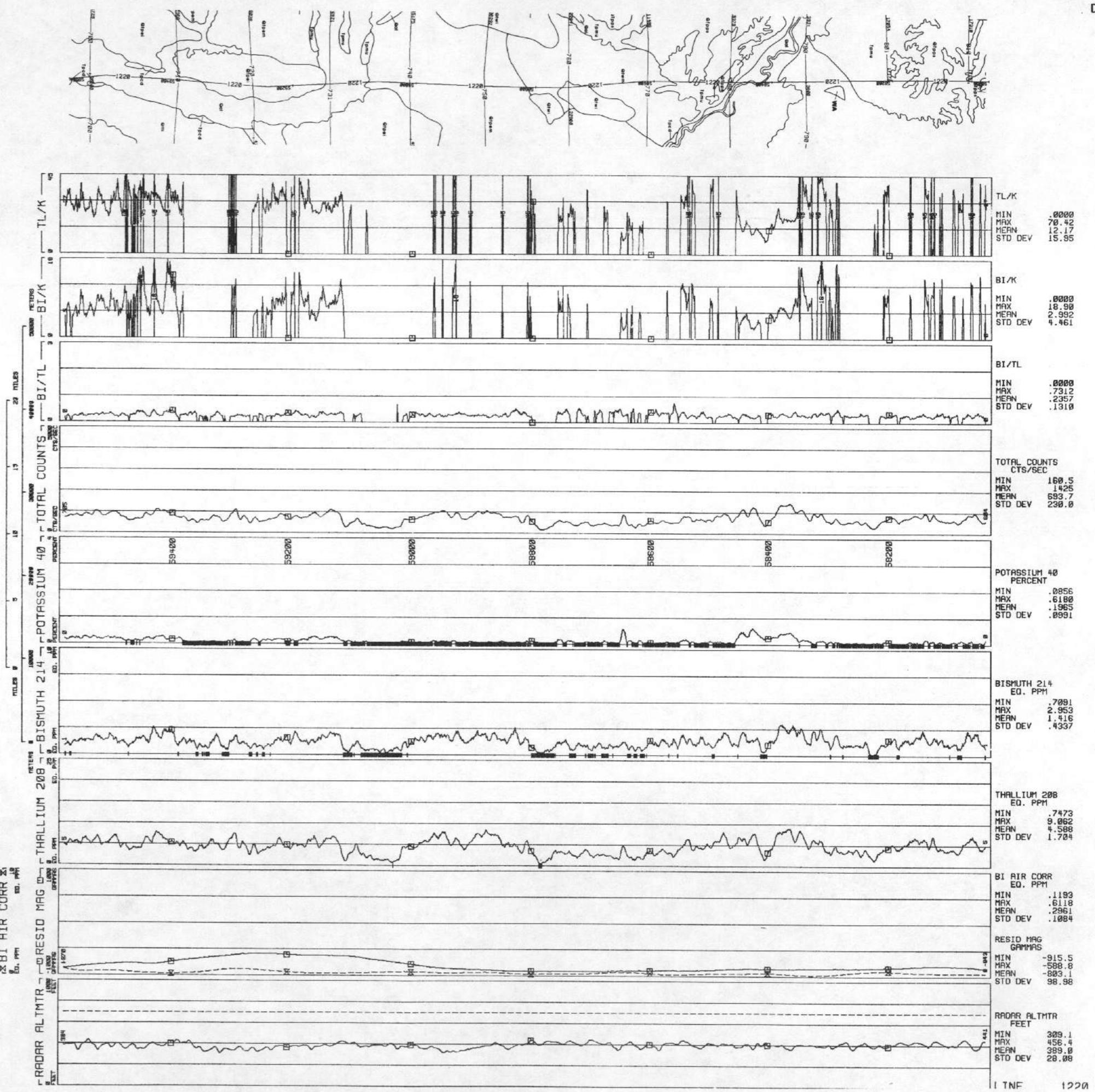
LINE 800
BRUNSWICK QUADRANGLE - NTMS NH 17-2
DATA ACQUIRED 8/10/23



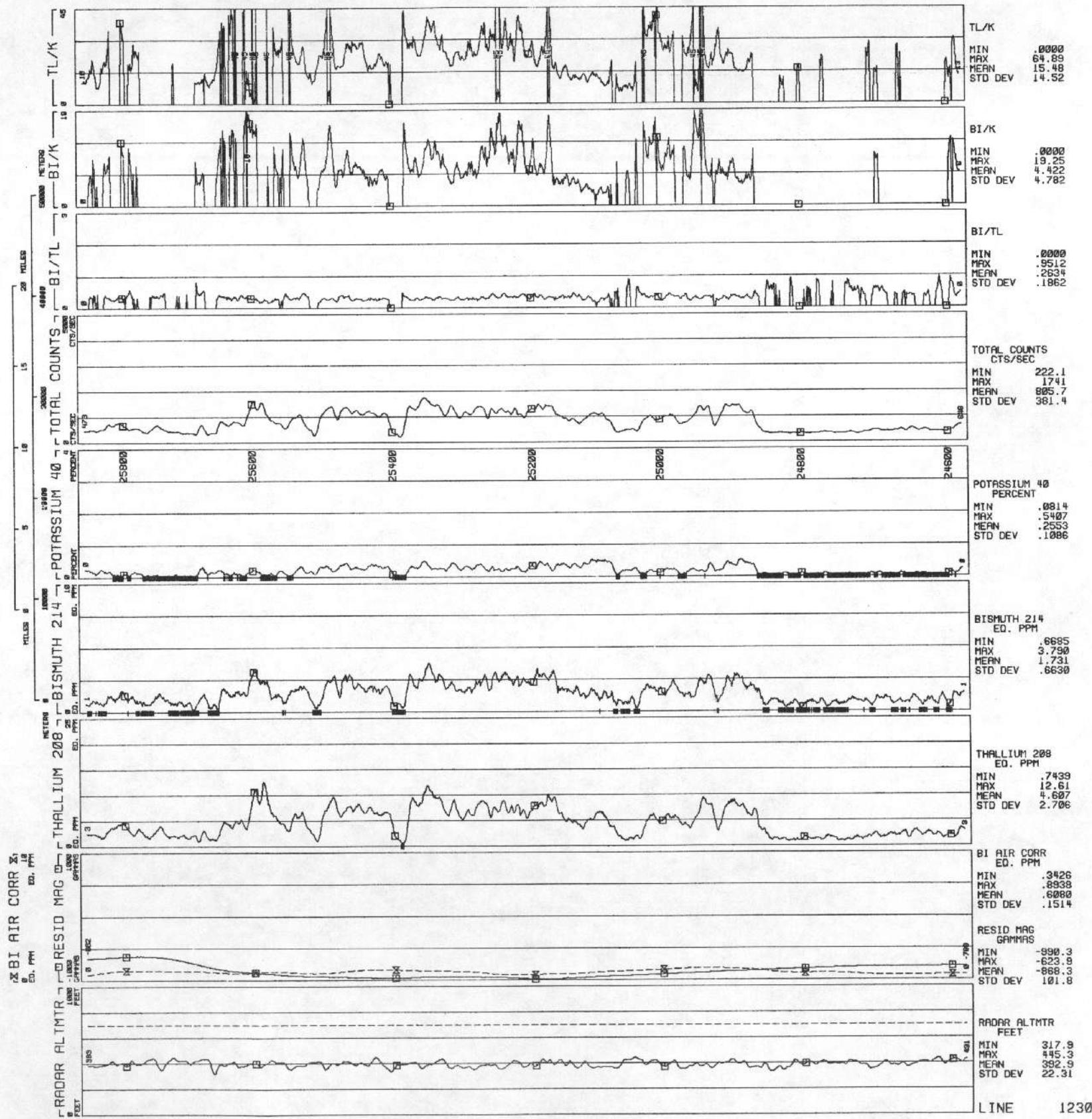
LINE 810 QUADRANGLE - NTMS NH 17-2
DATA ACQUIRED 8/10/24

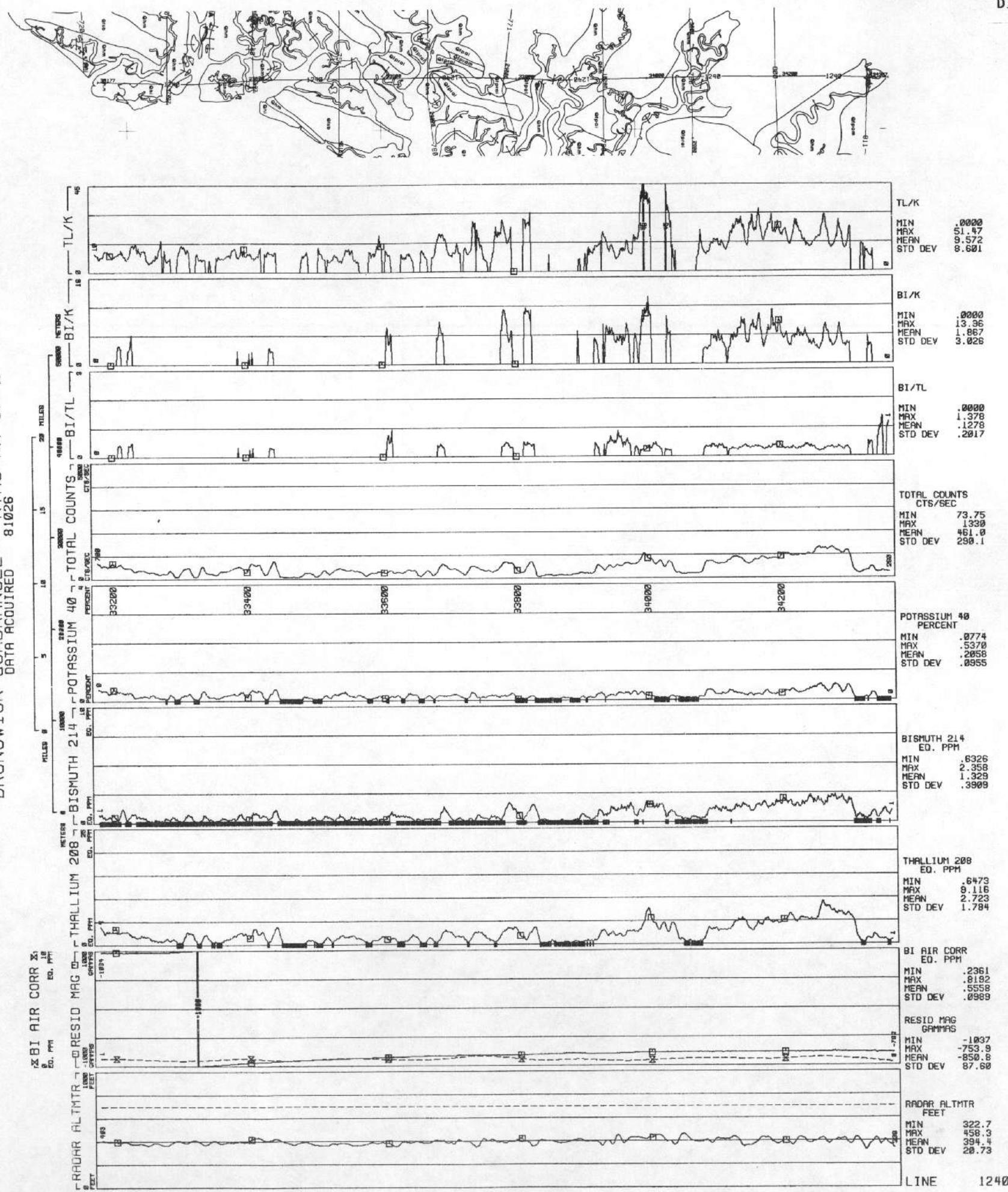


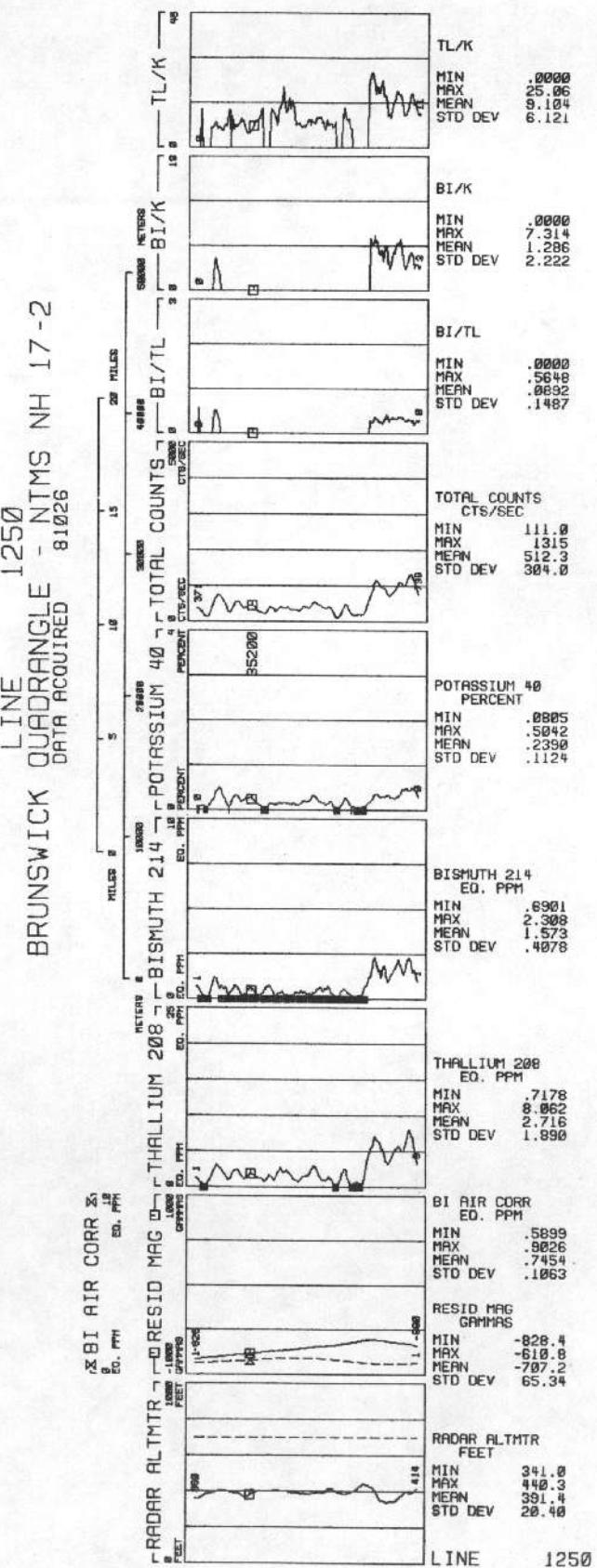
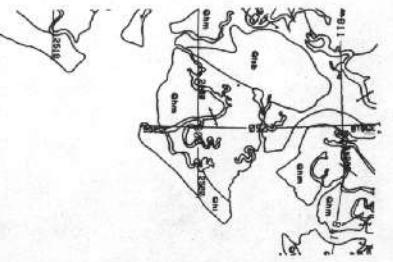
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BRUNSWICK DATA ACQUIRED 81031



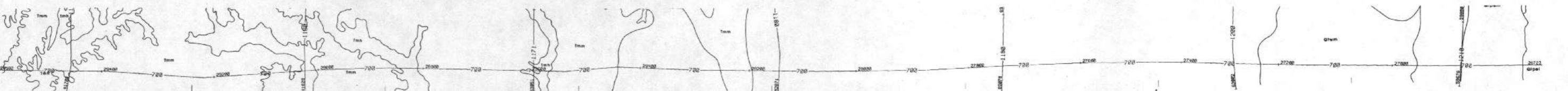
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DATA ACQUIRED 8/10/26



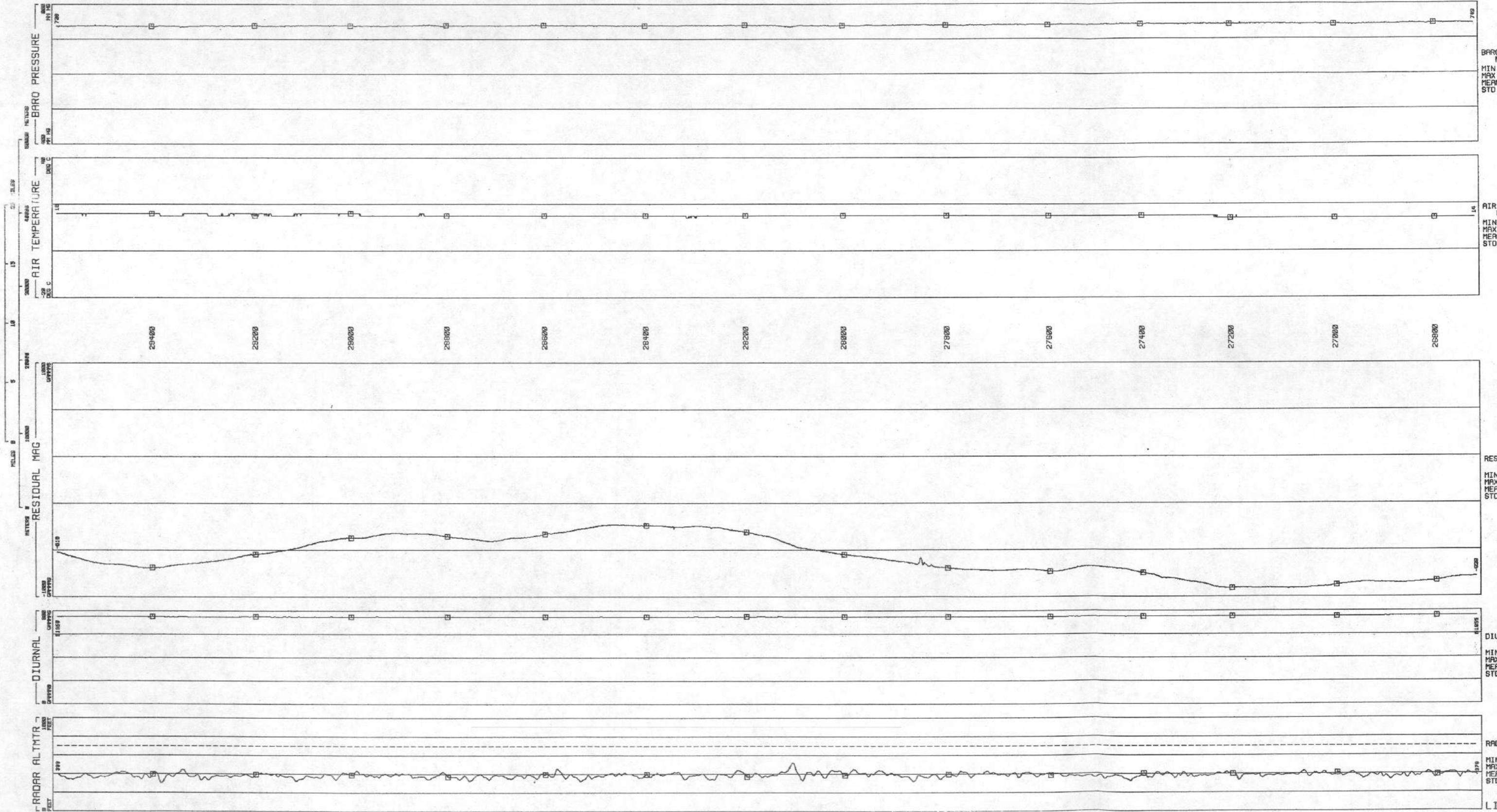




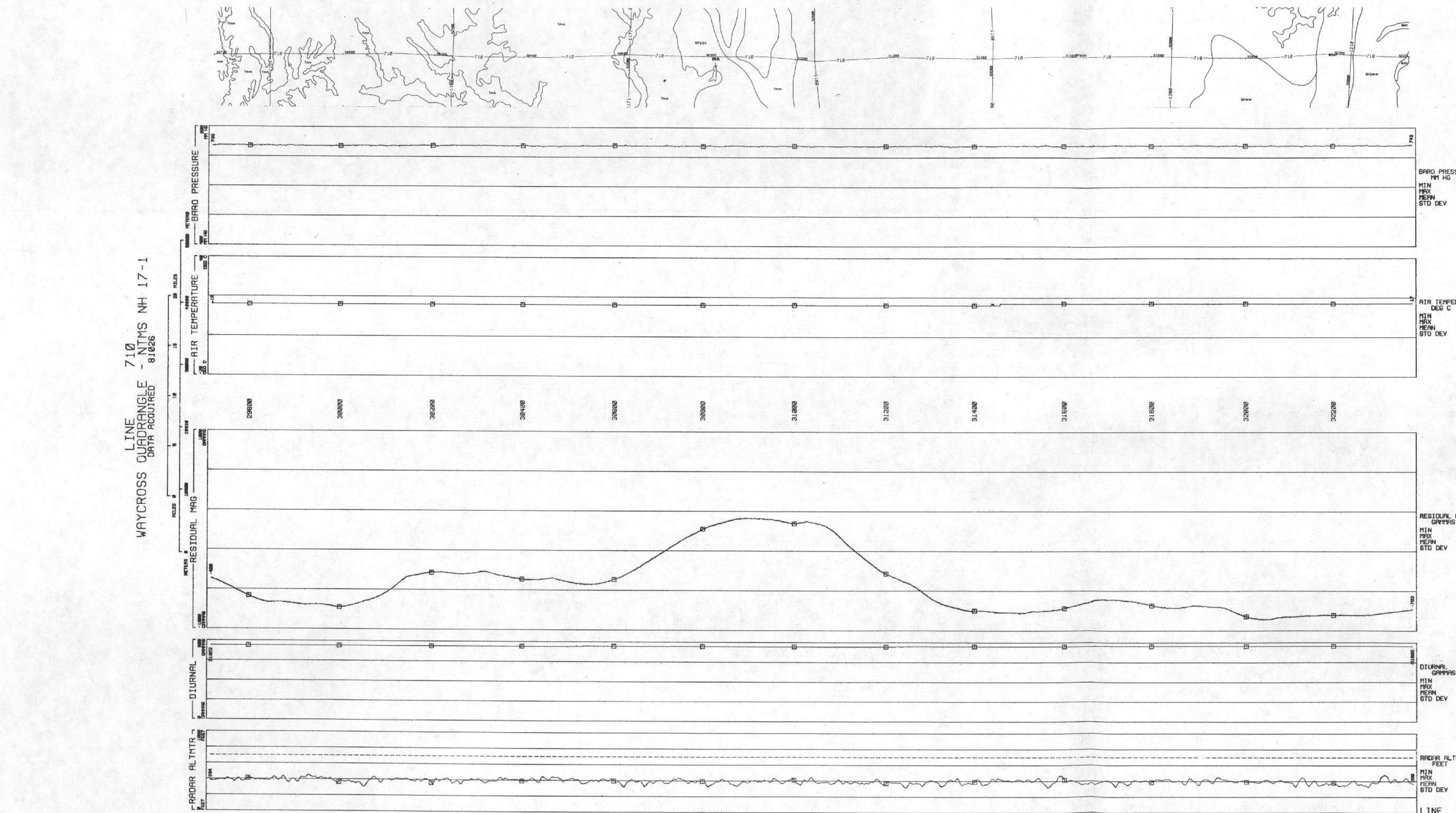
LINE 1250



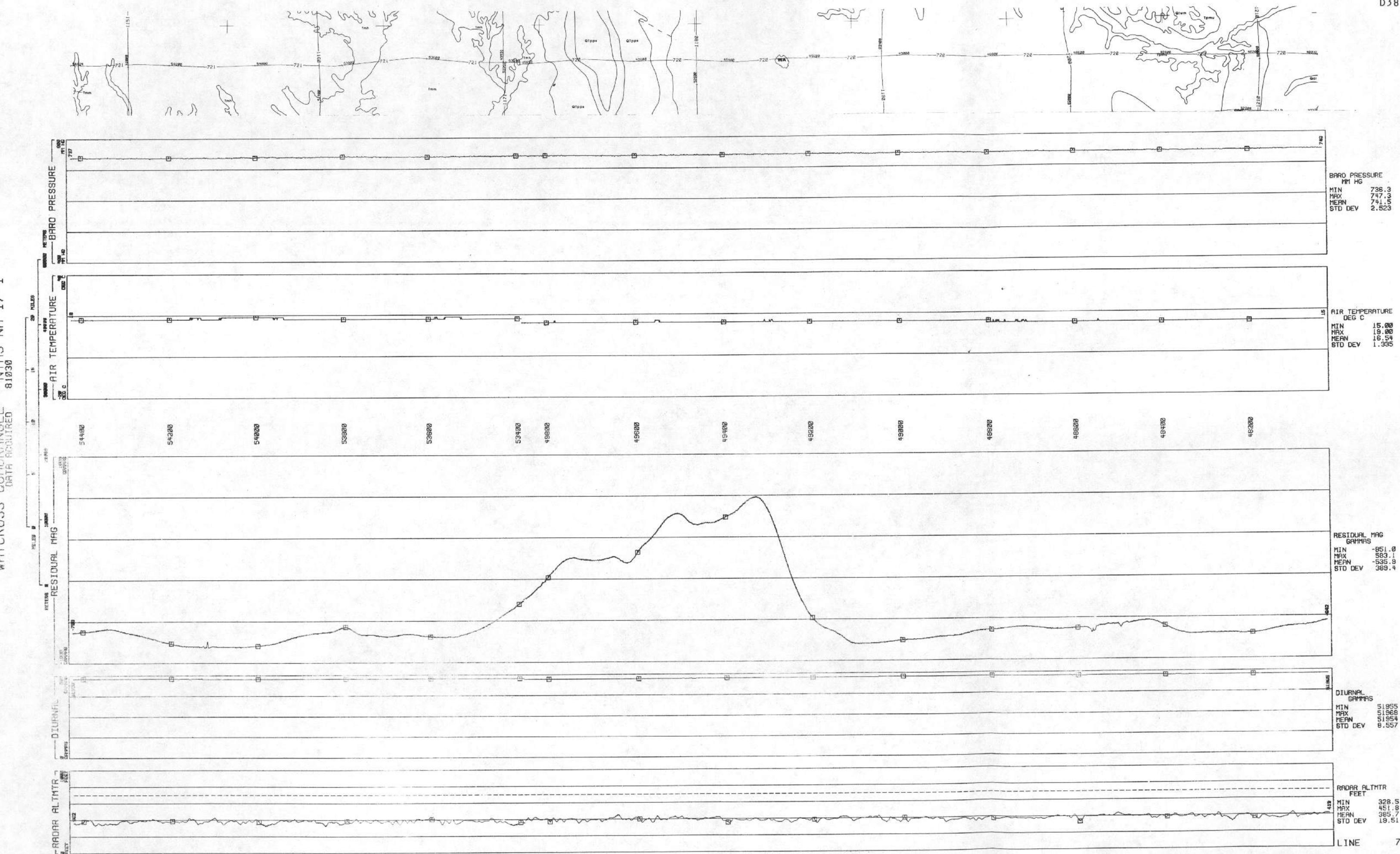
LINE 700
WAYCROSS QUADRANGLE - NTMS NH 17-1
Data Acquired 8/10/26

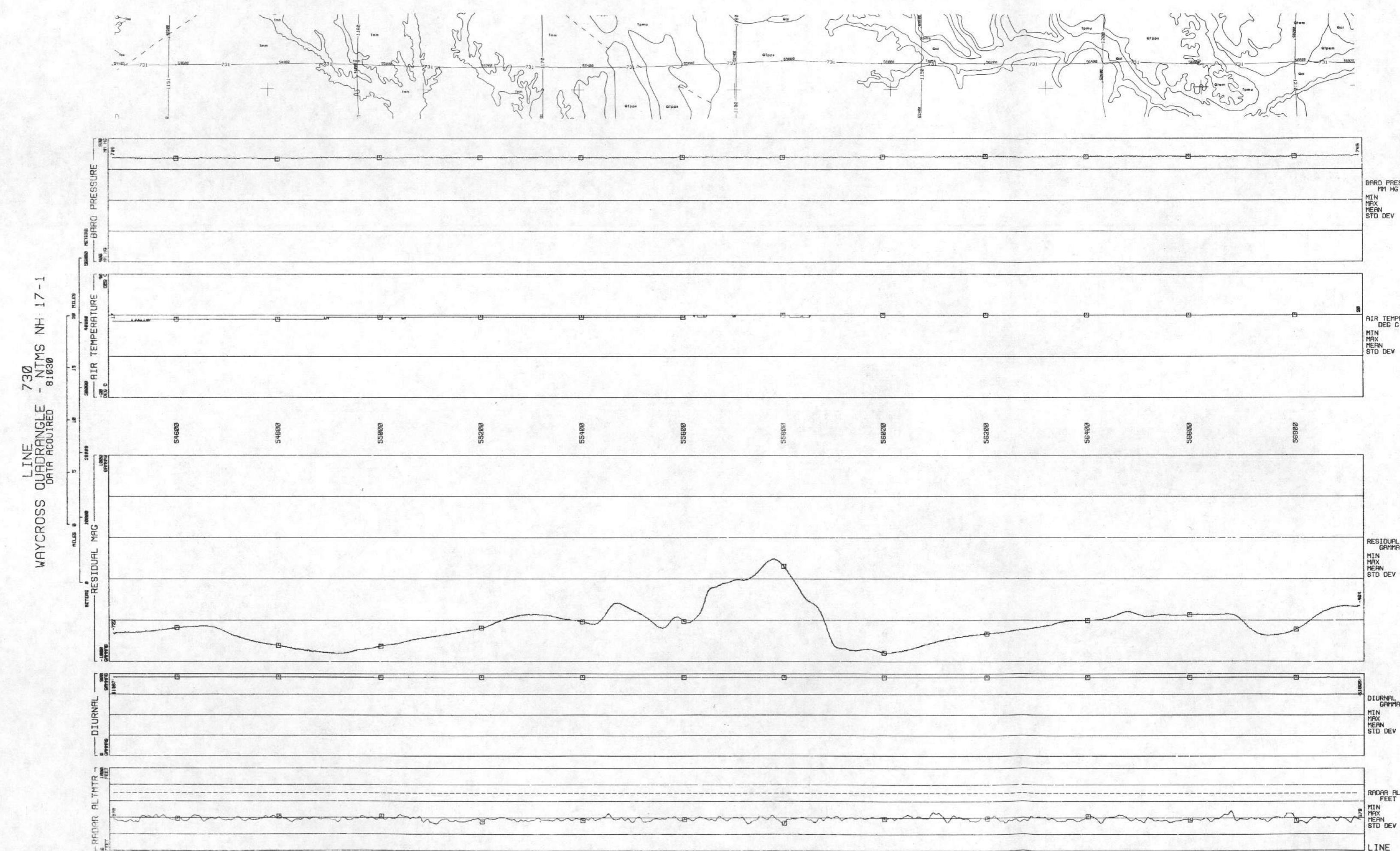


7 wb

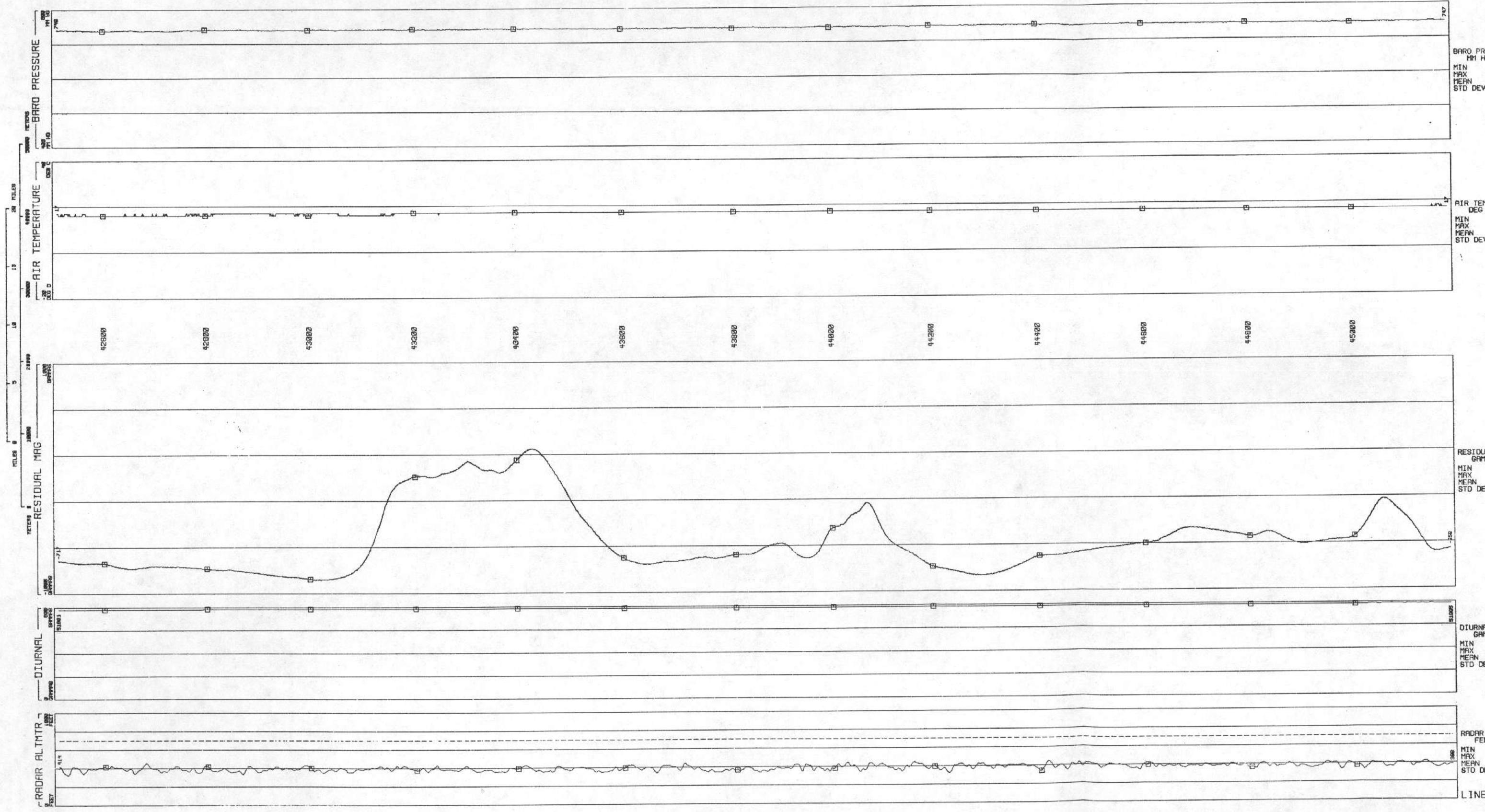


8 wb

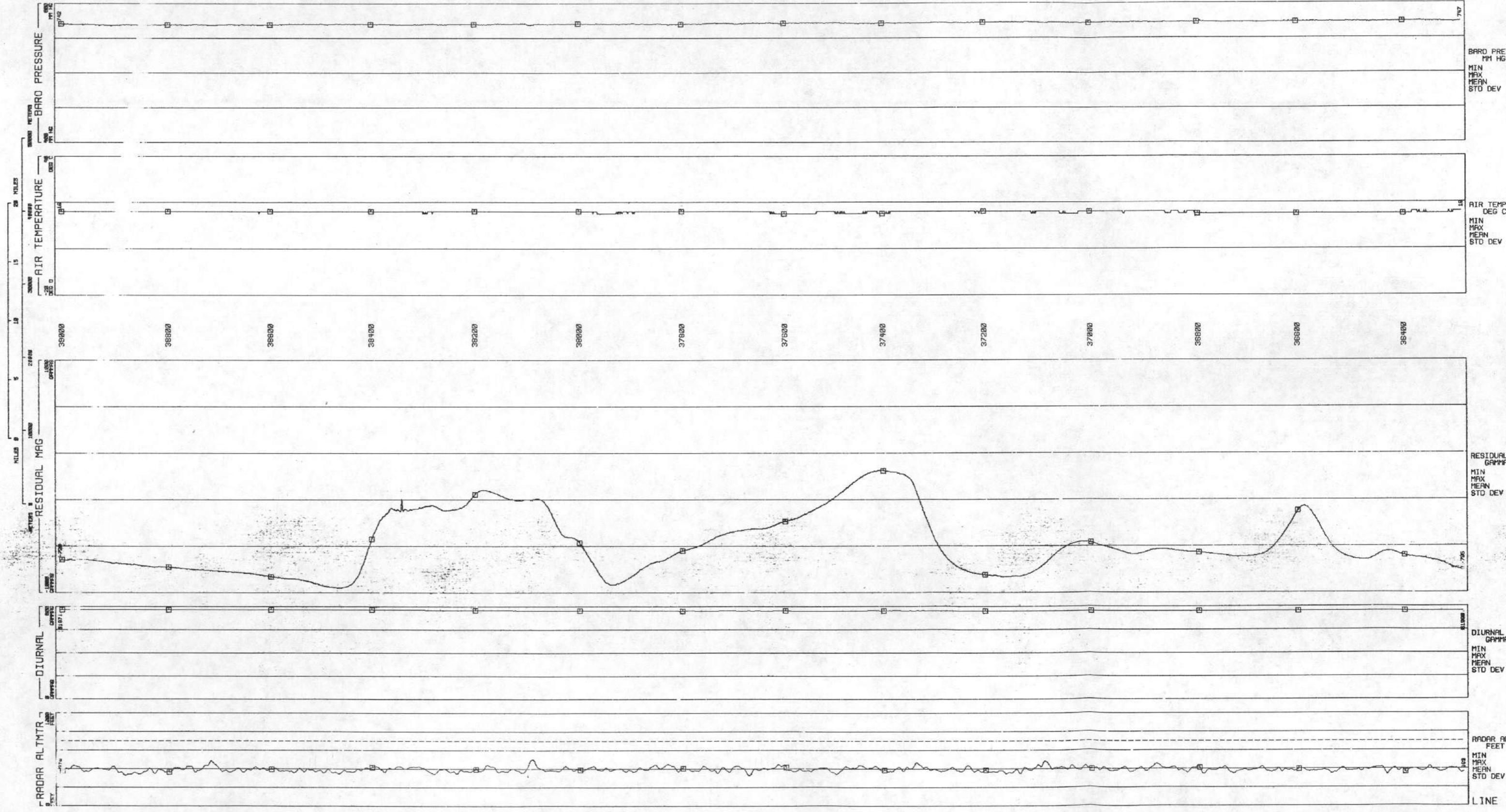




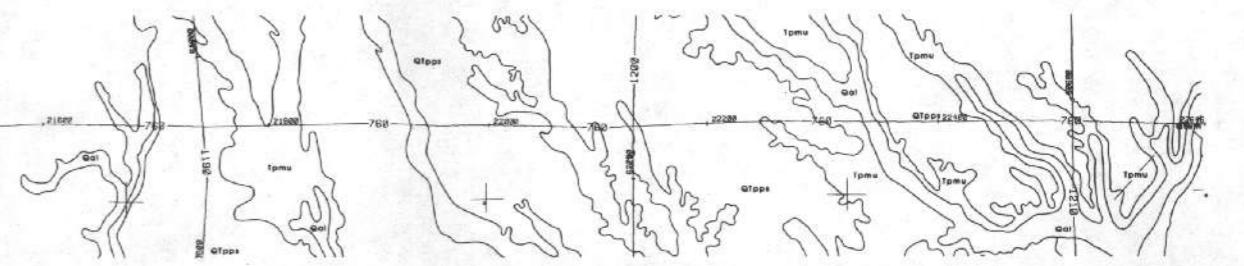
LINE 740 WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 8/029



LINE 750
WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 81029



wb



PRESSURE
HG

TEMPERATURE
EG C
10.00
12.00
10.94
DEV 2533

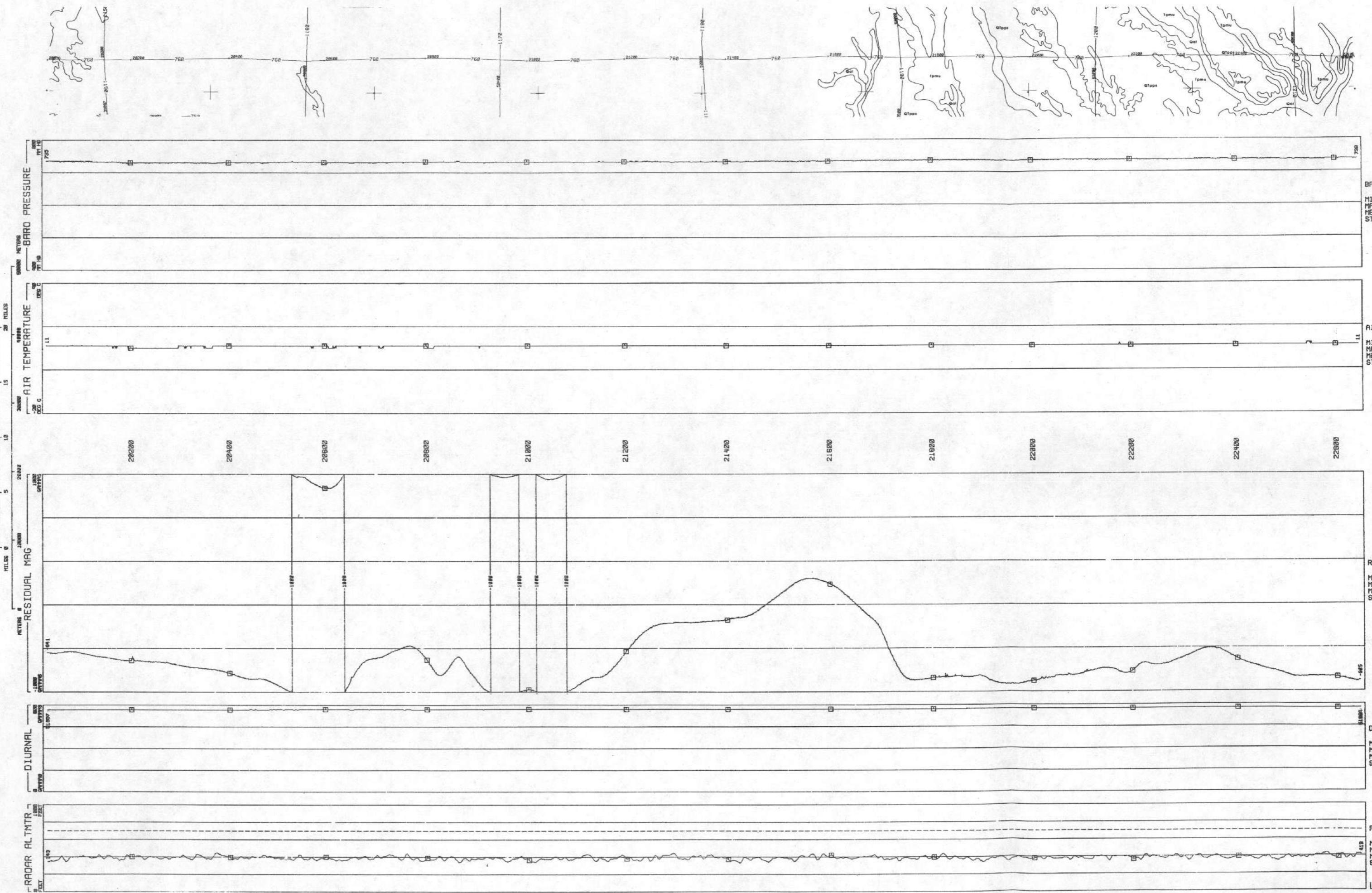
DUR. MAG
RMMAS -1129
42.90
-713.8
DEV 262.0

NFIL
GRAMMAS 51956
51864
51953
DEV 7752

MR ALTMTR
FEET
331.0
445.4
387.9
DEV 18.74

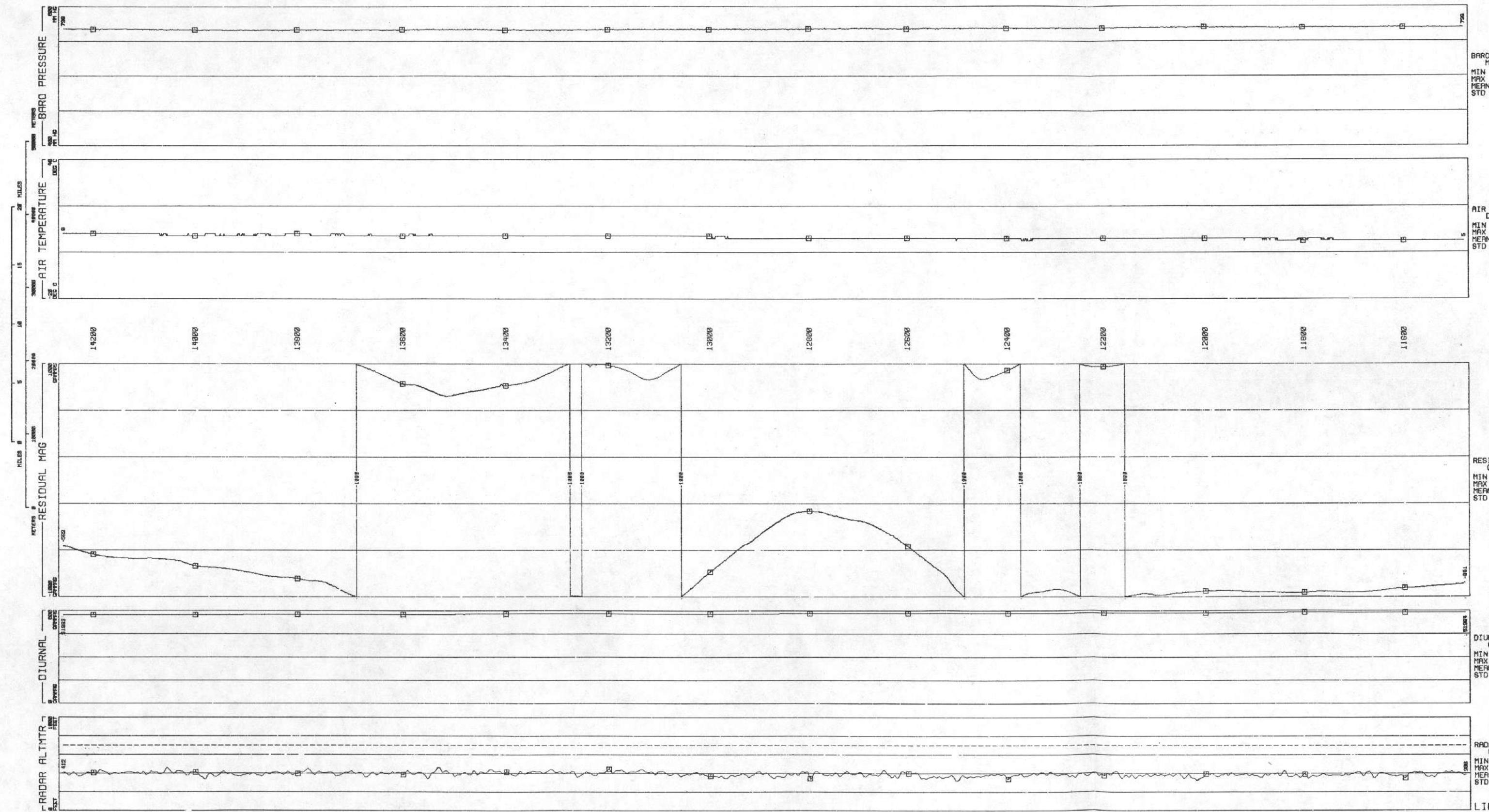
76

WAYCROSS LINE QUADRANGLE - 760 NTMS NH 17-1
DATA ACQUIRED 81024



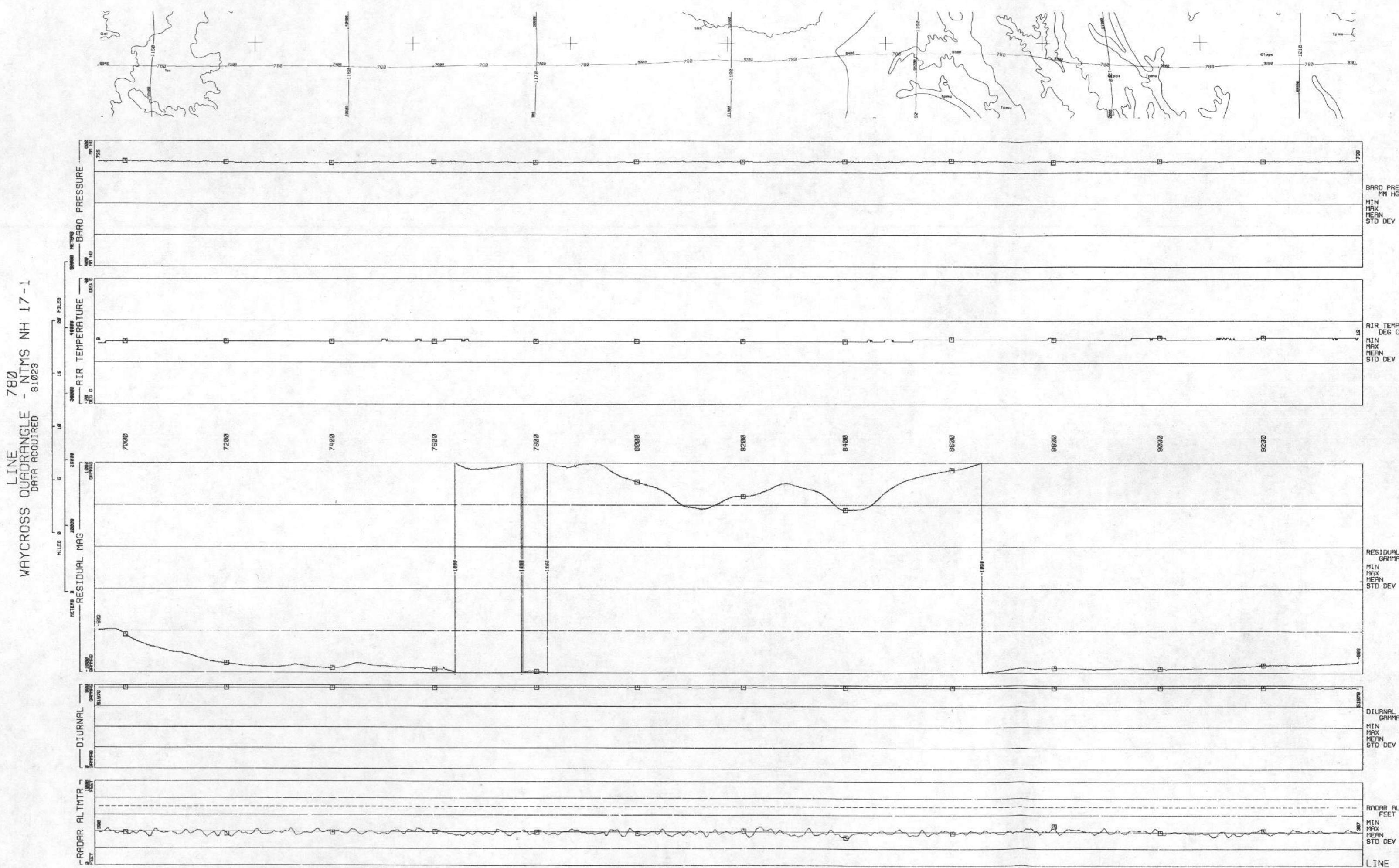


LINE 770
WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 8.10.24

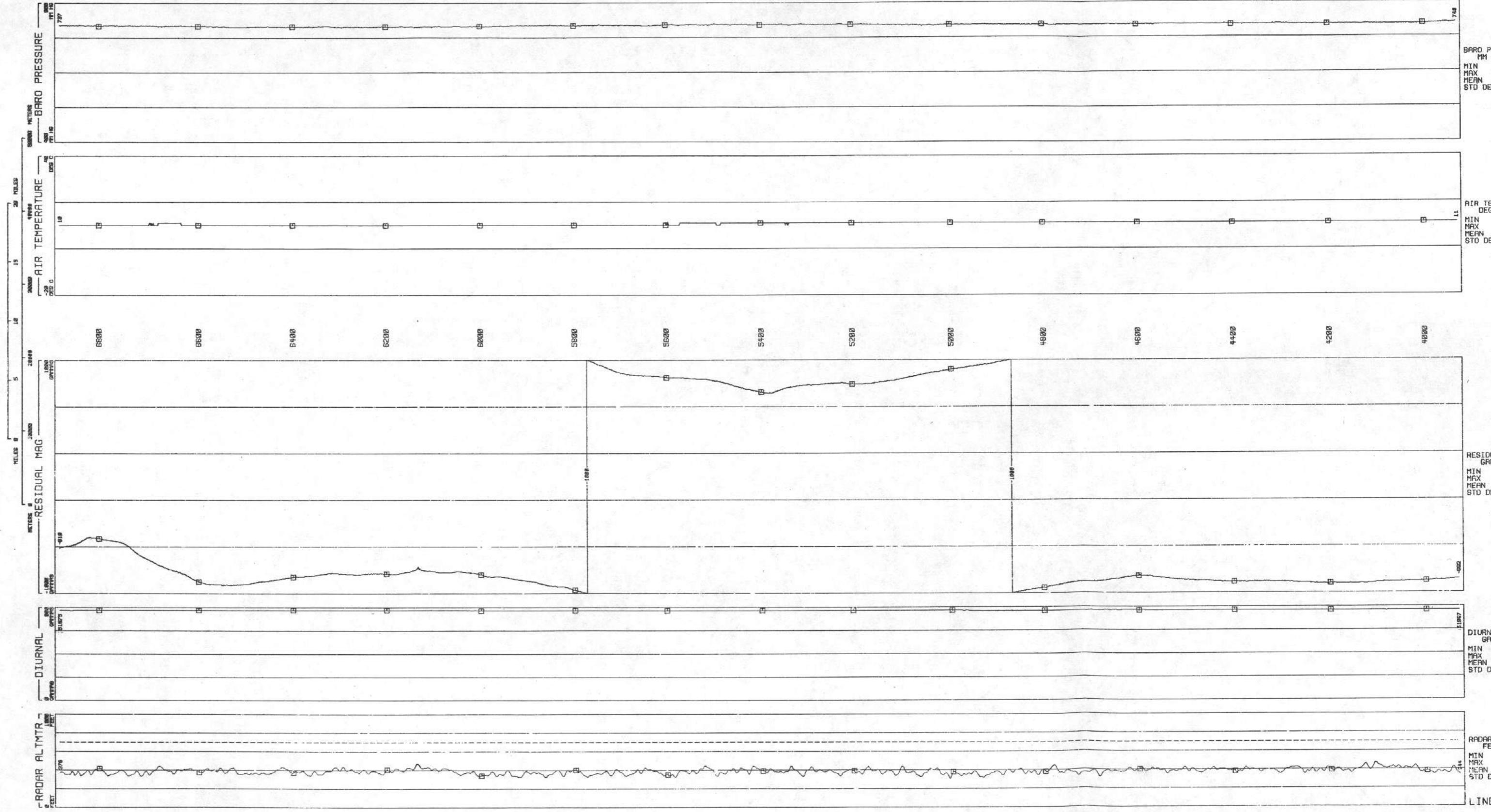


D44

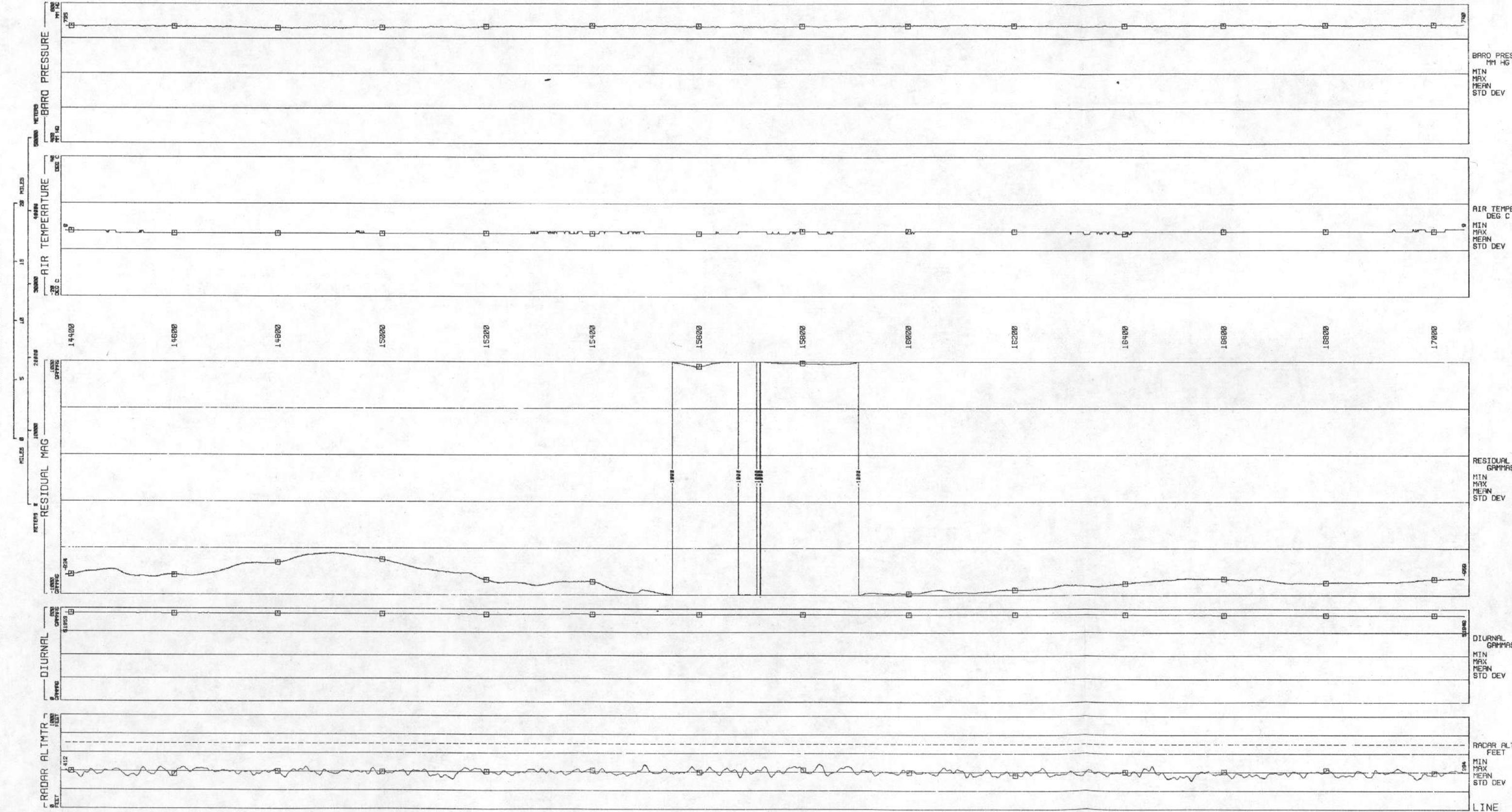
wb



LINE 790 WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 81023



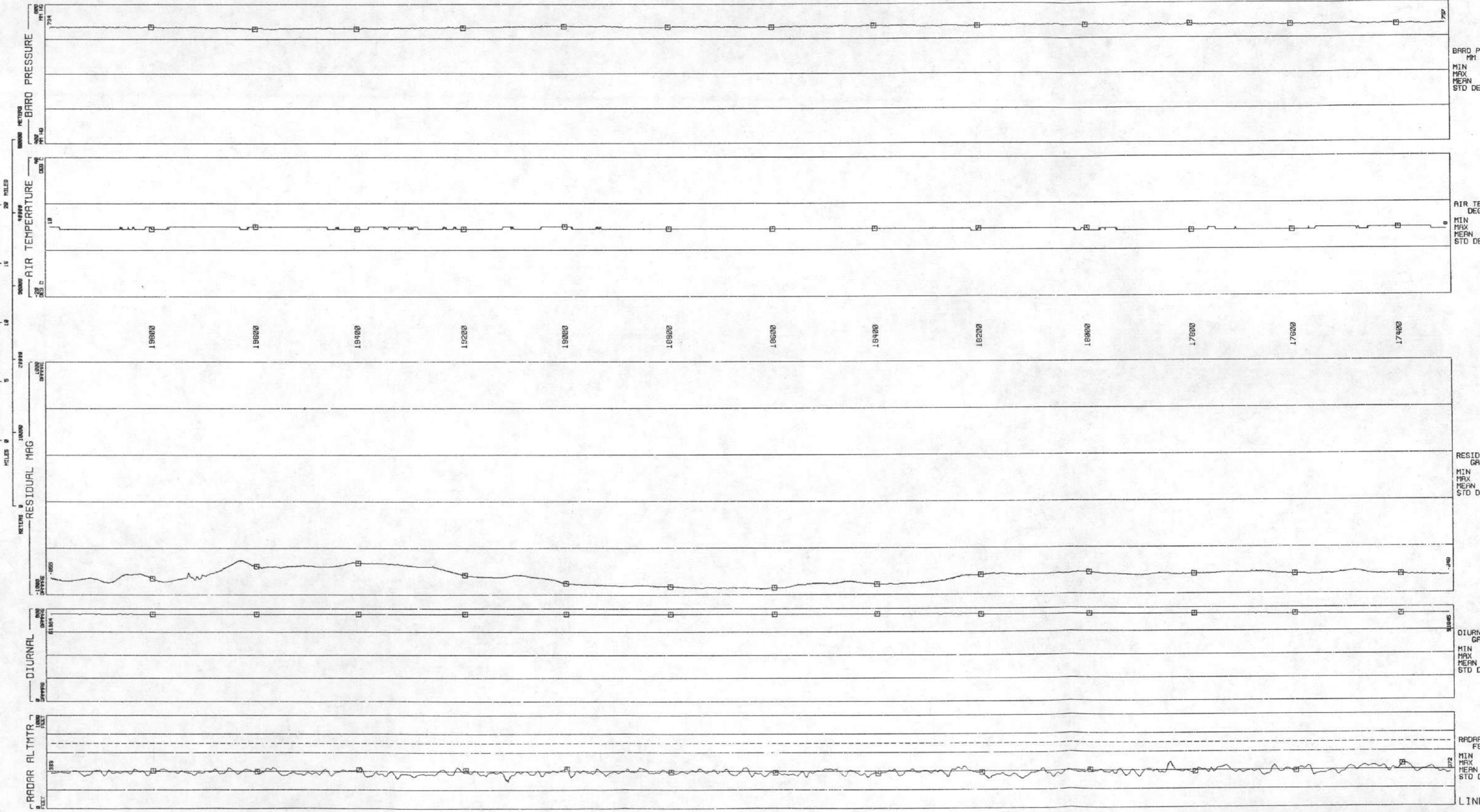
LINE 800
WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 8/10/23



C1

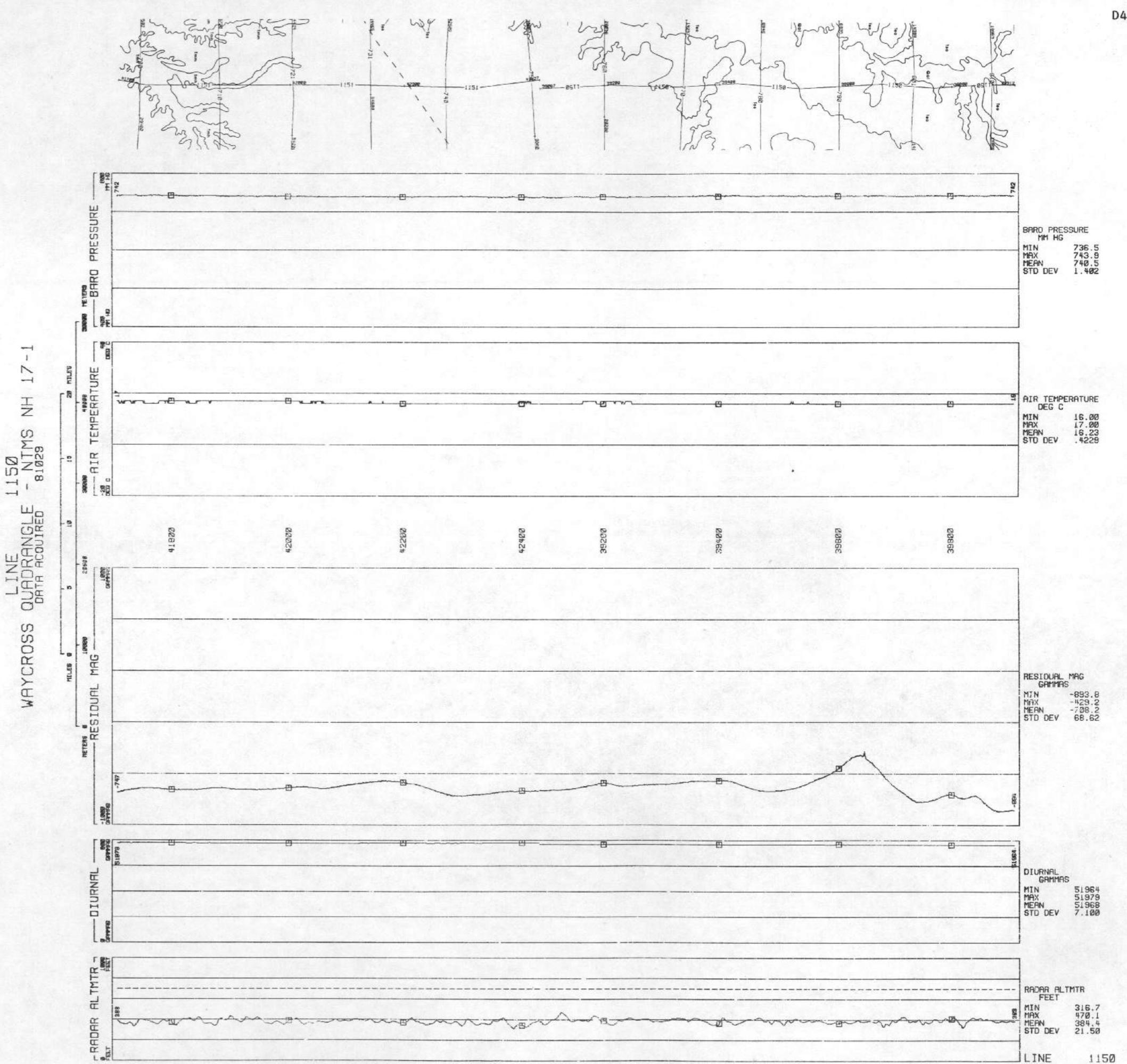
wb

LINE 810 WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 81024

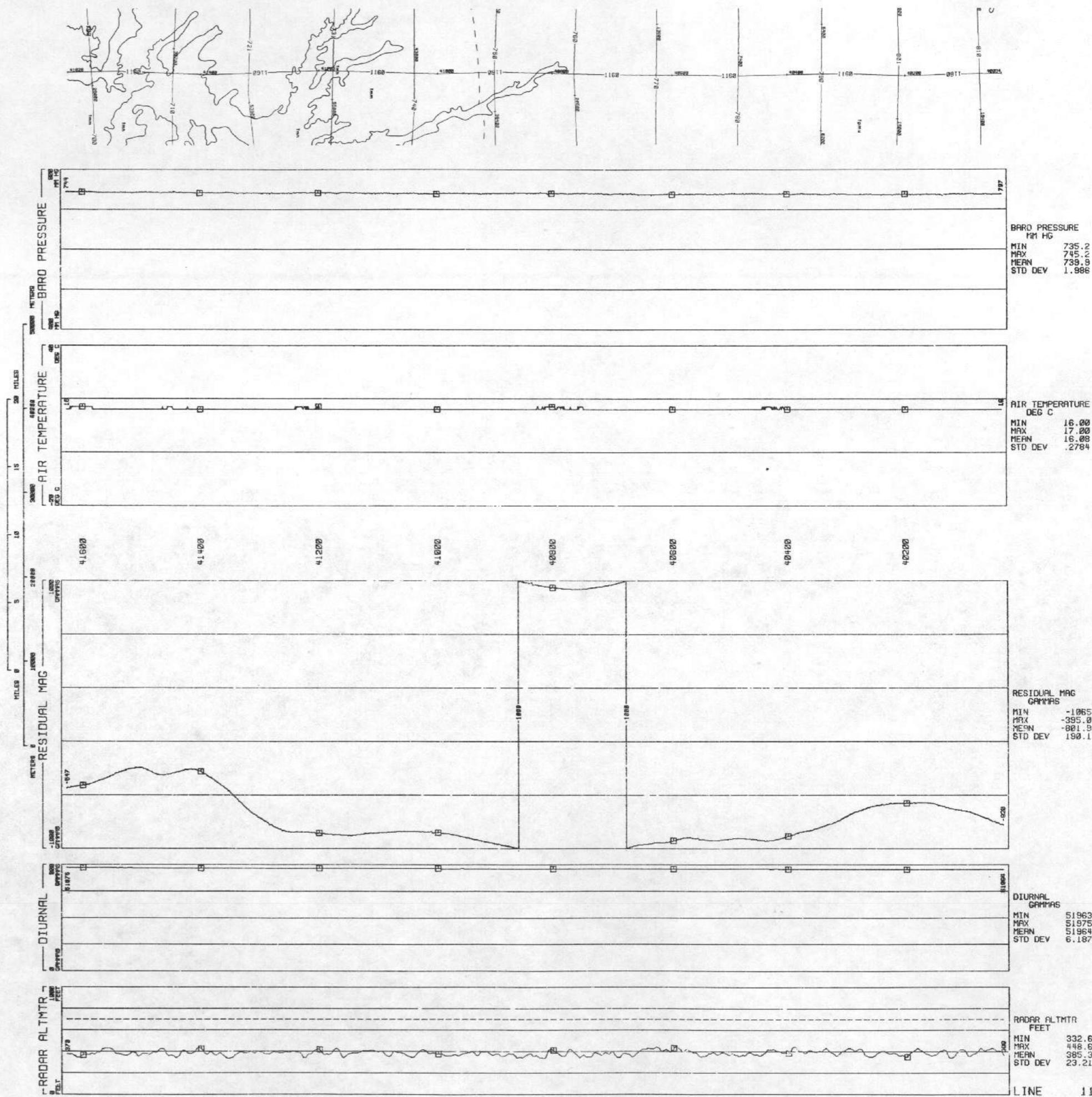


BARO. PRESSURE
MM HG
MIN 727.6
MAX 739.9
MEAN 735.0
STD DEV 2.391

AIR TEMPERATURE
DEG C
MIN 8.000
MAX 10.00
MEAN 9.613
STD DEV .6007

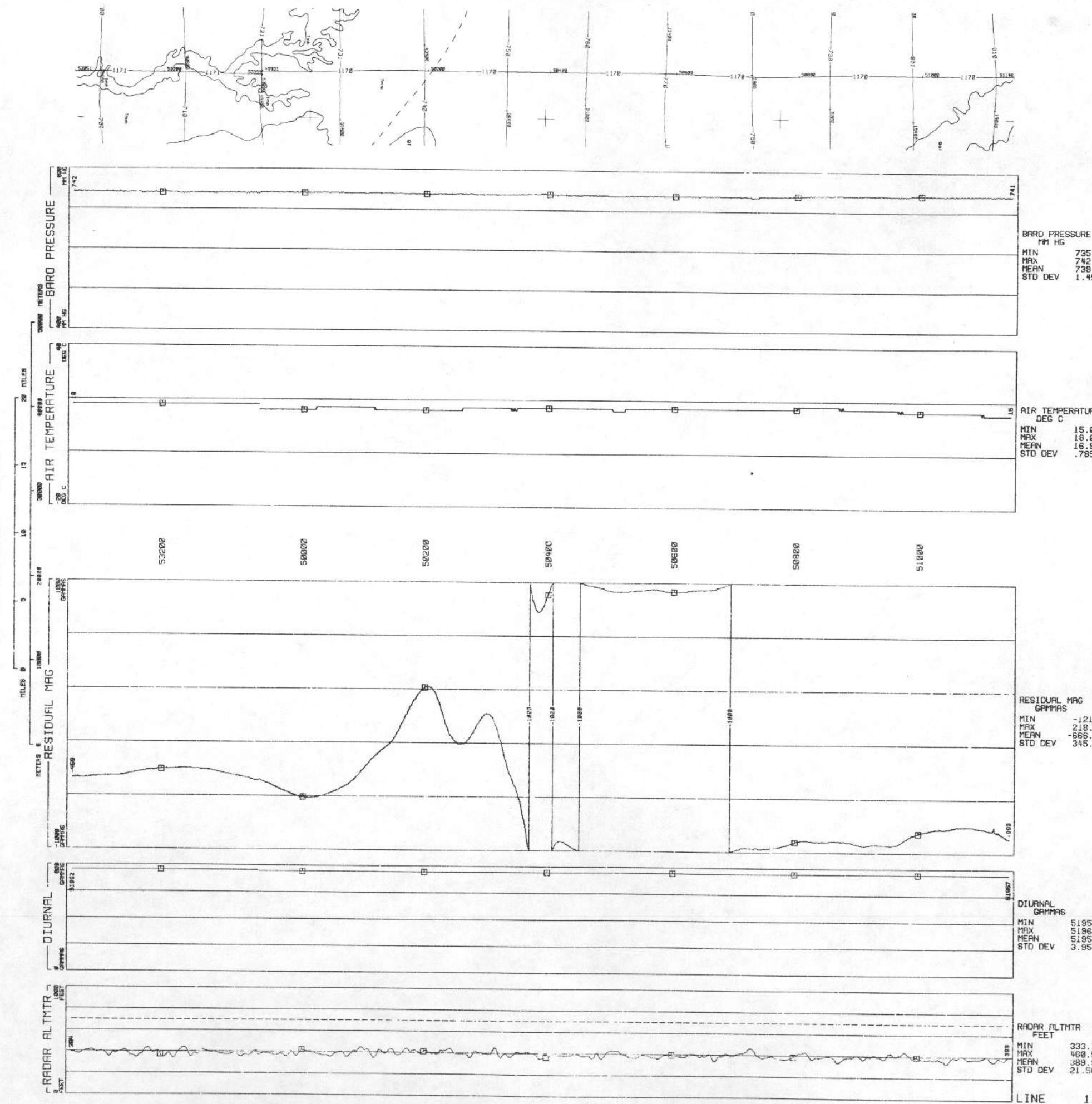


WAYCROSS QUADRANGLE - NAMS NH 17-1
LINE 1160 DATA ACQUIRED 81029

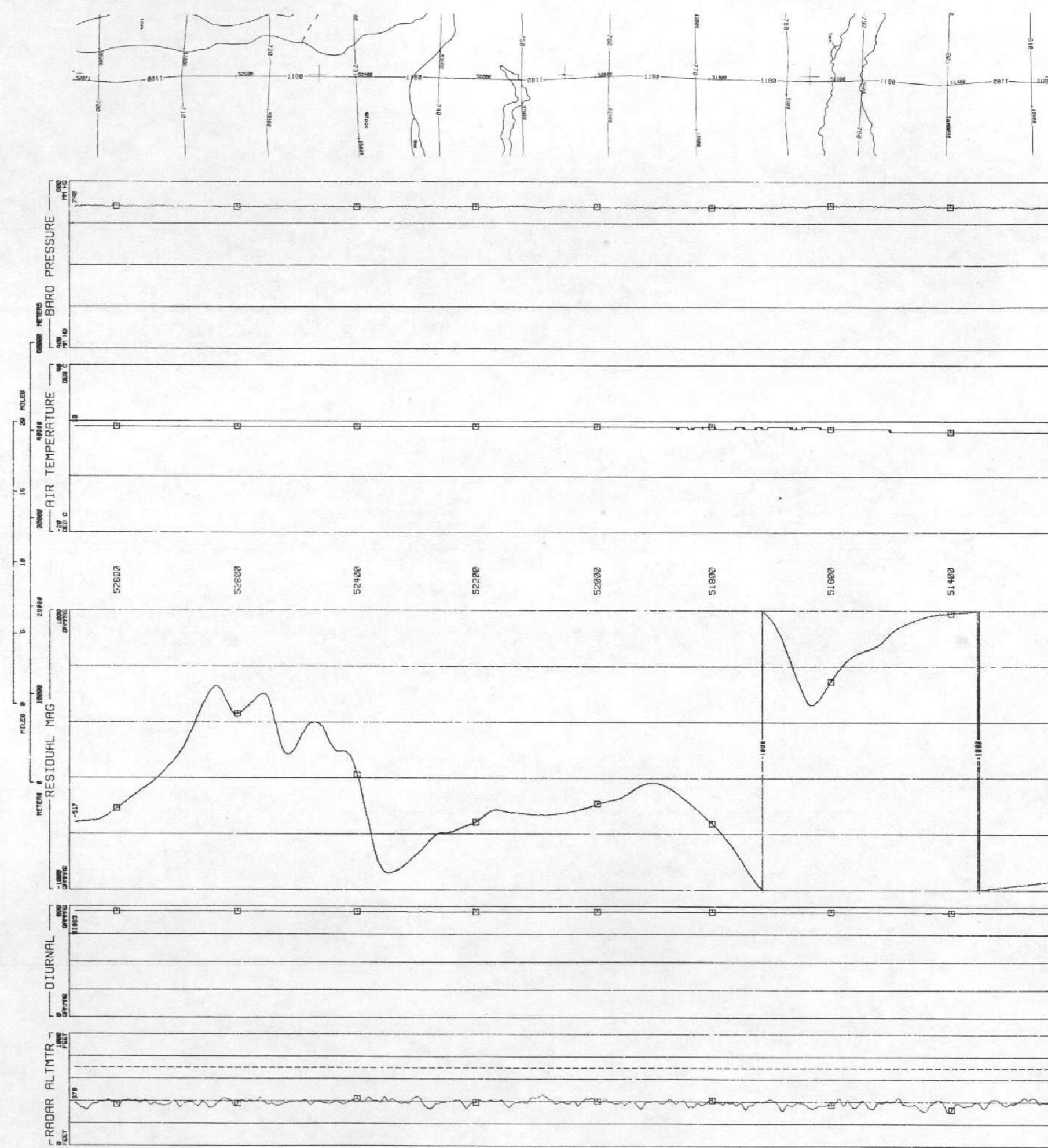


D50
wb

LINE 1170 WAYCROSS QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 81030

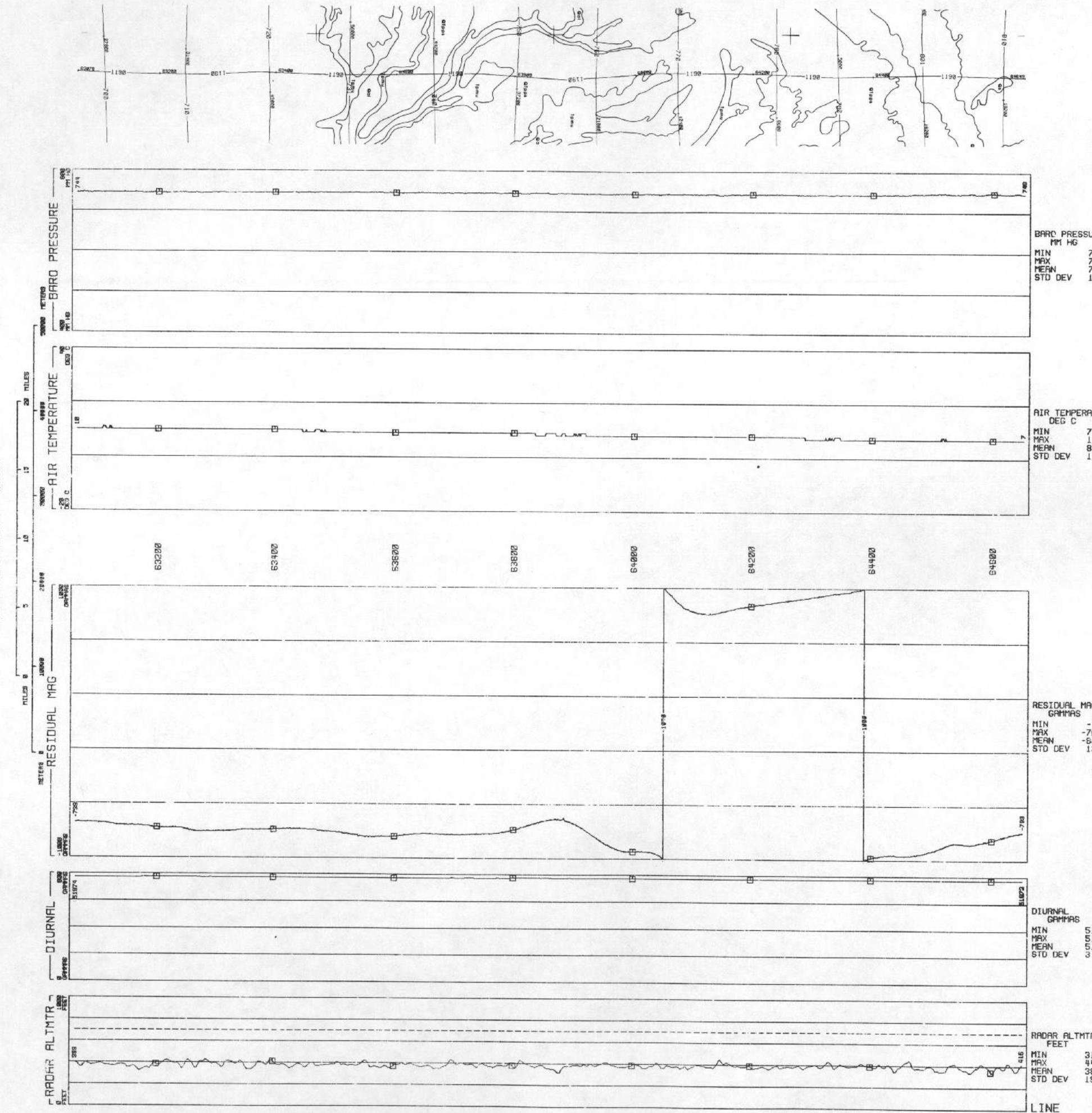


LINE 1180 QUADRANGLE - NTMS NH 17-1
DATA ACQUIRED 81030

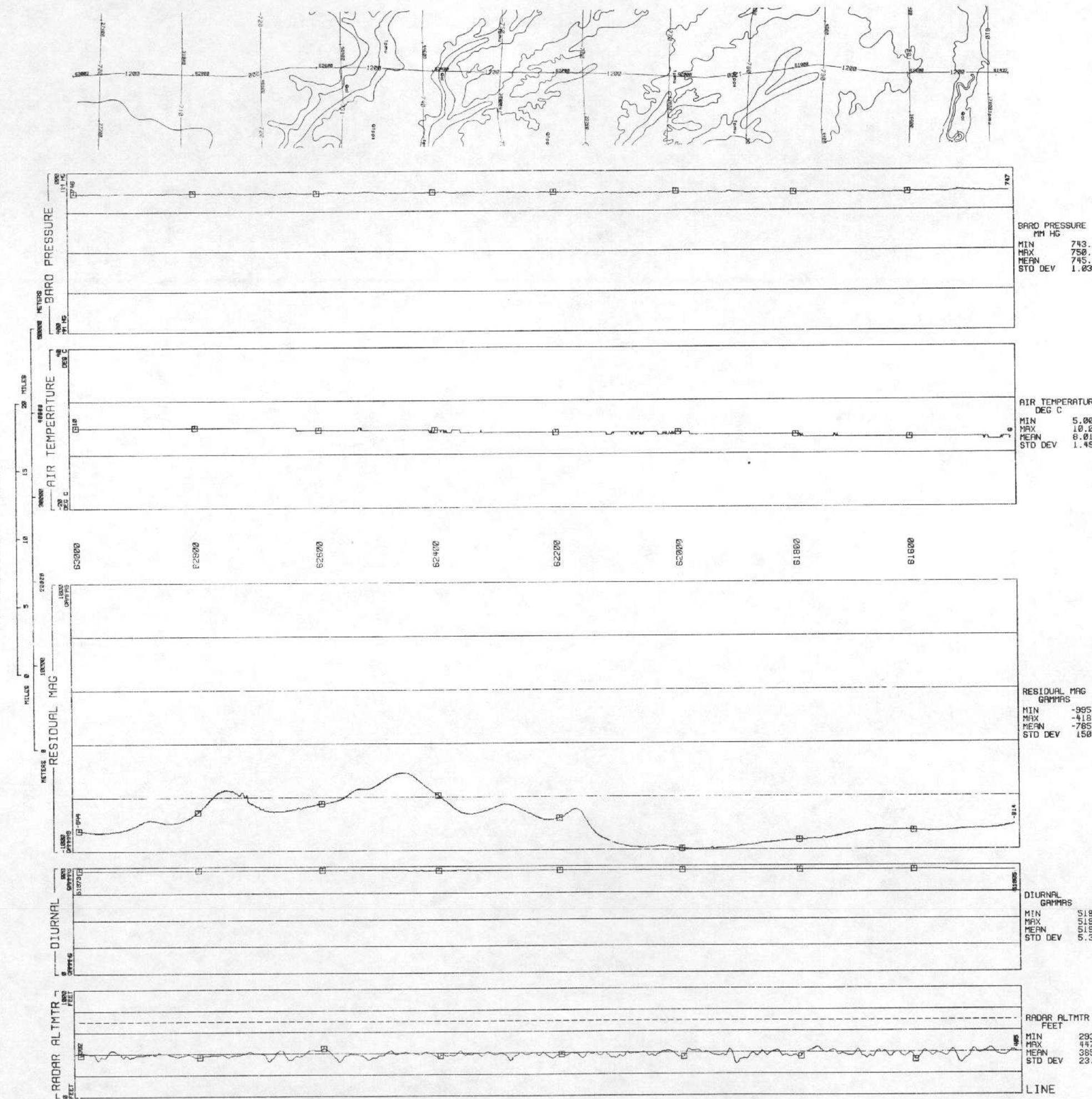


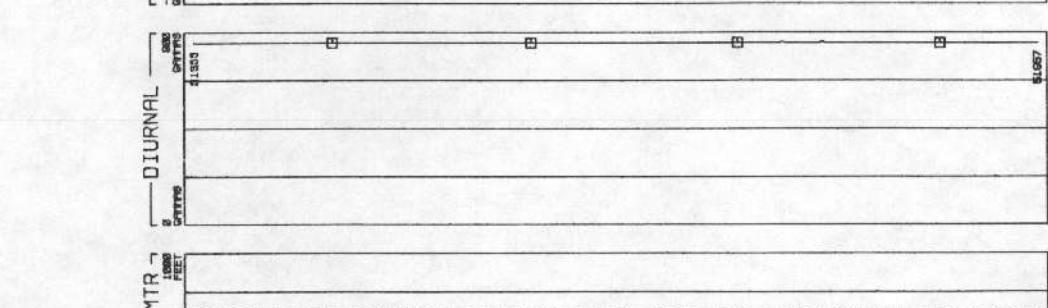
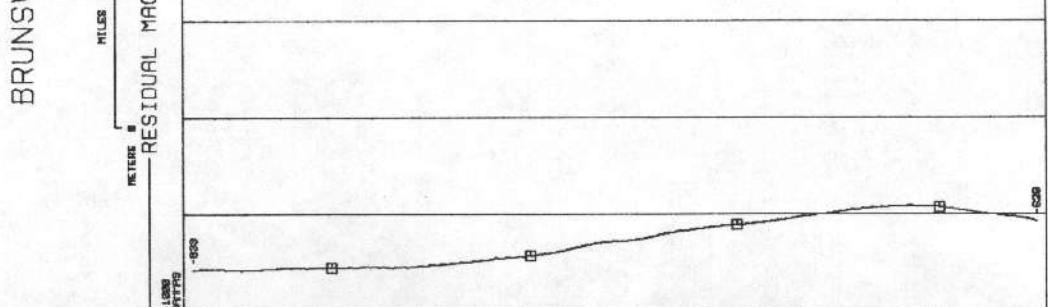
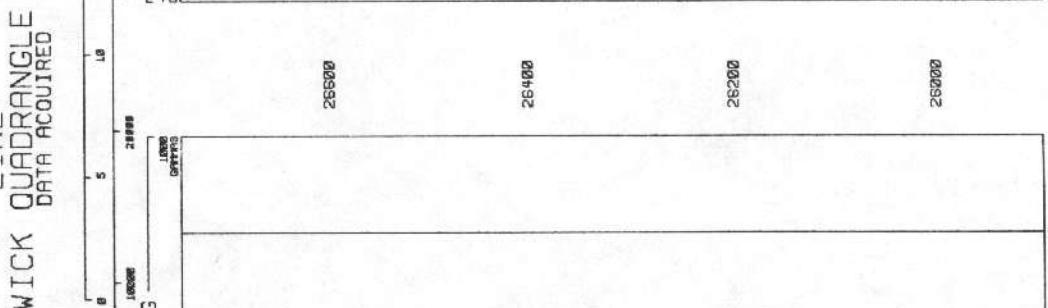
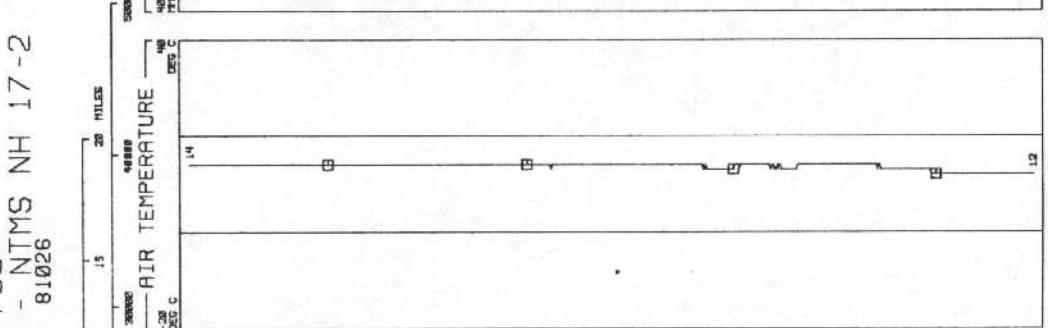
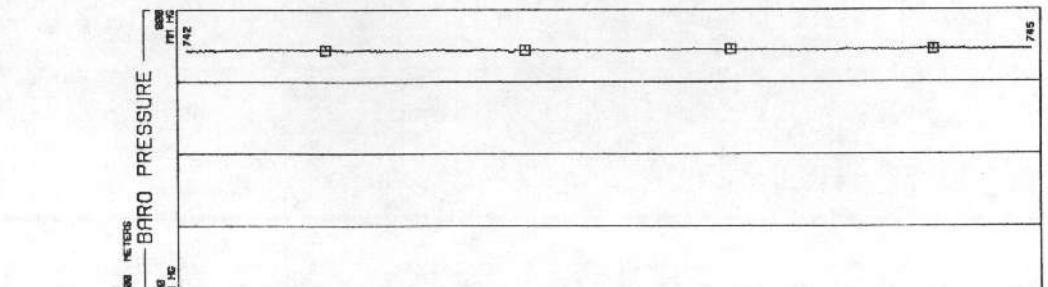
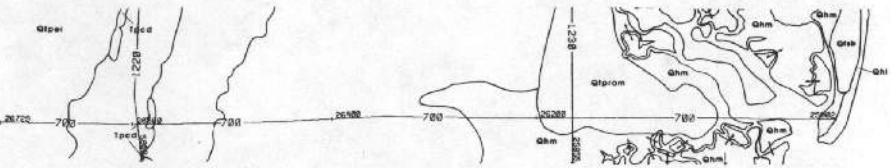
LINE 1180

LINE 1190 - NTMS NH 17-1
WAYCROSS QUADRANGLE
DATA ACQUIRED 81031



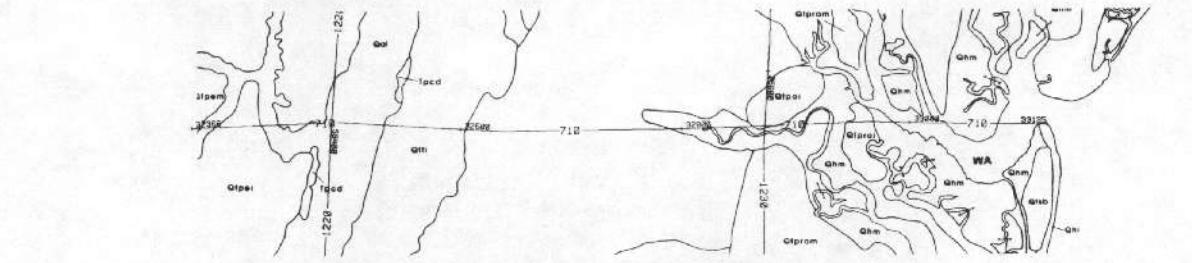
LINE 1200 QUADRANGLE - NTMS NH 17-1
WAYCROSS DATA ACQUIRED 81031



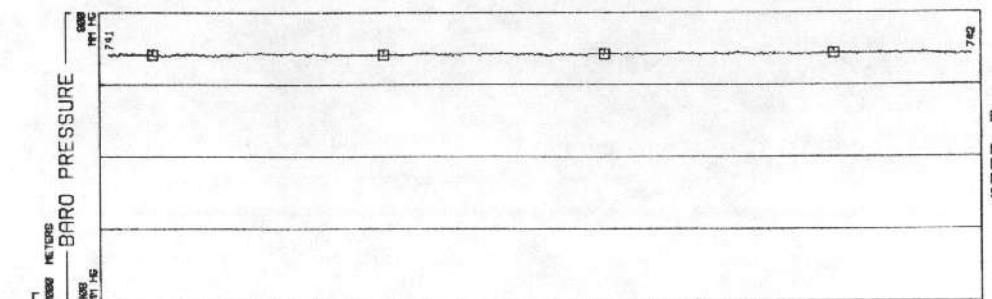


LINE 700

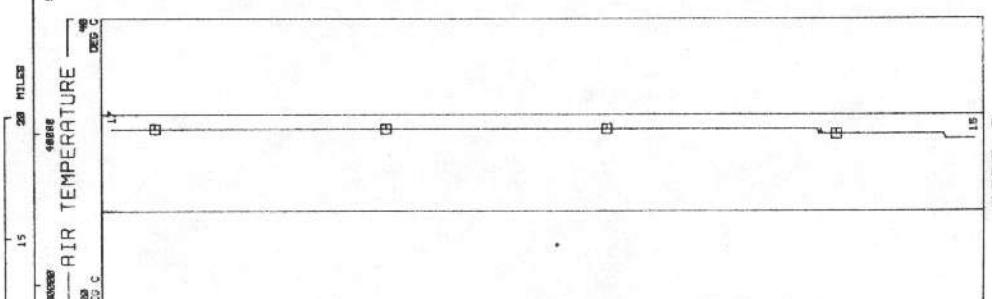
D55 wb



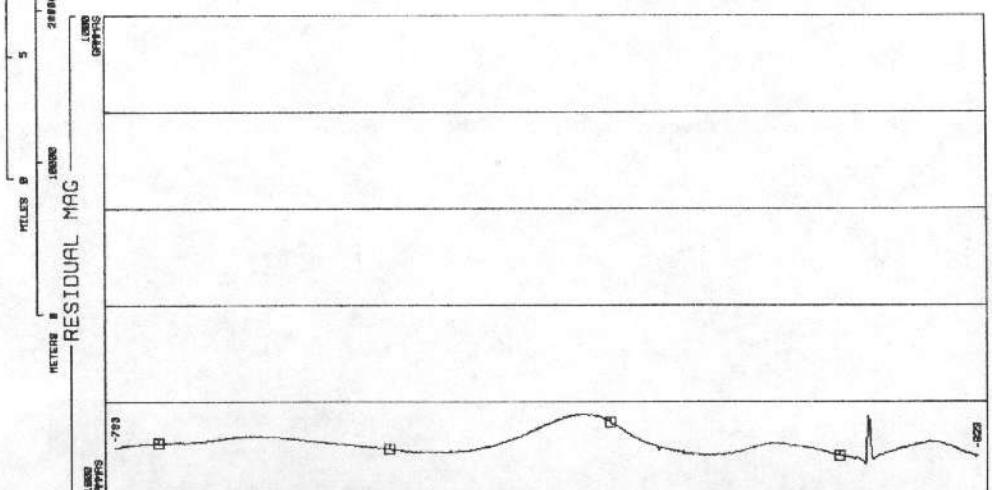
BRUNSWICK LINE QUADRANGLE 710
DATA ACQUIRED - NTMS NH 17-2
81026



BARD PRESSURE
MM HG

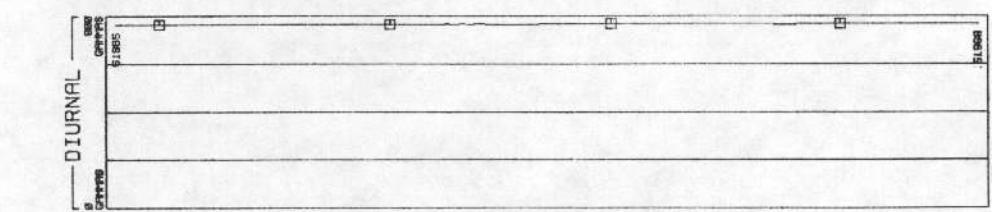


AIR TEMPERATURE
DEG C

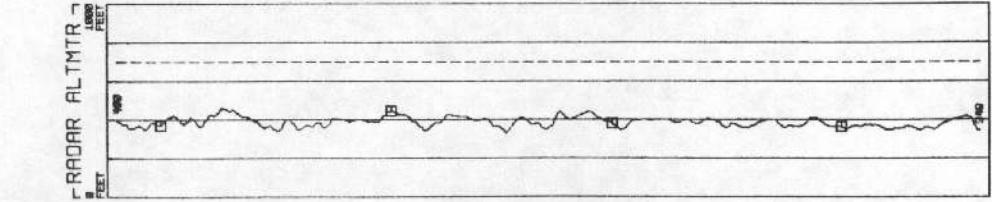


RESIDUAL MAG
GAMMAS

MIN	-858.9
MAX	-650.6
MEAN	-773.7
STD DEV	42.03



DIURNAL
GAMMAS

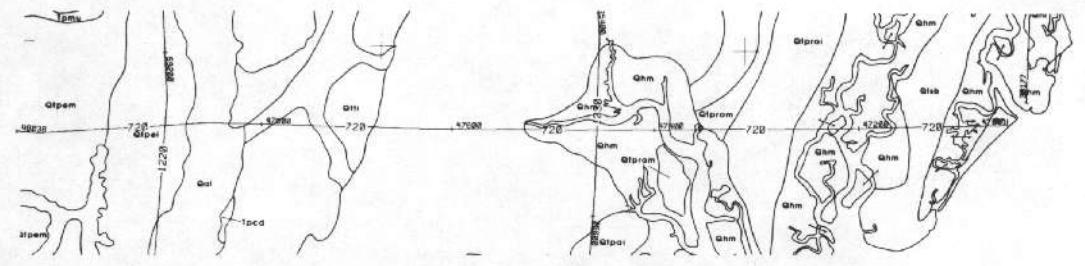


RADAR ALTMTR
FEET

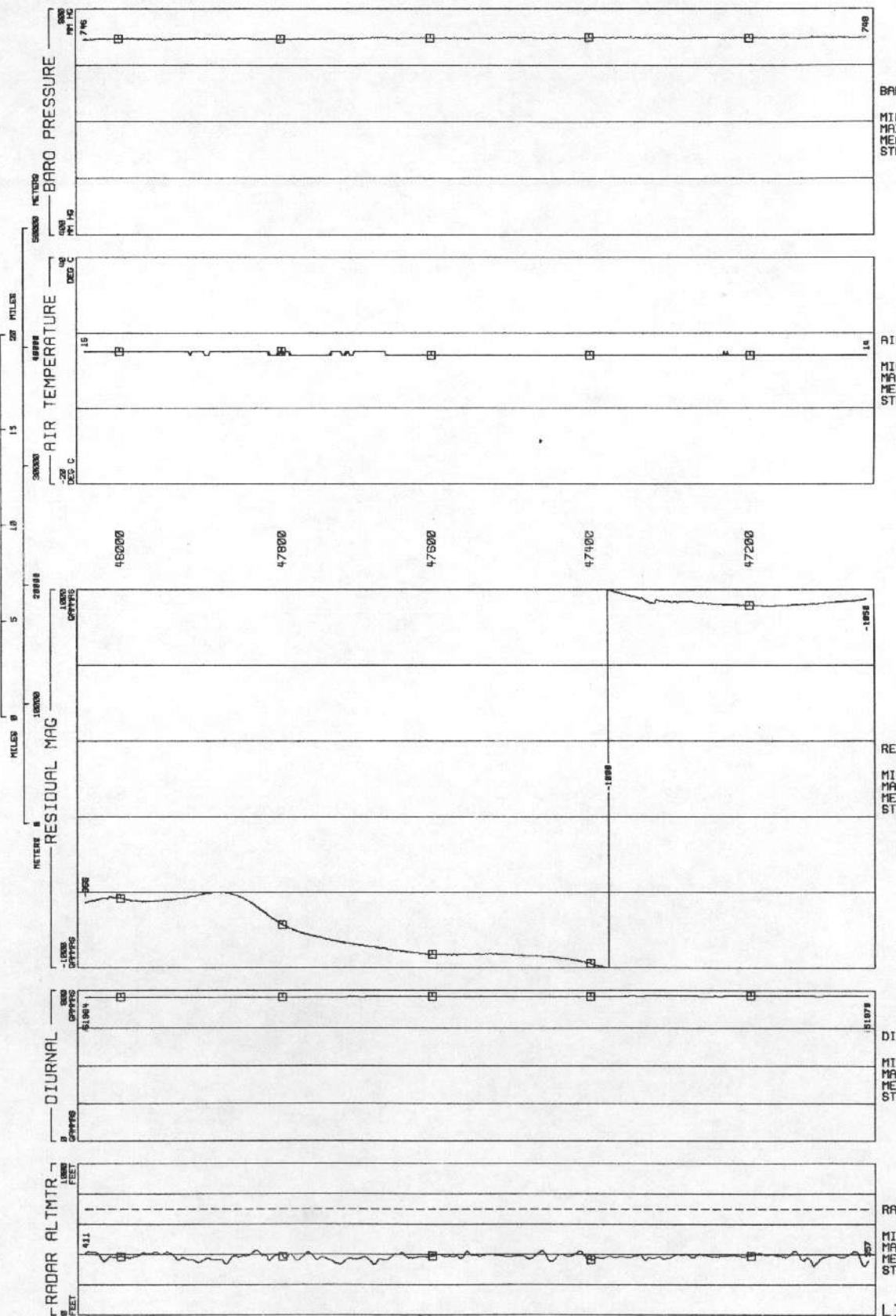
MIN	332.5
MAX	461.9
MEAN	386.7
STD DEV	25.81

LINE 71

D56 wb



BRUNSWICK LINE QUADRANGLE 720
DATA ACQUIRED - NTMS NH 17-2
81030



BARD PRESSURE
MM HG

AIR TEMPERATURE
DEG C

MIN	14.00
MAX	15.00
MEAN	14.30
STD DEV	.4589

RESIDUAL MAG
 GAMMAS
 MIN -1088
 MAX -599.2
 MEAN -892.9
 STD DEV 162.9

DIURNAL
GAMMAS

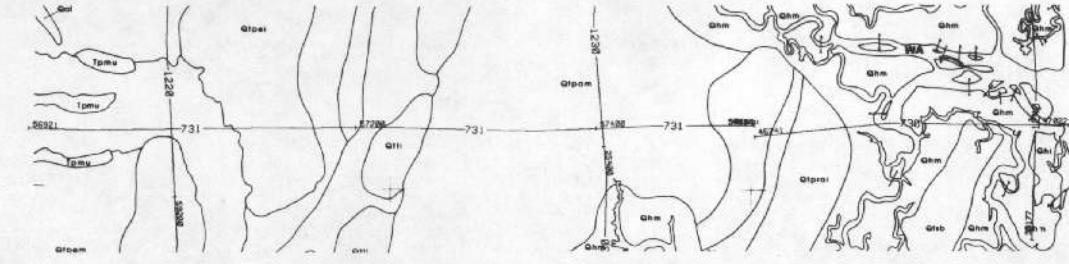
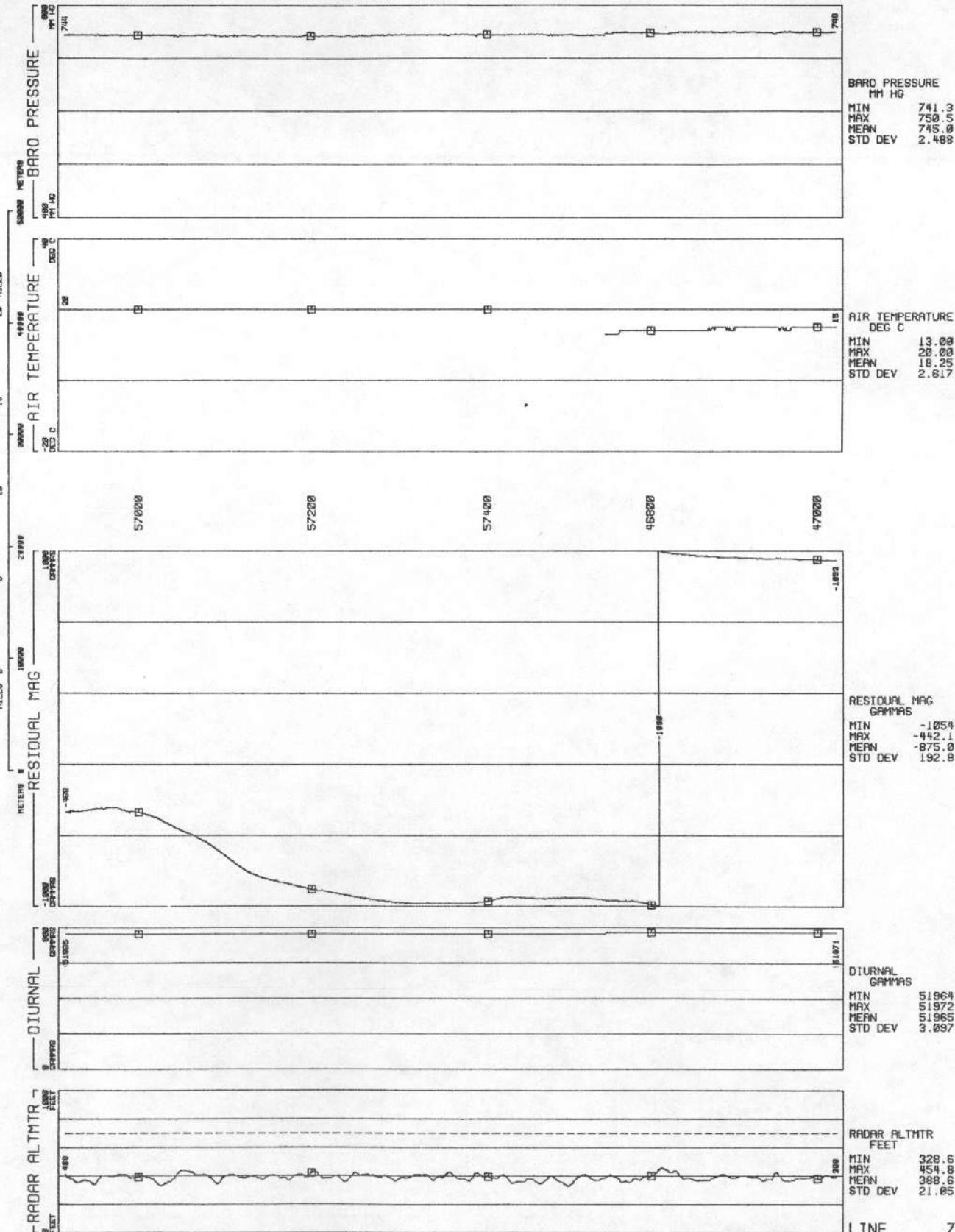
MIN	51964
MAX	51971
MEAN	51966
STD DEV	2.780

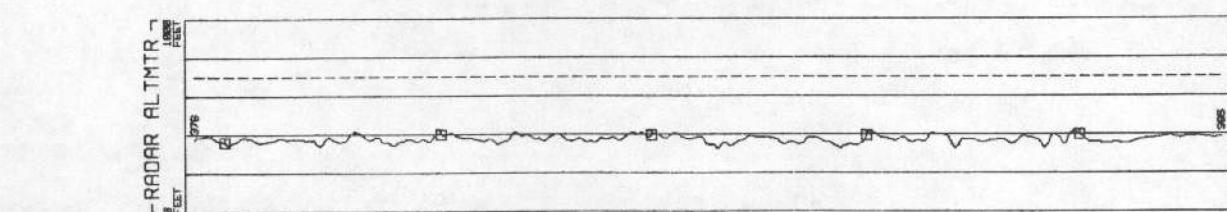
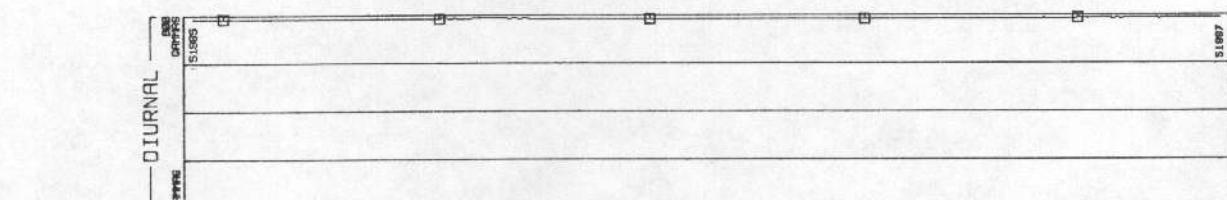
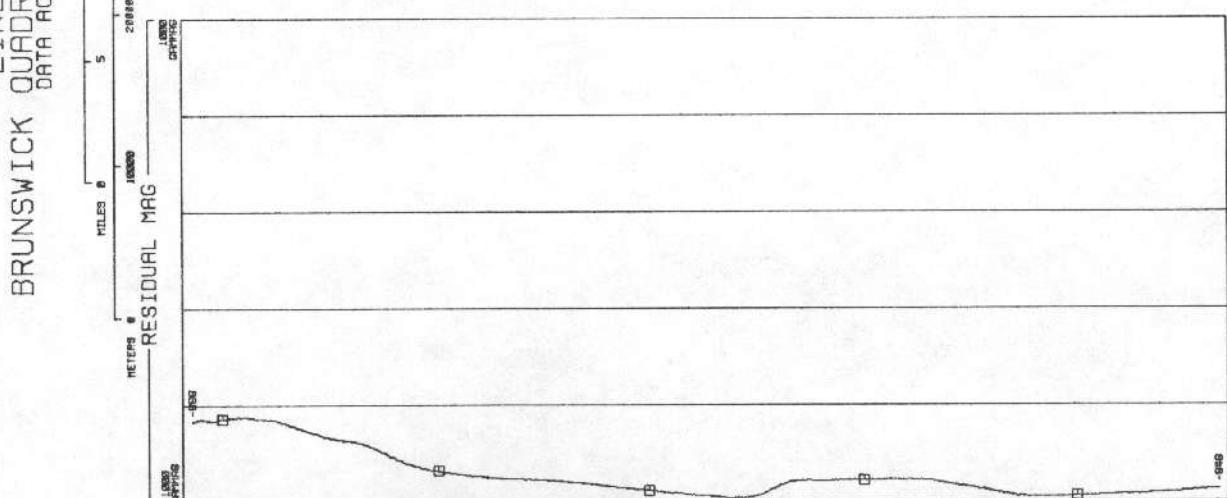
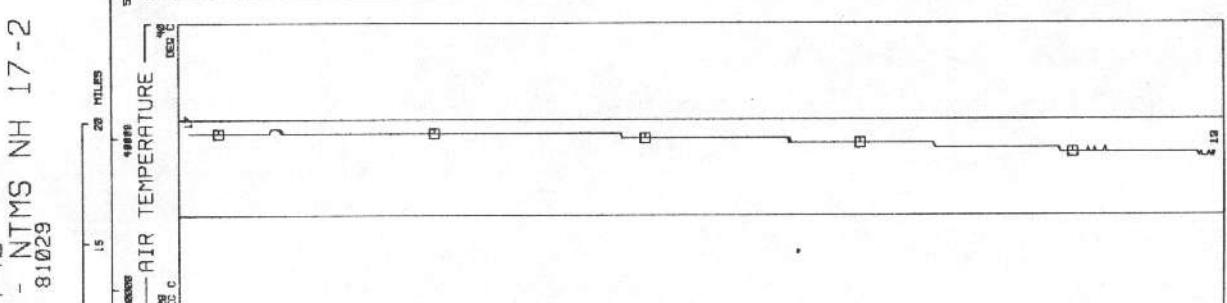
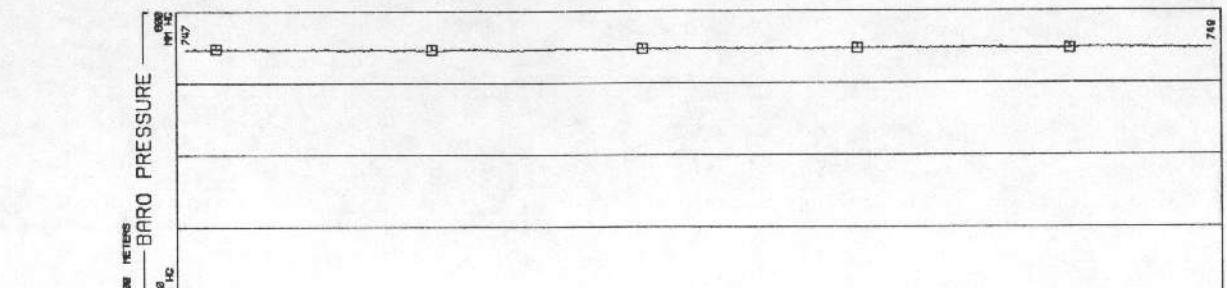
RADAR ALTMTR
FEET

MIN	324.8
MAX	426.5
MEAN	384.8
STD DEV	17.72

LINE 72

LINE 730 QUADRANGLE - NTMS NH 17-2
BRUNSWICK DATA ACQUIRED 8/10/30





LINE 740

LINE 740 QUADRANGLE - NTMS NH 17-2
DATA ACQUIRED 81029

MILES 0 5 10 15 20 MILES

METERS 0 20000 40000 60000 80000

DEGREES 0 10 20 30 40 50 60

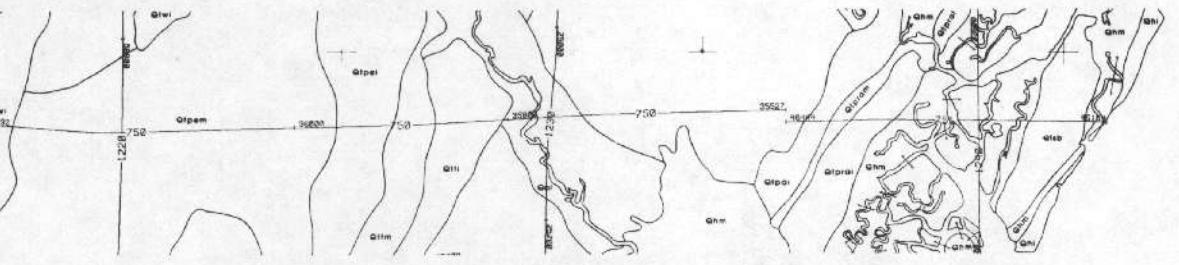
FEET 0 45200 45400 45600 45800 46000

GRADMAS 0 1000 2000 3000 4000 5000

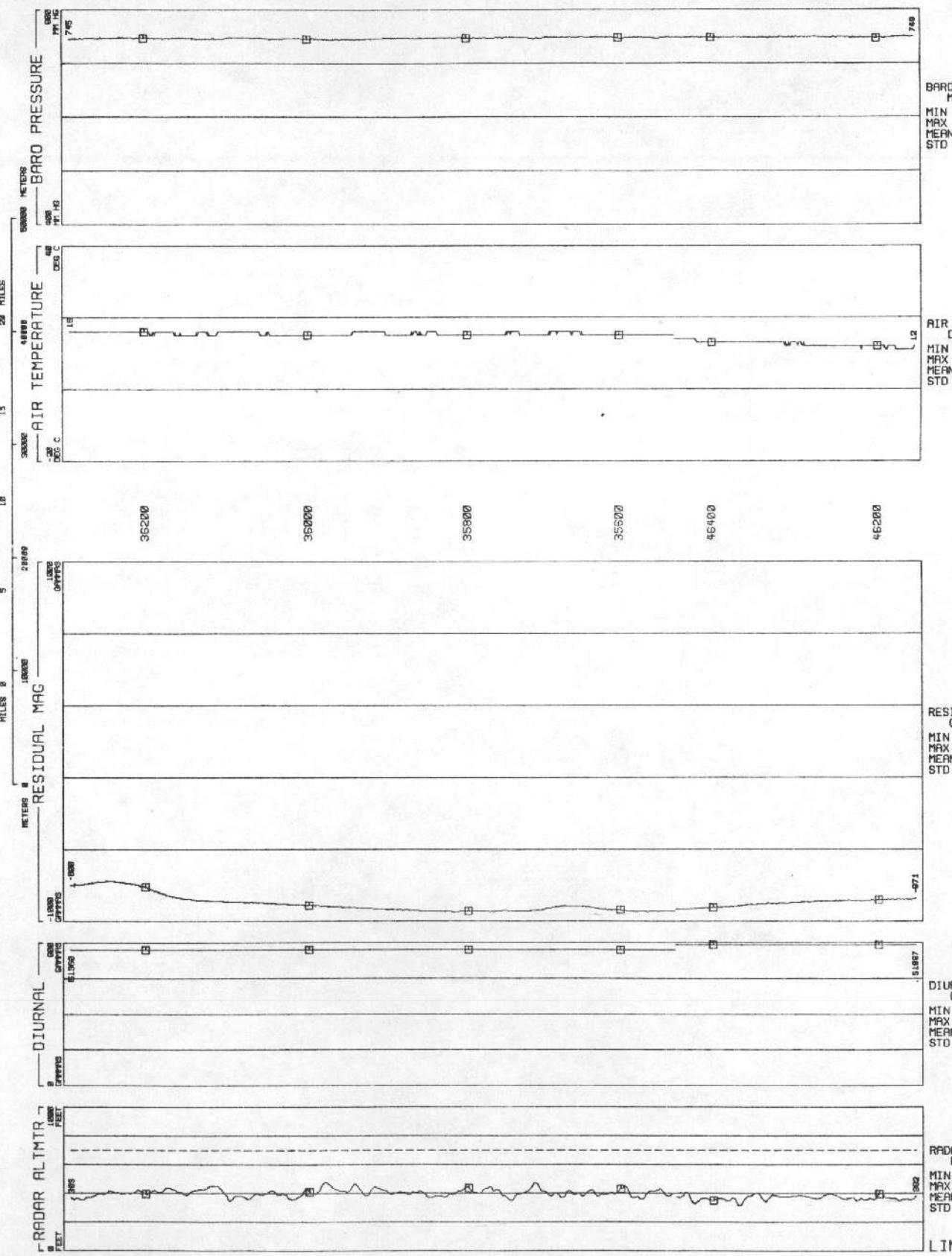
SUBS 0 1000 2000 3000 4000 5000

FEET 0 1000 2000 3000 4000 5000

D59 wb



BRUNSWICK LINE QUADRANGLE /50
DATA ACQUIRED - NTMS NH 17-2
81029



ARD PRESSURE
MM HG

MEAN 747.5
STD DEV 1.162

IR TEMPERATURE
DEG C
IN 11.00
AX 16.00
EAN 14.61
STD. DEV. 1.425

RESIDUAL MAG
 GAMMAS
 IN -948.3
 AX -776.5
 EAN -902.0
 STD DEV 44.73

GAMMAS	
IN	-948.3
AX	-776.5
EAN	-902.0
STD DEV	44.73

JOURNAL
GAMMAS

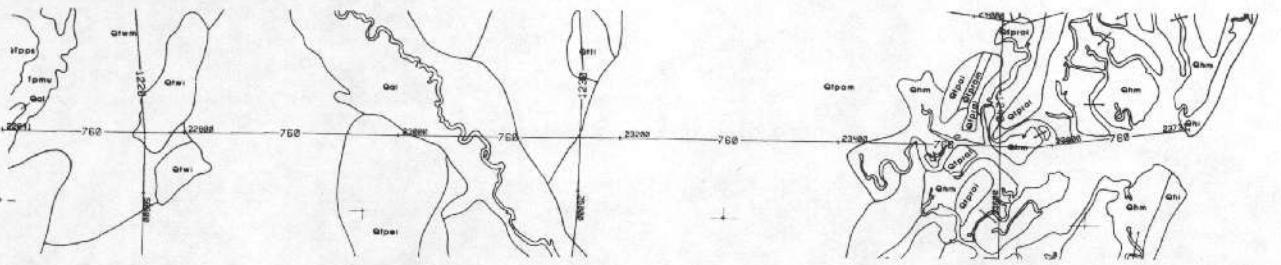
IN	51959
MAX	51989
MEAN	51966
STD DEV	12.78

JOURNAL
GRAMMARS
MIN 51959
MAX 51989
MEAN 51966
STD DEV 12.78

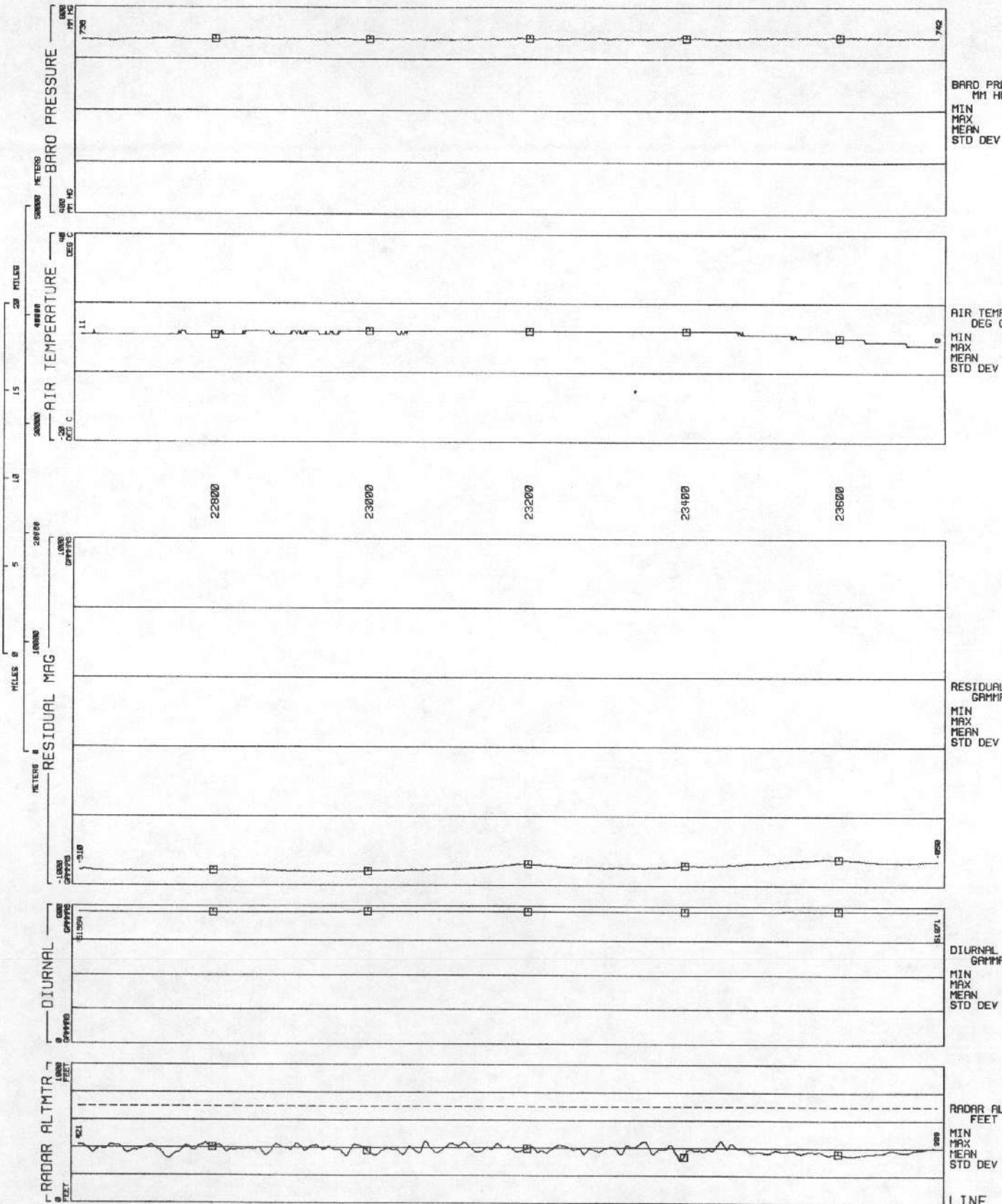
DAR ALTMTR
FEET

MIN	314.6
MAX	473.6
MEAN	393.4
STD DEV	27.52

LINE 750

D60
wb

BRUNSWICK QUADRANGLE - NTMS NH 17-2
LINE 760 DATA ACQUIRED 810224



BARO PRESSURE
MM HG
MIN 735.8
MAX 742.3
MEAN 739.5
STD DEV 1.397

AIR TEMPERATURE
DEG C
MIN 8.000
MAX 12.00
MEAN 11.23
STD DEV 1.058

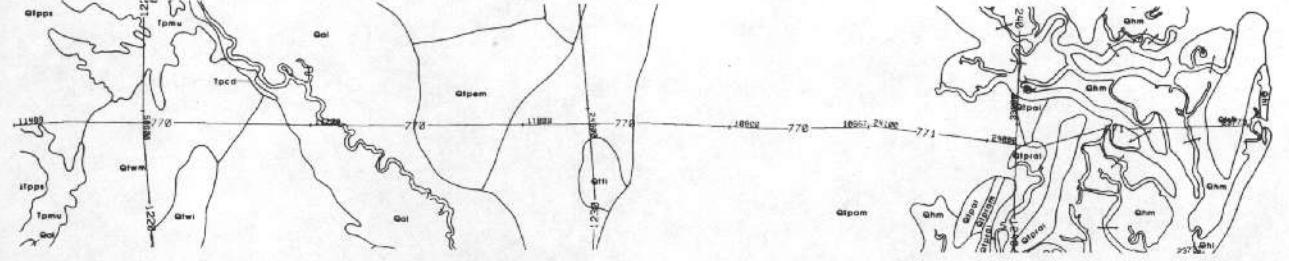
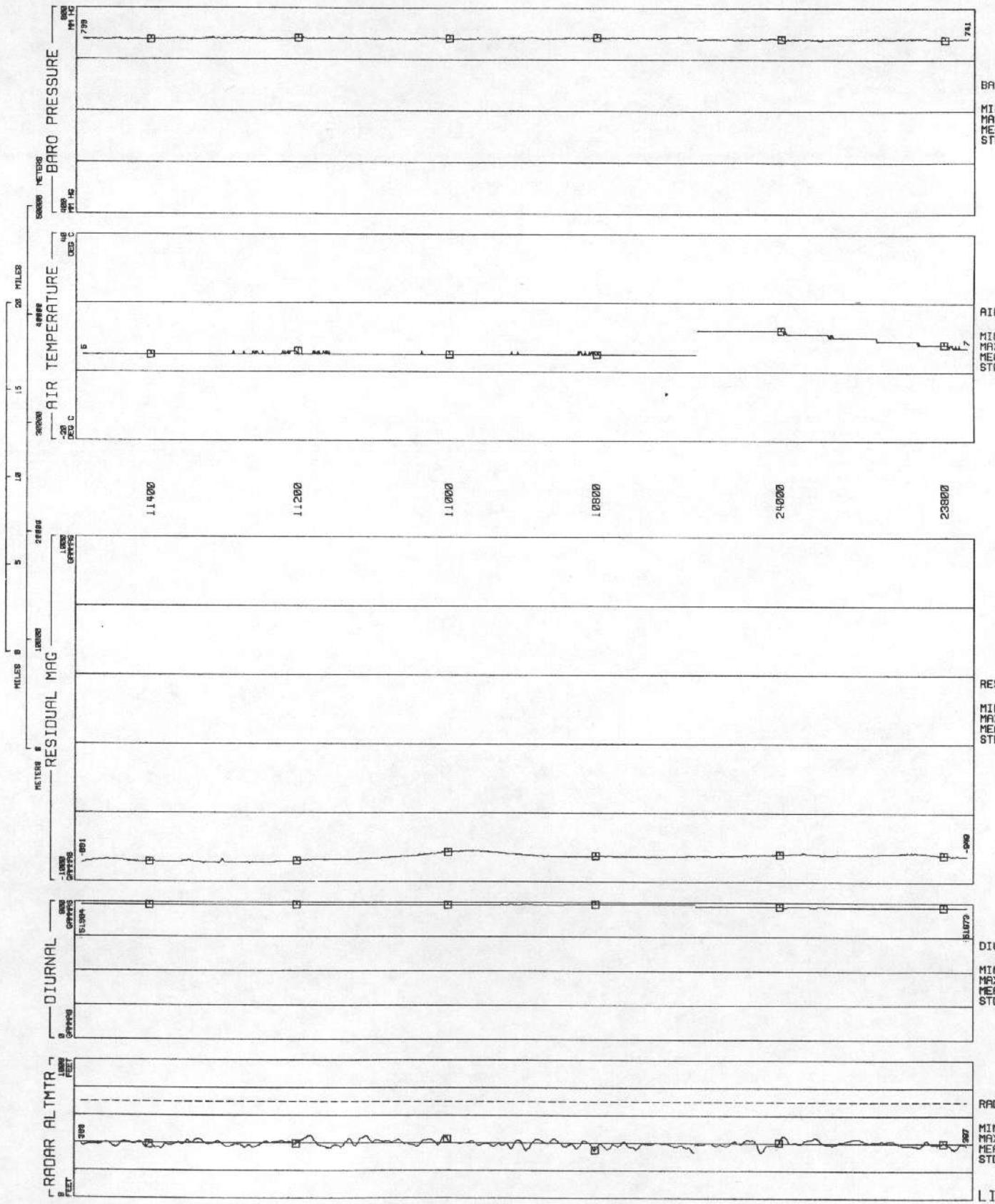
RESIDUAL MAG
GRAMS
MIN -925.8
MAX -845.1
MEAN -893.5
STD DEV 22.35

DIURNAL
GAMMAS
MIN 51964
MAX 51972
MEAN 51965
STD DEV 2.945

RADAR ALTMTR
FEET
MIN 309.9
MAX 449.3
MEAN 387.8
STD DEV 23.03

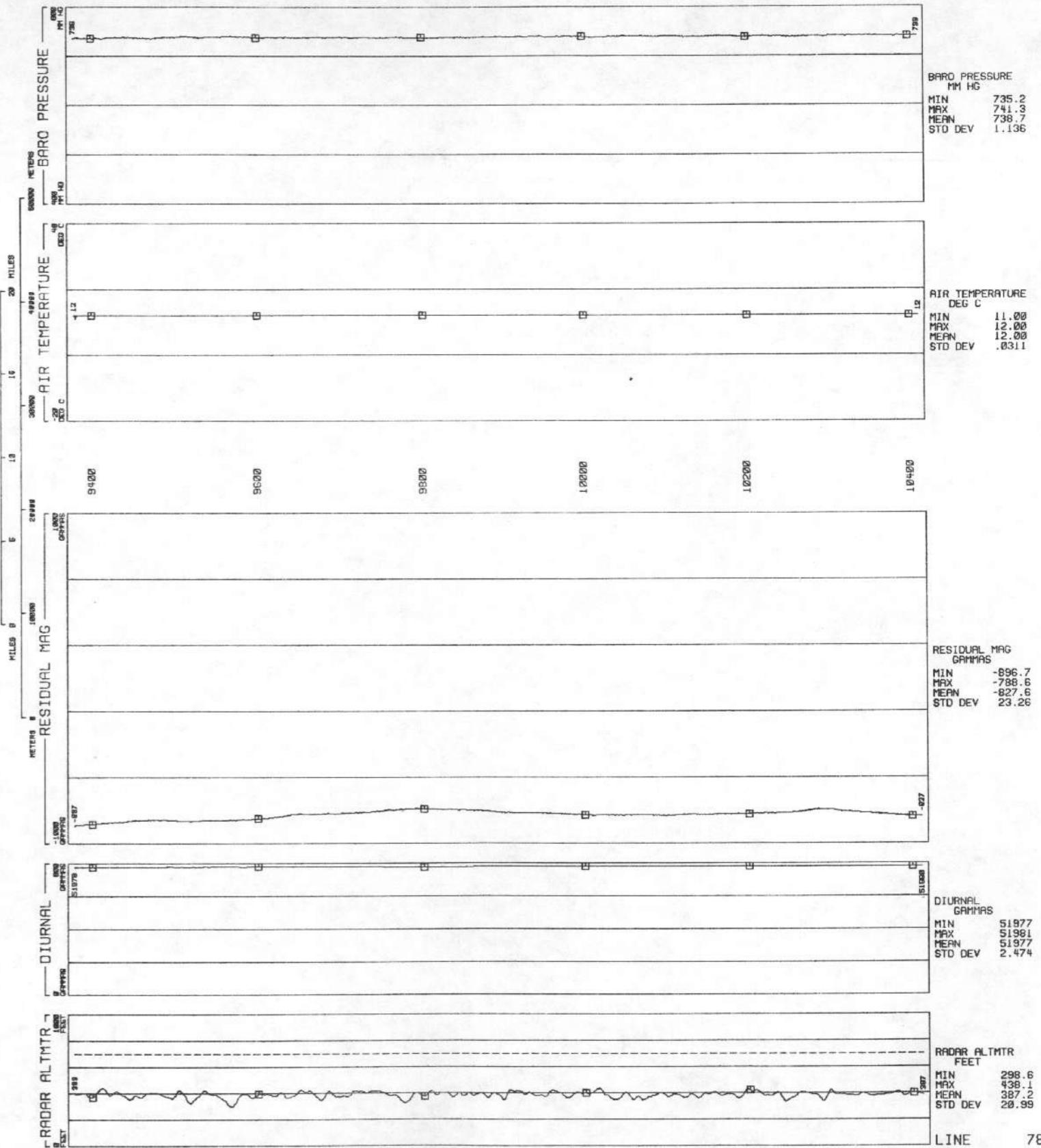
LINE 760

BRUNSWICK LINE QUADRANGLE - 770 NTMS NH 17-2
DATA ACQUIRED 8.10.24

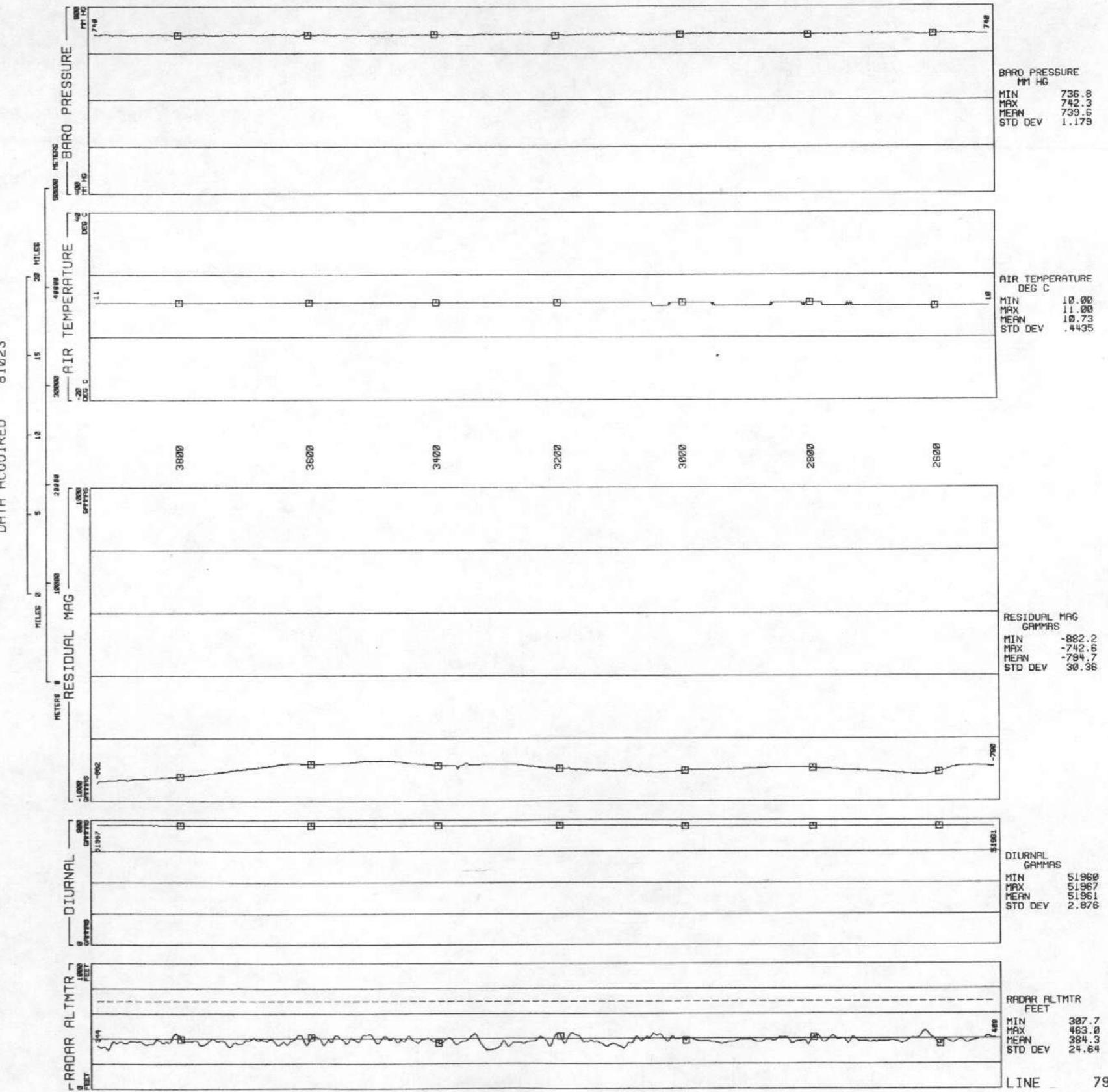


D62
wb

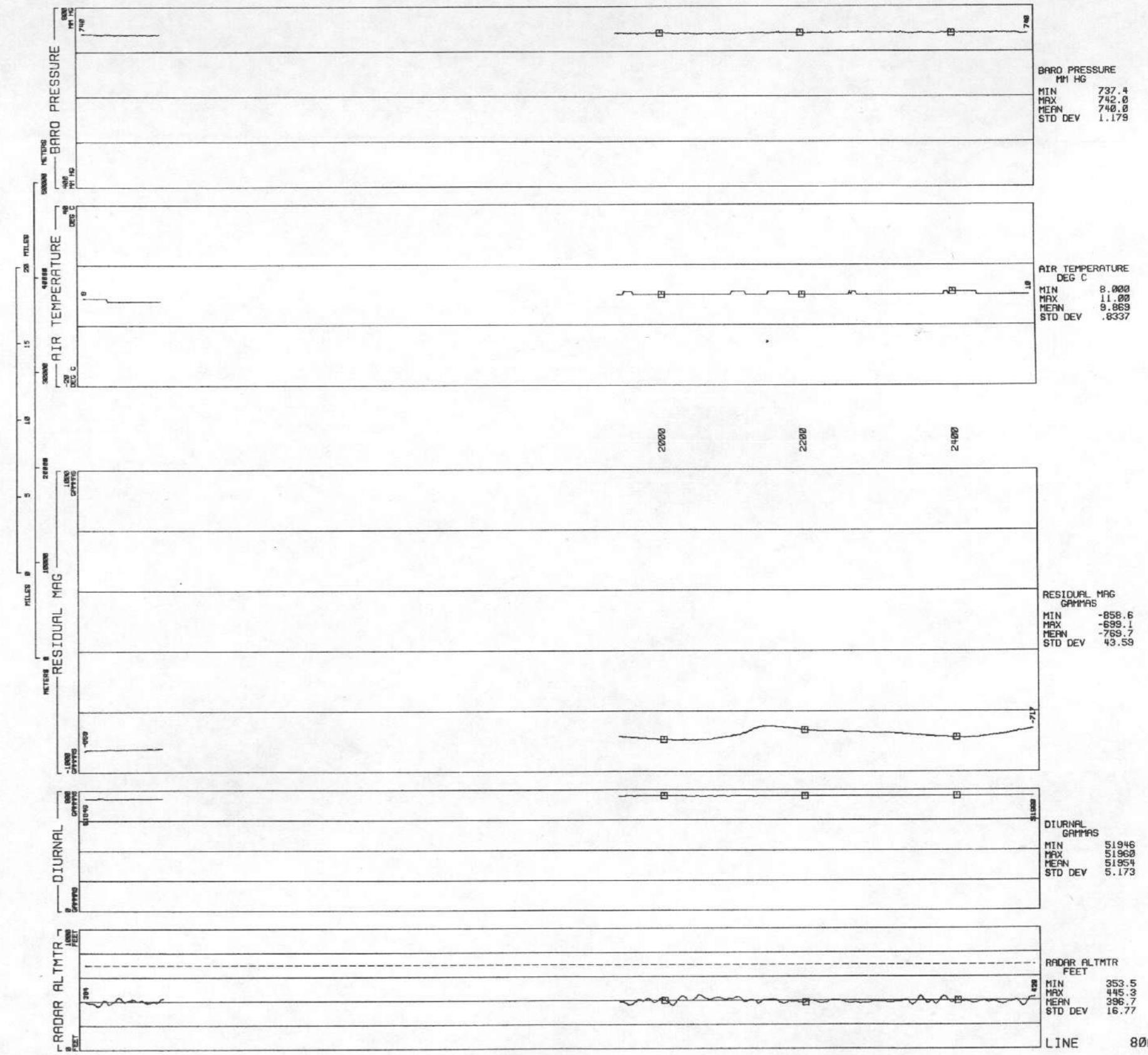
BRUNSWICK LINE QUADRANGLE - NTMS NH 17-2
DATA ACQUIRED 8/10/23



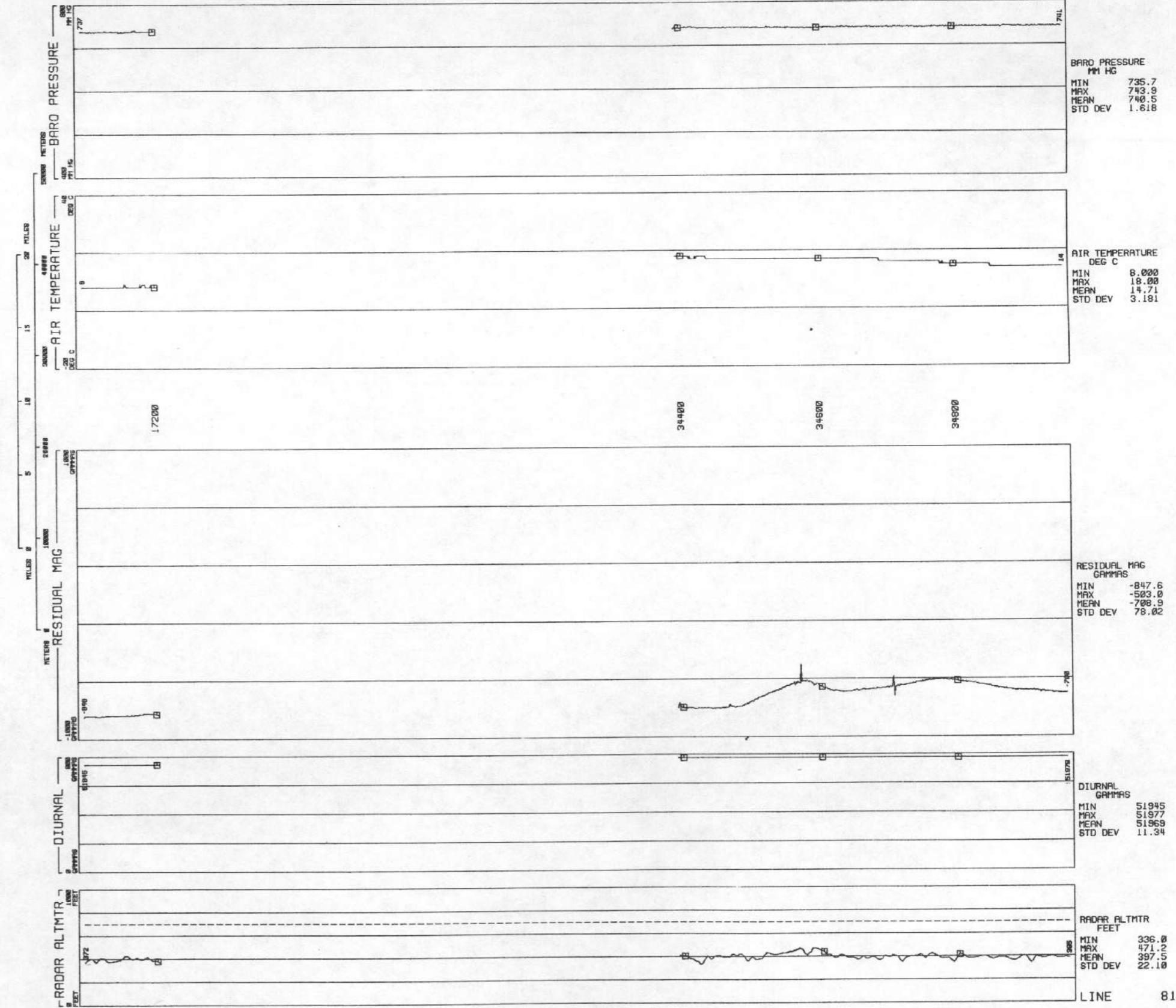
LINE 790
BRUNSWICK QUADRANGLE - NTMS NH 17-2
Data Acquired 8/10/23



LINE 800 QUADRANGLE - NTMS NIH 17-2
DATA ACQUIRED 81023

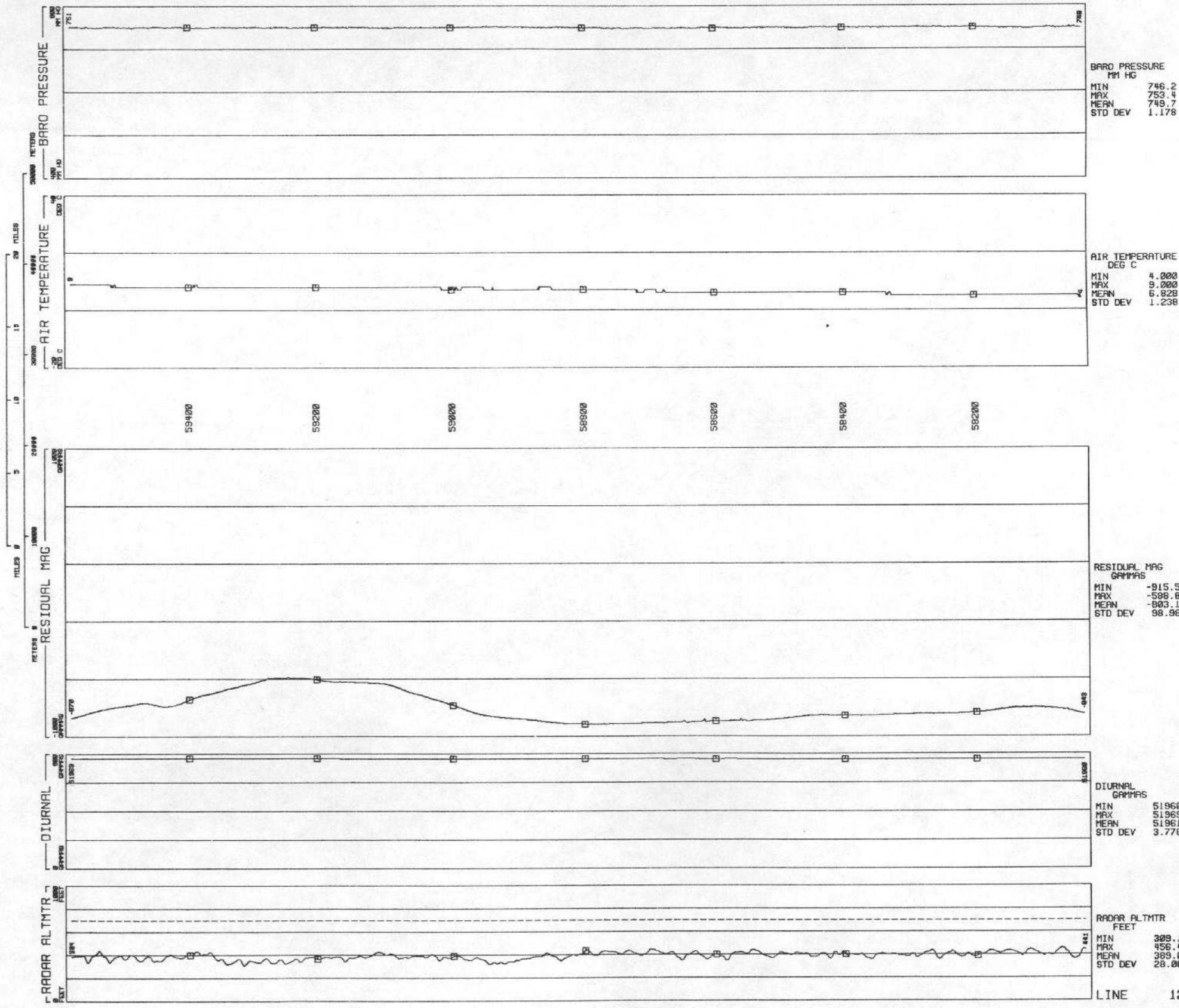


LINE 810 QUADRANGLE - NTMS NH 17-2
DATA ACQUIRED 81024

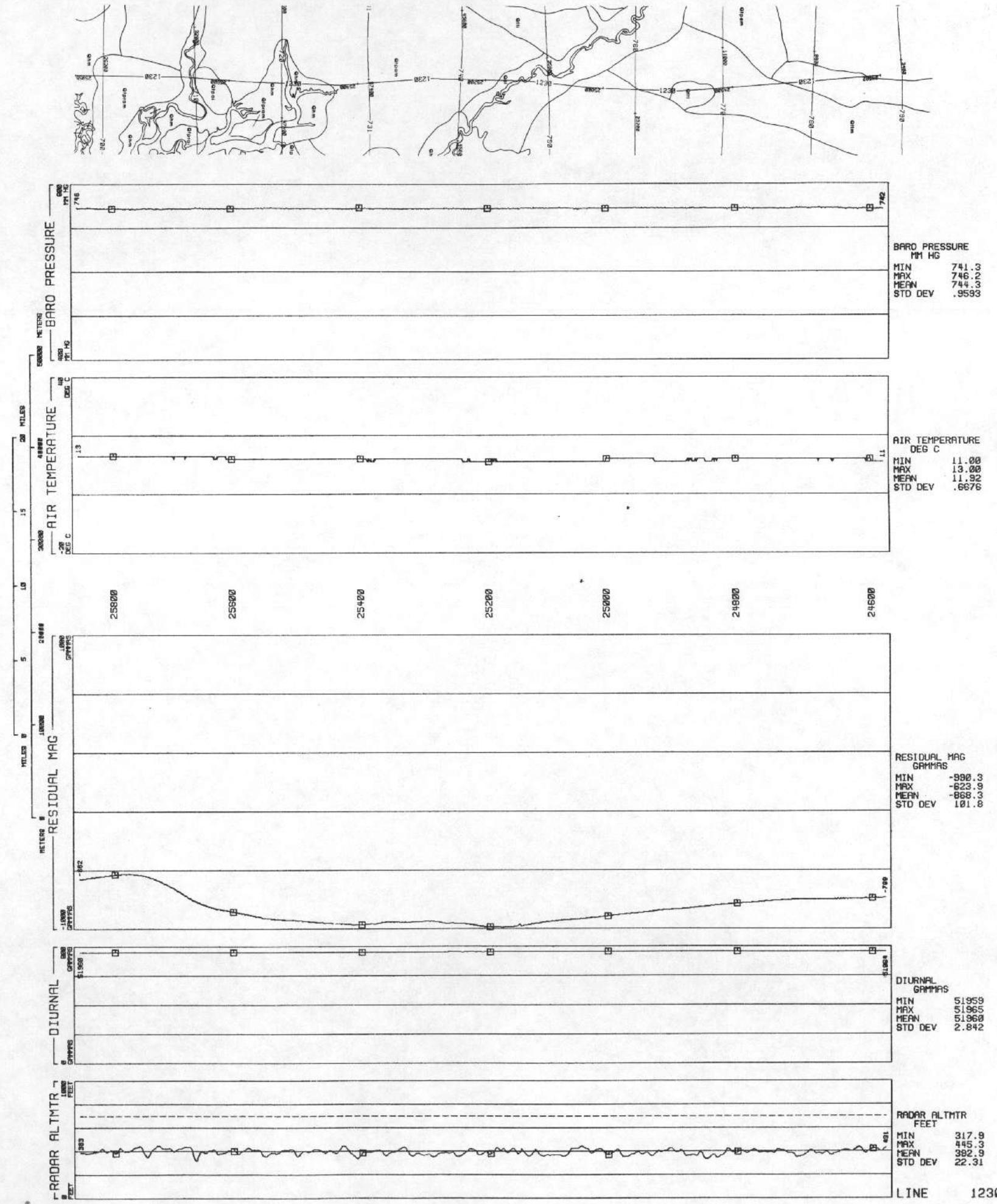


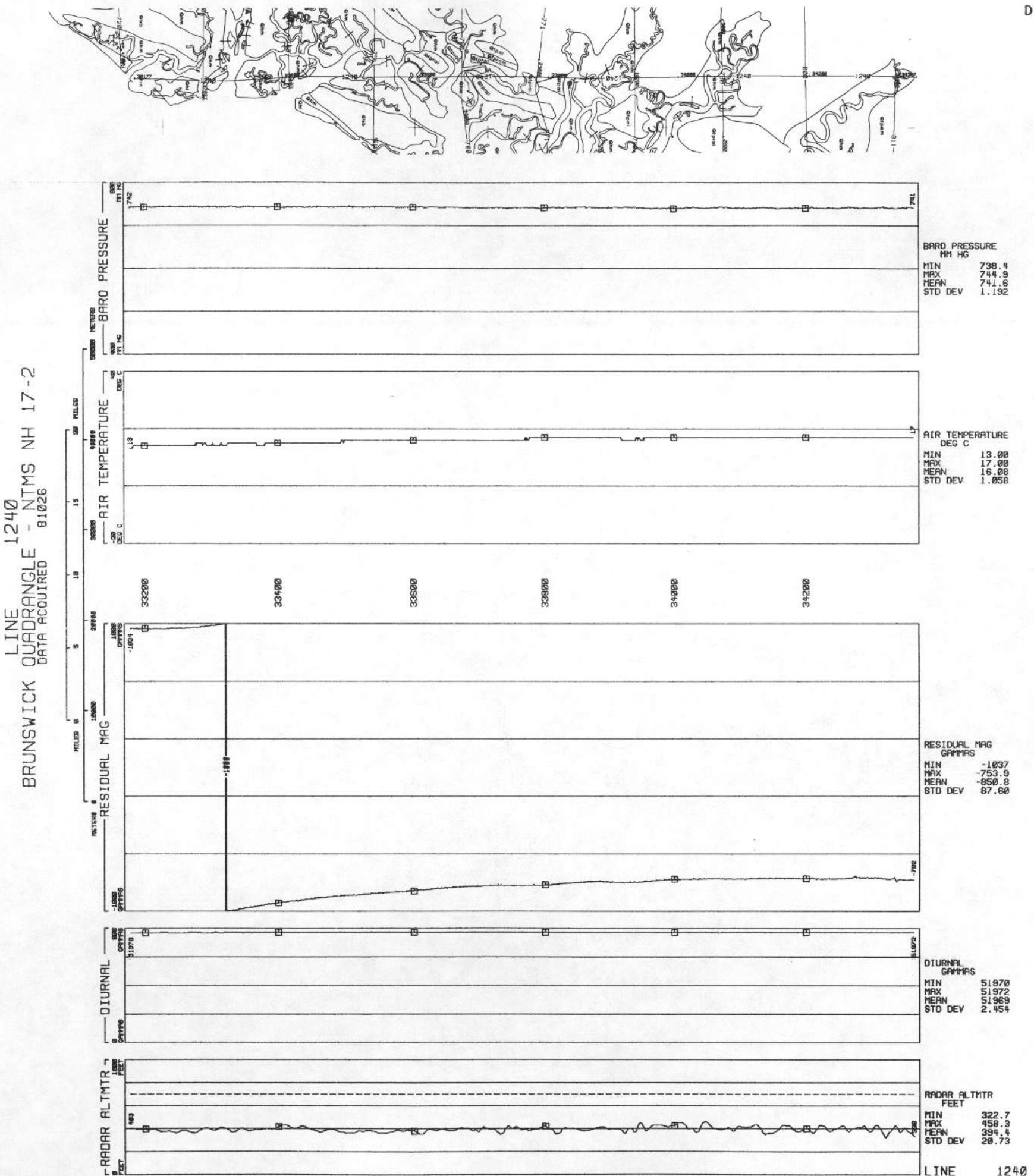
D66
wb

LINE 1220 QUADRANGLE - NTMS NH 17-2
DATA ACQUIRED 81031

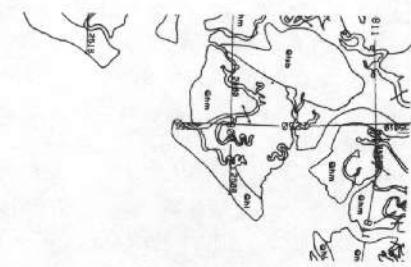


LINE 1230 QUADRANGLE - NTMS NH 17-2
DATA ACQUIRED 81026

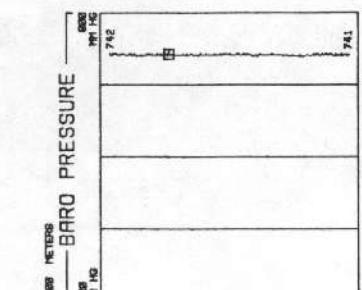




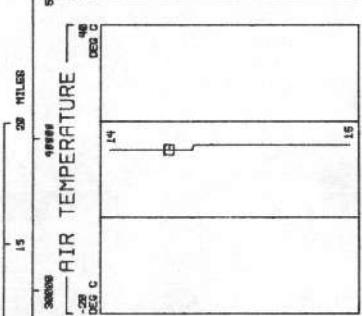
D69 wb



ICK LINE 1250 QUADRANGLE - NTMS NH 17-2
DATA ACQUIRED 81026

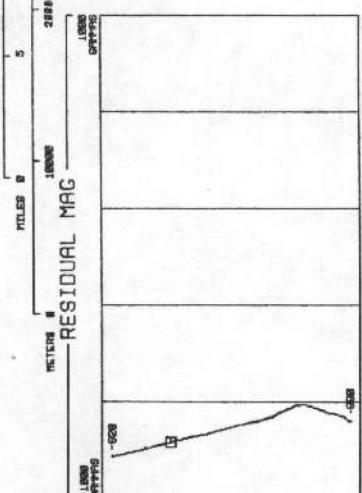


BARO PRESSURE
MM HG



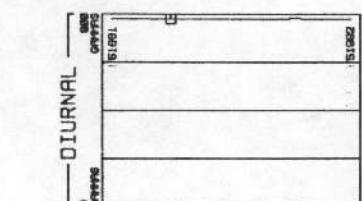
AIR TEMPERATURE
DEG C

MIN	14.00
MAX	15.00
MEAN	14.58
STD DEV	.4669



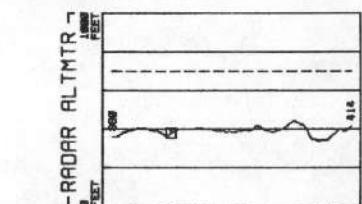
RESIDUAL MAG
GRAMMAS

MIN	-828.4
MAX	-610.8
MEAN	-707.2
STD DEV	65.34



DIURNAL
GAMMAS

MIN	51980
MAX	51982
MEAN	51981
STD DEV	.9258

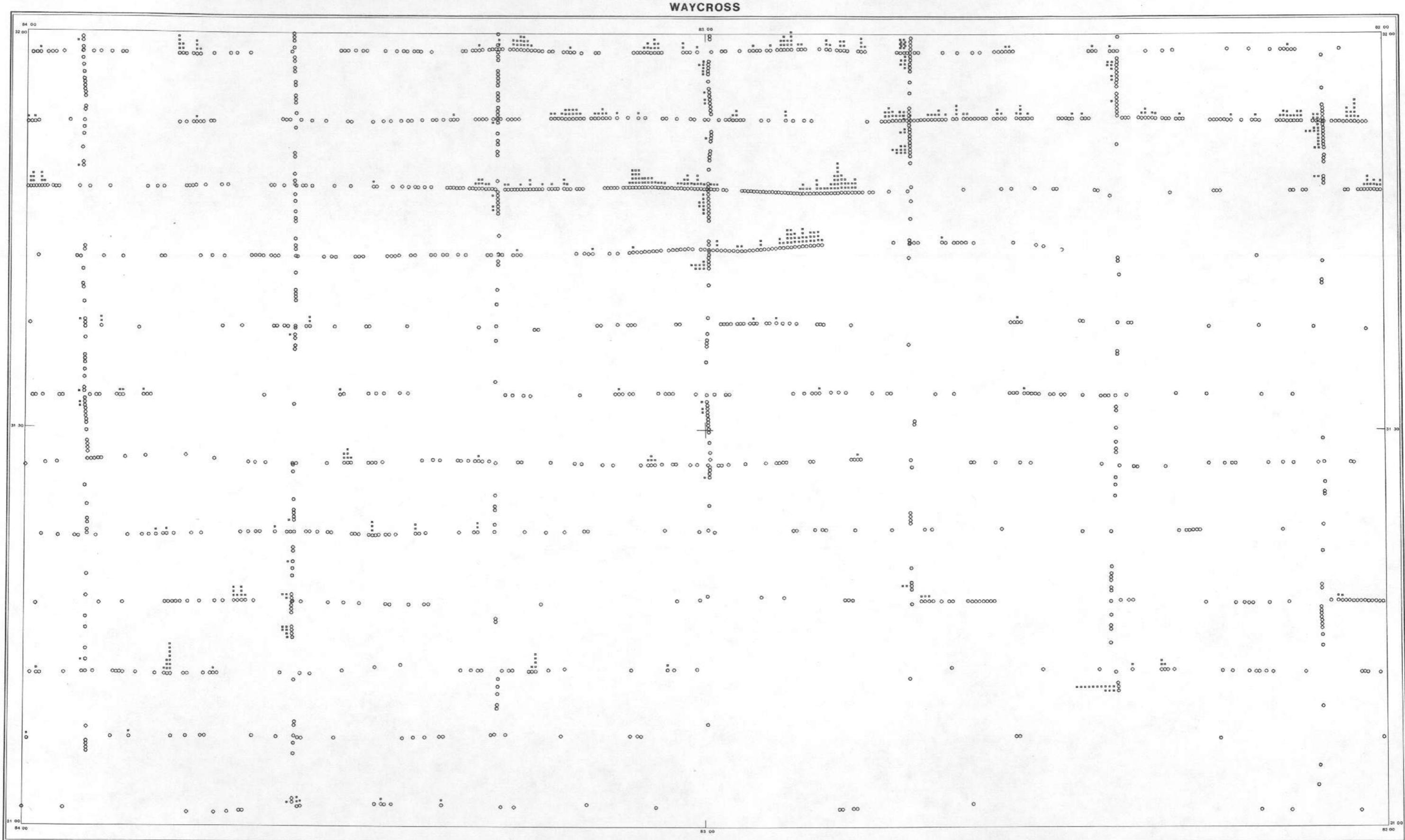


RADAR ALTMTR
FEET

MIN	341.0
MAX	440.3
MEAN	391.4
STD DEV	20.40

LINE 12

APPENDIX E - Standard Deviation Maps

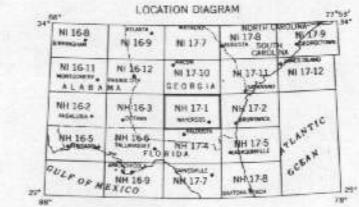


SCALE 1:500,000

MILES 0 5 10 15 20 25 30 MILES
KILOMETERS 0 5 10 15 20 25 30 KILOMETERS

SURVEY AND
COMPILE BY:

EG&G GEOMETRICS

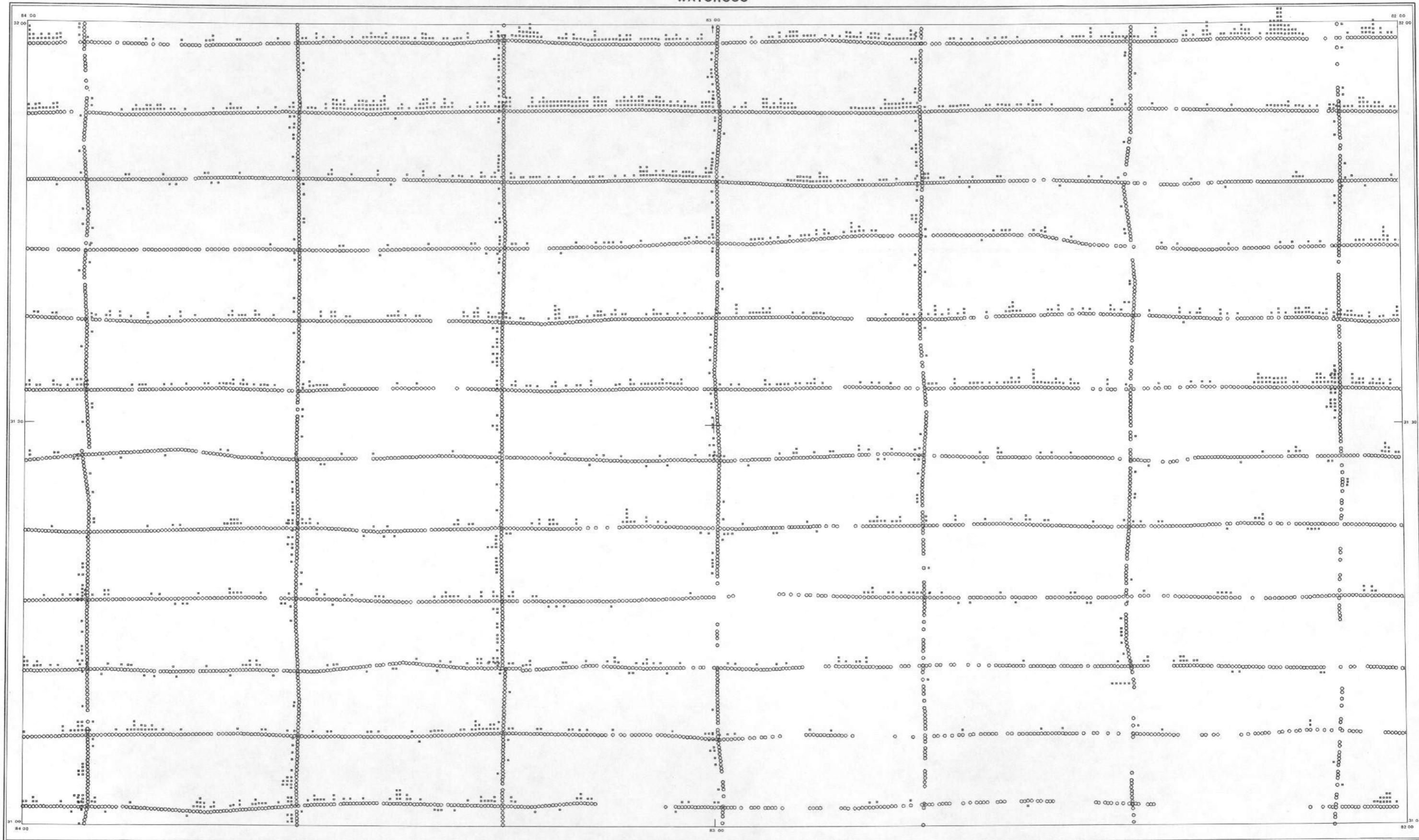


POTASSIUM STANDARD DEVIATION MAP

MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY

WAYCROSS



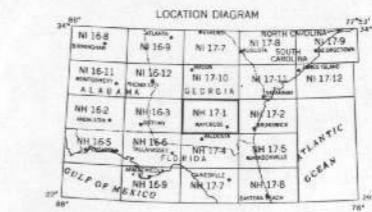
SURVEY AND
COMPILED BY



- DATA STATISTICALLY ADEQUATE
 BLANK - DATA STATISTICALLY INADEQUATE
 * 1 ABOUT MEASURE OF CENTRAL TENDENCY
 NOTE: ON E-W LINES, +0 TO NORTH, -0 TO SOUTH
 ON N-S LINES, +0 TO WEST, -0 TO EAST.

NOTE: ON E-W LINES, +σ TO NORTH, -σ TO S
ON N-S LINES, +σ TO WEST, -σ TO E

ON N-S LINES. +0 TO WEST, -0 TO EAST.

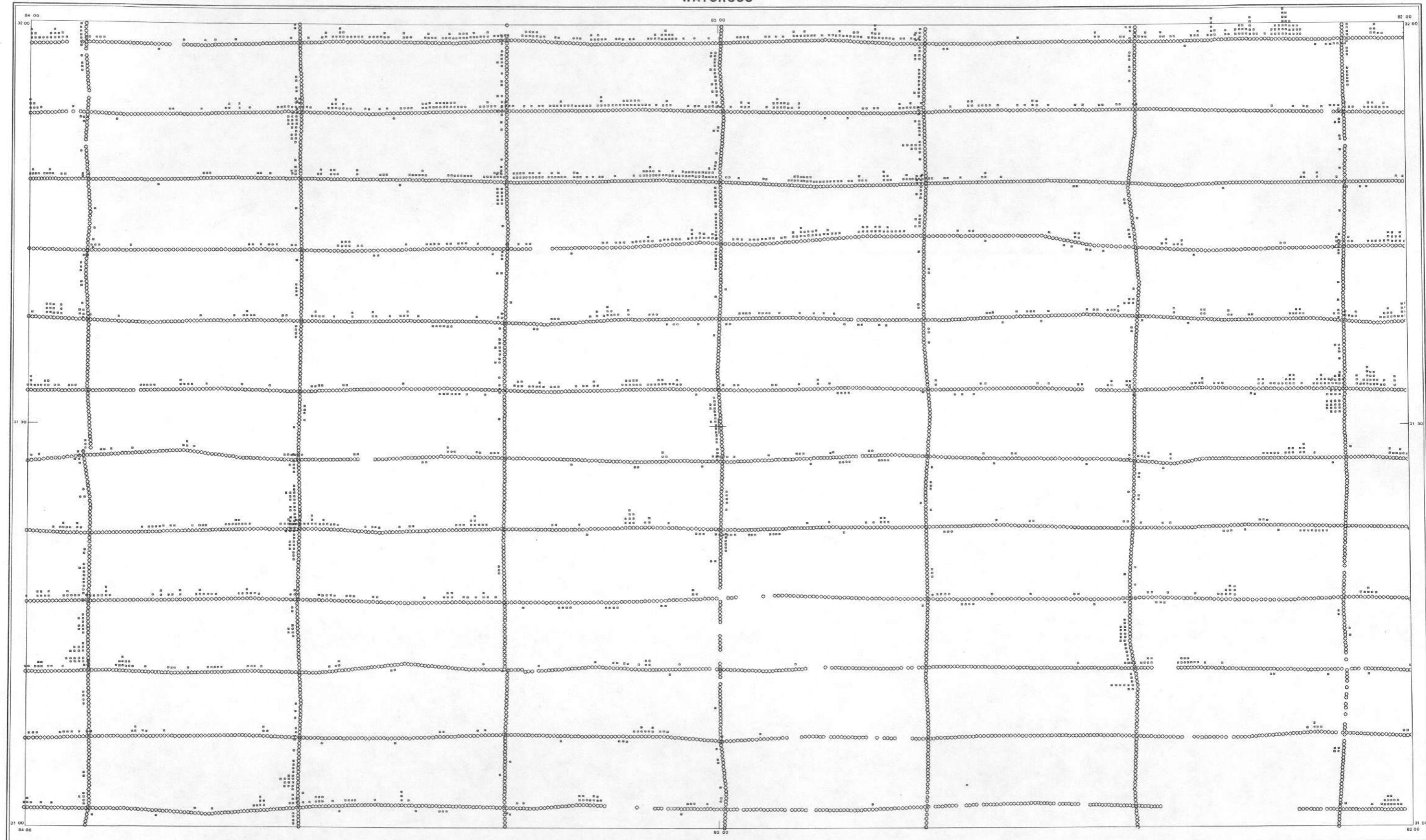


URANIUM STANDARD DEVIATION MAP

MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY

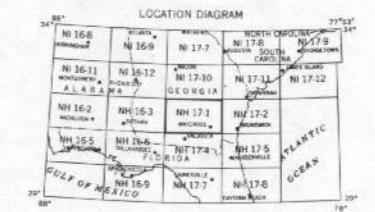
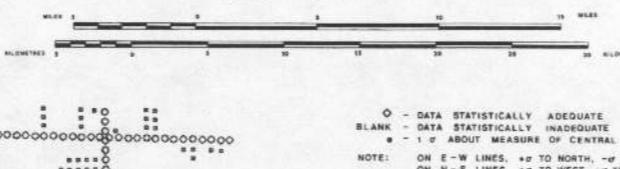
WAYCROSS



SCALE 1:500,000

0 1 10 19 MILES

◊ - DATA STATISTICALLY ADEQUATE
 BLANK - DATA STATISTICALLY INADEQUATE
 ■ - 1 σ ABOUT MEASURE OF CENTRAL TENDENCY
 NOTE: ON E-V LINES, + TO NORTH, - TO SOUTH
 ON N-S LINES, + TO WEST, - TO EAST



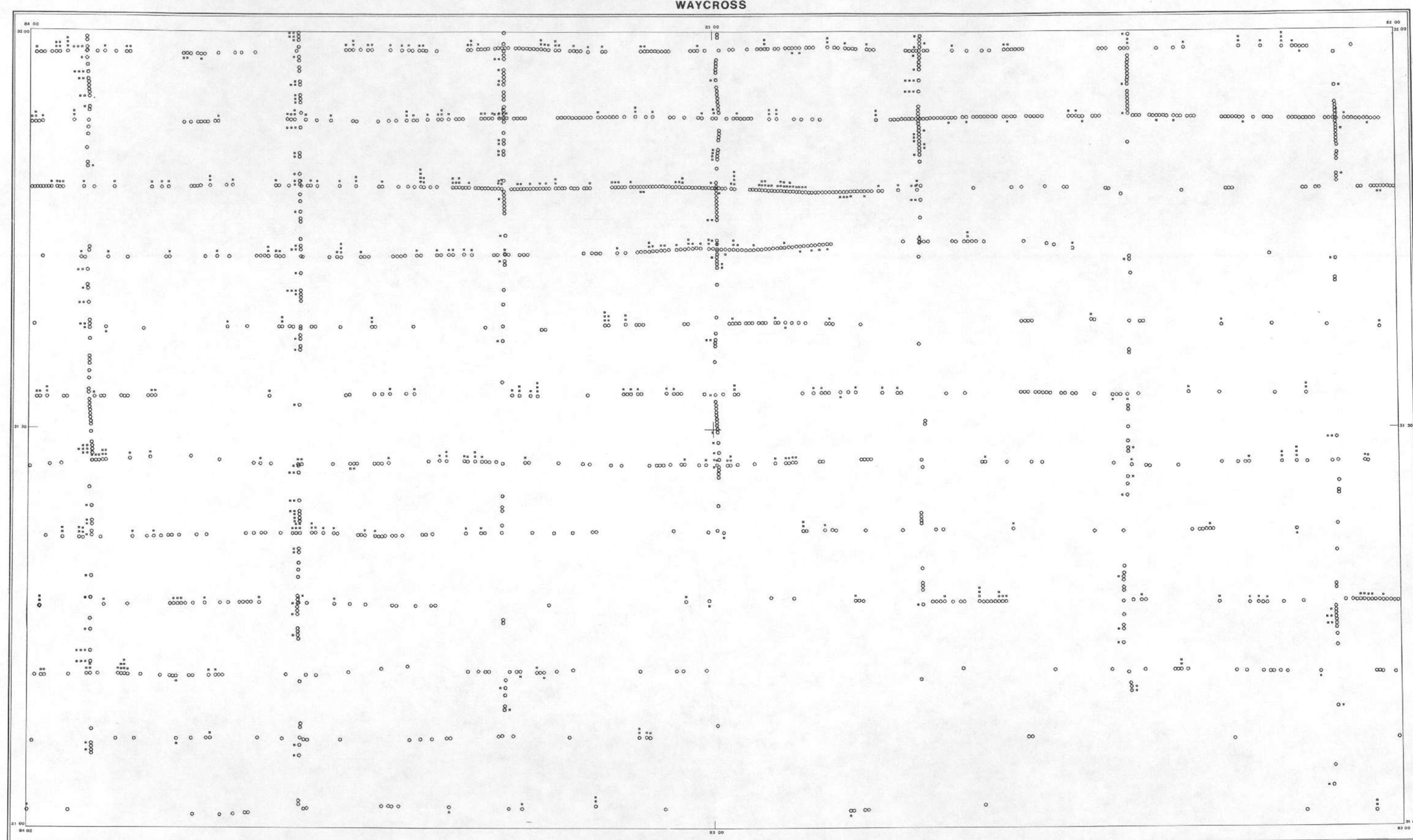
THORIUM STANDARD DEVIATION MAP

MISSISSIPPI / FLORIDA PROJECT

S. DEPARTMENT OF ENERGY

SURVEY AND
COMPILED

EG&G GEOMETRICS



SCALE 1:500,000

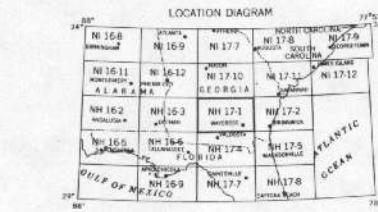


0 5 10 15 20 25 30 35 40 MILES
0 5 10 15 20 25 30 KILOMETERS

○ - DATA STATISTICALLY ADEQUATE
BLANK - DATA STATISTICALLY INADEQUATE
■ - DATA ABOUT MEASURE OF CENTRAL TENDENCY
NOTE: ON E-W LINES, → TO NORTH, ← TO SOUTH
ON N-S LINES, → TO WEST, ← TO EAST.

SURVEY AND
COMPILE BY:

EG&G GEOMETRICS

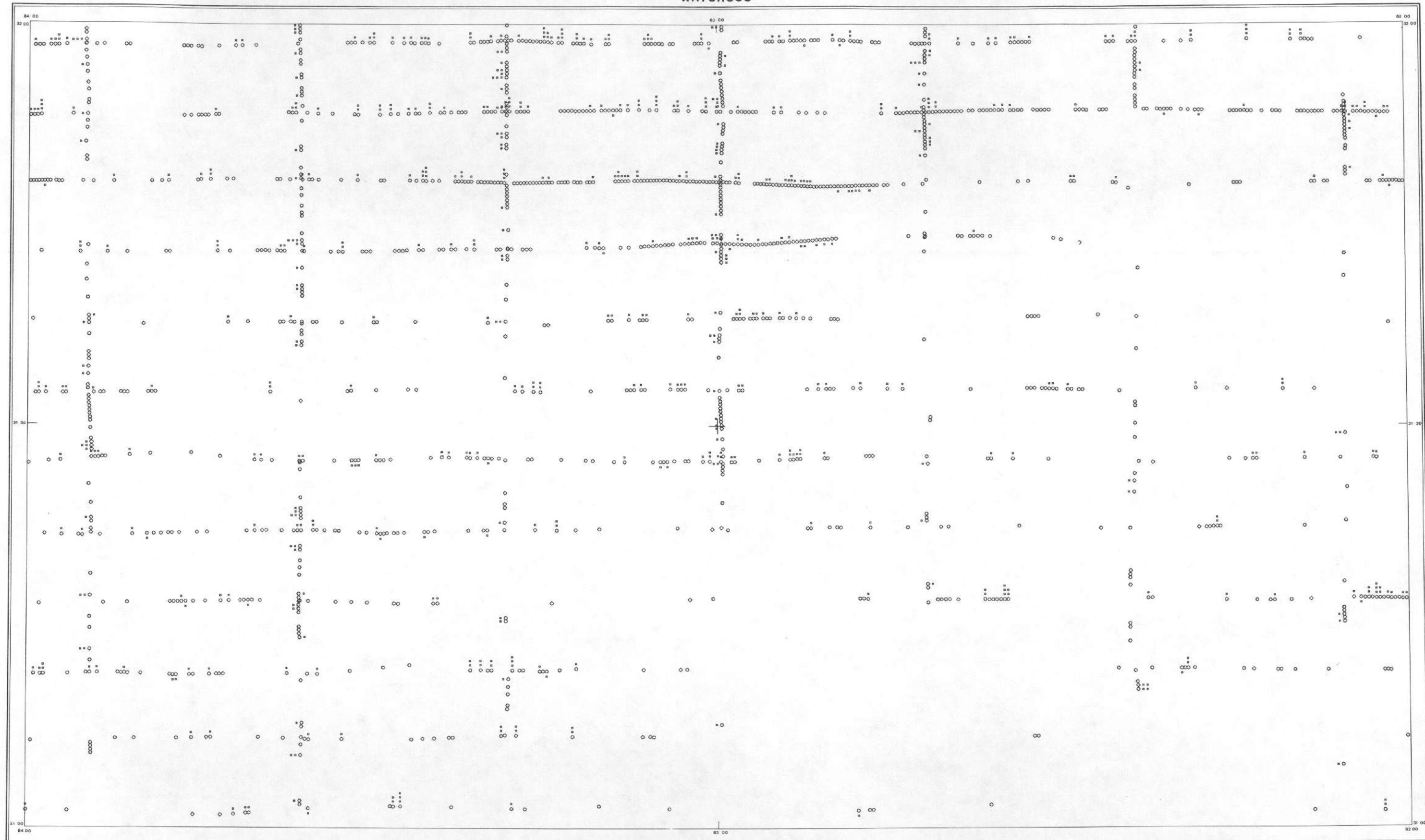


THORIUM/POTASSIUM STANDARD DEVIATION MAP

MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY

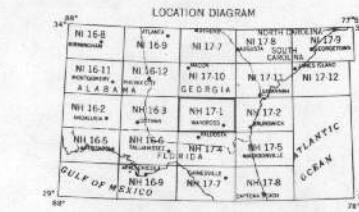
WAYCROSS



SURVEY
COMMITTEE

EG&G GEOMETRIC

NOTE: ON E-W LINES, \rightarrow TO NORTH, \rightarrow WEST
 ON N-S LINES, \rightarrow WEST, \rightarrow NORTH

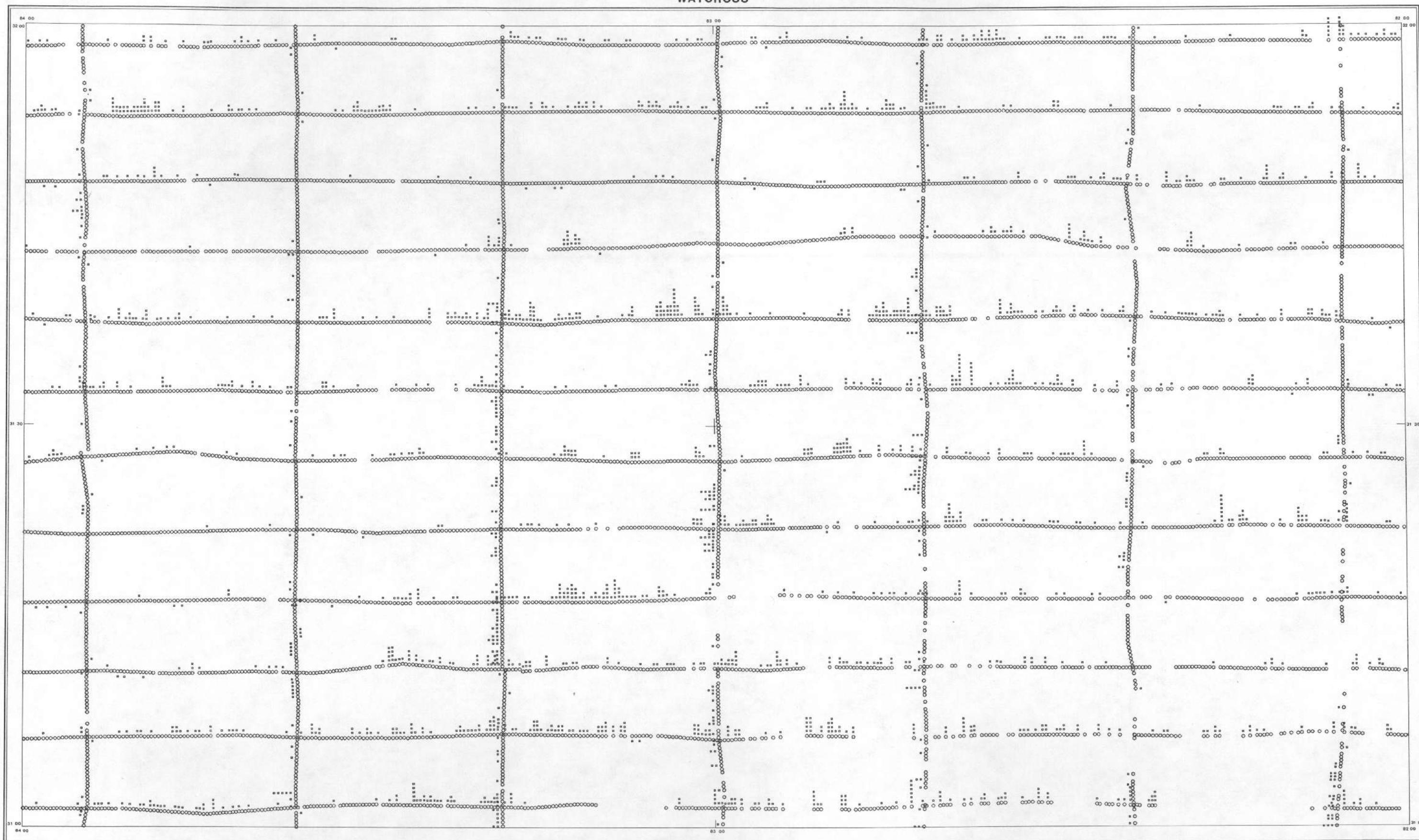


URANIUM/POTASSIUM STANDARD DEVIATION MAP

MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY

WAYCROSS



SCALE 1:500,000

O - DATA STATISTICALLY ADEQUATE
 BLANK - DATA STATISTICALLY INADEQUATE
 ■ - 1 ABOUT MEASURE OF CENTRAL TENDENCY
 NOTE: ON E-W LINES, + θ TO NORTH, - θ TO SOUTH
 ON N-S LINES, + θ TO WEST, - θ TO EAST

This figure is a map titled "LOCATION DIAGRAM" showing the location of the Mississippi River delta. The map includes state boundaries for Louisiana, Mississippi, and Alabama. Major rivers shown include the Mississippi River, Atchafalaya River, Red River, Arkansas River, and the Gulf of Mexico. A grid system is overlaid on the map, with horizontal lines labeled "30°N" and "32°N" and vertical lines labeled "89°W" and "90°W". A small inset map in the bottom right corner shows the location of the main map relative to the Atlantic Ocean.

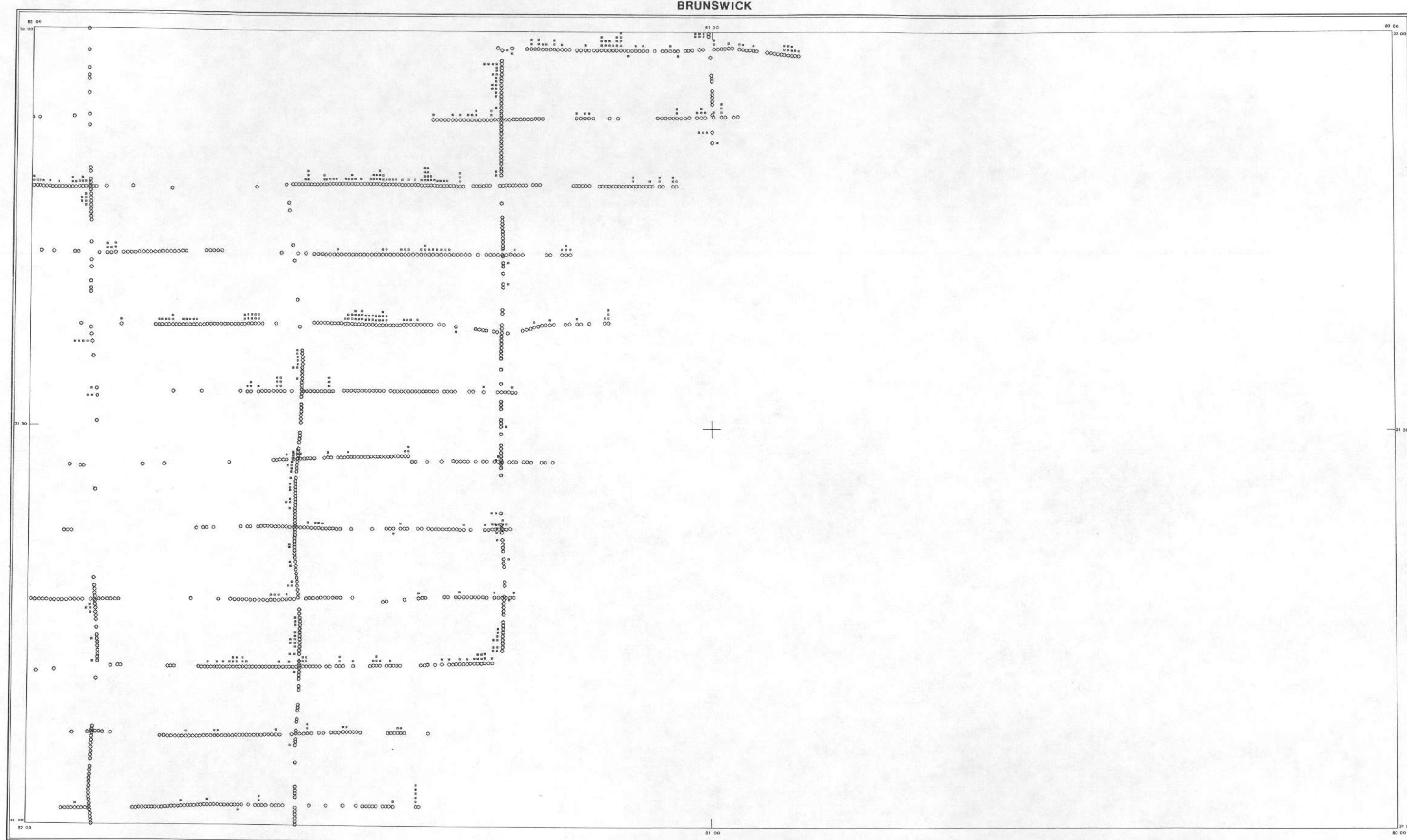
URANIUM/THORIUM STANDARD DEVIATION MAP

MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY

**SURVEY AND
COMPILED**





SCALE 1:500,000

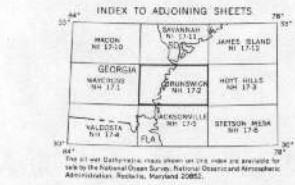
MILES 1 2 3 4 5 6 7 8 MILES
KILOMETERS 0 5 10 15 20 25 30 35 KILOMETERS

EAST

SURVEY AND
COMPILE BY:

EB&G GEOMETRICS

DATA STATISTICALLY ADEQUATE
BLANK = DATA STATISTICALLY INADEQUATE
= 1 σ ABOUT MEASURE OF CENTRAL TENDENCY
NOTE: ON E-W LINES, → TO NORTH, ← TO SOUTH
ON N-S LINES, → TO WEST, ← TO EAST.

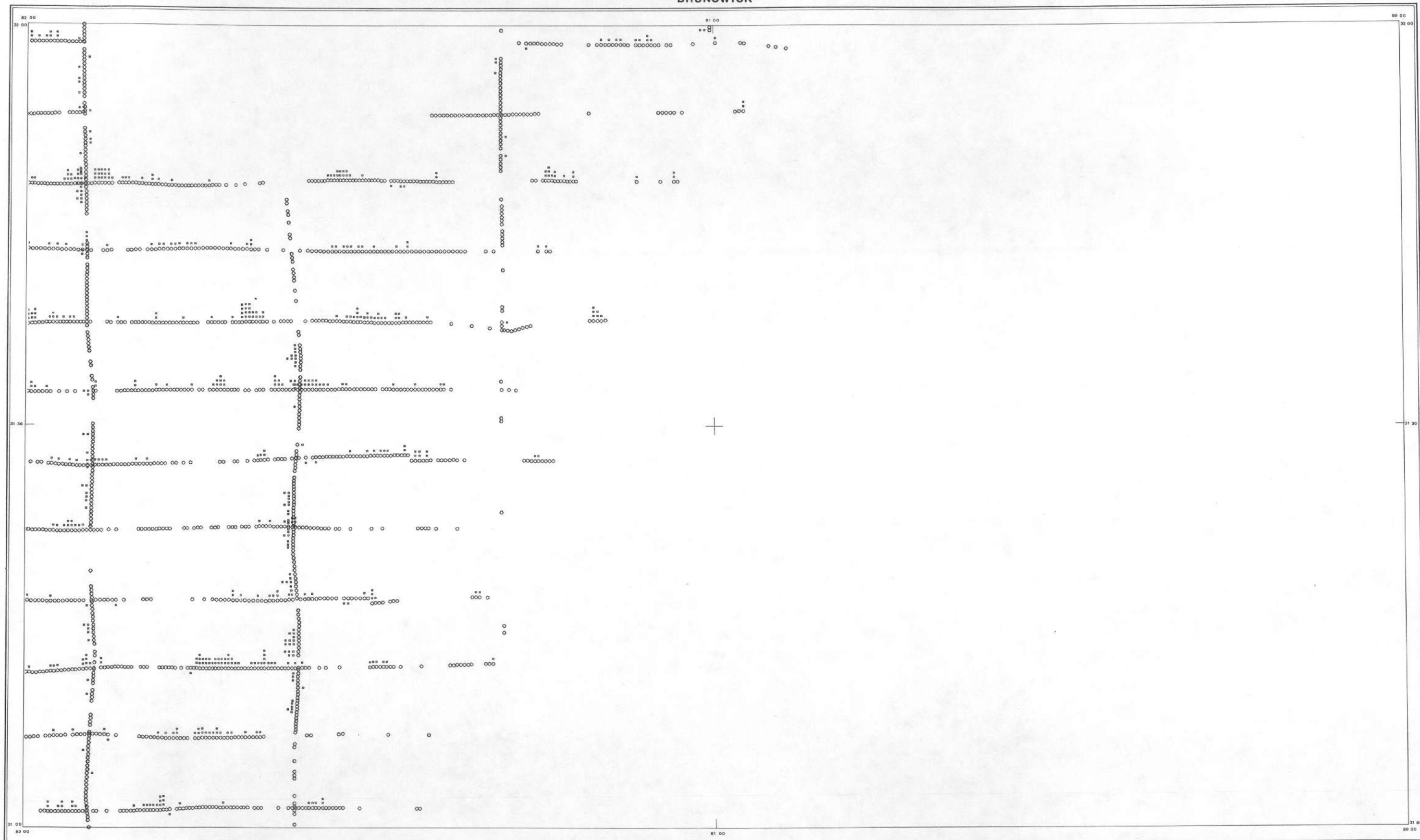


POTASSIUM STANDARD DEVIATION MAP

MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY

BRUNSWIC



SURVEY AND DISCUSSION

EG&G GEOMETRICS

SCALE 1:500,000

MILES KILOMETRES

0 5 10 15 20 25 30

0 5 10 15 20 25 30

MILES KILOMETRES

Detailed description: A scale bar at the top of the page. It features two horizontal lines. The top line is labeled 'MILES' at both ends and has numerical markings at 0, 5, 10, 15, 20, and 25. The bottom line is labeled 'KILOMETRES' at both ends and has numerical markings at 0, 5, 10, 15, 20, and 25. Below these lines is a legend area.

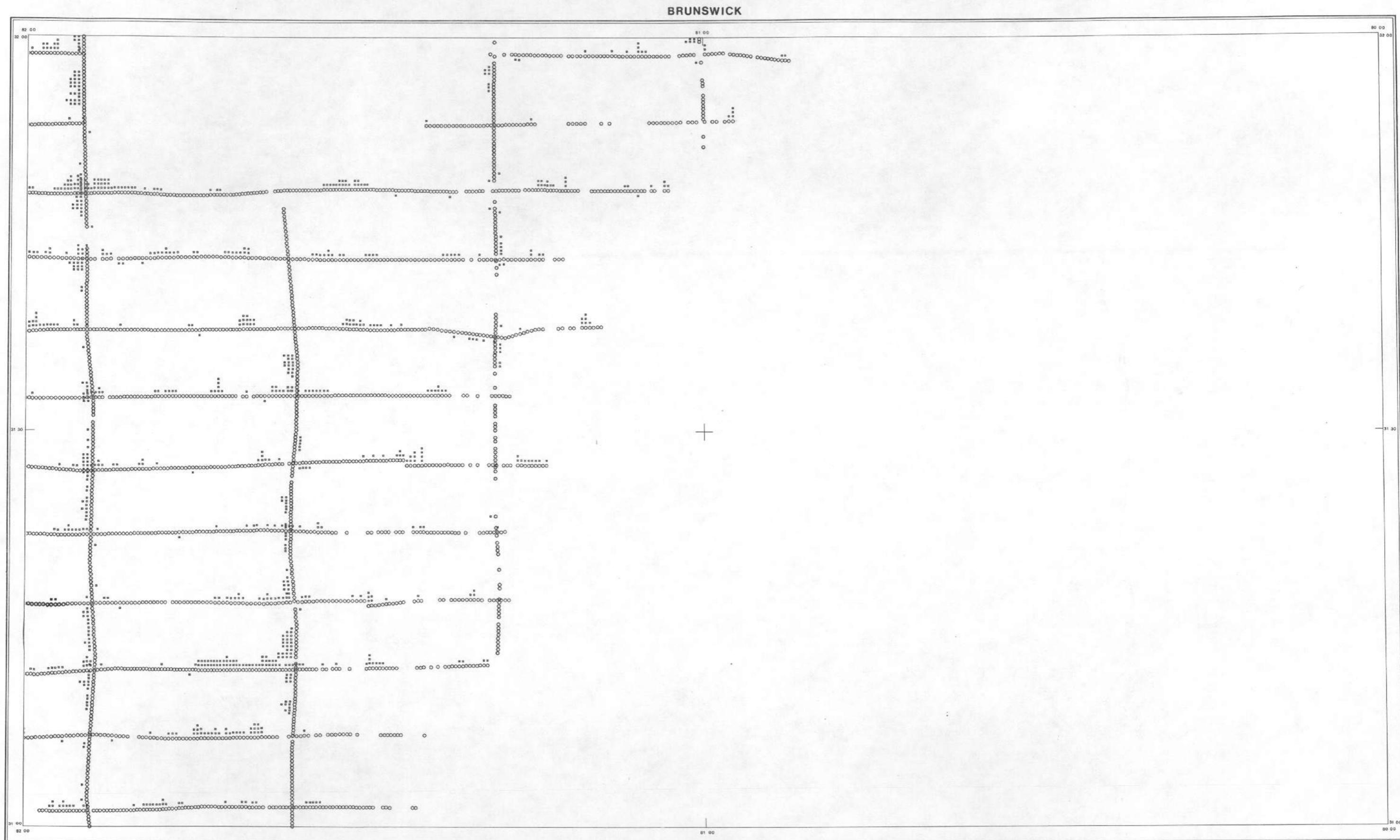
Symbol	Description
◊	DATA STATISTICALLY ADEQUATE
▪	DATA STATISTICALLY INADEQUATE
▫	± 1% ABOUT MEASURE OF CENTRAL TENDENCY

NOTE: ON E-W LINES, → TO NORTH, ← TO SOUTH
ON N-S LINES, ↑ TO WEST, ↓ TO EAST

URANIUM STANDARD DEVIATION MAP

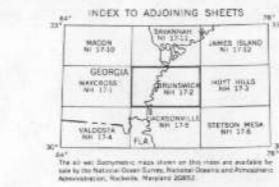
MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY



SURVEY AND
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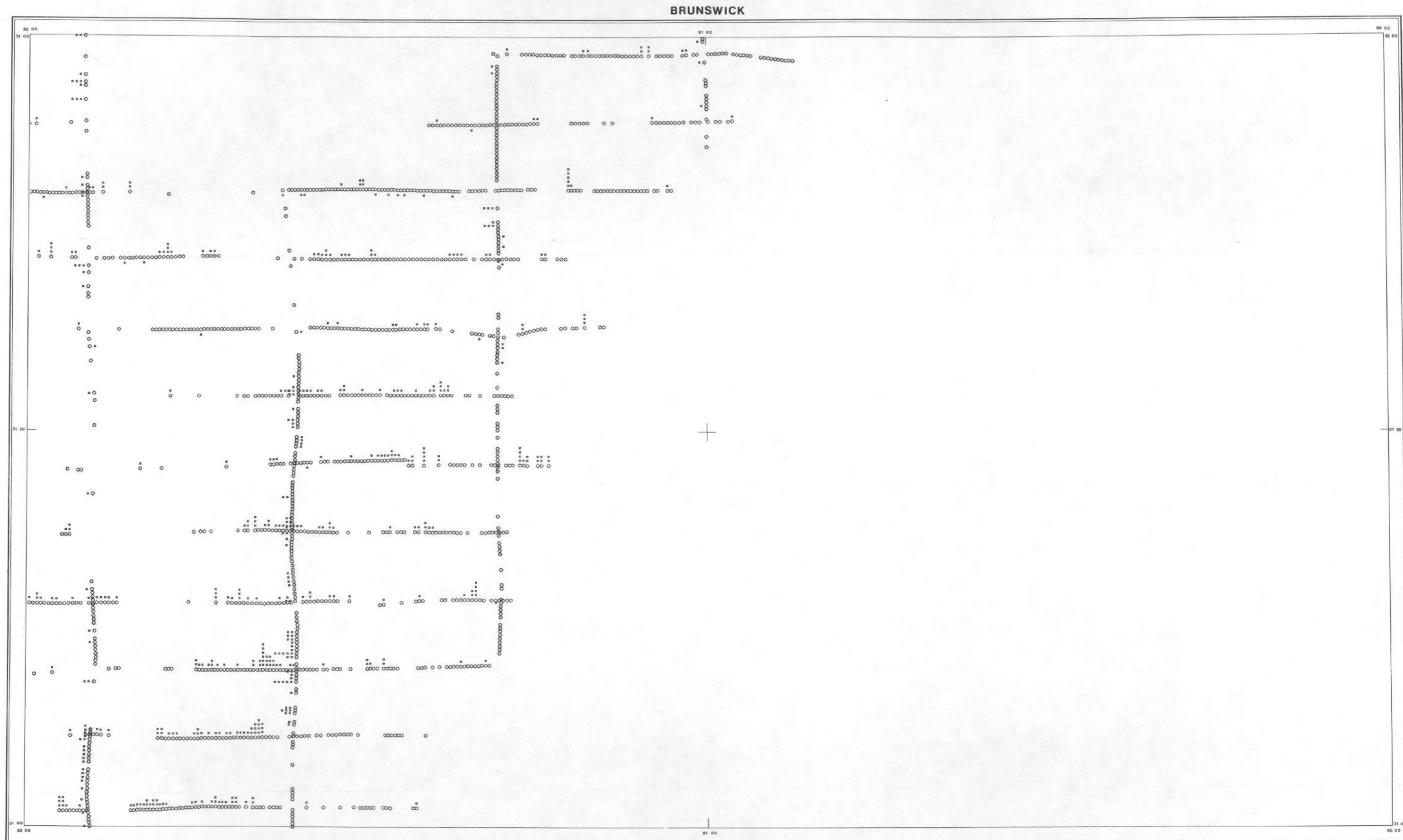
 EG&G GEOMETRICS



THORIUM STANDARD DEVIATION MAP

MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY



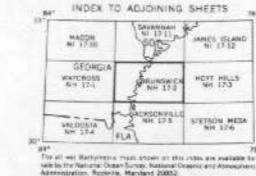
SCALE 1:500,000



SURVEY AND
COMPILE BY:

EG&G GEOMETRICS

DATA STATISTICALLY ADEQUATE
BLANK - DATA STATISTICALLY INADEQUATE
■ = 1 σ ABOUT MEASURE OF CENTRAL TENDENCY
NOTE: ON E-W LINES, +σ TO NORTH, -σ TO SOUTH.
ON N-S LINES, +σ TO WEST, -σ TO EAST.

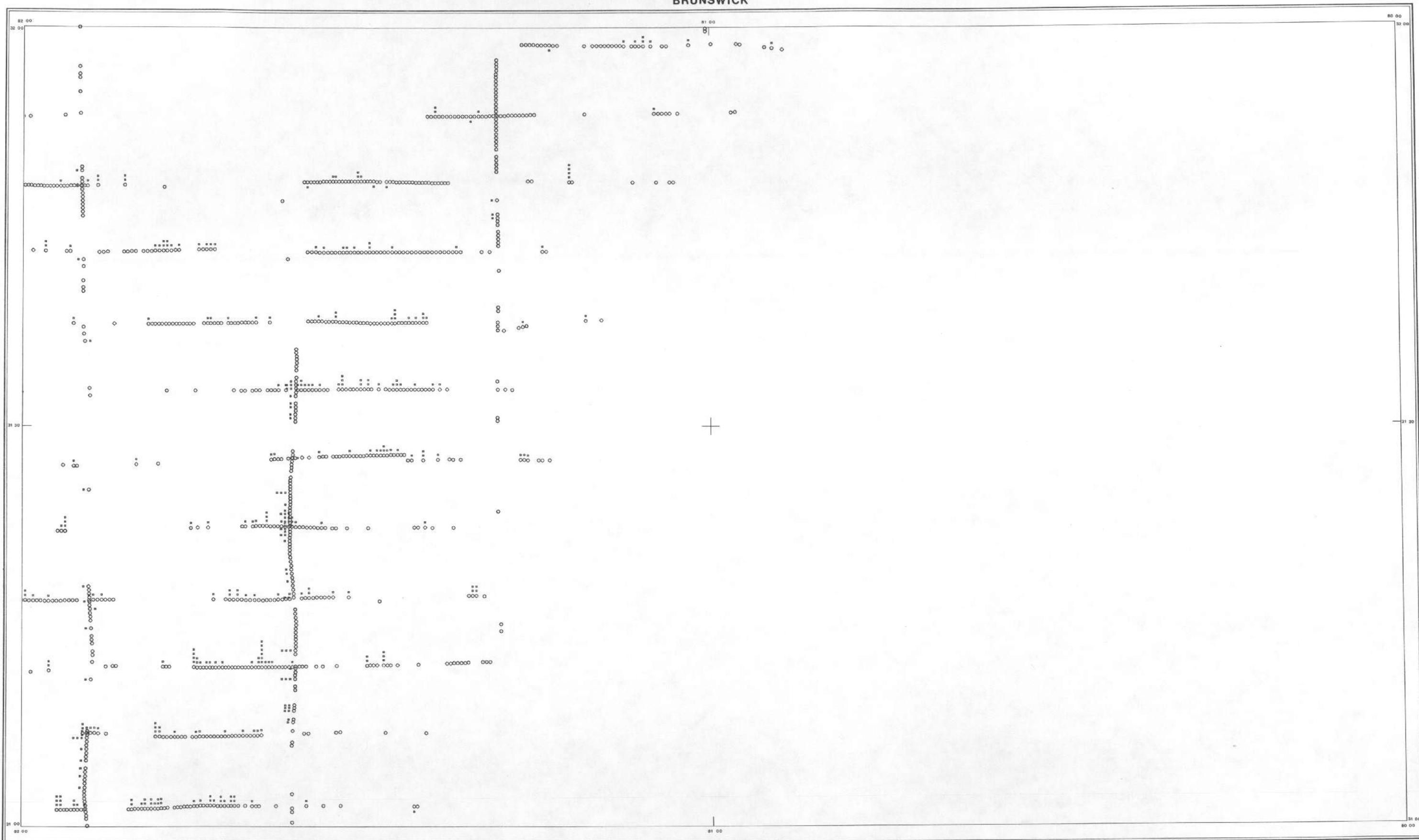


THORIUM/POTASSIUM STANDARD DEVIATION MAP

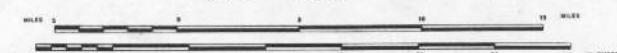
MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY

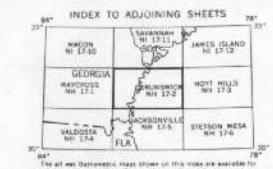
BRUNSWICK



SCALE 1:500,000



● - DATA STATISTICALLY ADEQUATE
 BLANK - DATA STATISTICALLY INADEQUATE
 ■ - 1 σ ABOUT MEASURE OF CENTRAL TENDENCY
 NOTE: ON E-W LINES, +σ TO NORTH, -σ TO SOUTH.
 ON N-S LINES, +σ TO WEST, -σ TO EAST.



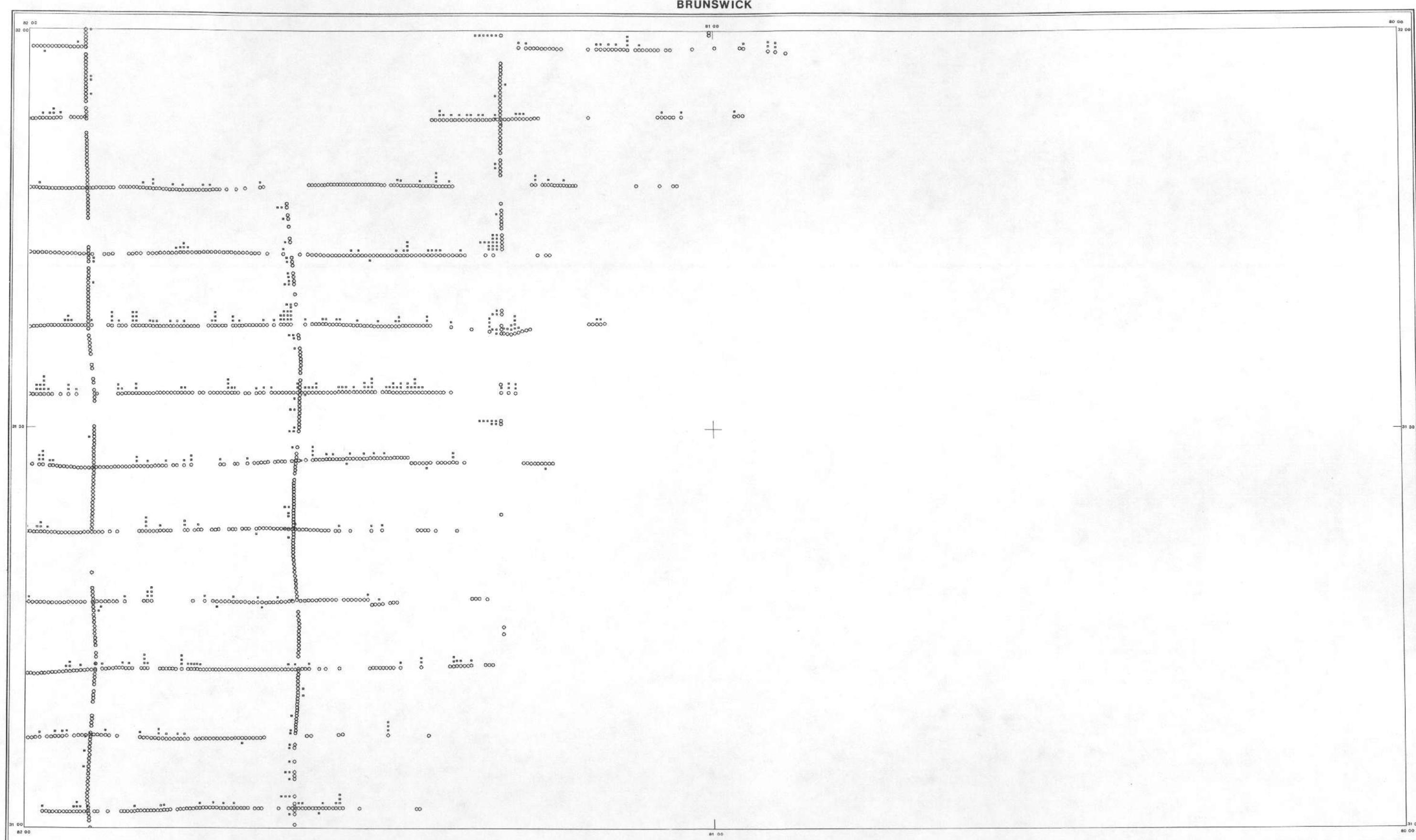
URANIUM/POTASSIUM STANDARD DEVIATION MAP

MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY

SURVEY AND
COMPILE BY:

EG&G GEOMETRICS



SURVEY AND
COMPILE BY:

EG&G GEOMETRICS

DATA SYMBOLS

- - DATA STATISTICALLY ADEQUATE
- - DATA STATISTICALLY INADEQUATE
- - 1 σ ABOUT MEASURE OF CENTRAL TENDENCY

NOTE: ON E-W LINES, +σ TO NORTH, -σ TO SOUTH.
ON N-S LINES, +σ TO WEST, -σ TO EAST.

URANIUM/THORIUM STANDARD DEVIATION MAP

MISSISSIPPI / FLORIDA PROJECT

U. S. DEPARTMENT OF ENERGY

**APPENDIX F - Histograms and Map Unit Conversion
Table**

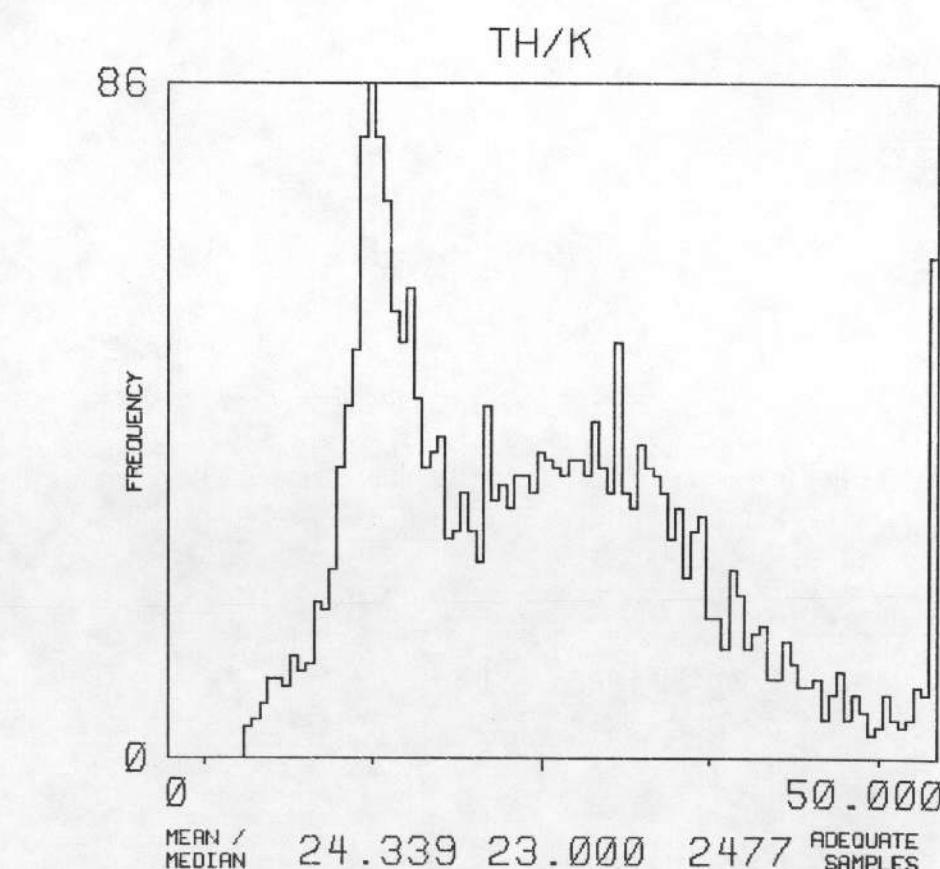
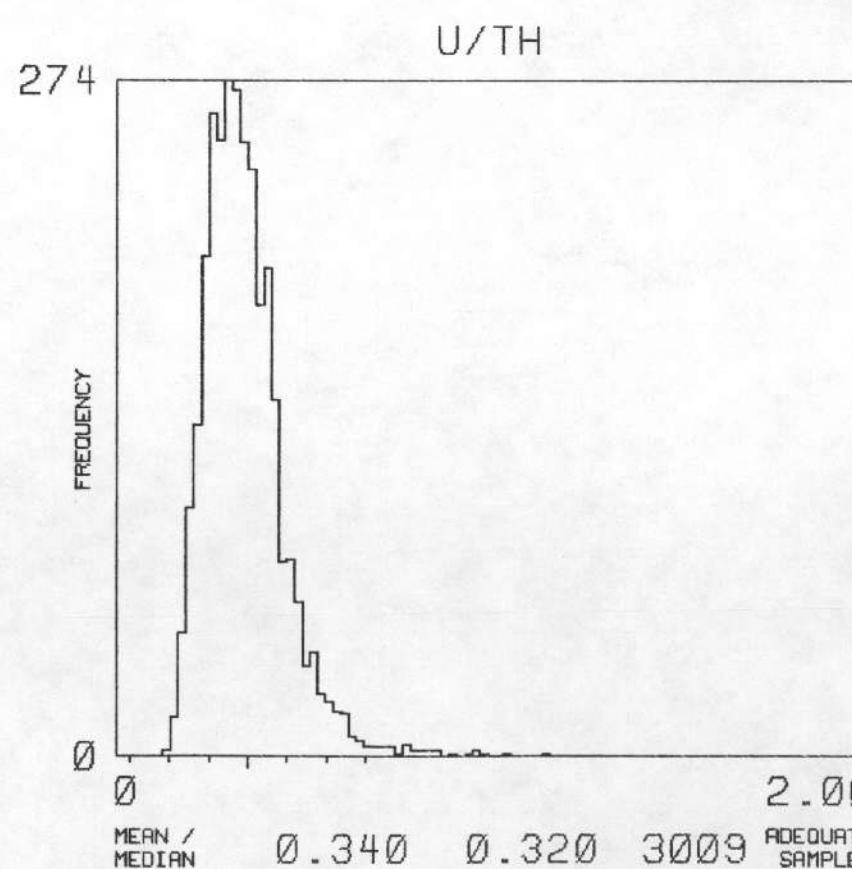
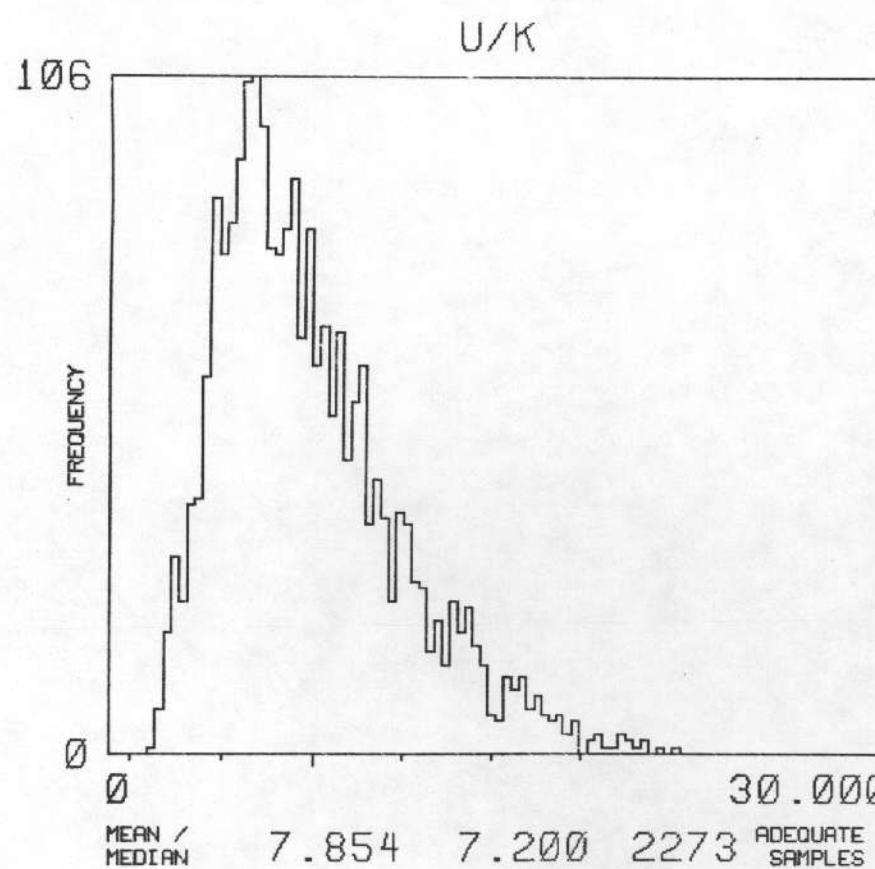
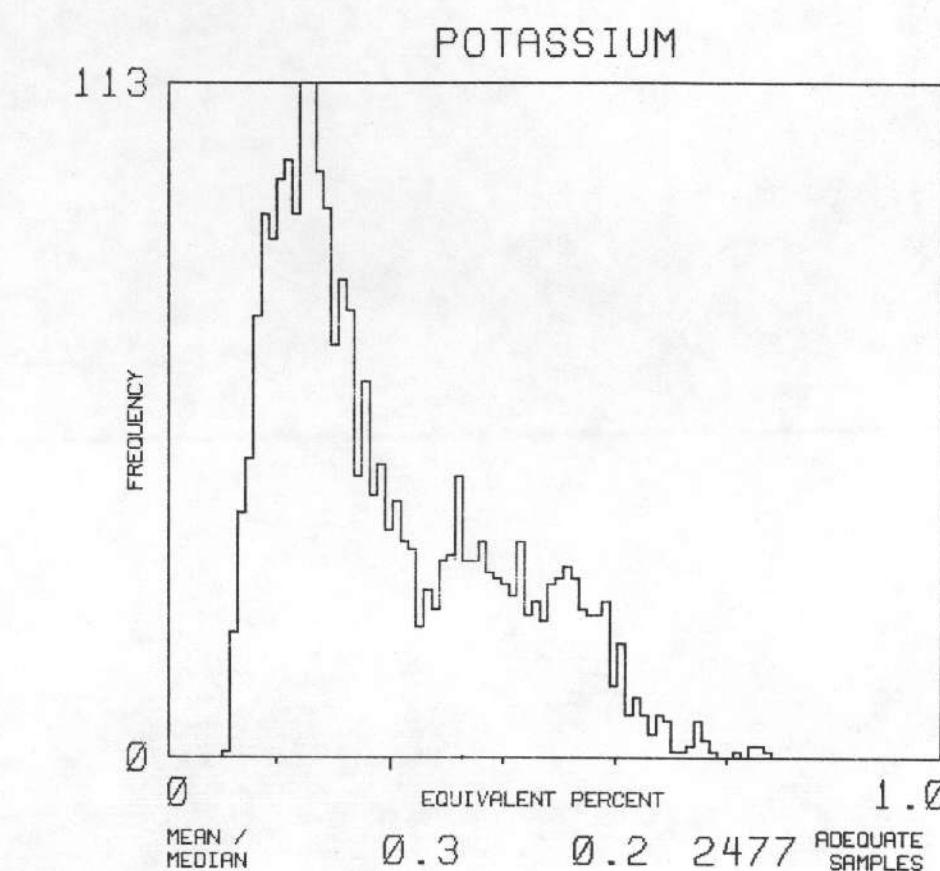
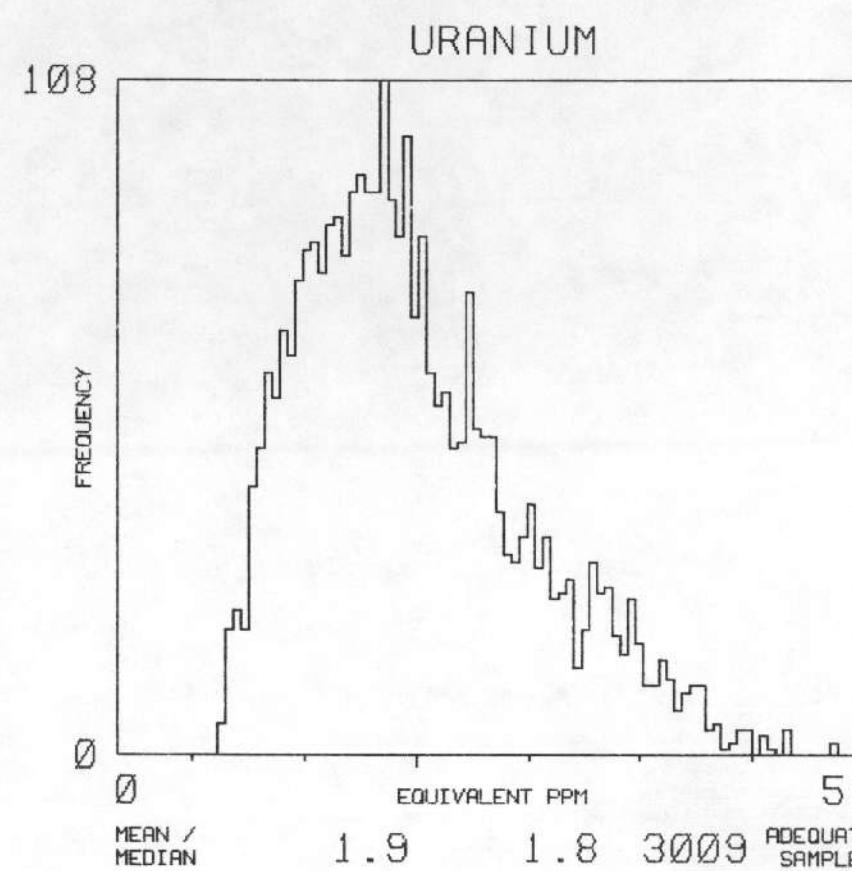
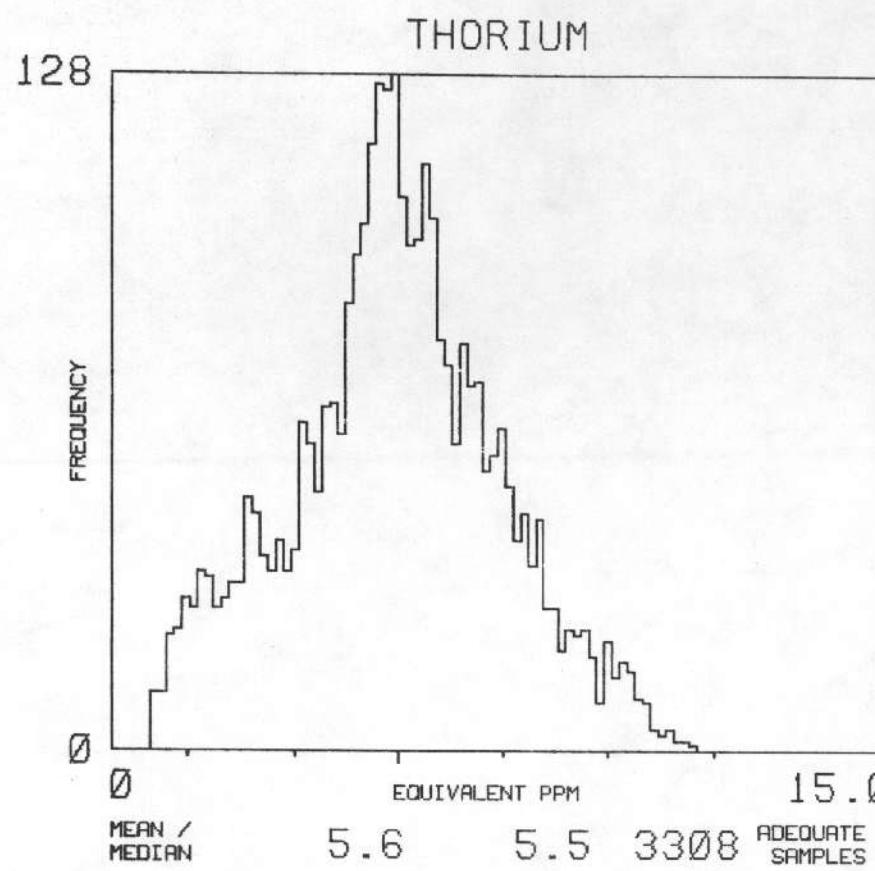
NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : QAL

TOTAL NUMBER
OF SAMPLES

3312

F1
wb



NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

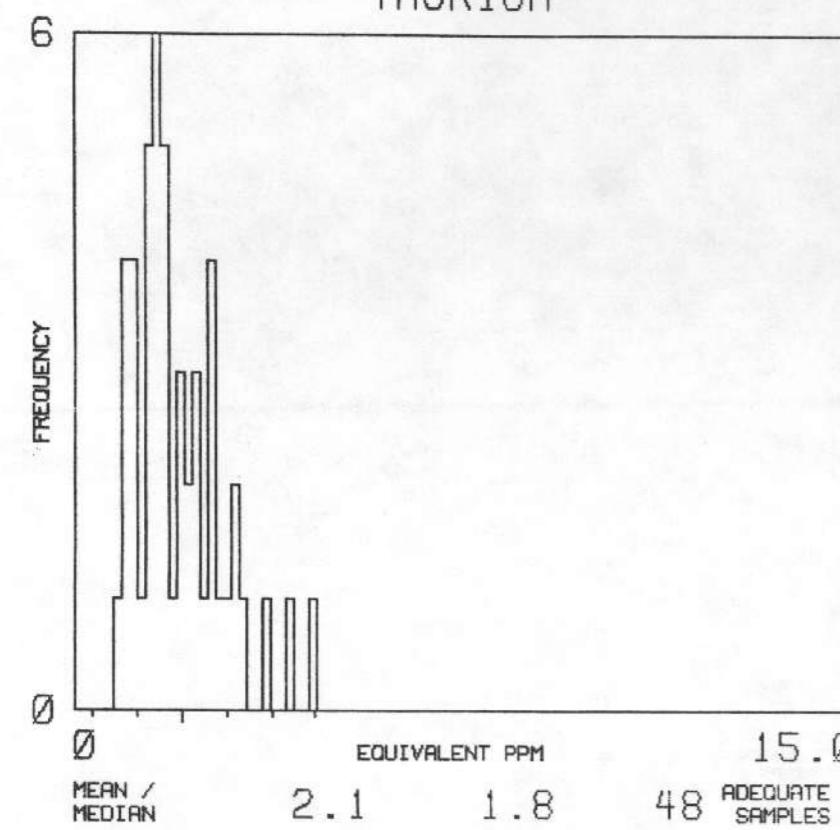
MAP UNIT : QS

TOTAL NUMBER
OF SAMPLES

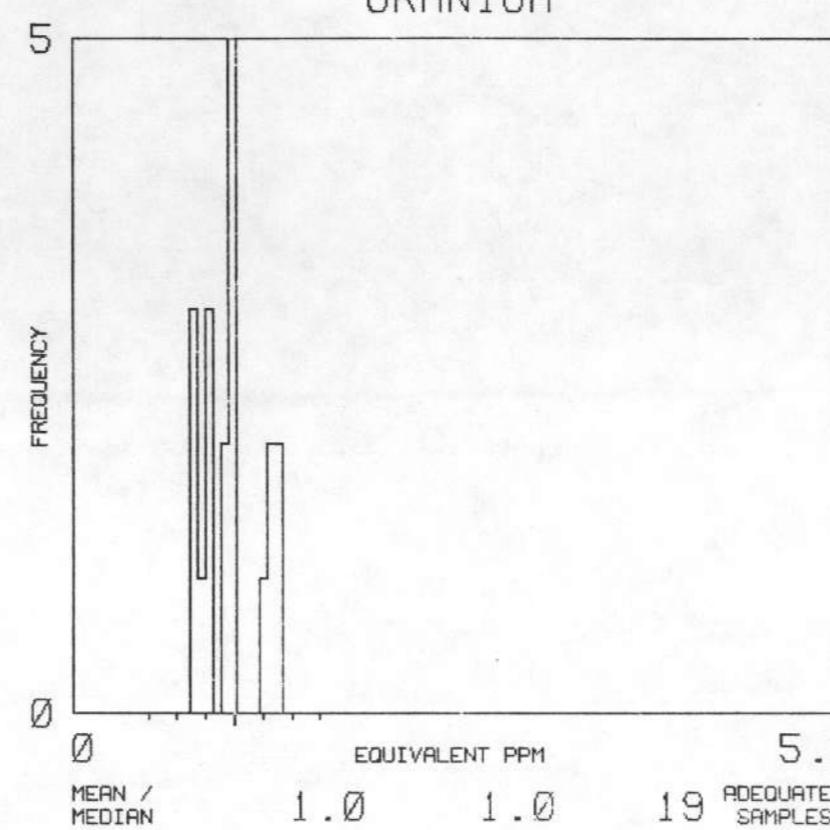
48

F²_{wb}

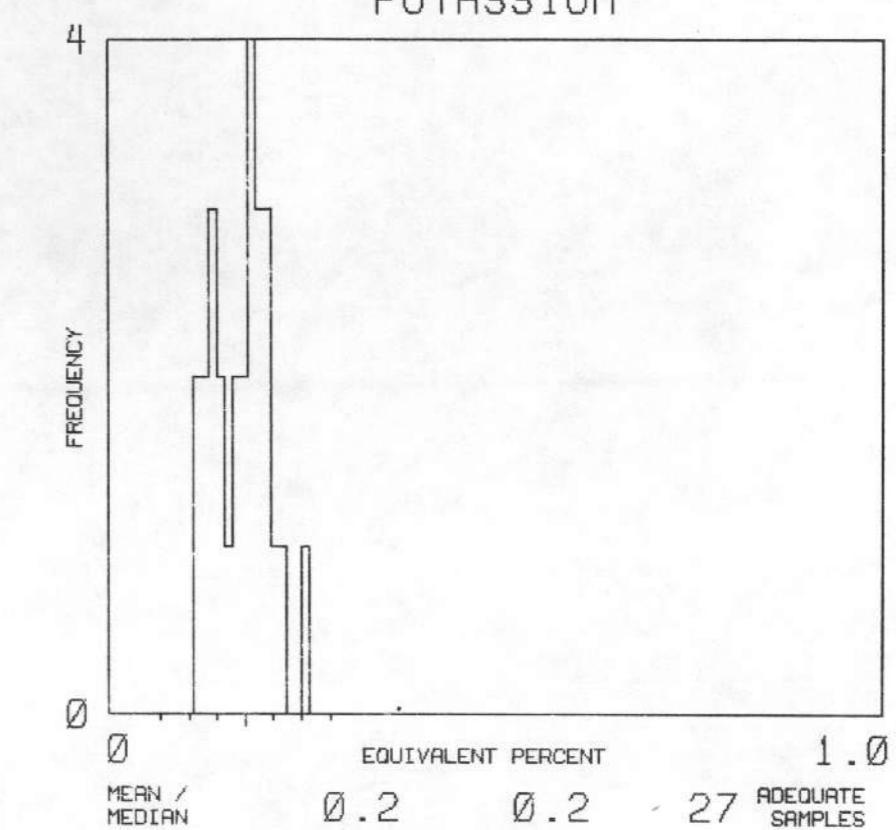
THORIUM



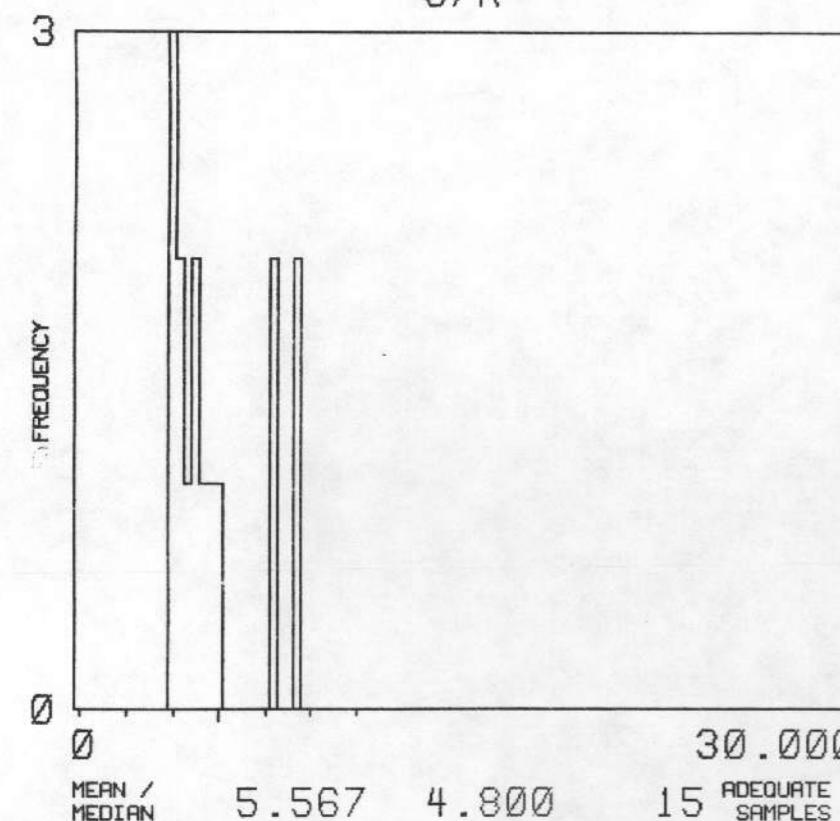
URANIUM



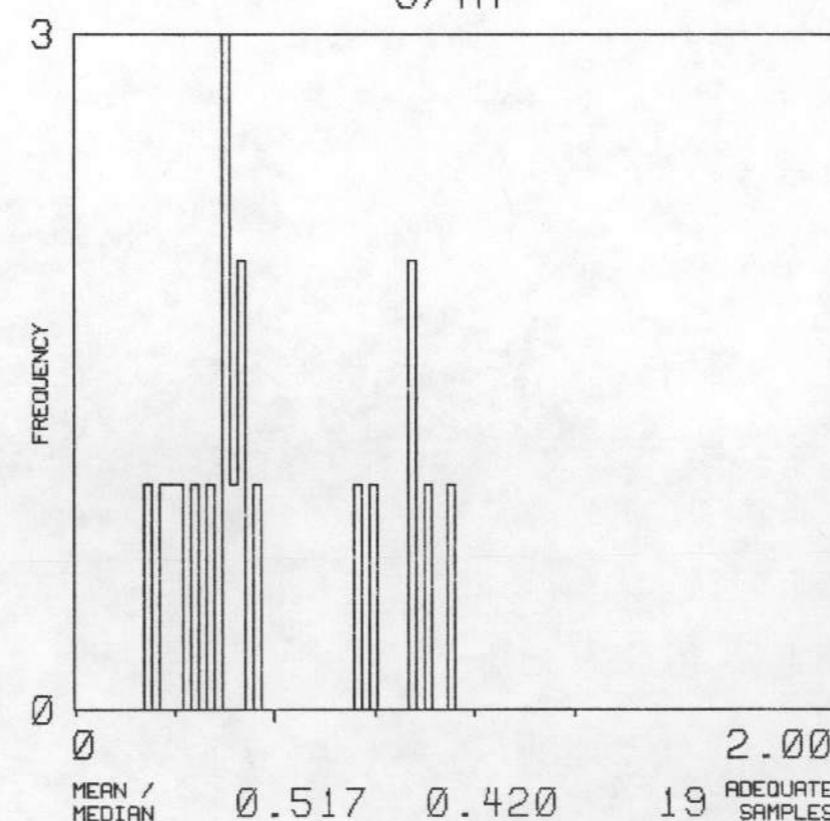
POTASSIUM



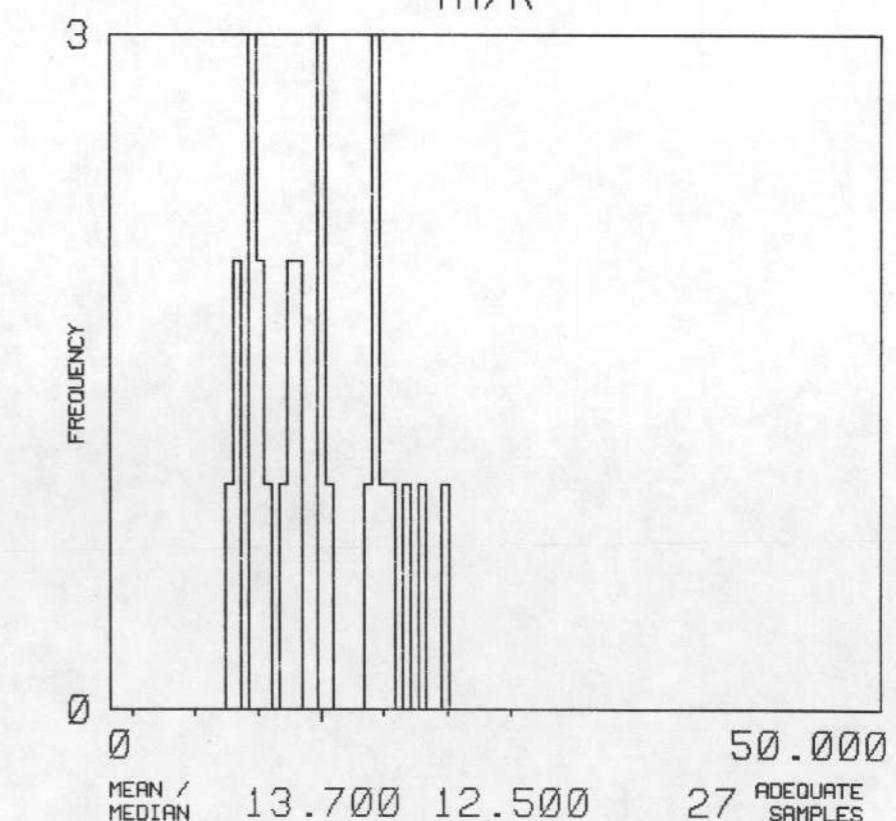
U/K



U/TH



TH/K



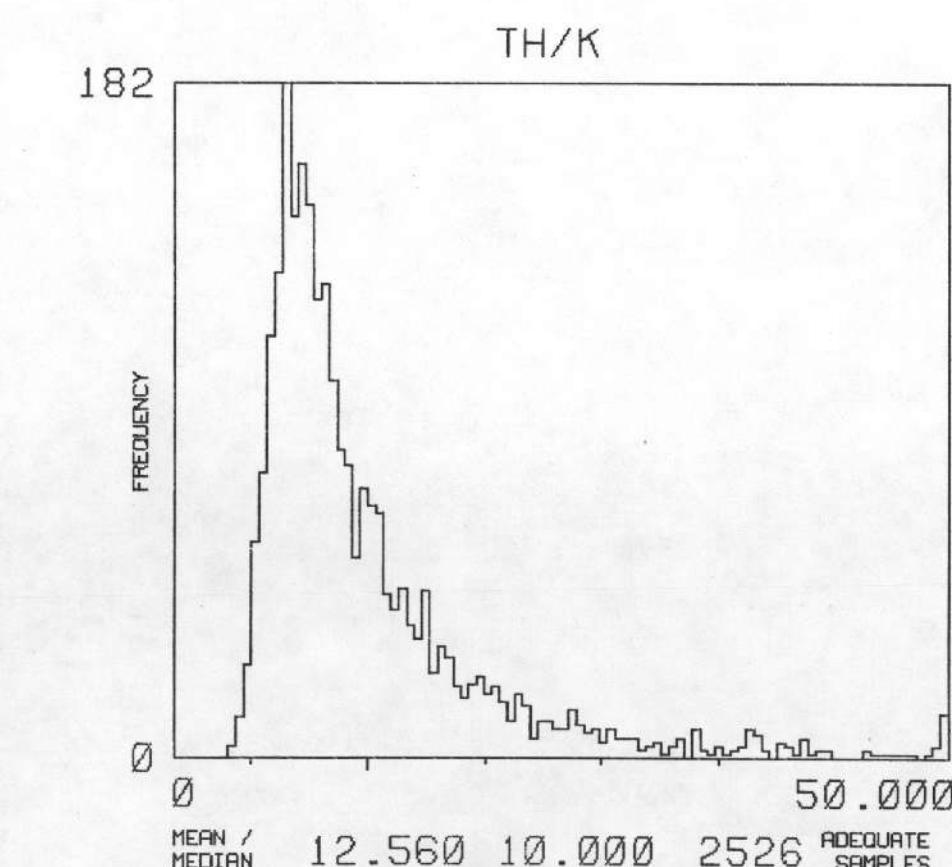
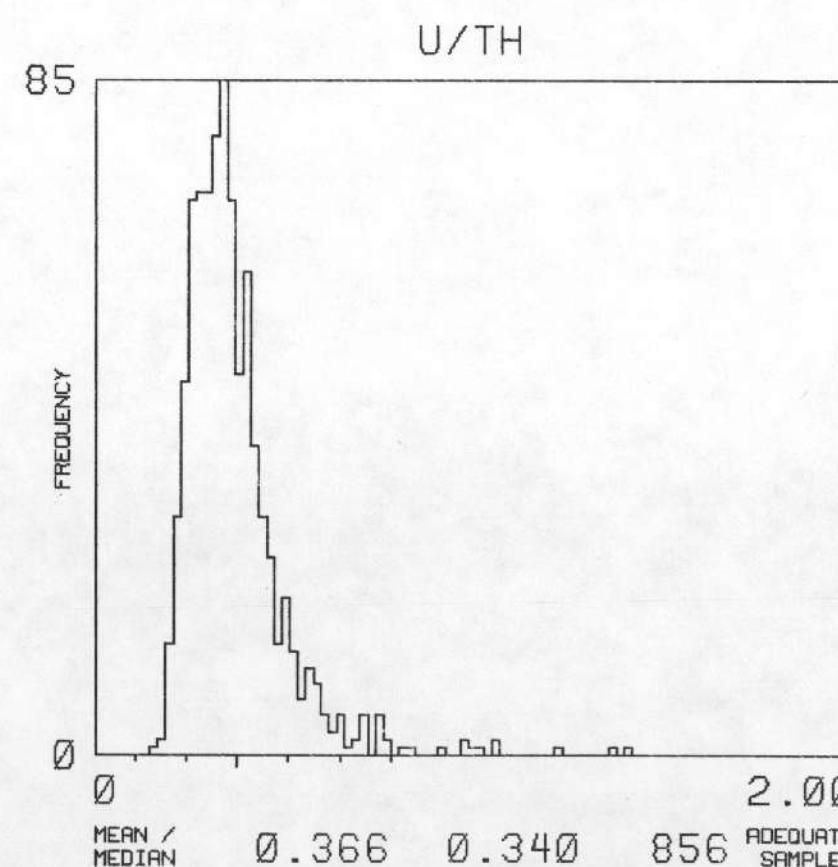
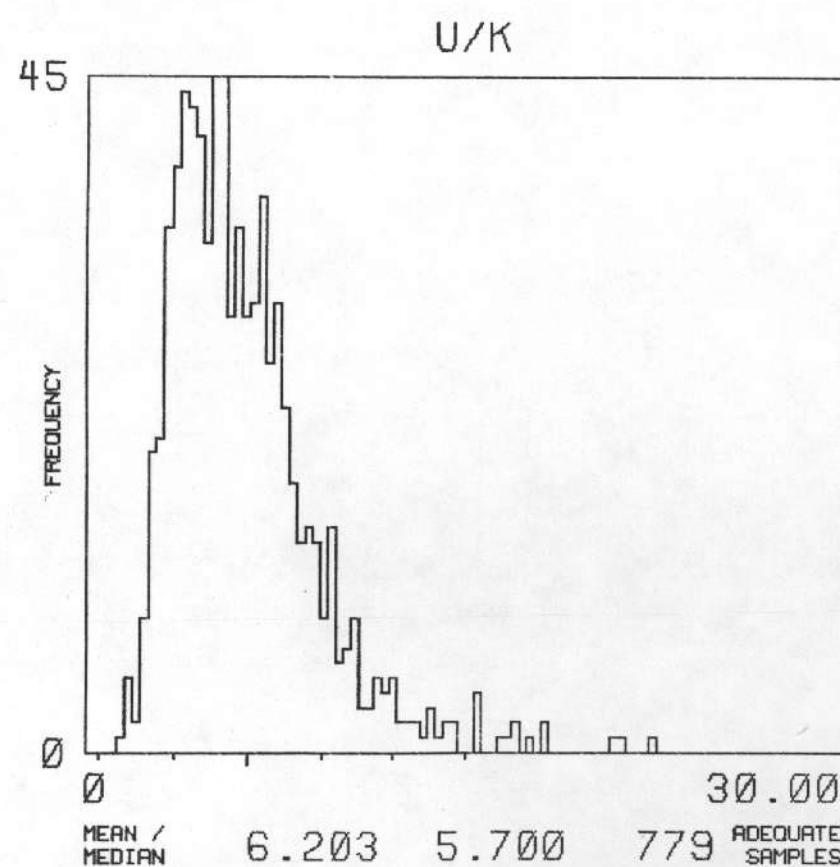
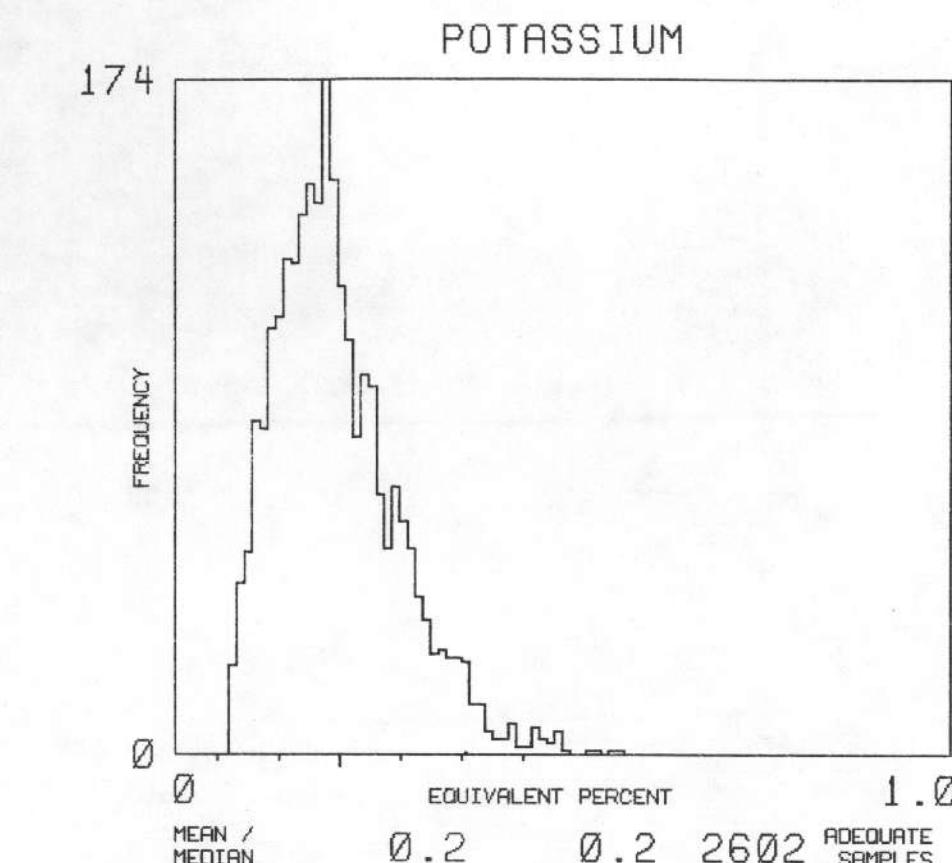
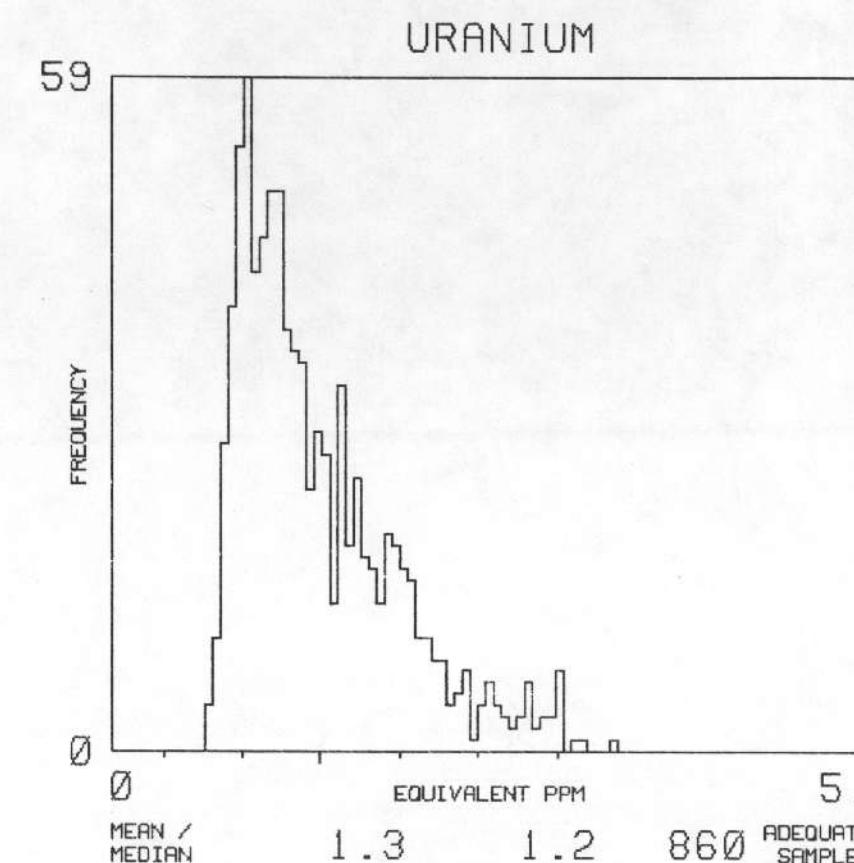
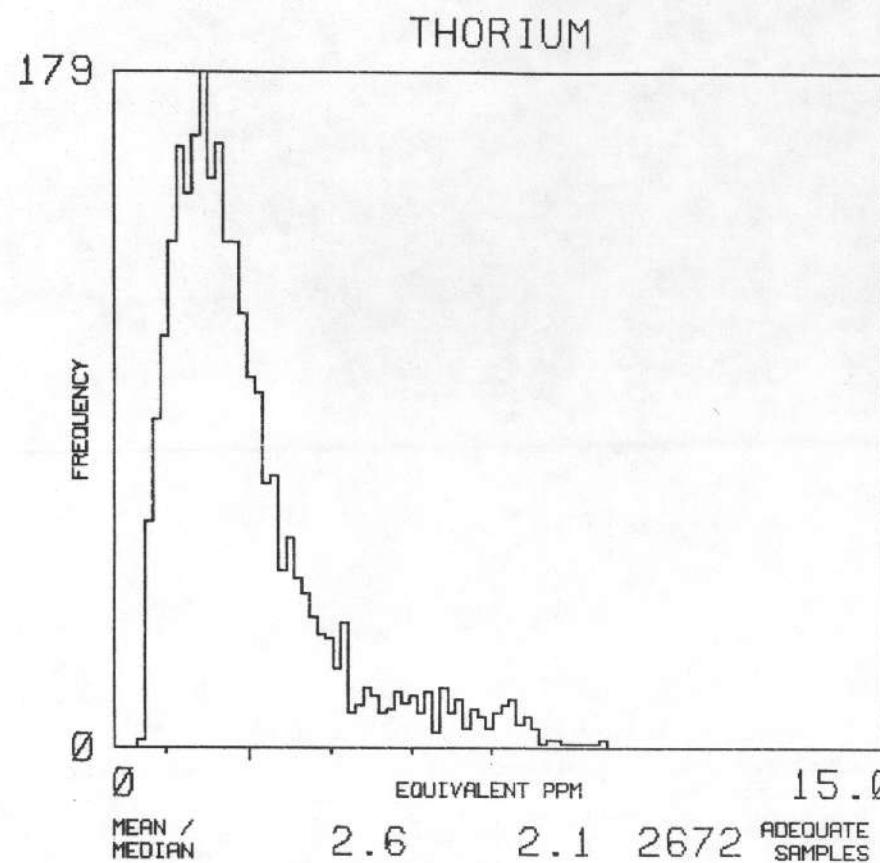
NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : QHM

TOTAL NUMBER
OF SAMPLES

2863

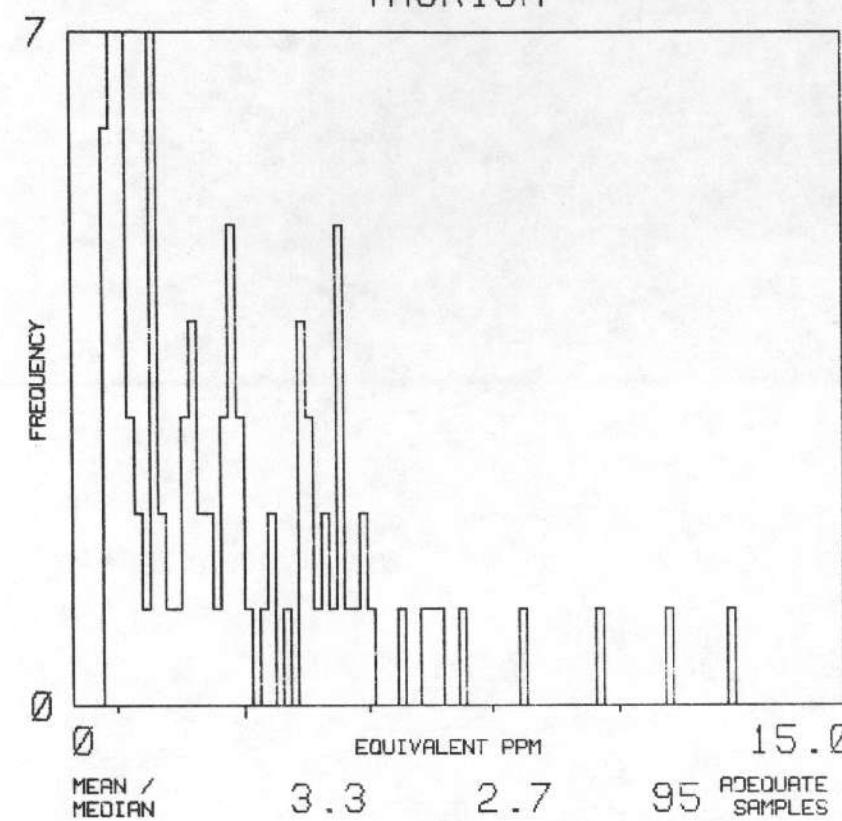
F3
wb



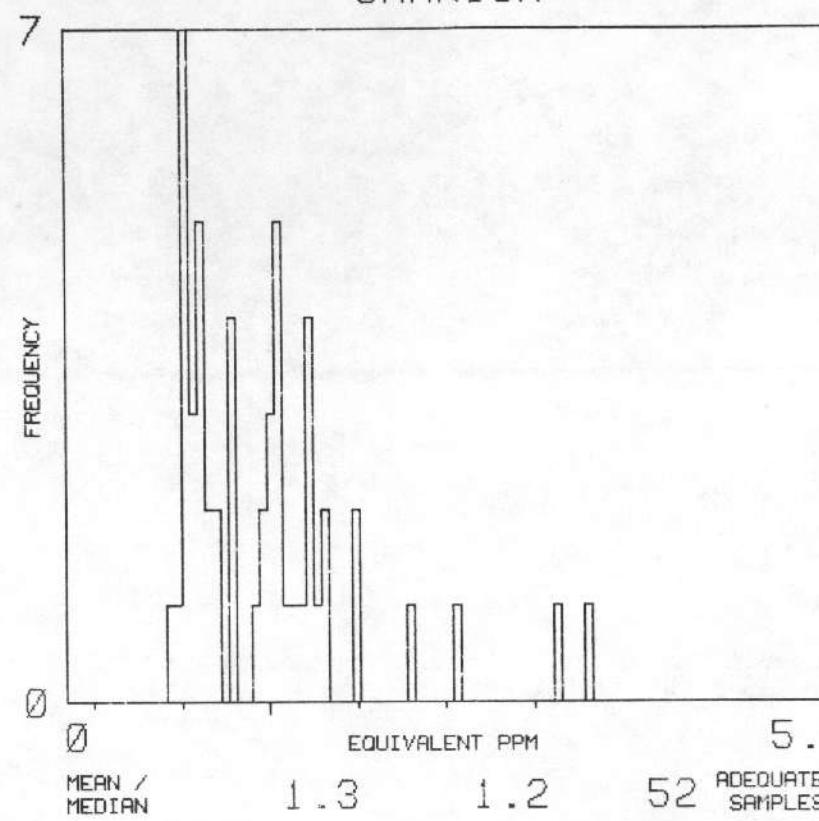
NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : QHI TOTAL NUMBER OF SAMPLES 100

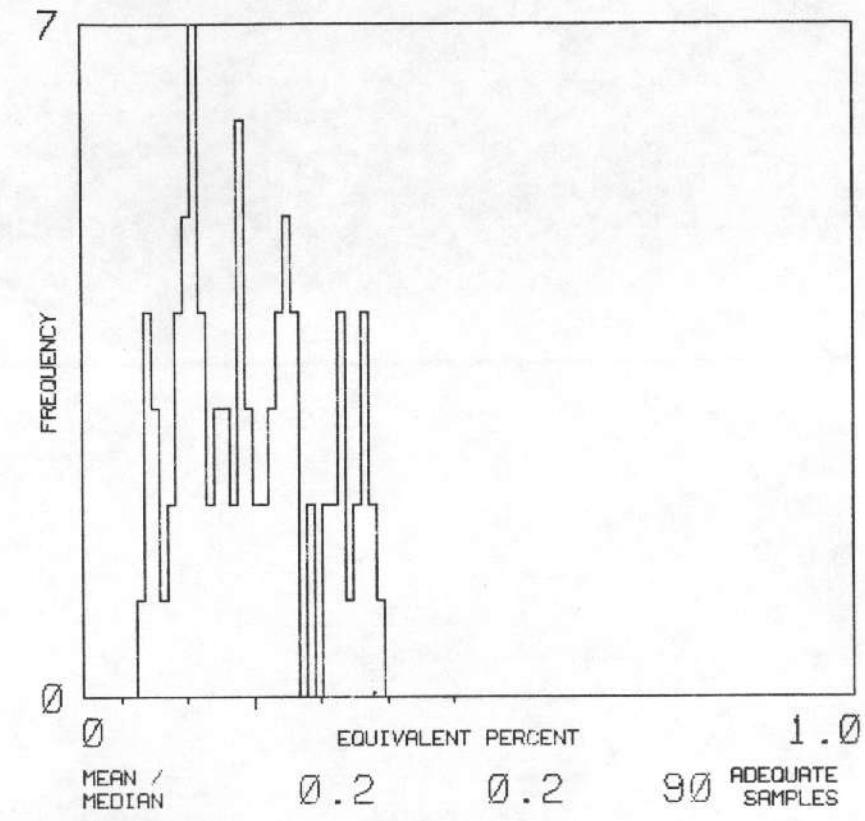
THORIUM



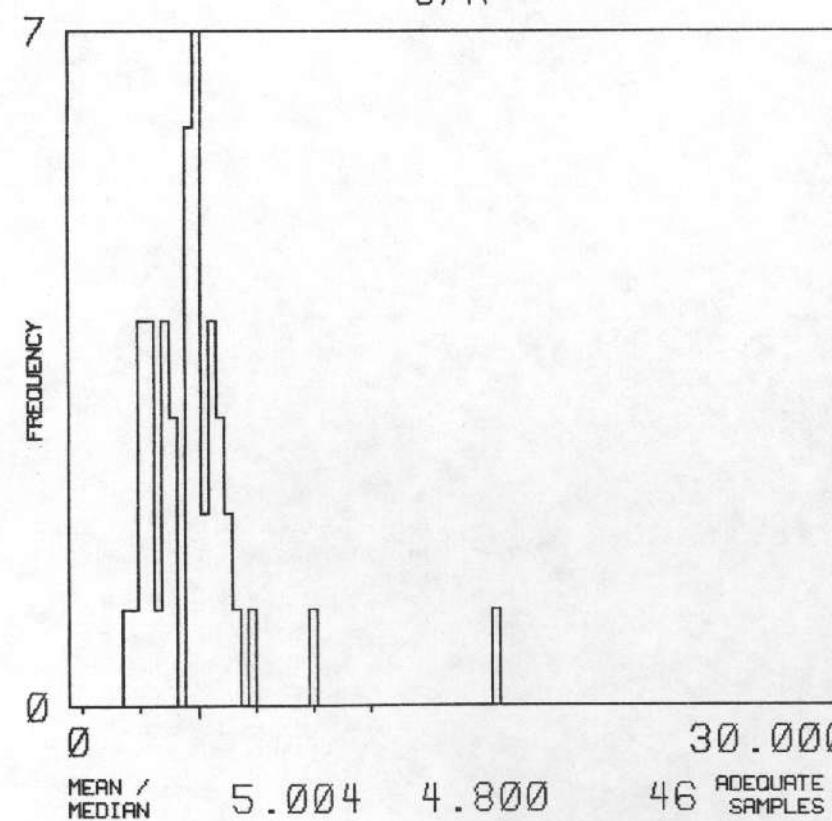
URANIUM



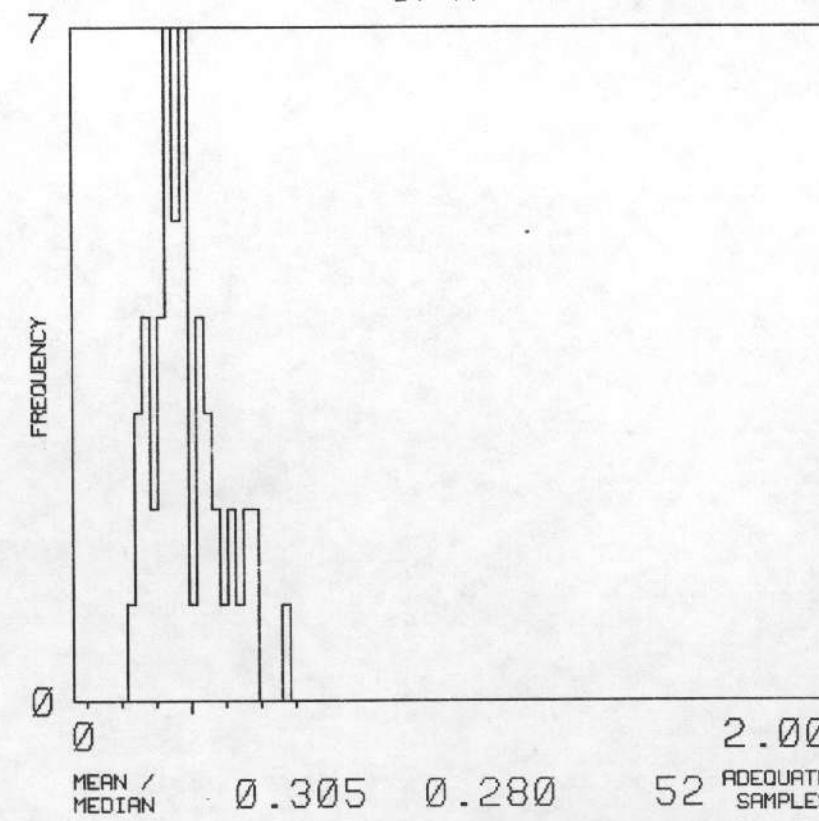
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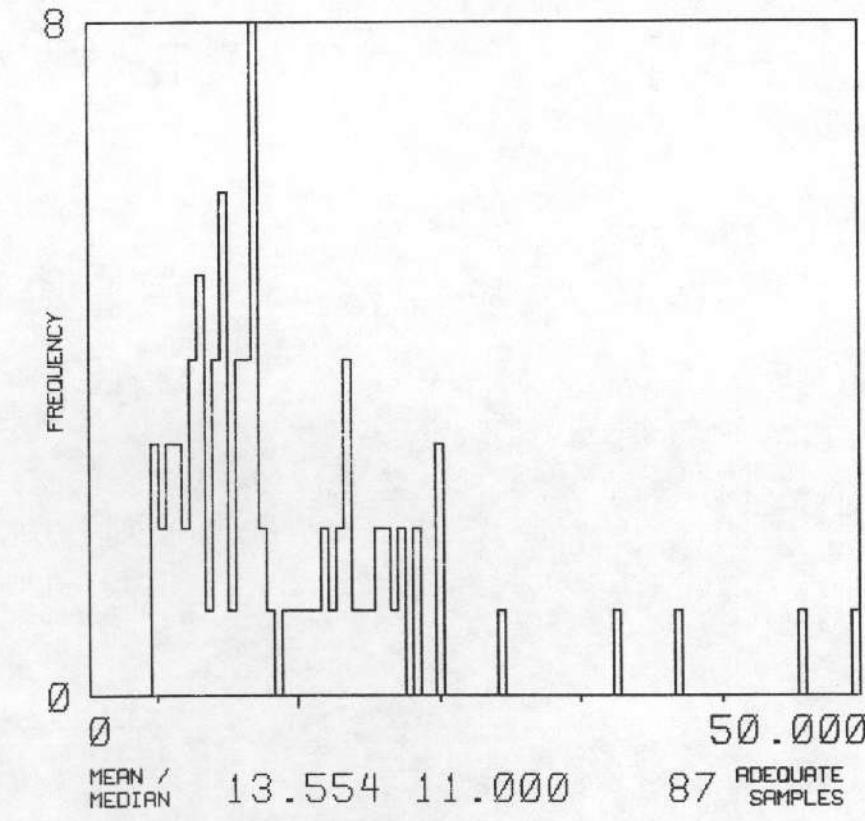
U/K



U/TH

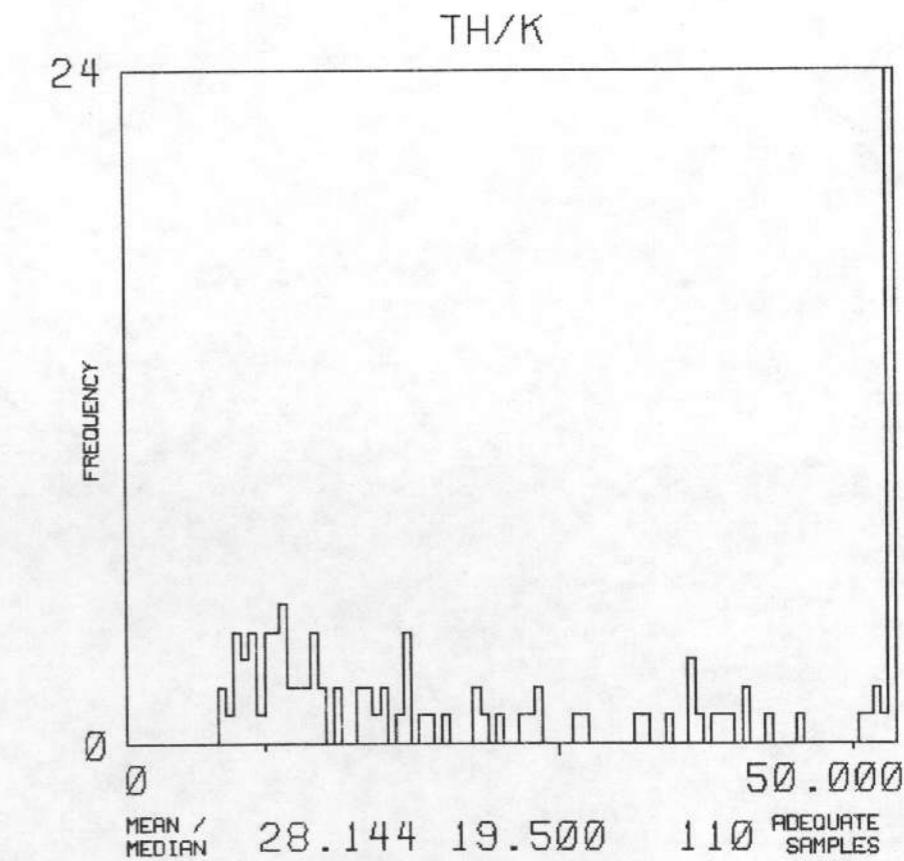
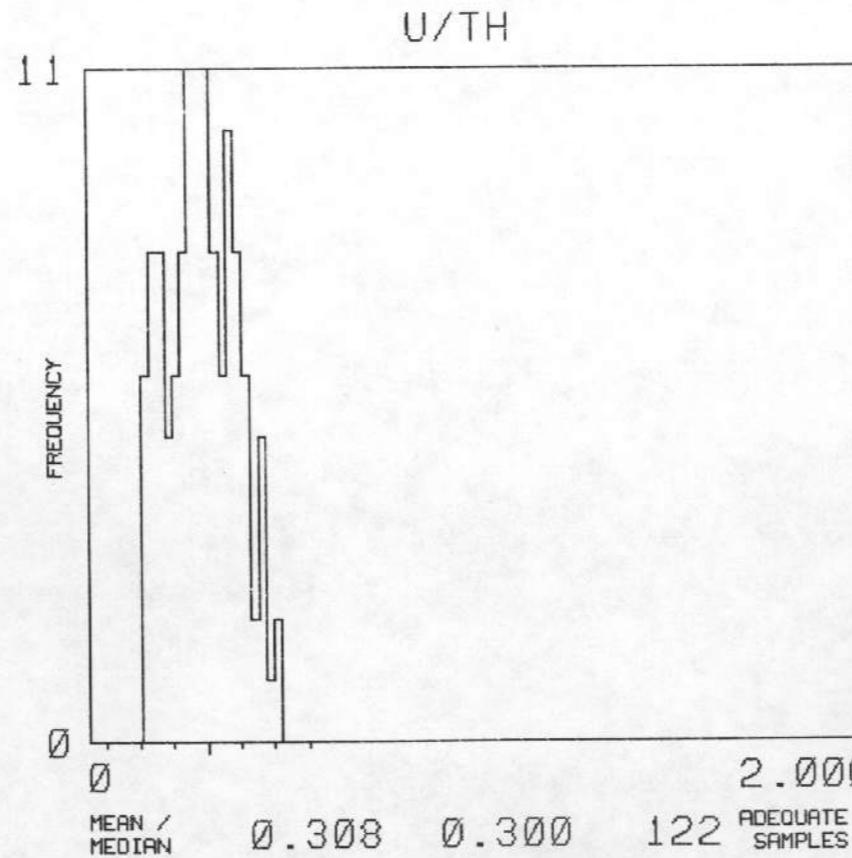
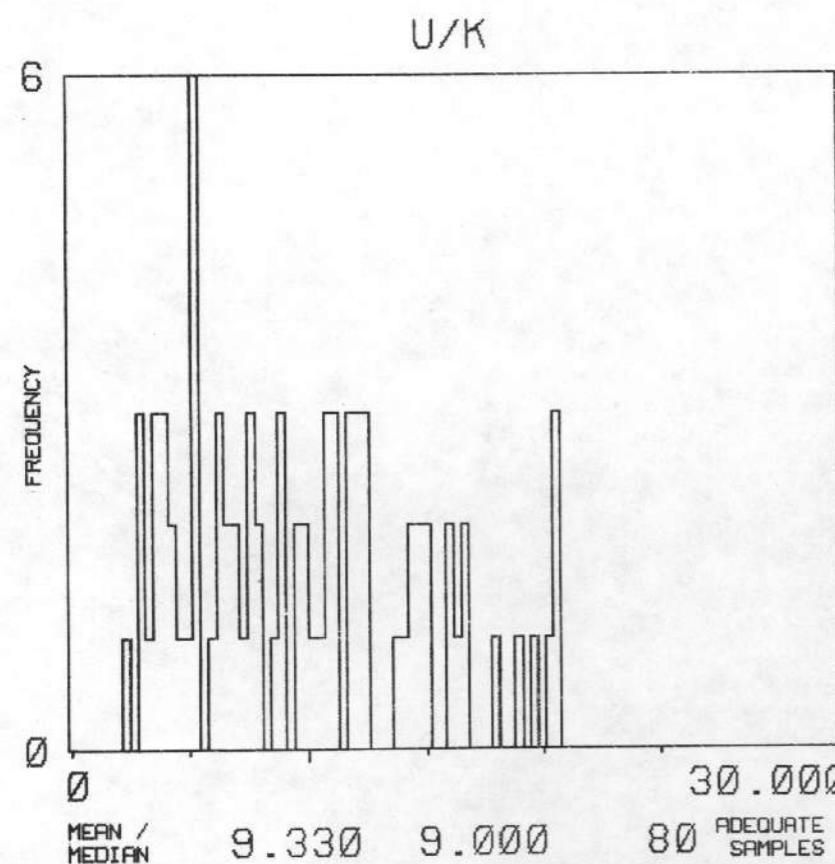
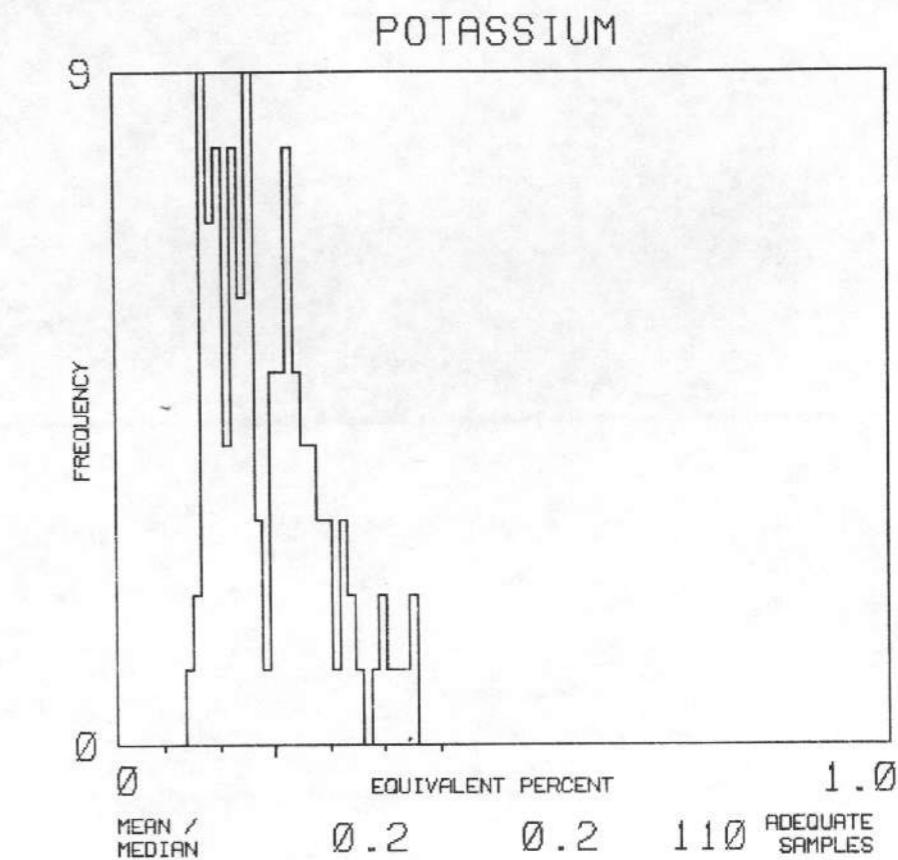
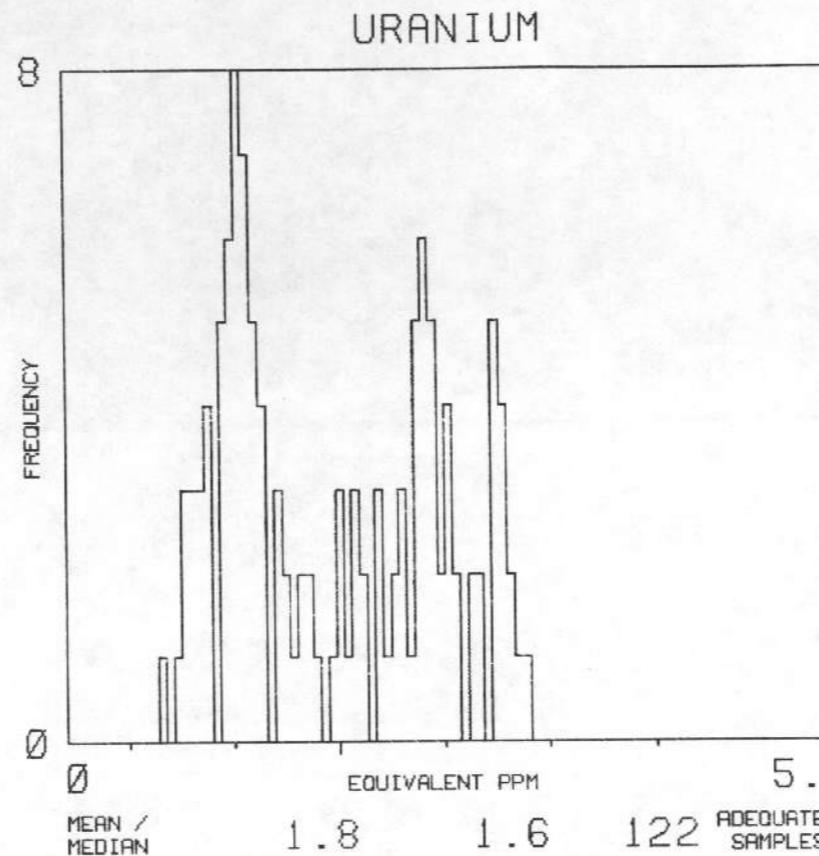
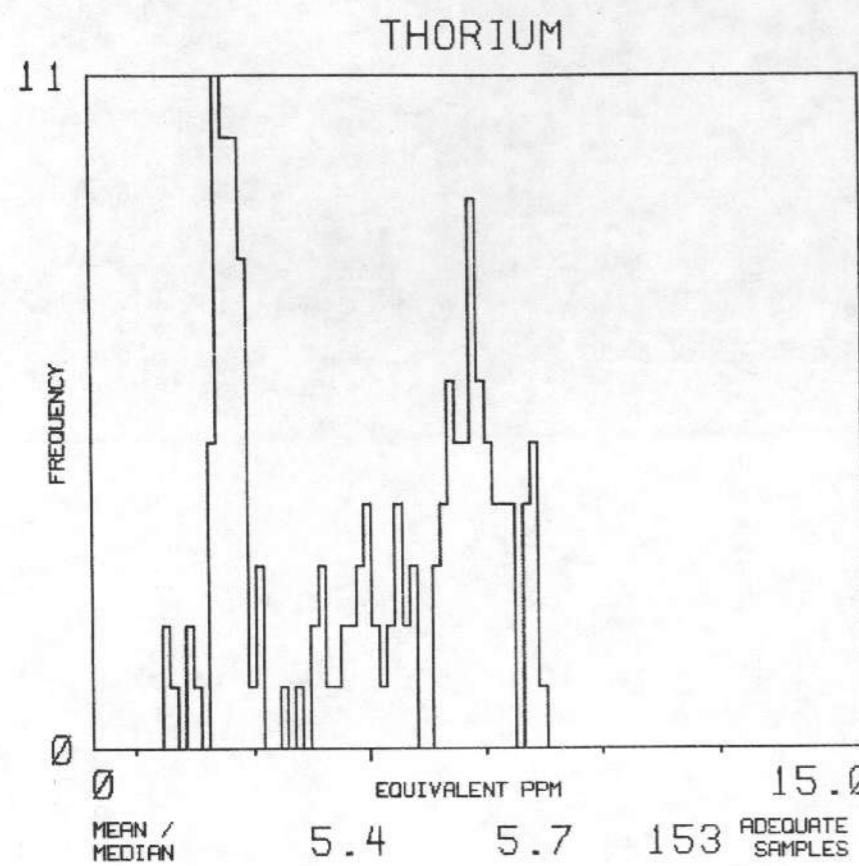


TH/K



NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : QTSB TOTAL NUMBER OF SAMPLES 153

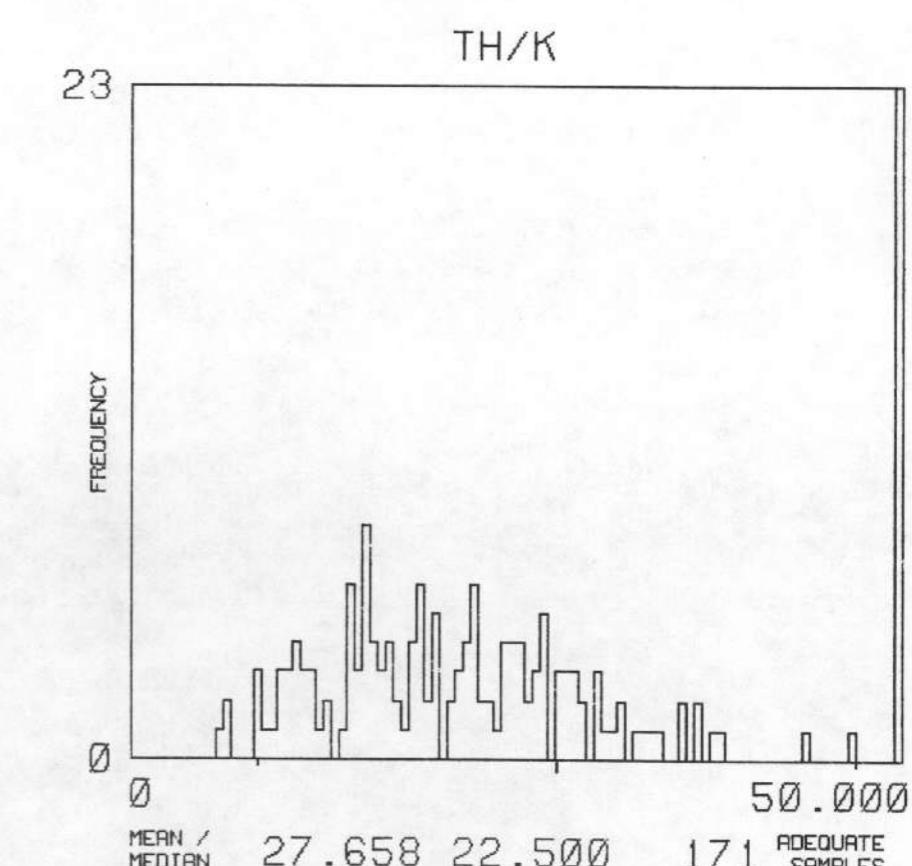
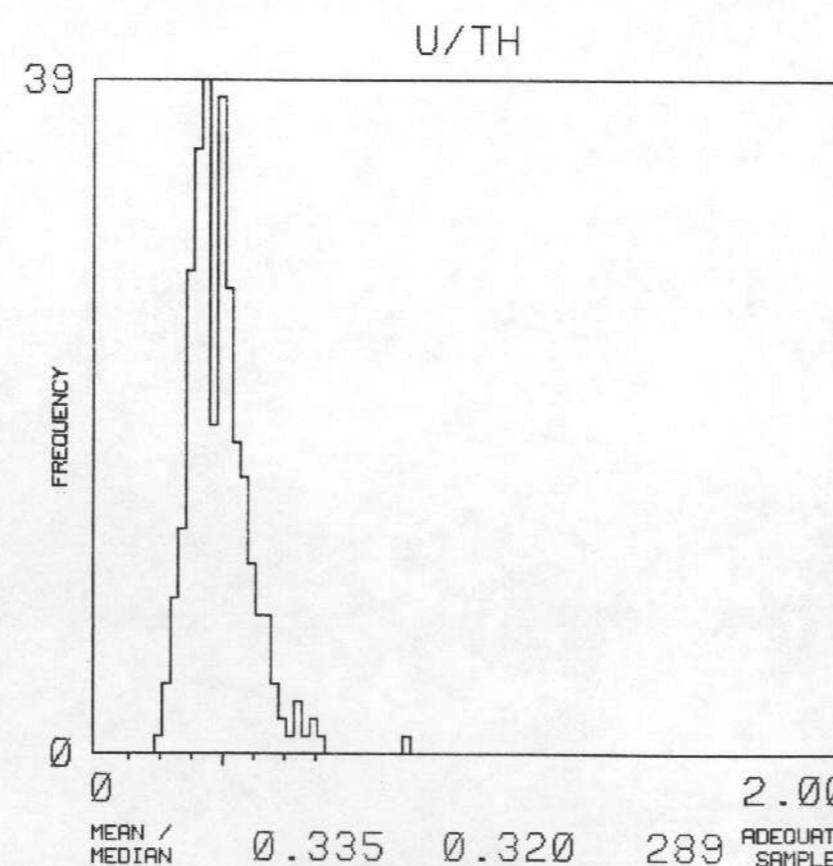
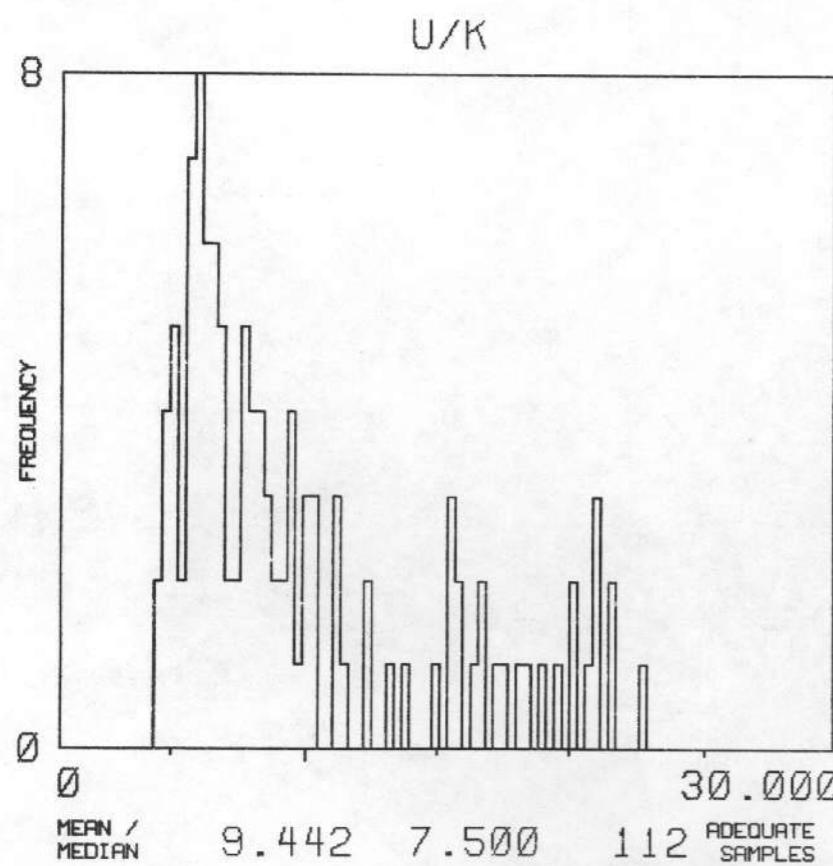
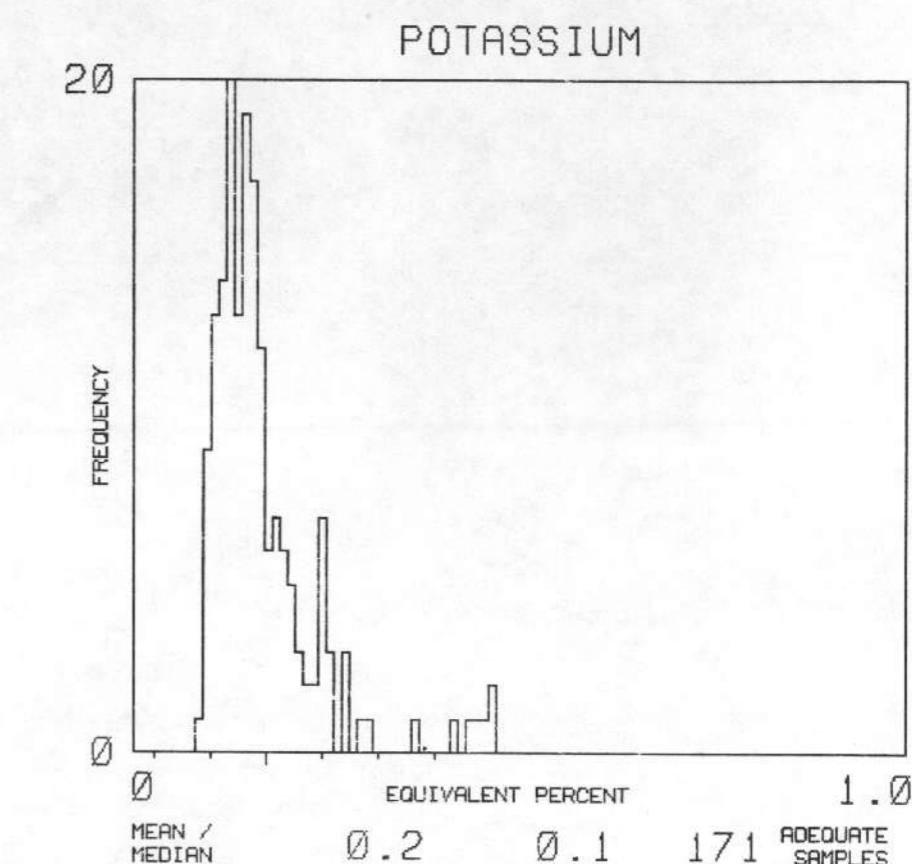
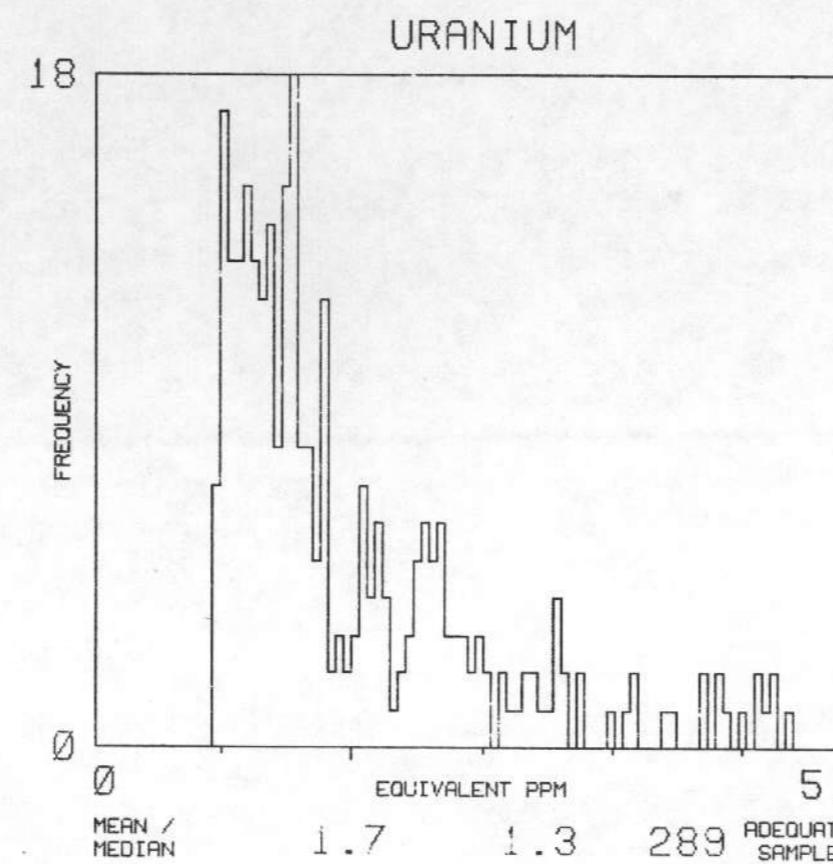
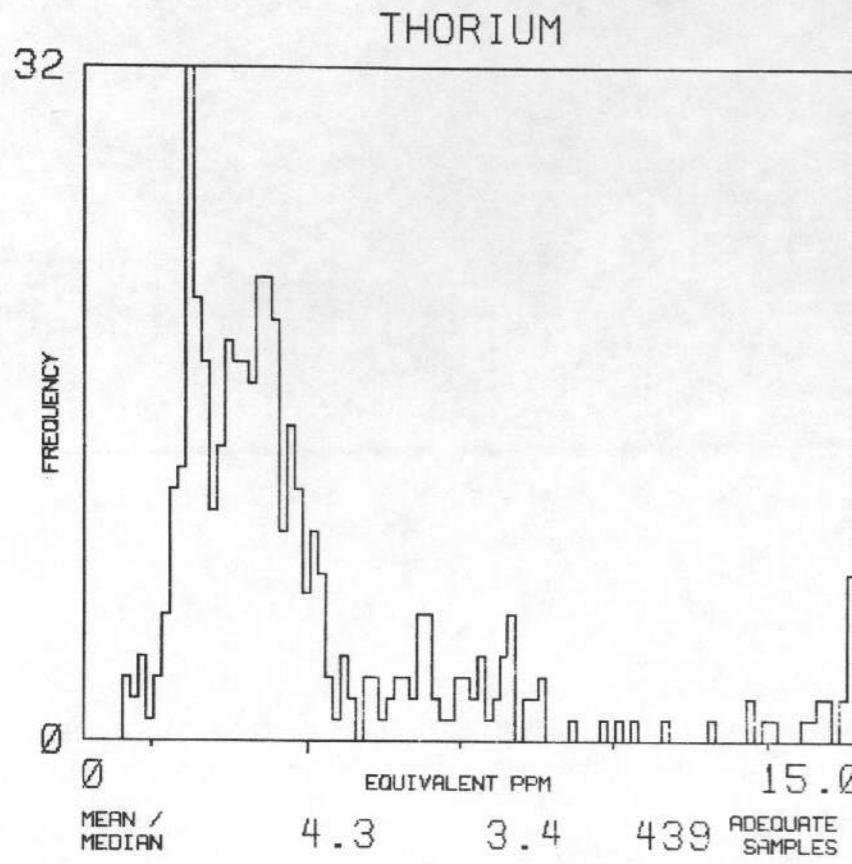


NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : QTPRAM TOTAL NUMBER OF SAMPLES

439

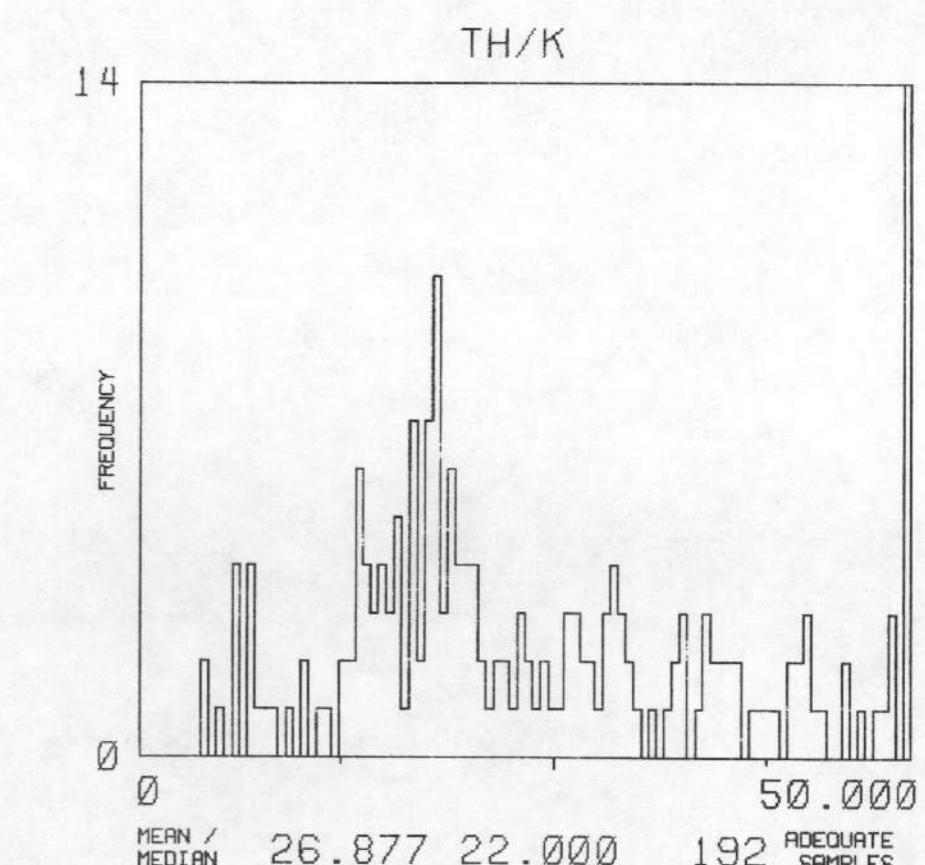
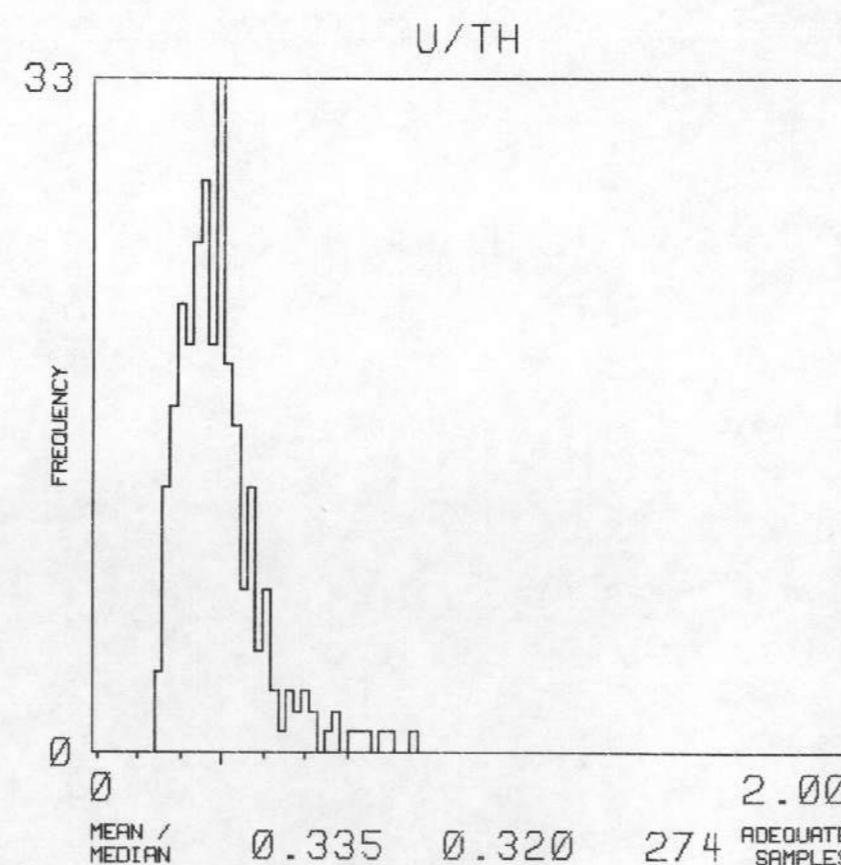
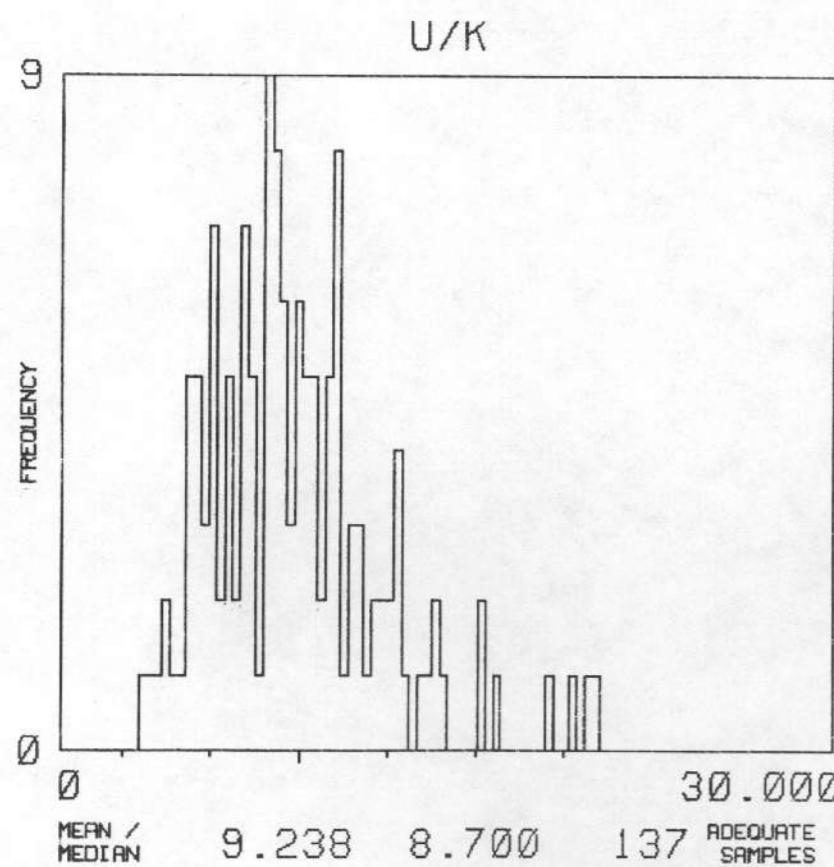
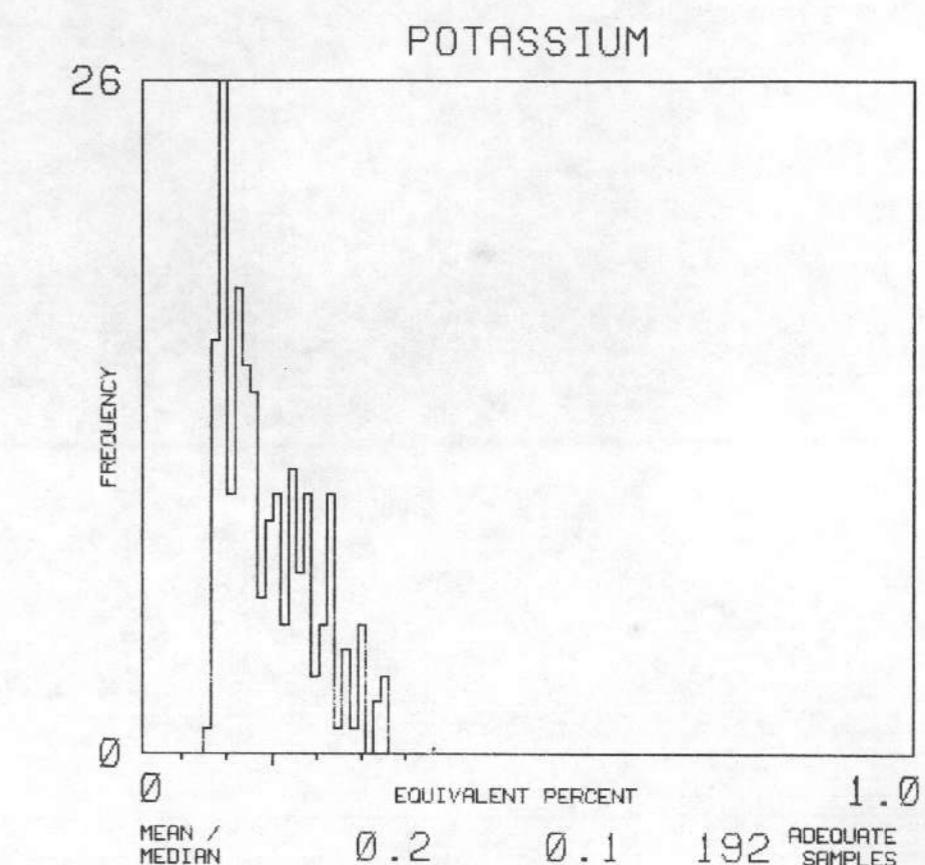
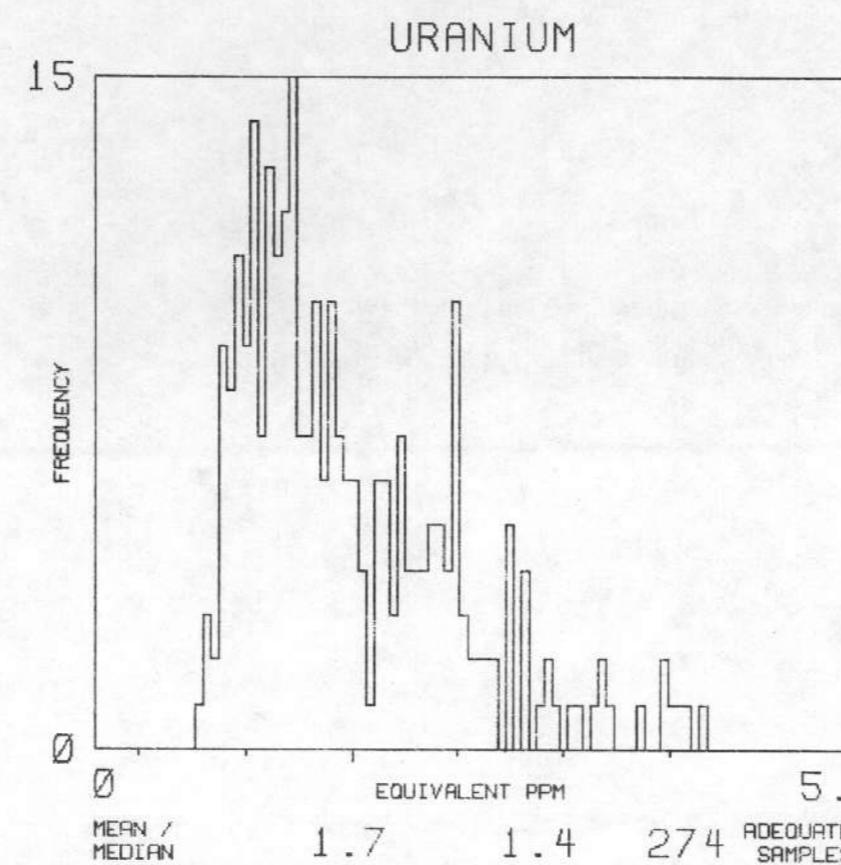
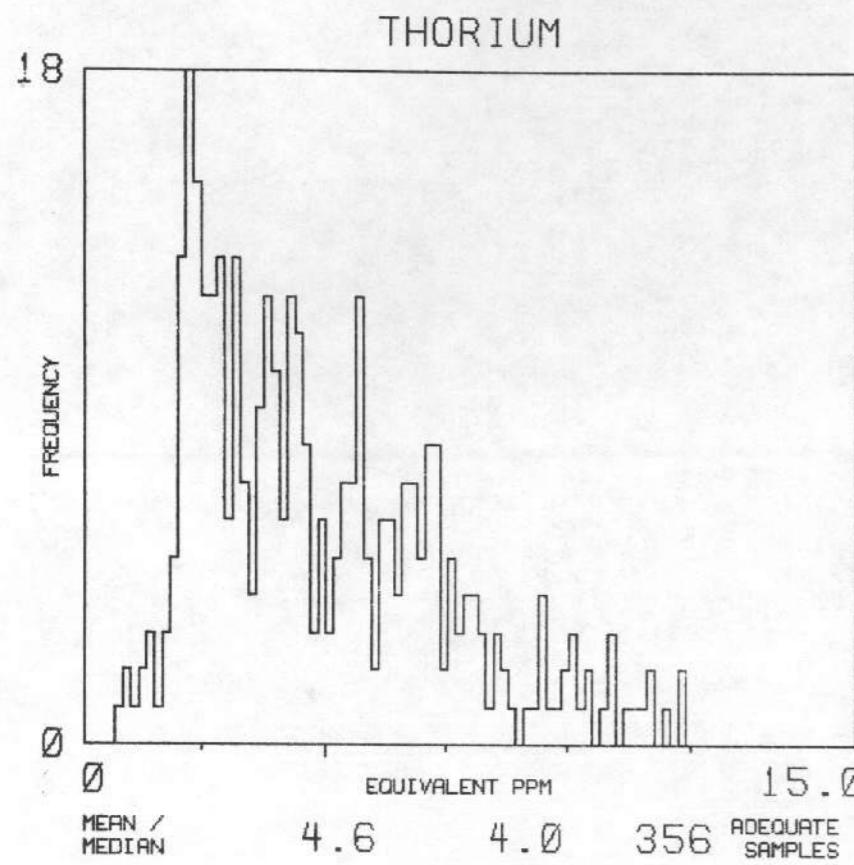
F6
wb



NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

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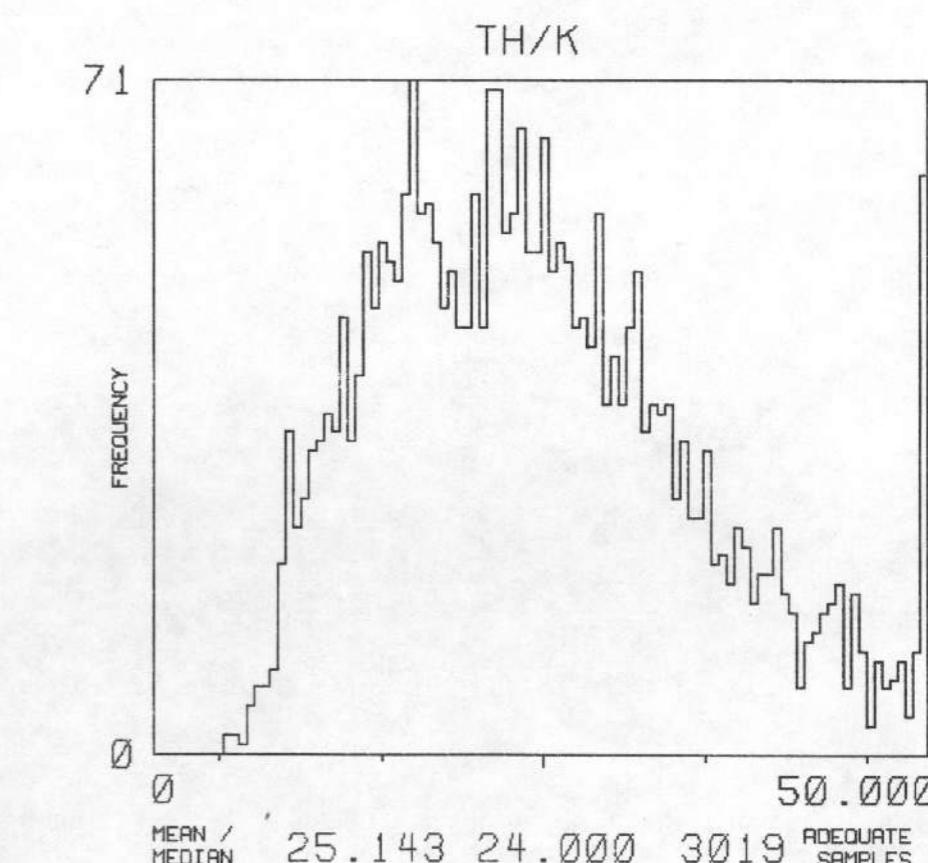
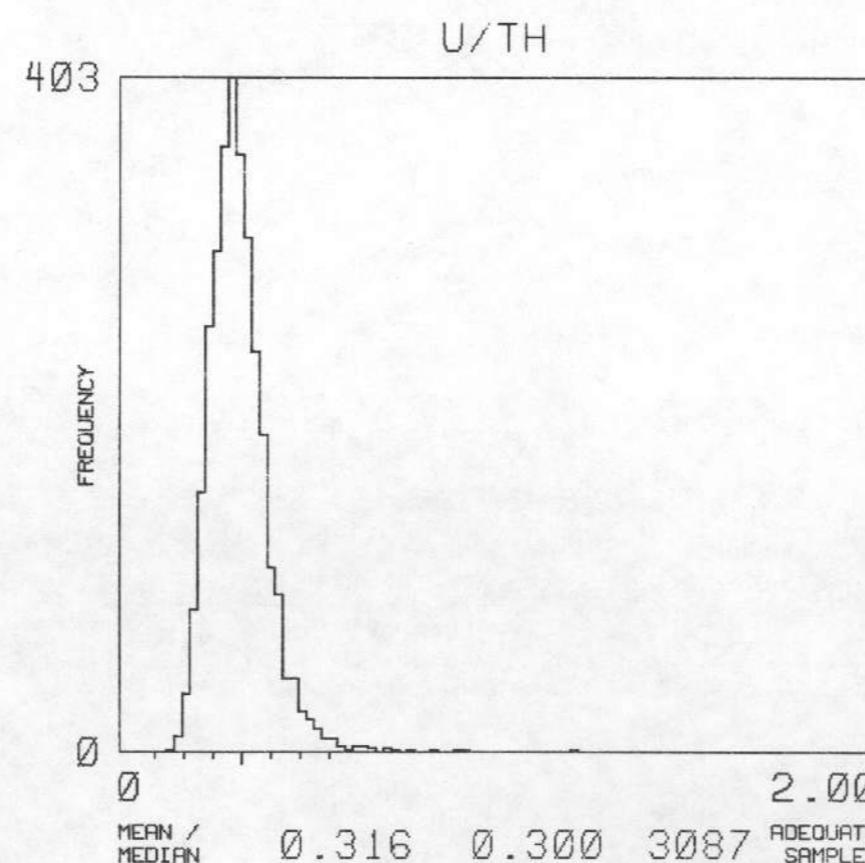
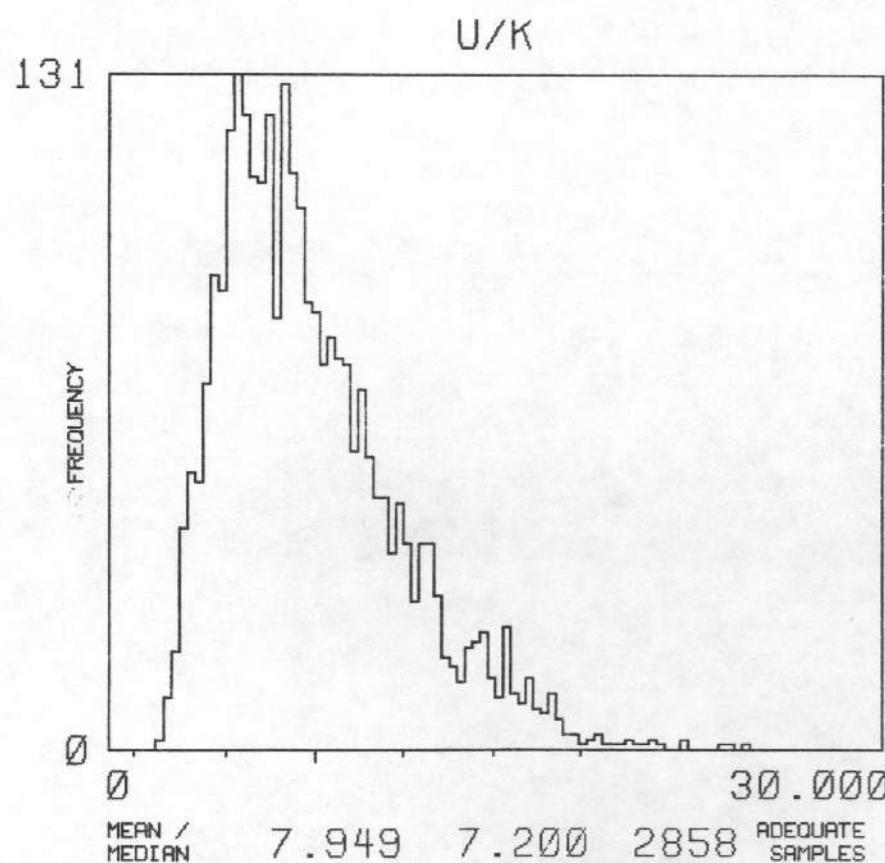
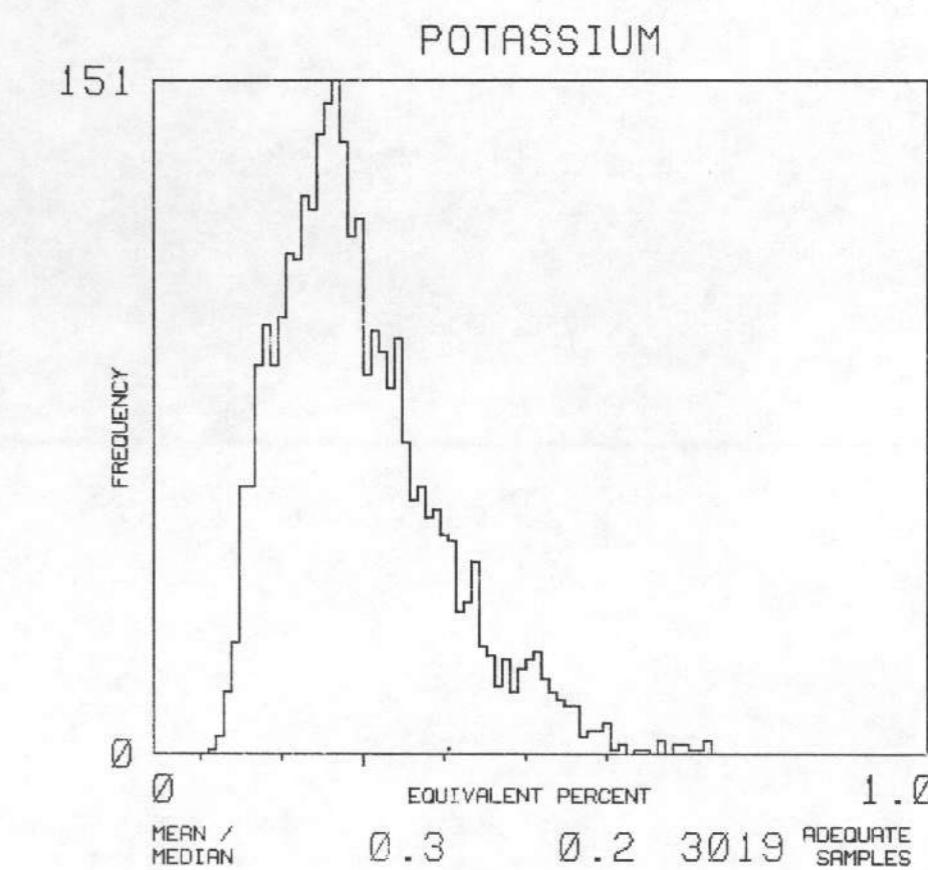
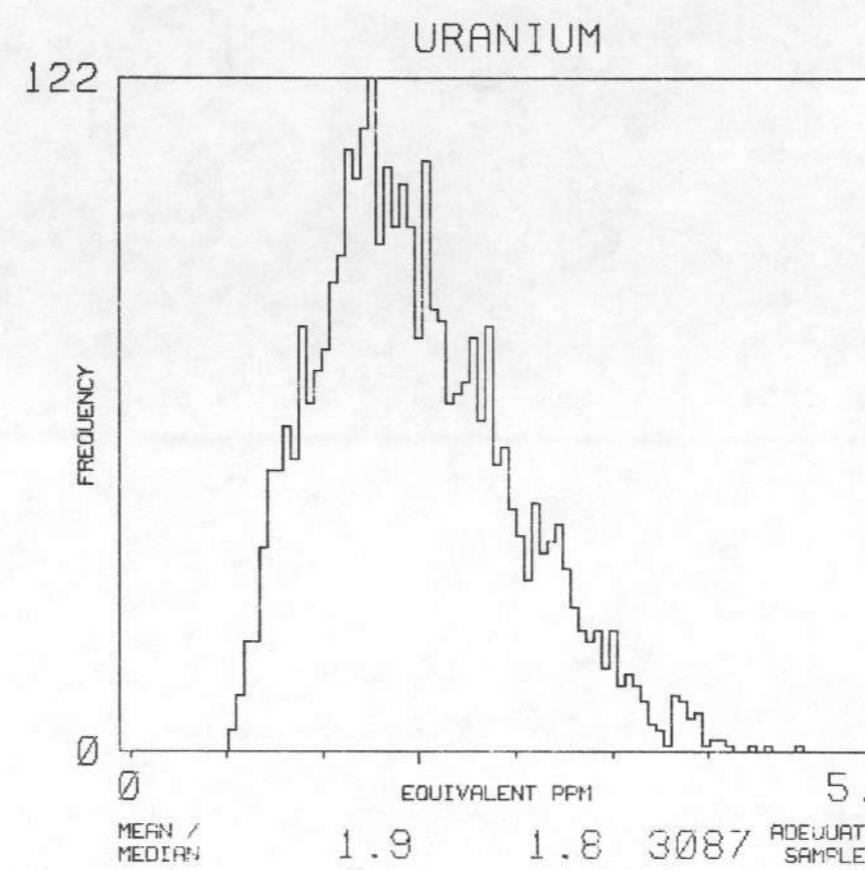
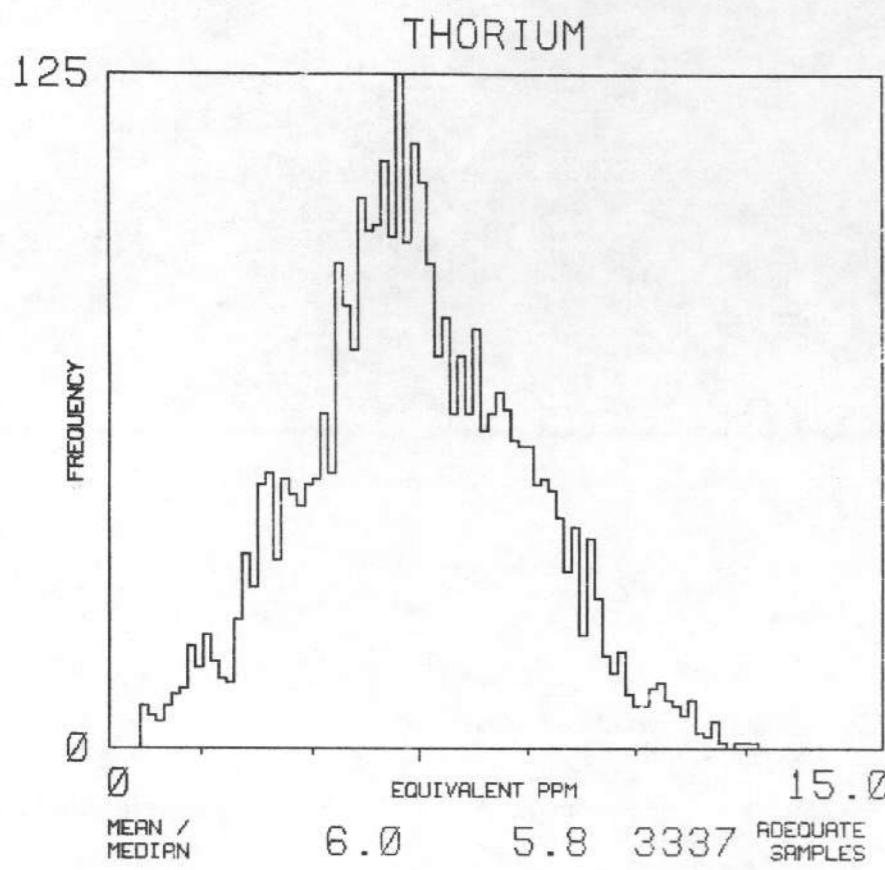
F7 wb



NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : QTPAM TOTAL NUMBER OF SAMPLES 3346

F₈_{wb}



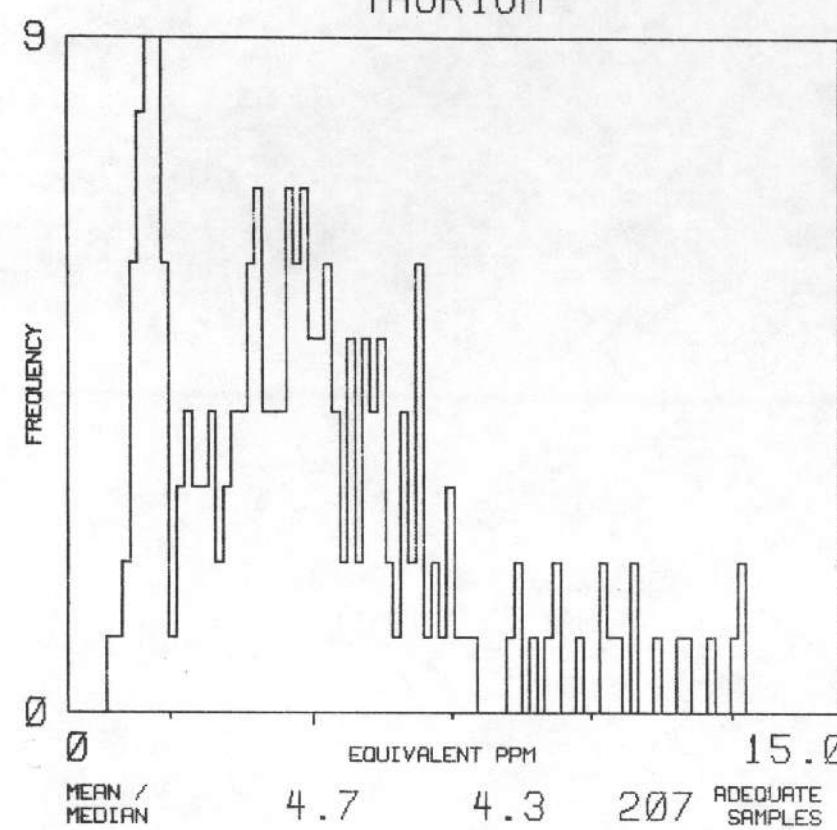
NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : QTPAI TOTAL NUMBER OF SAMPLES

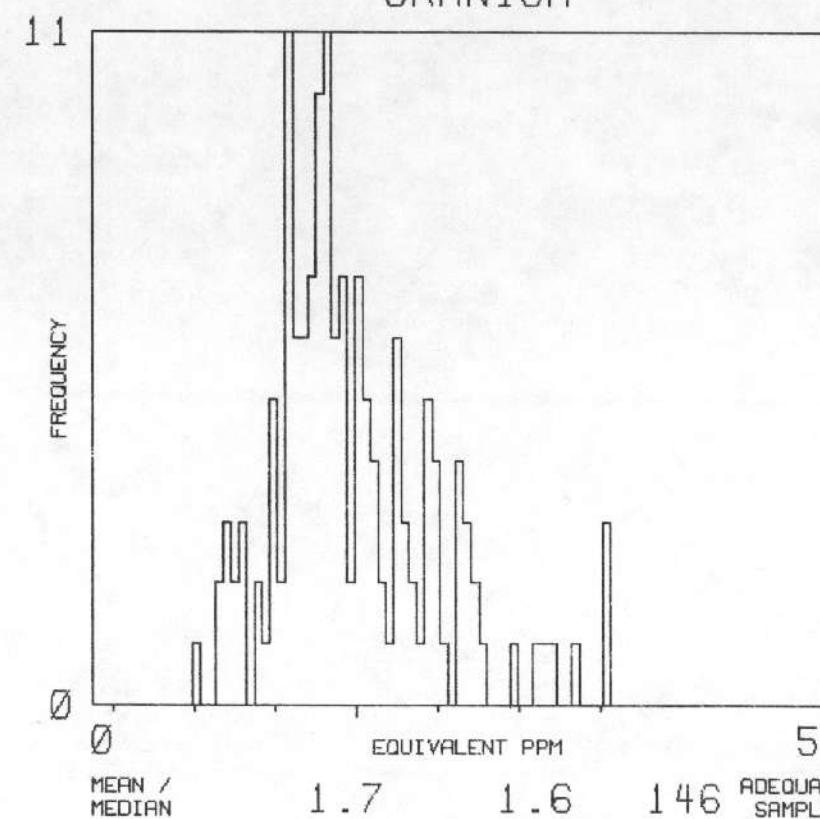
207

F9
wb

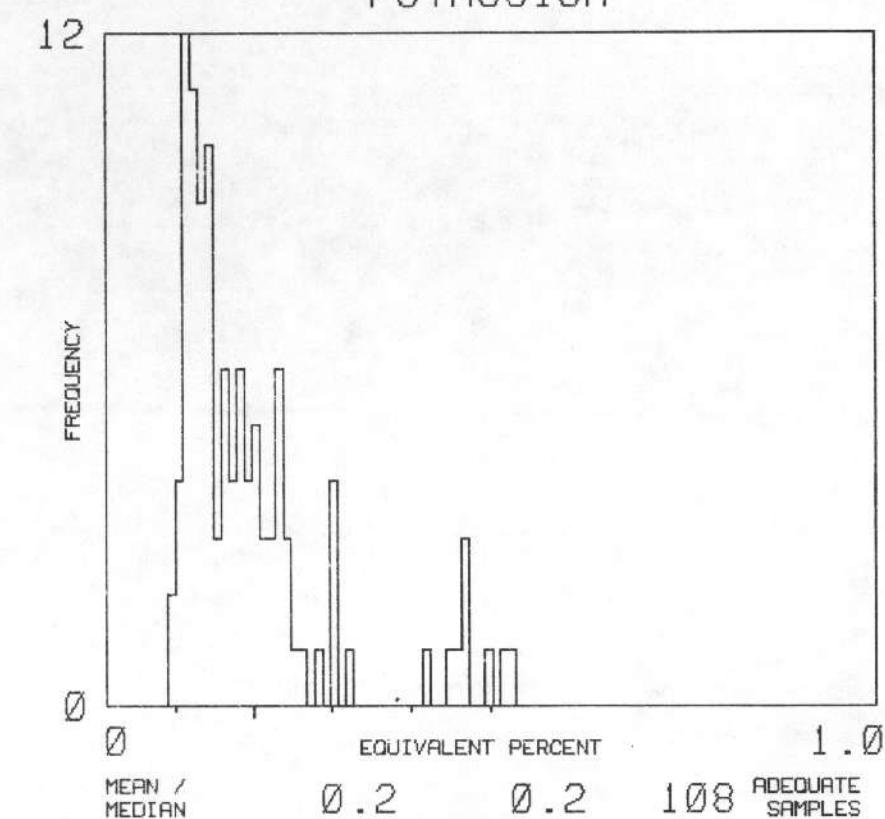
THORIUM



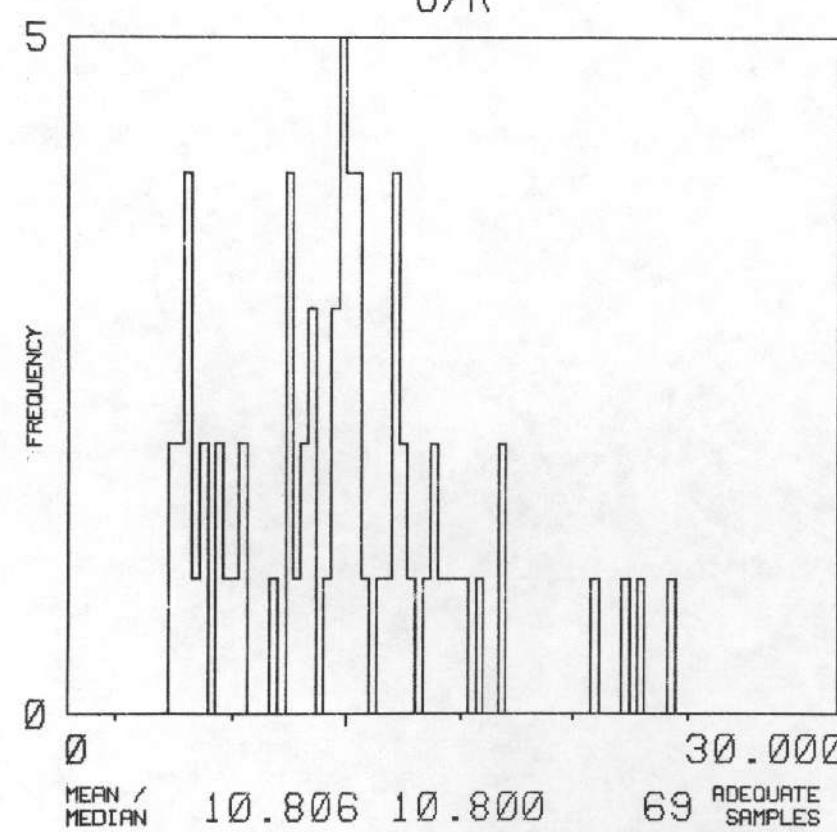
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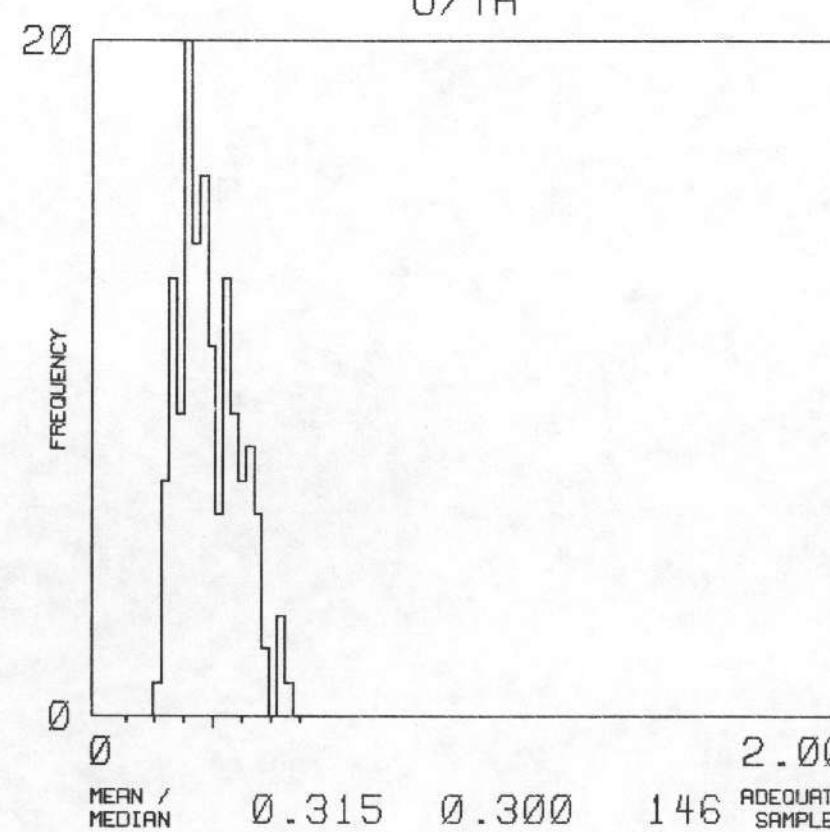
POTASSIUM



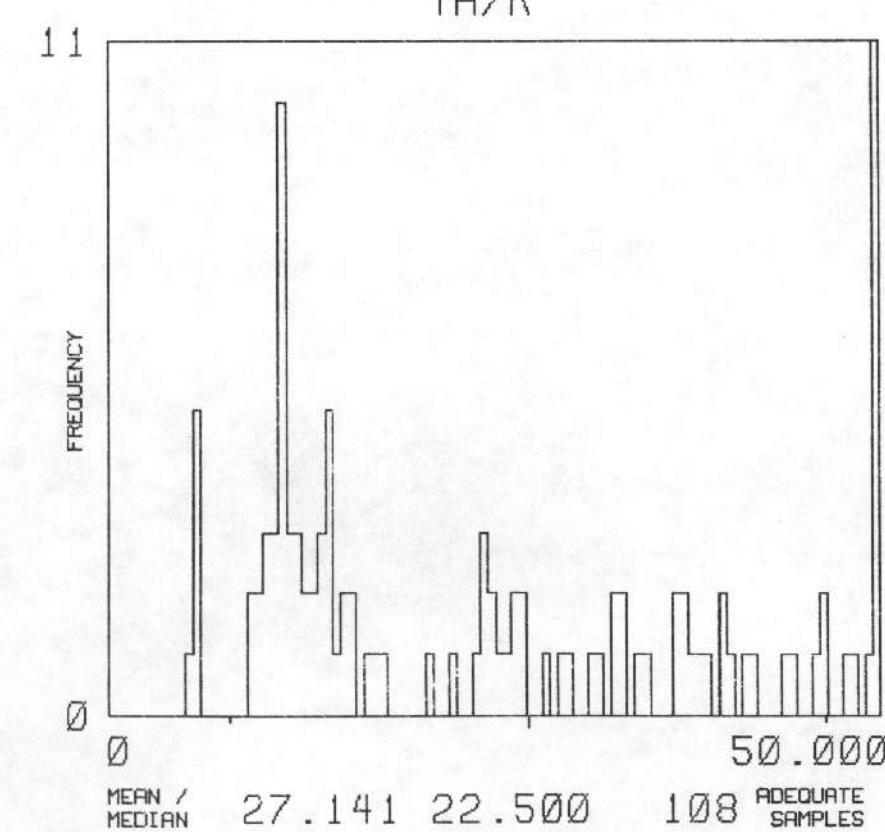
U/K



U/TH



TH/K



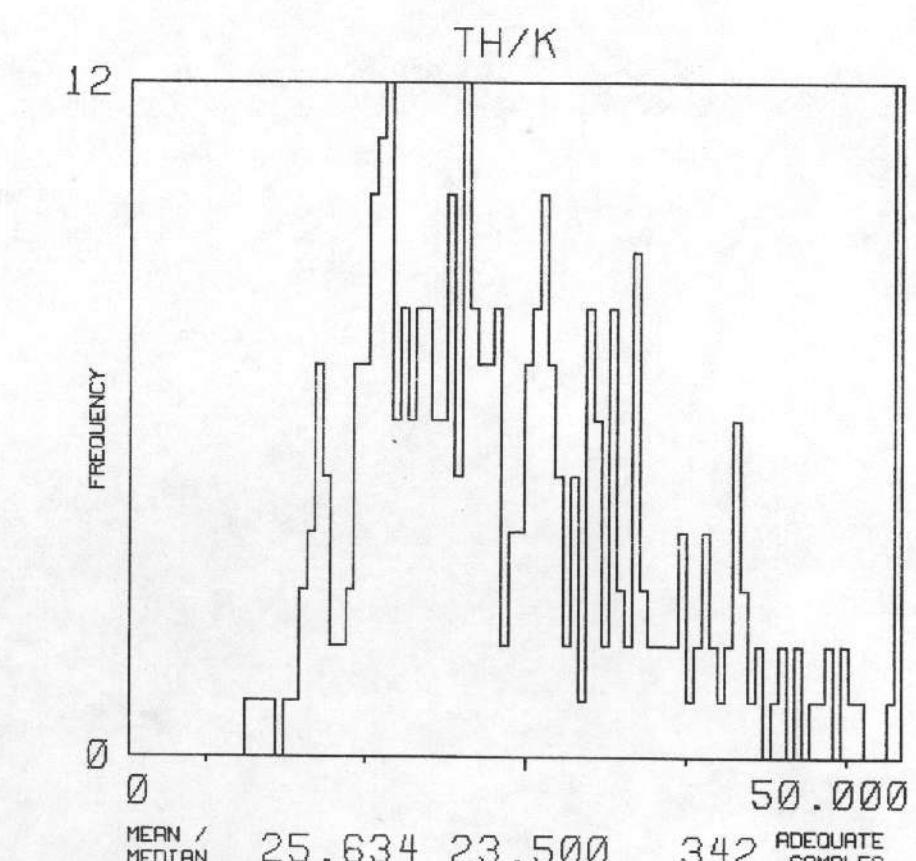
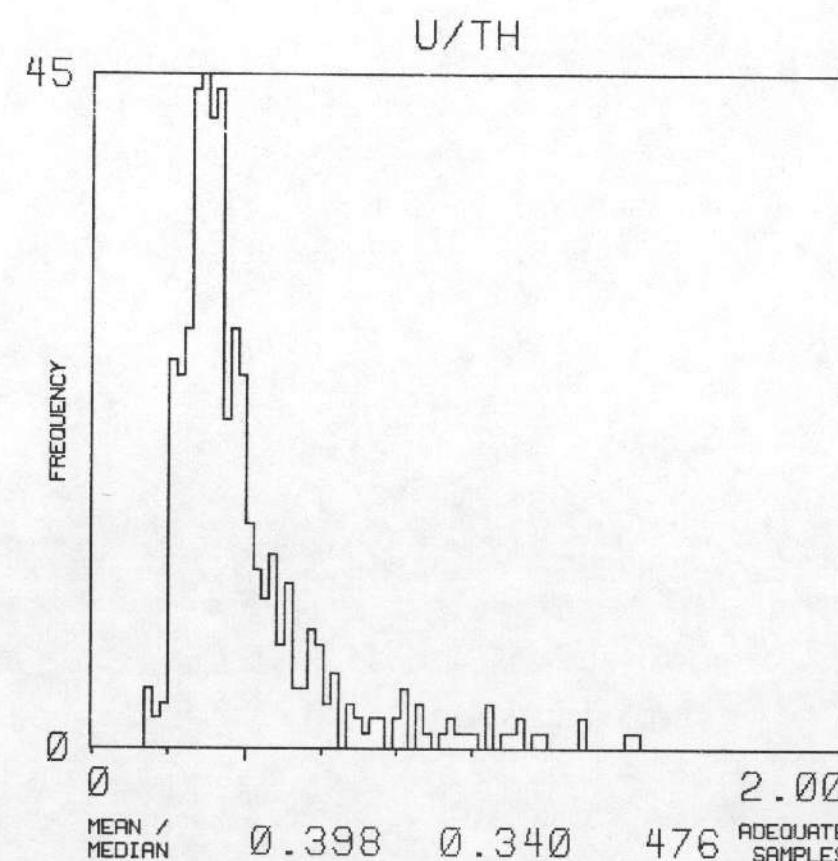
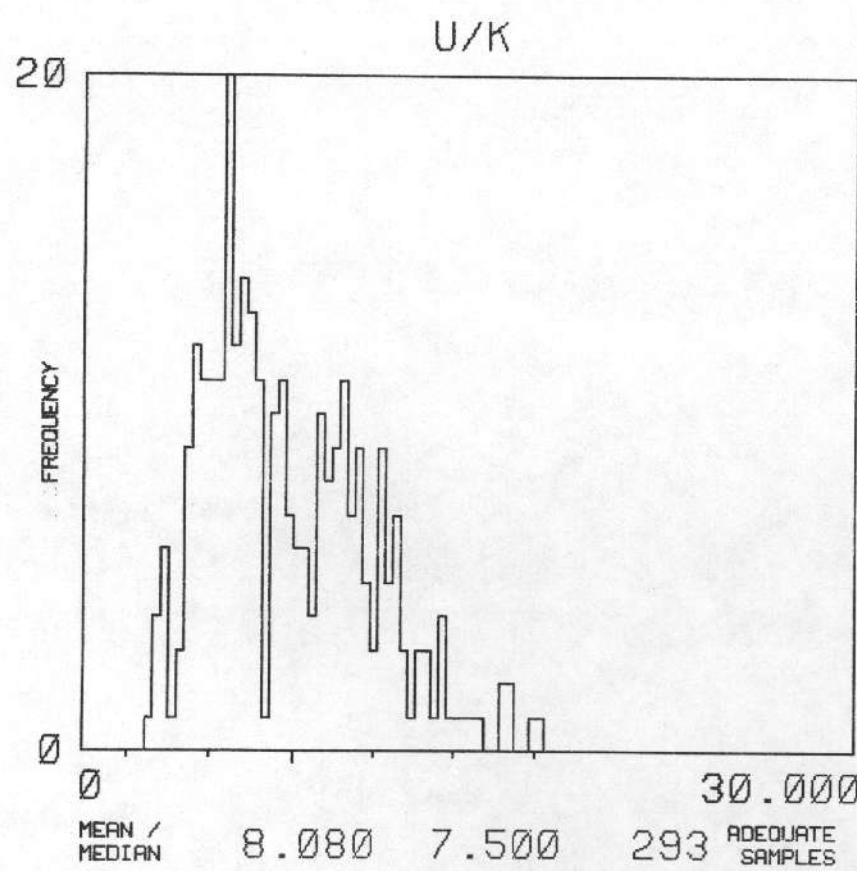
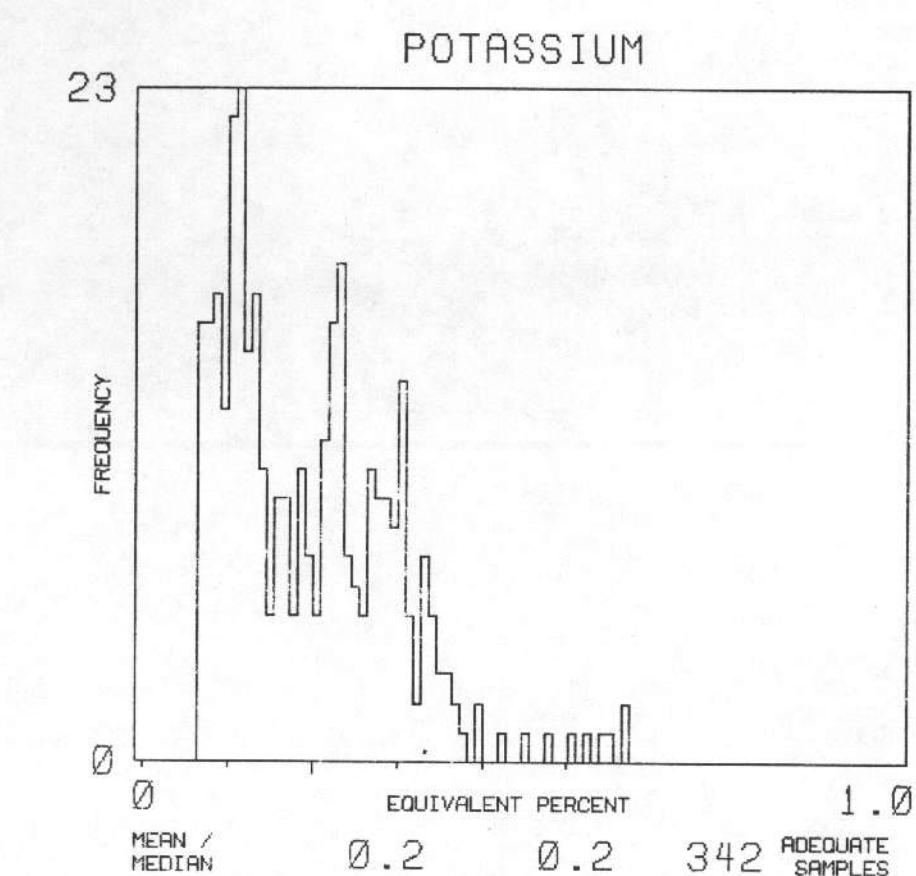
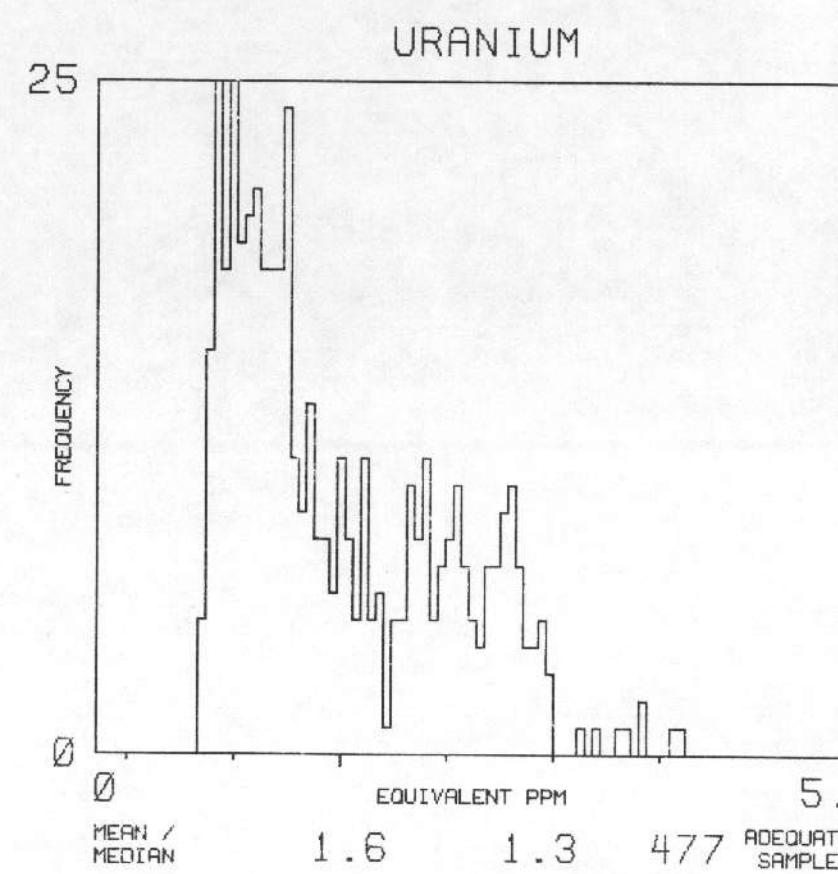
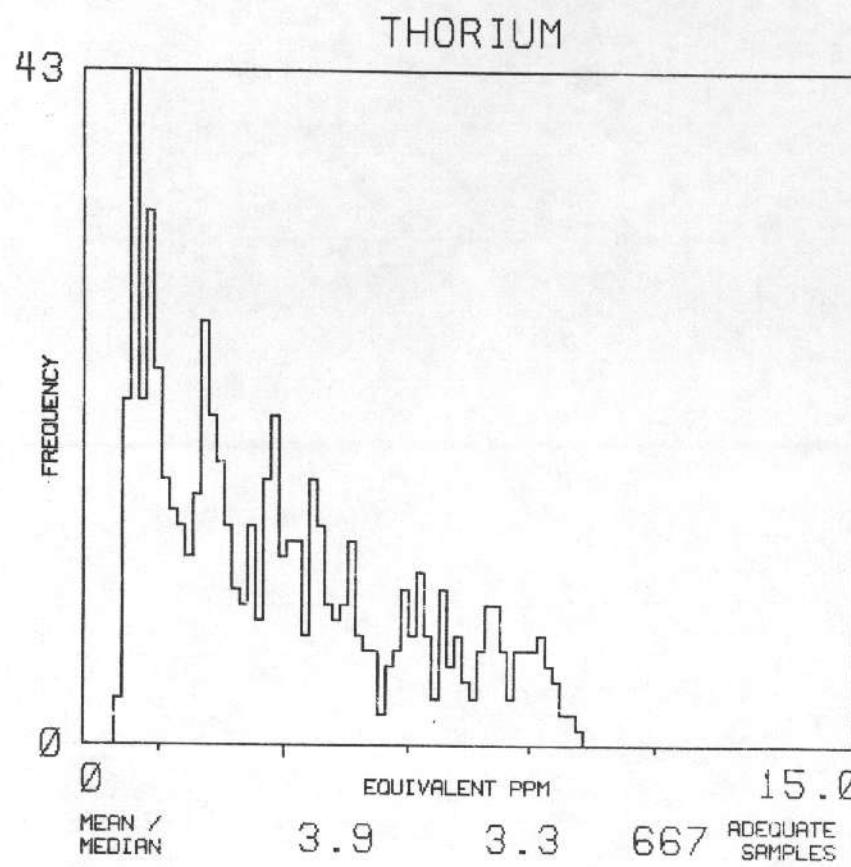
NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : QTTM

TOTAL NUMBER
OF SAMPLES

670

F₁₀^{wb}

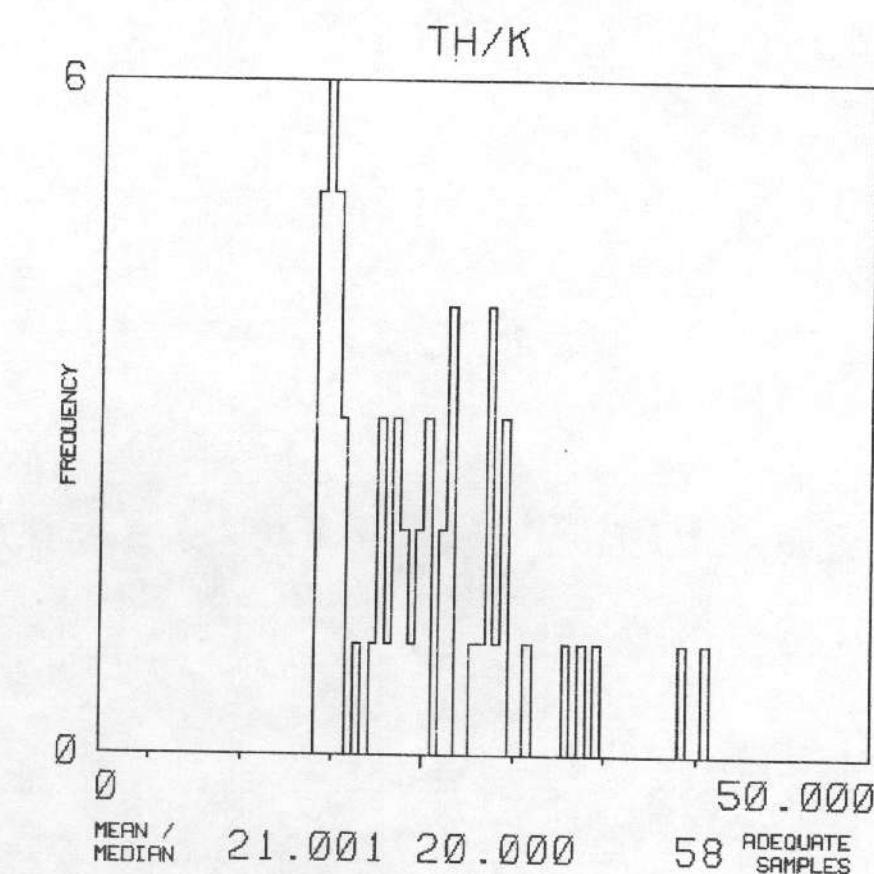
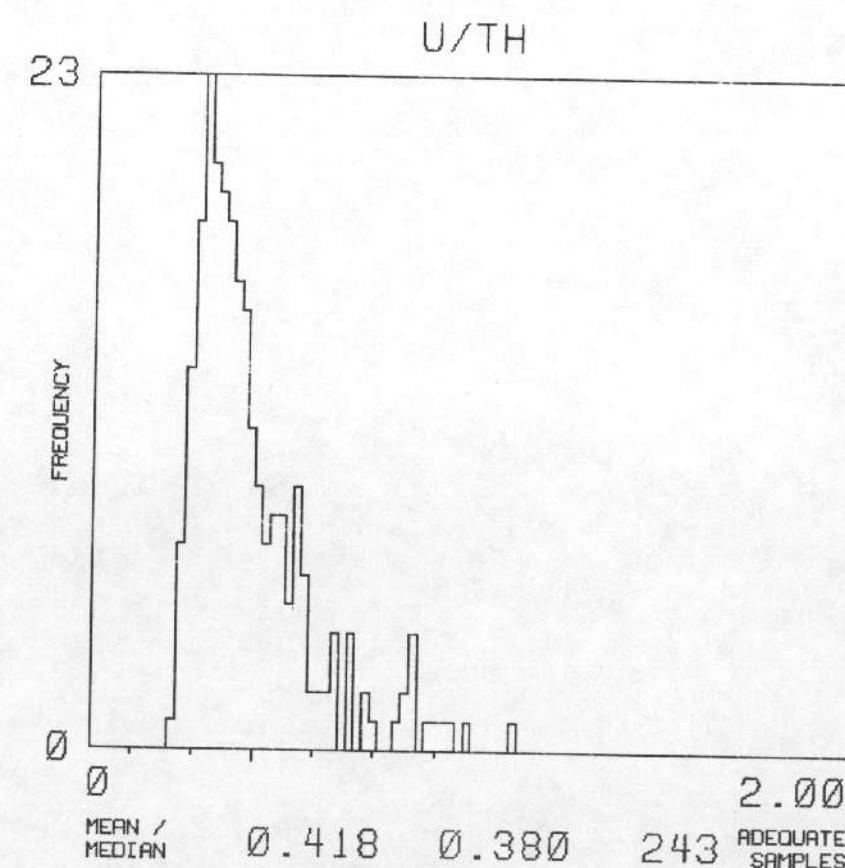
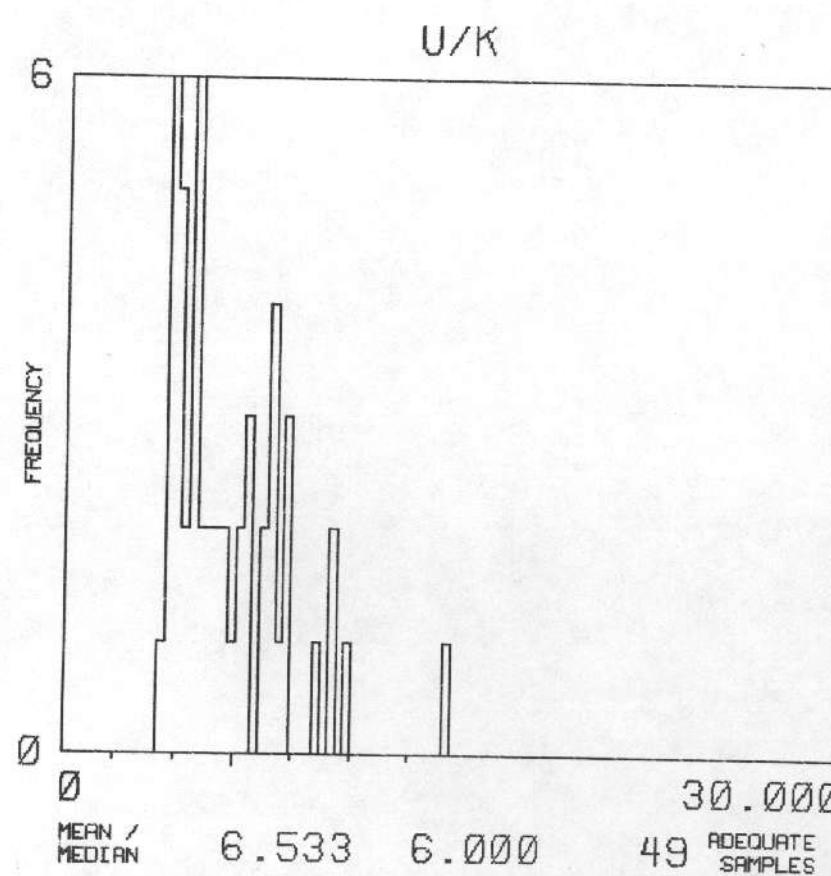
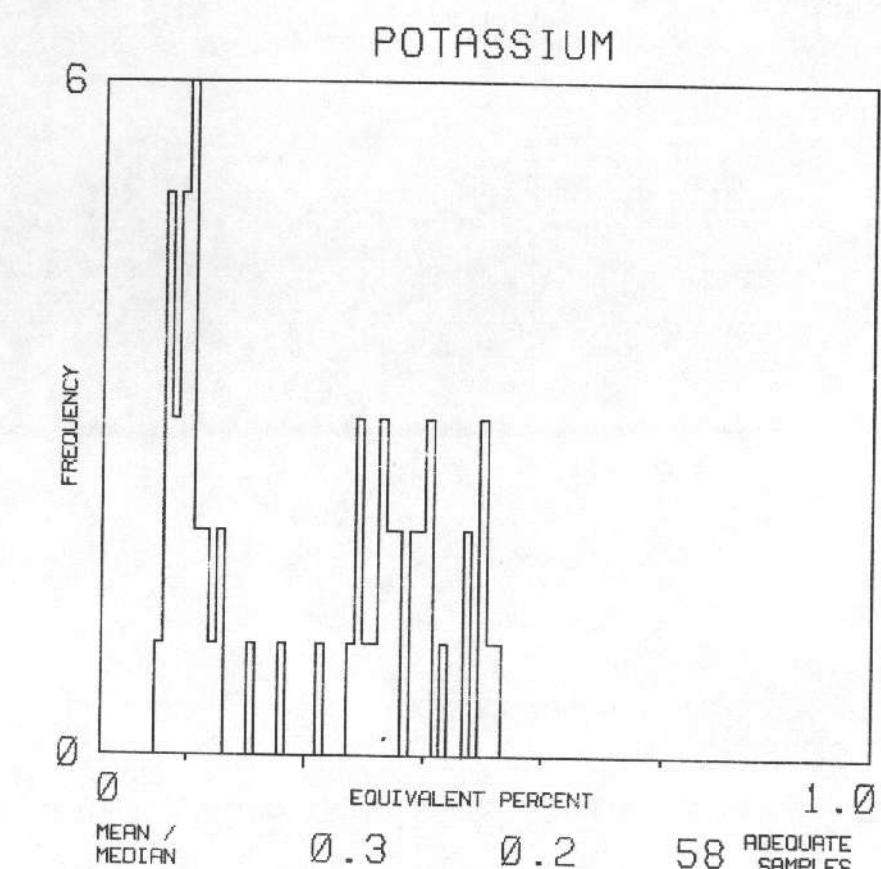
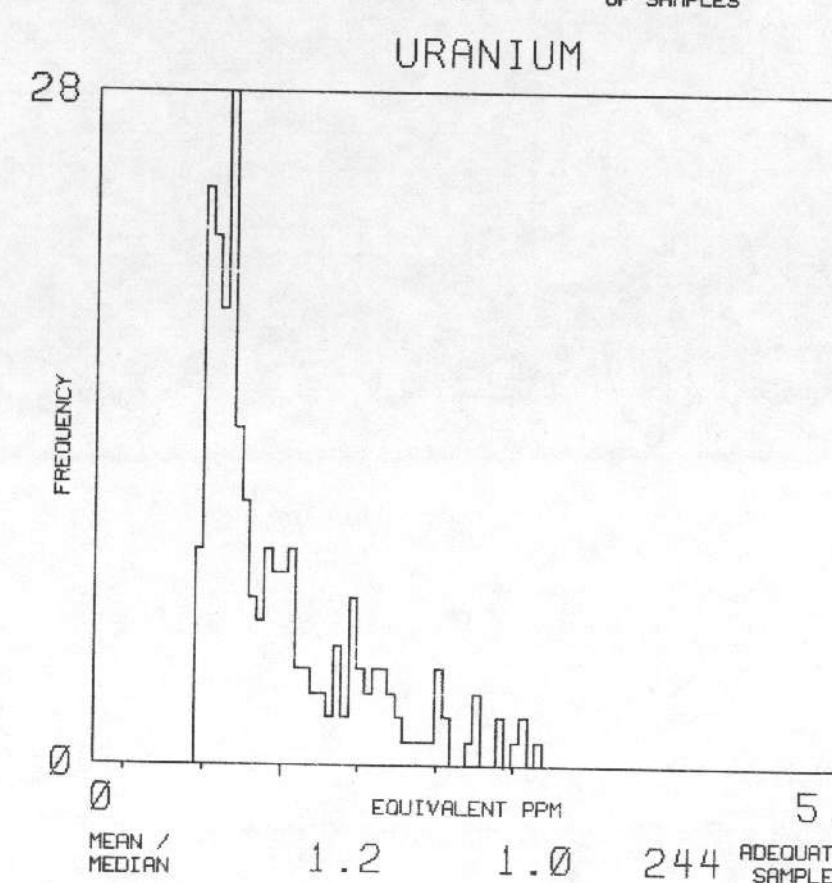
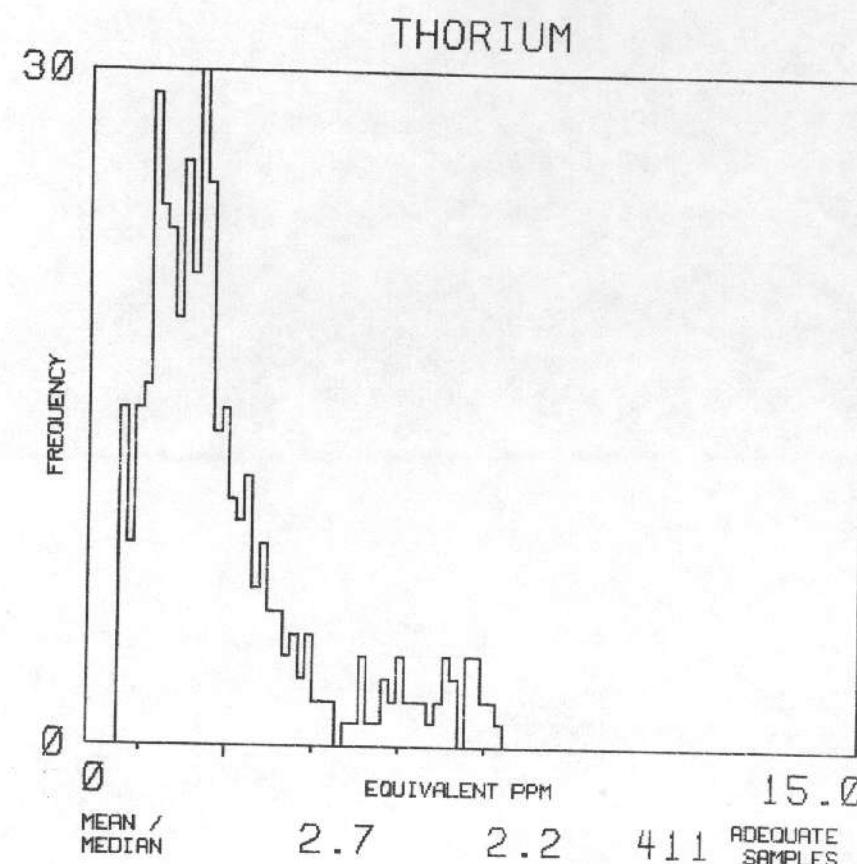


NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : OTTI TOTAL NUMBER OF SAMPLES

430

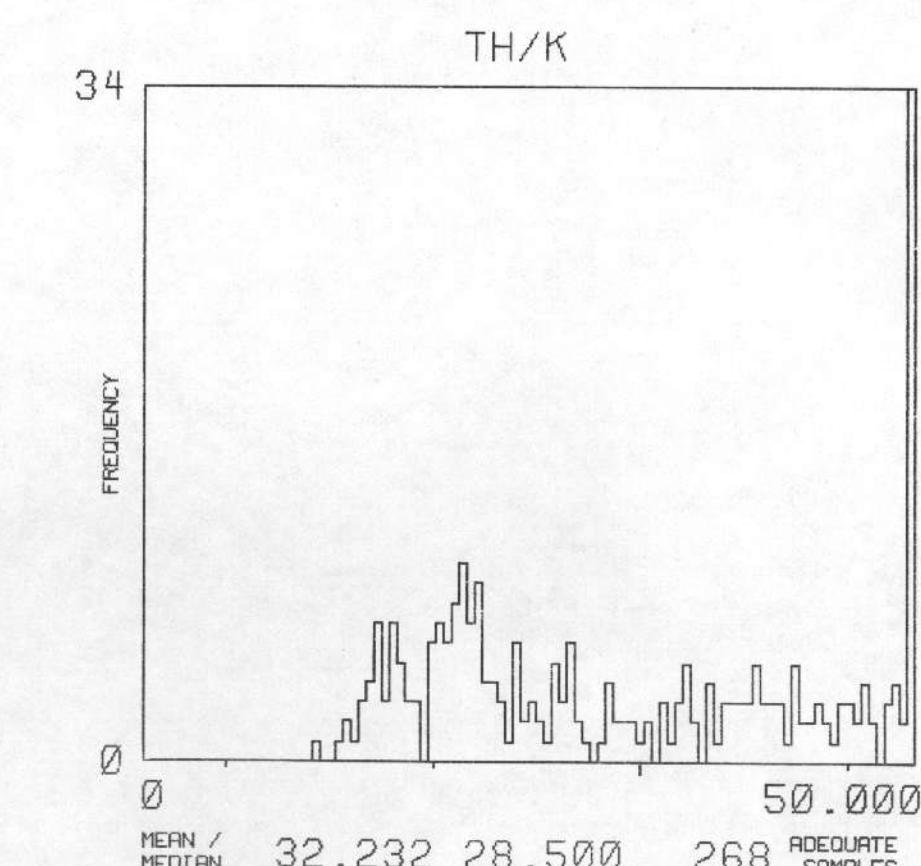
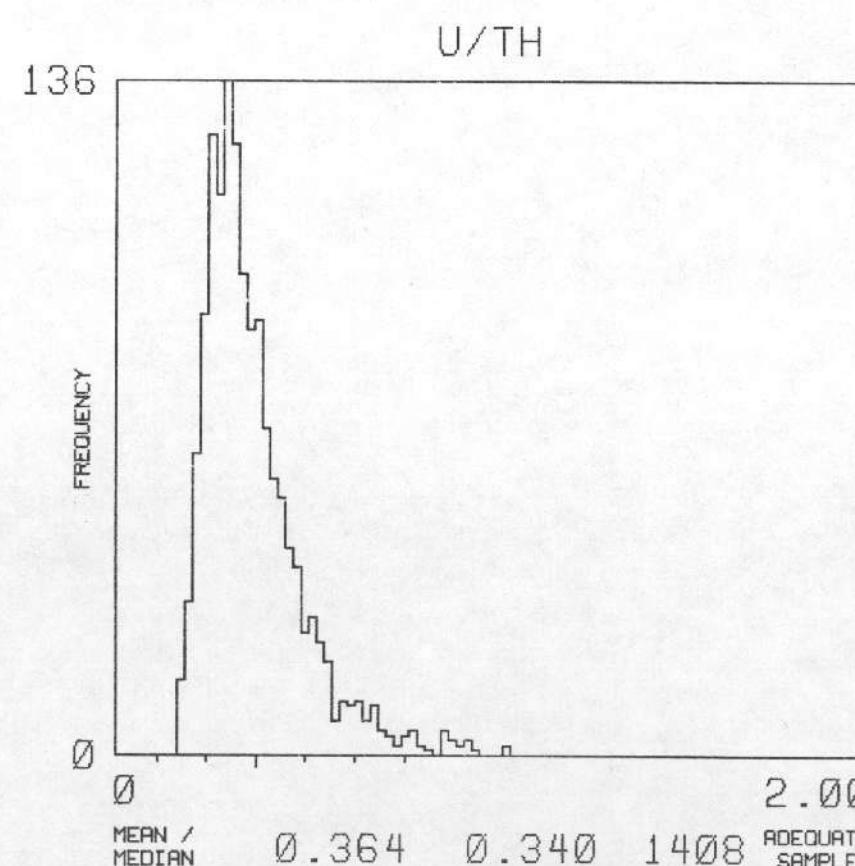
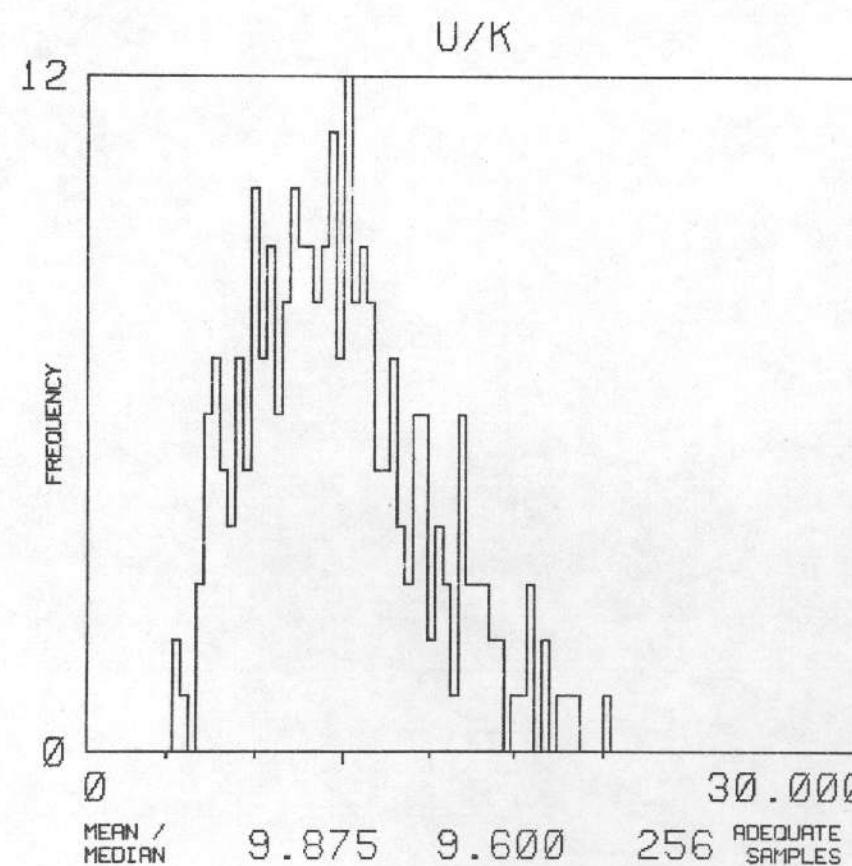
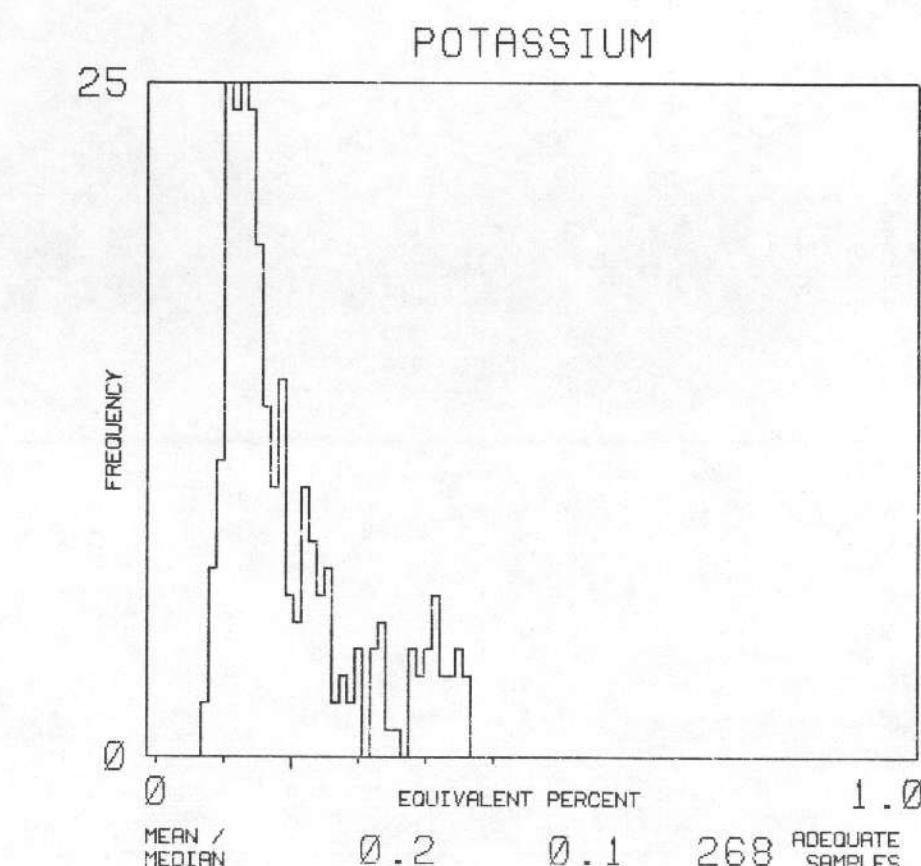
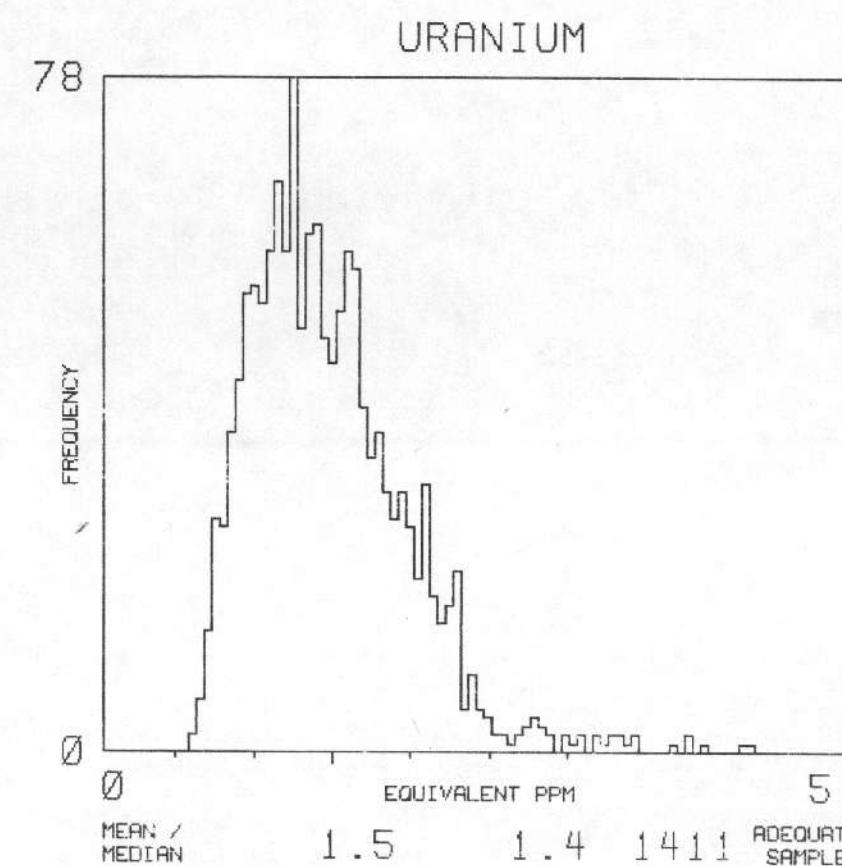
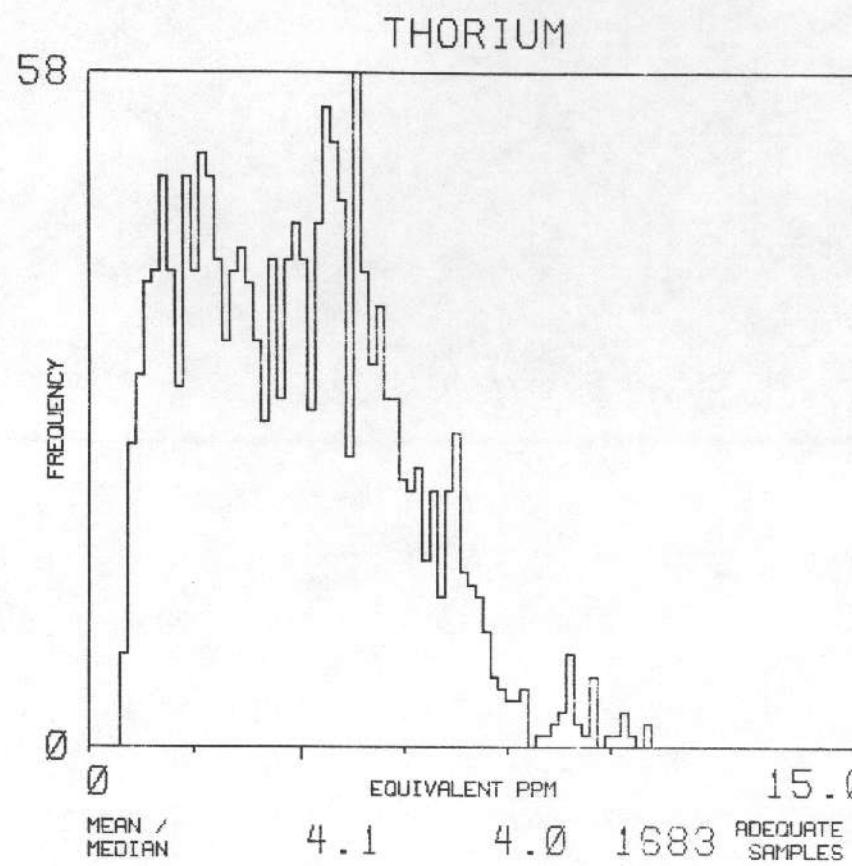
F11
wb



NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

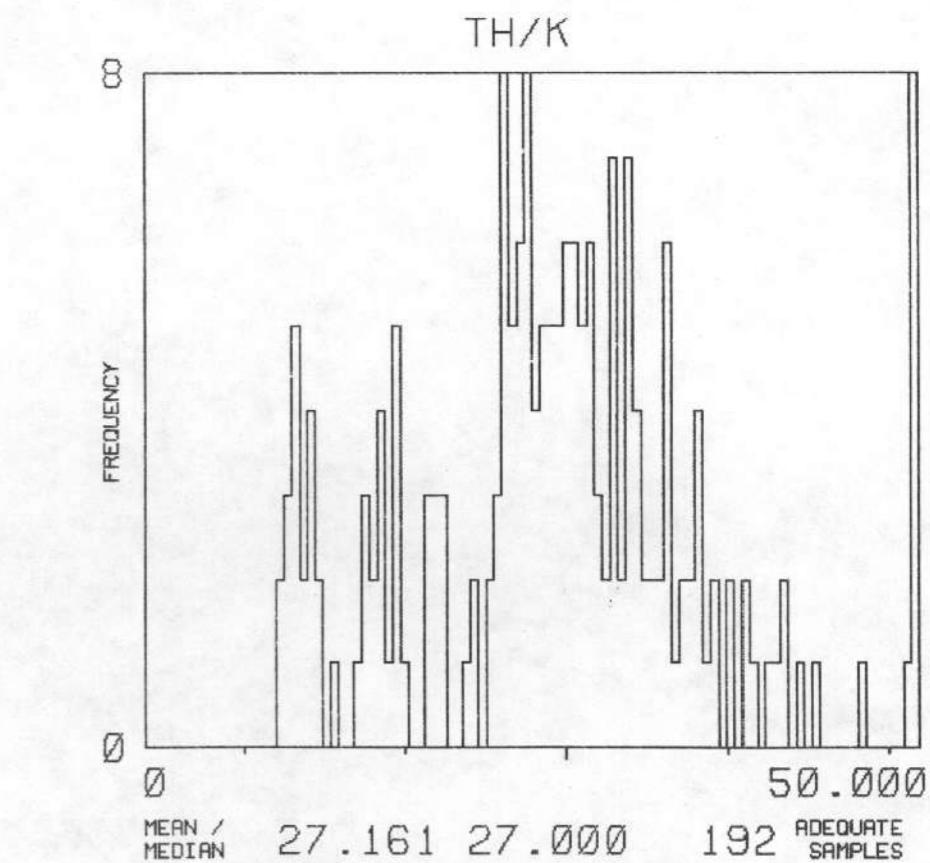
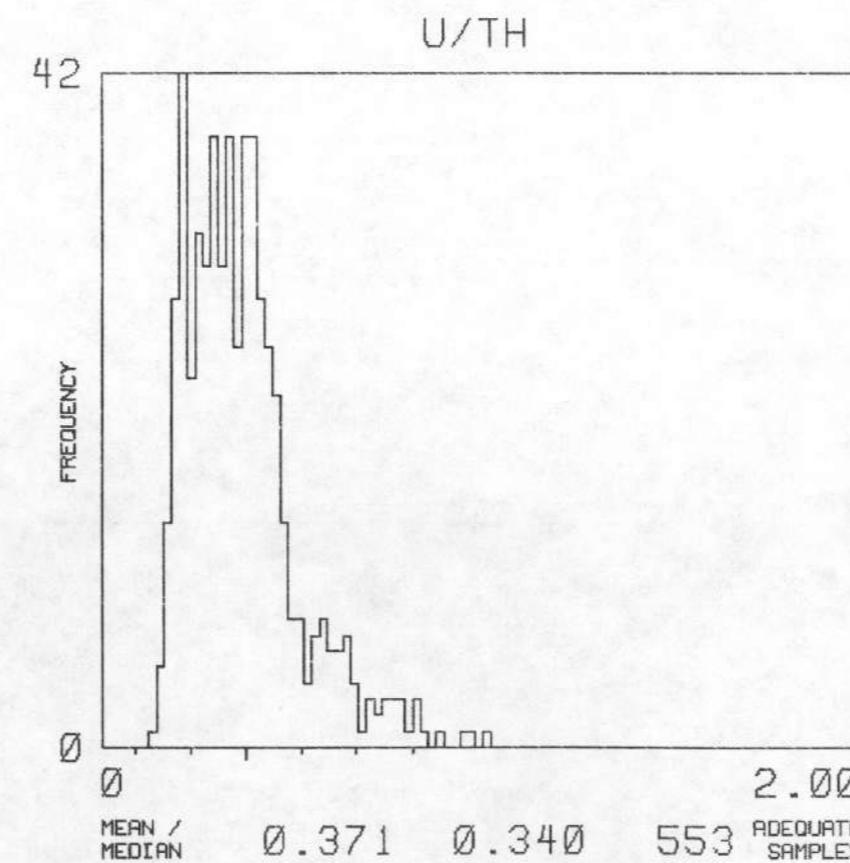
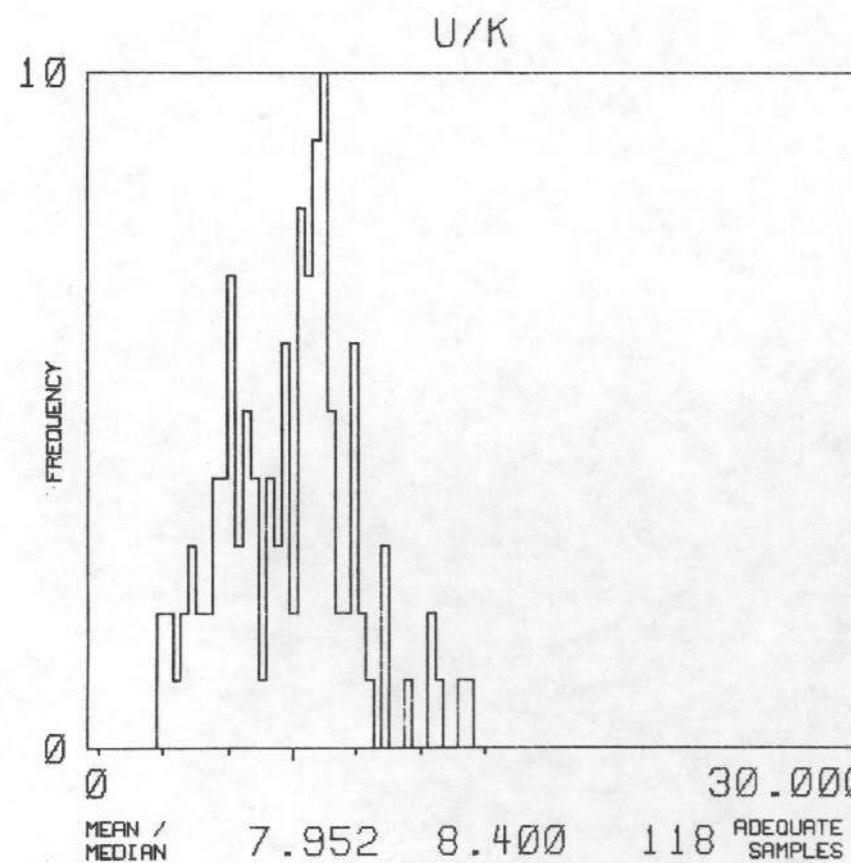
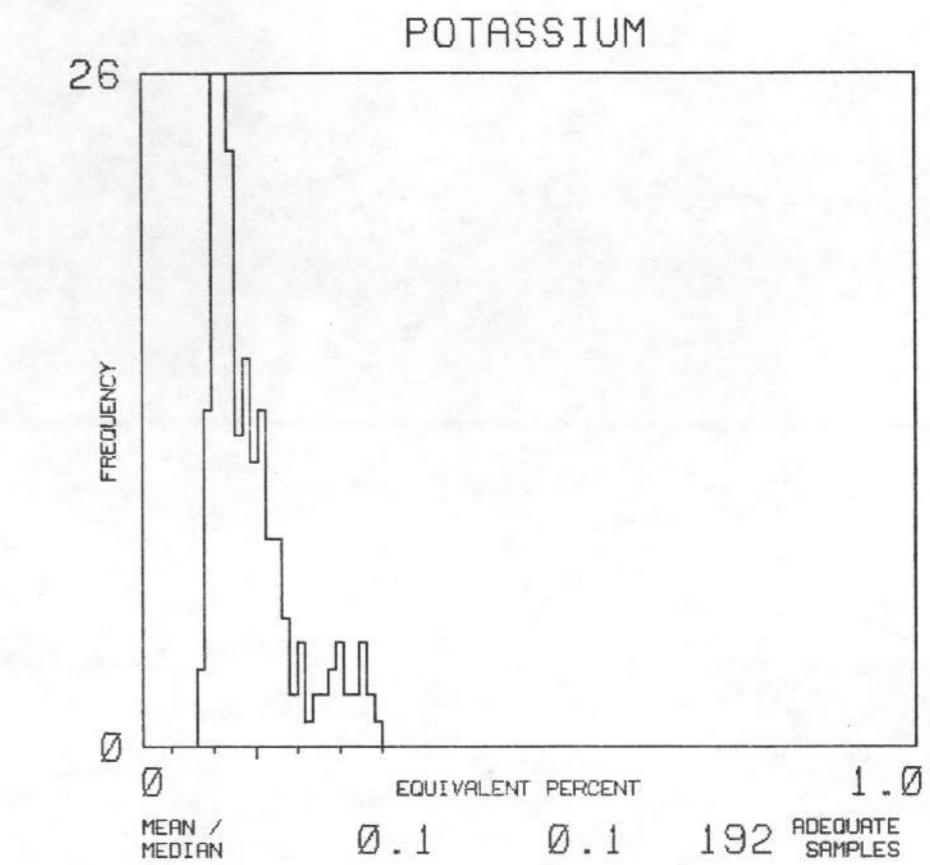
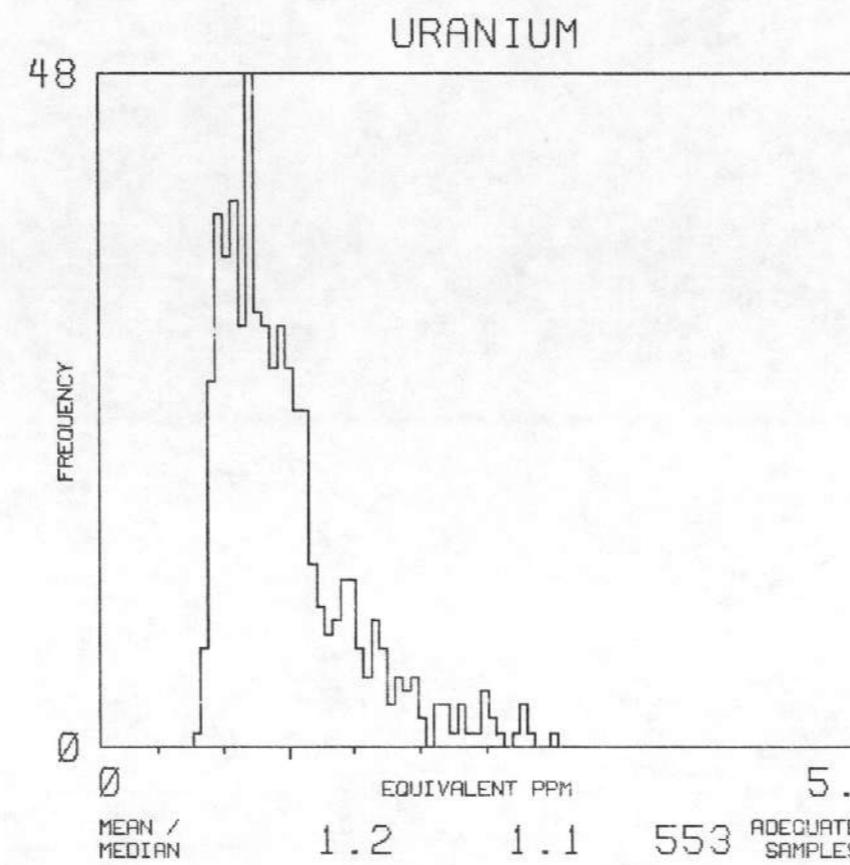
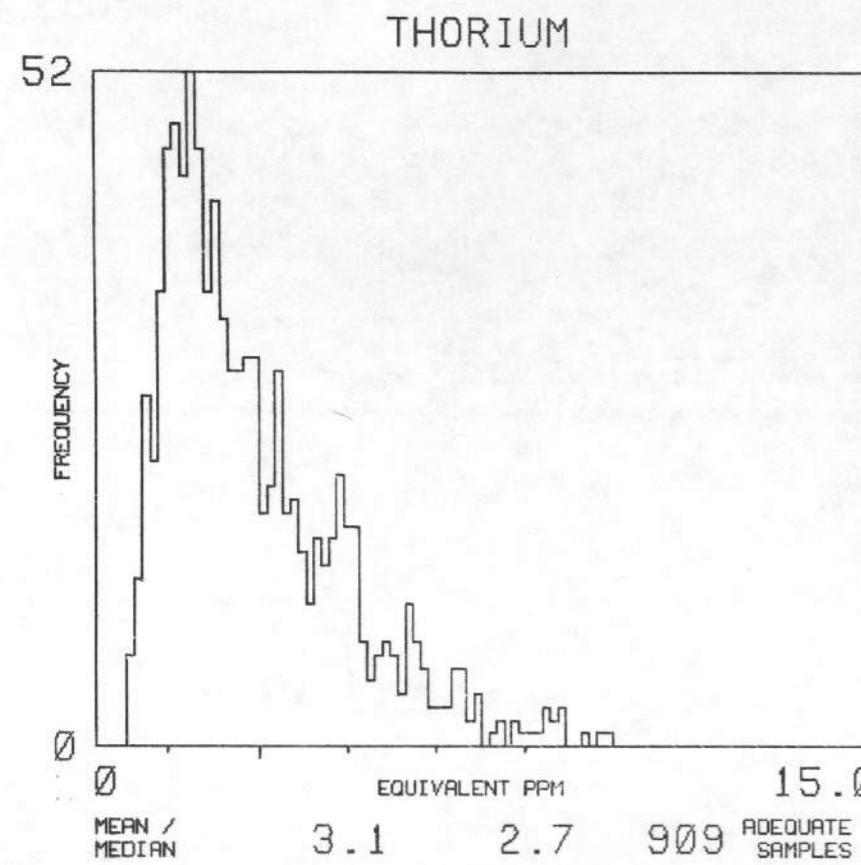
MAP UNIT : QTPEM TOTAL NUMBER OF SAMPLES 1693

F12 wb



NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : QTPEI TOTAL NUMBER OF SAMPLES 955

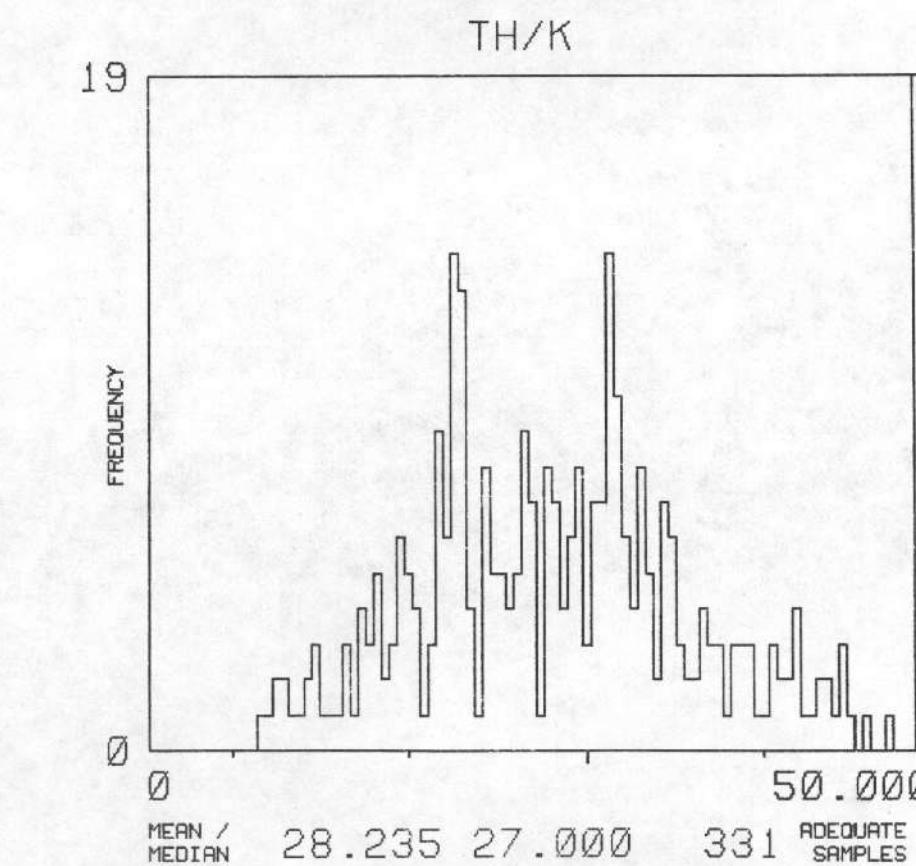
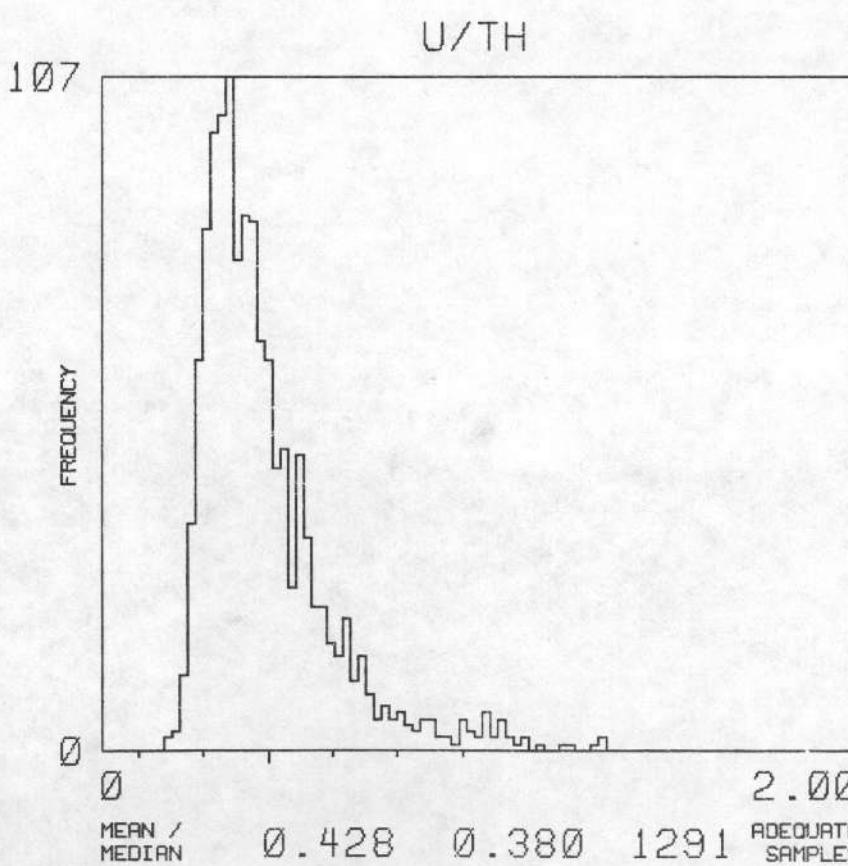
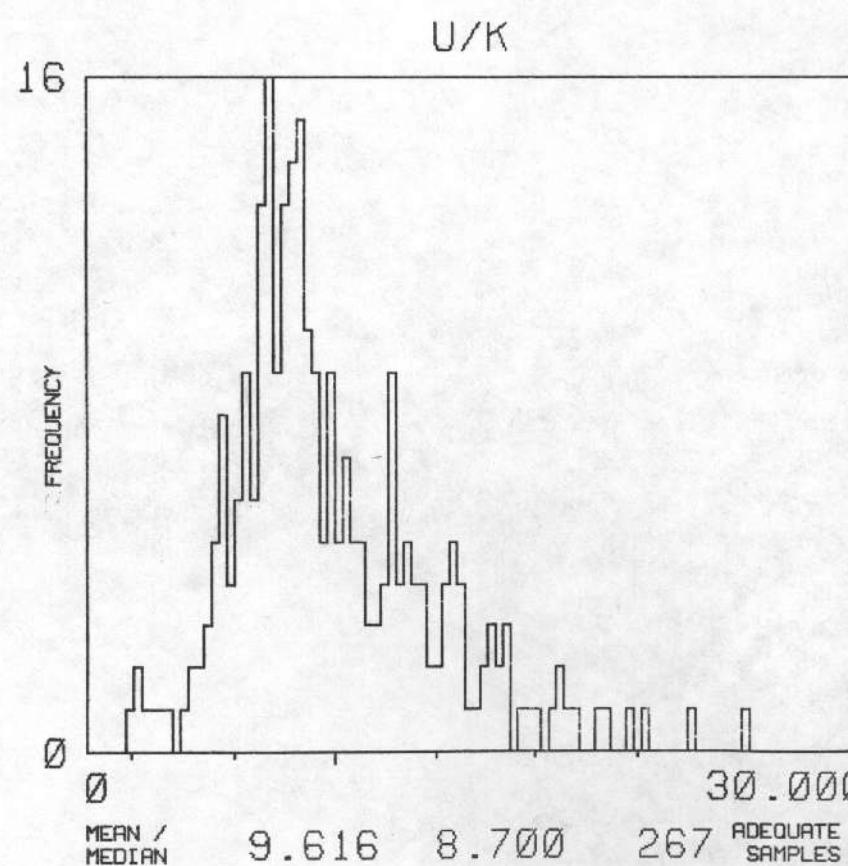
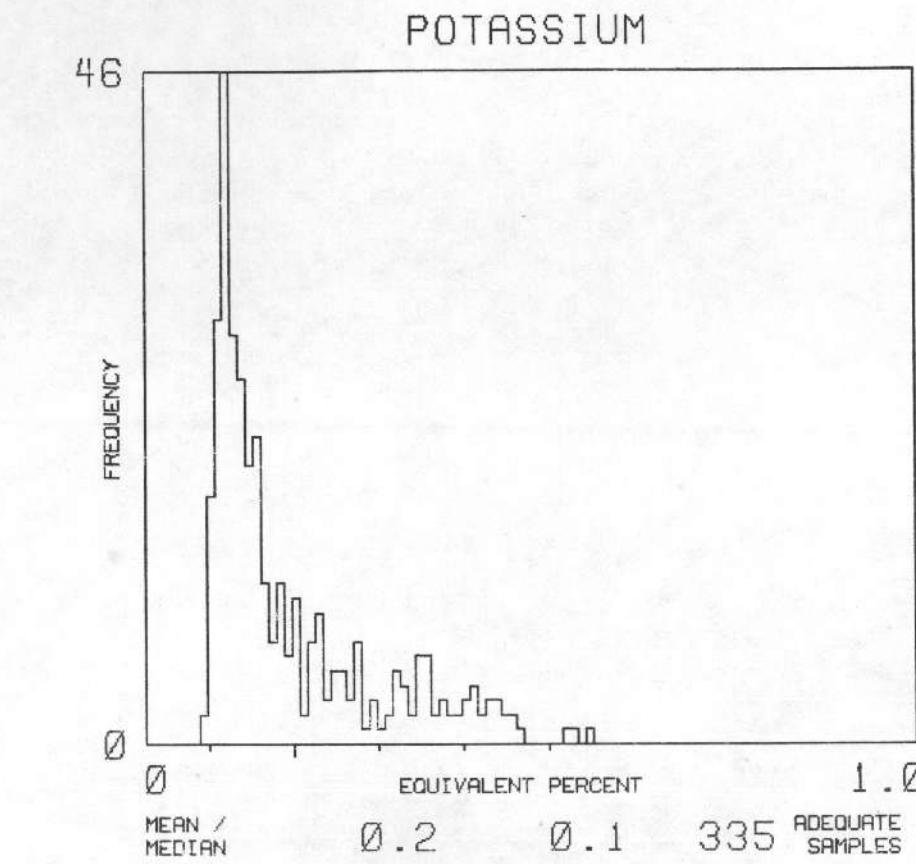
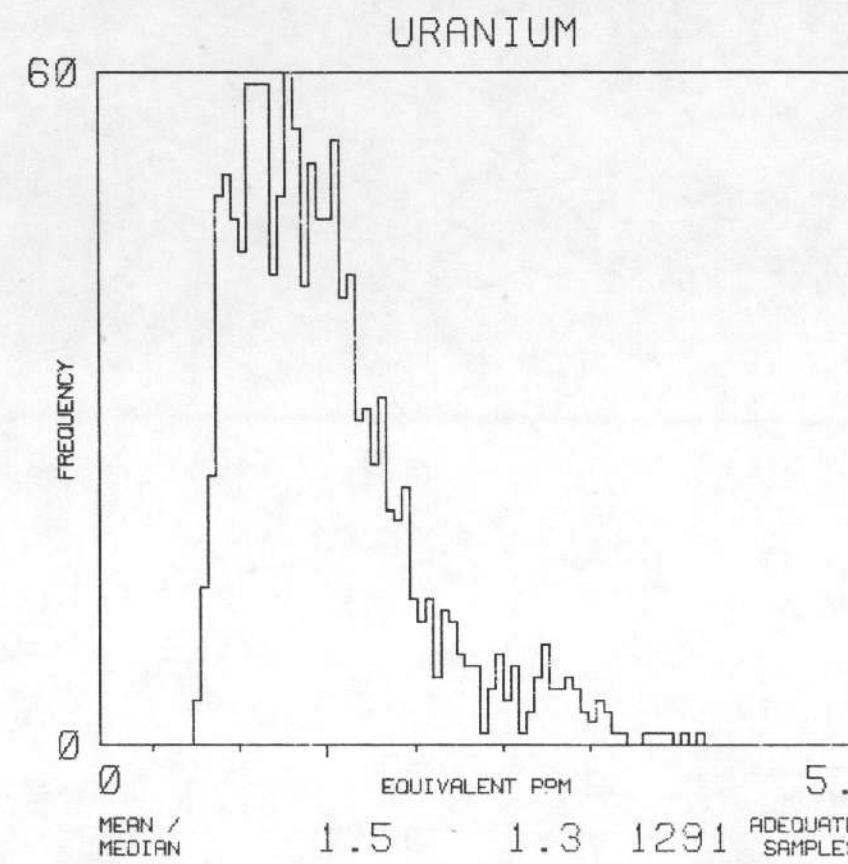
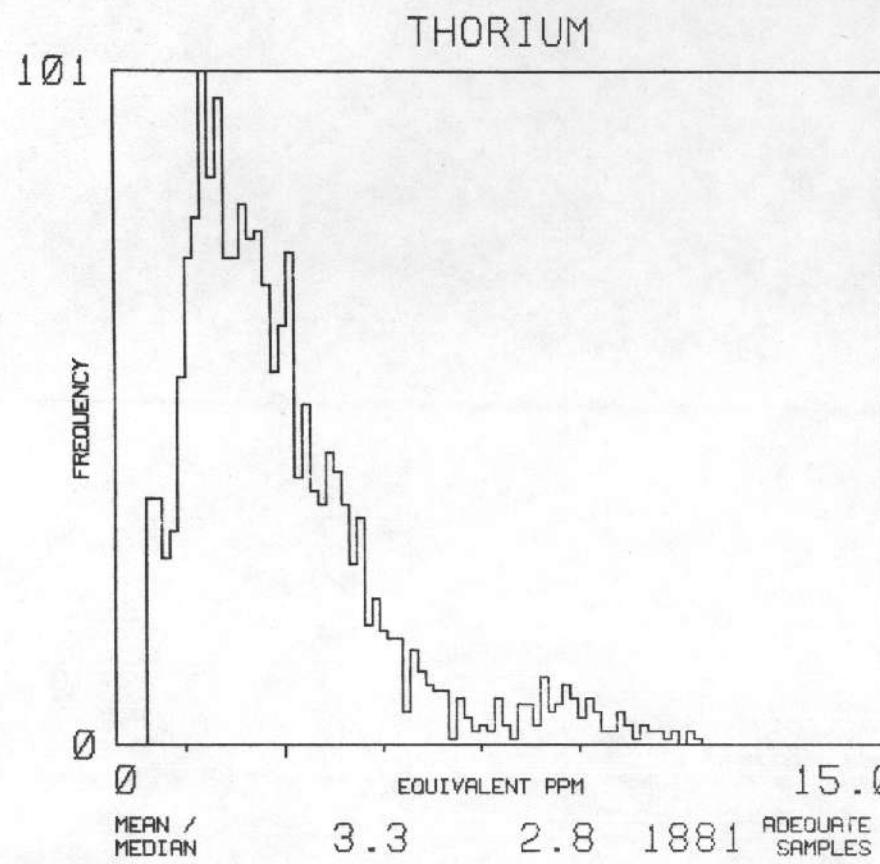


NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : QTWM

TOTAL NUMBER
OF SAMPLES

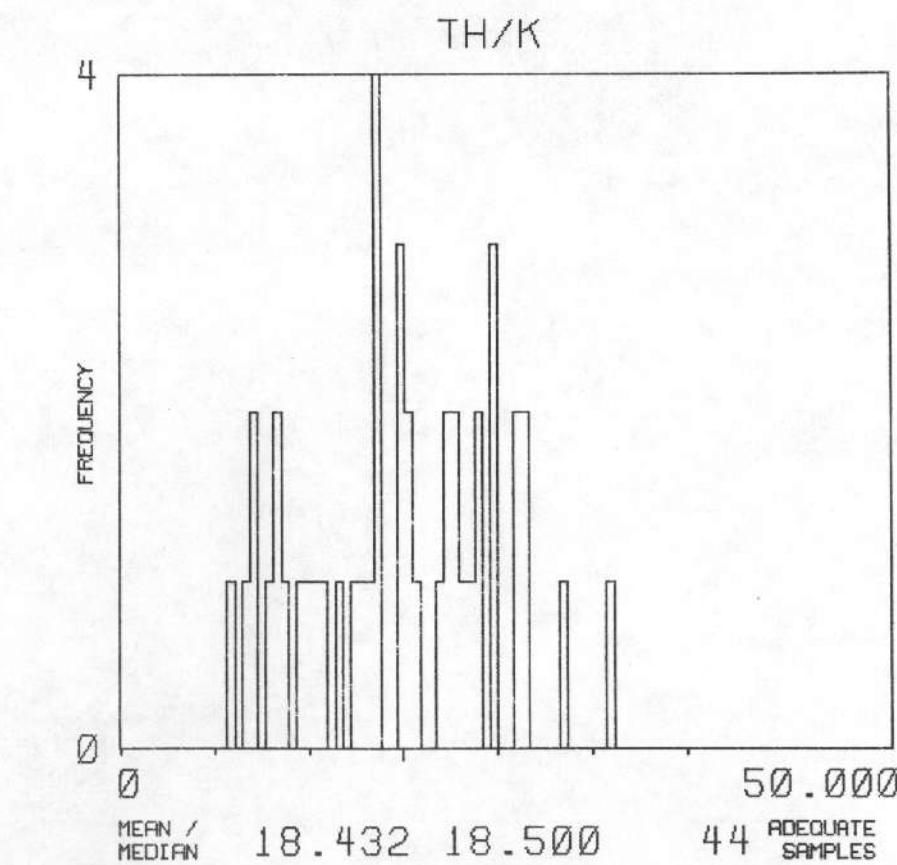
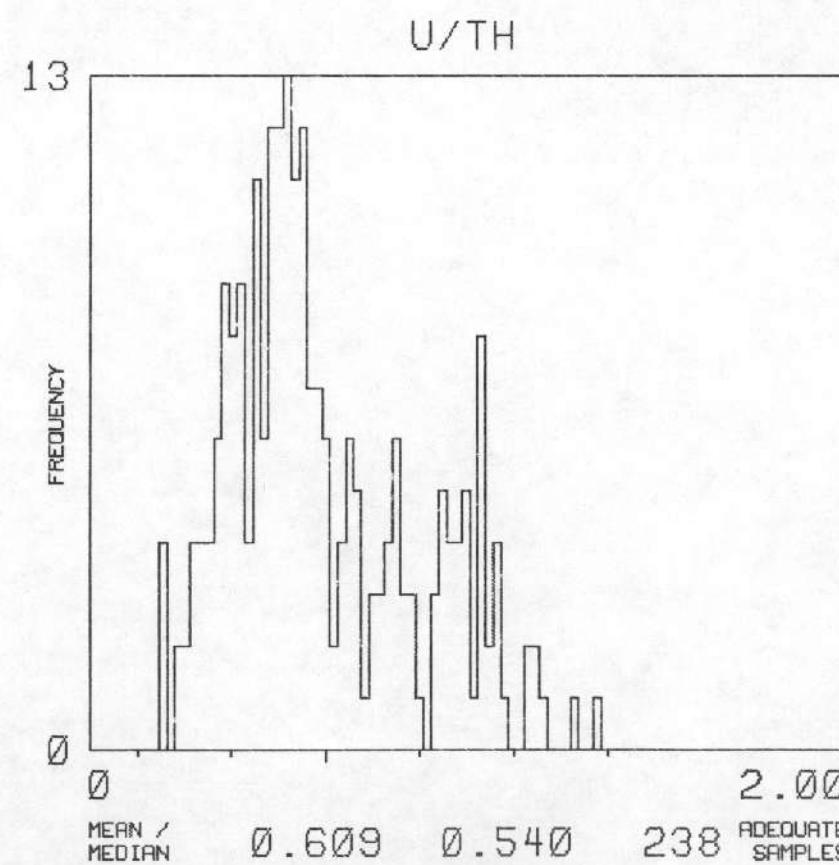
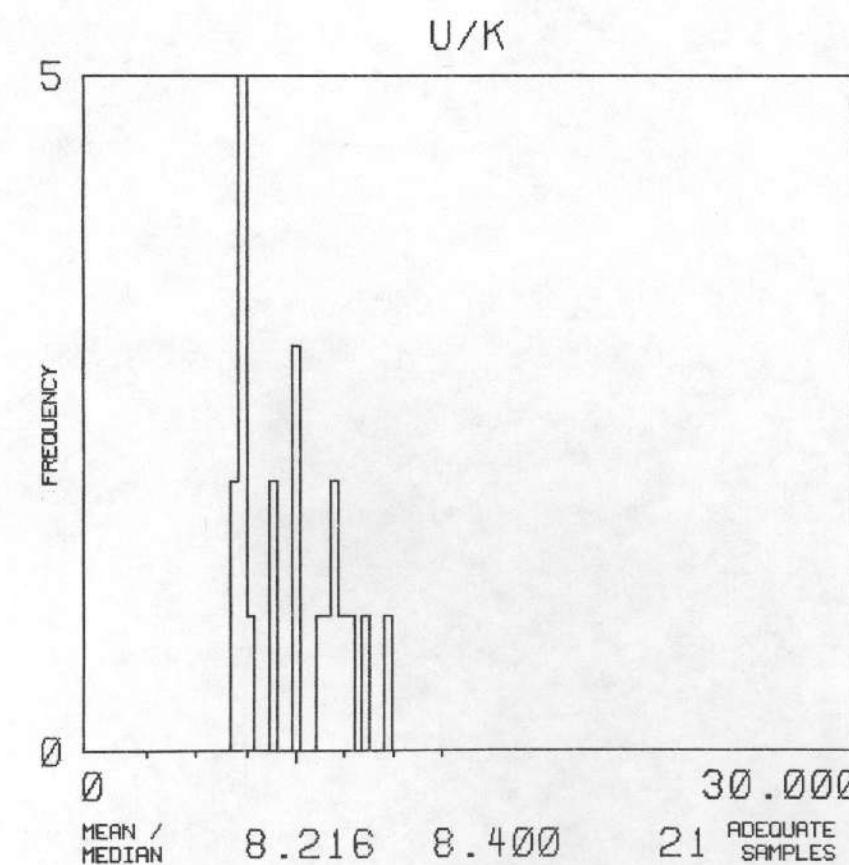
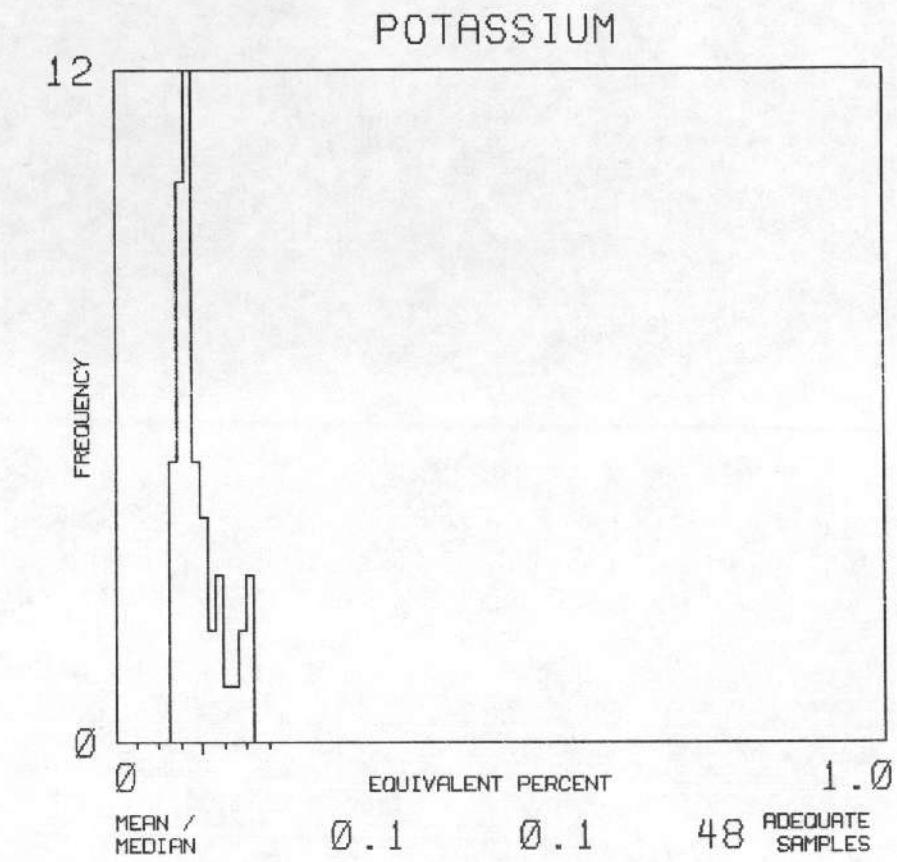
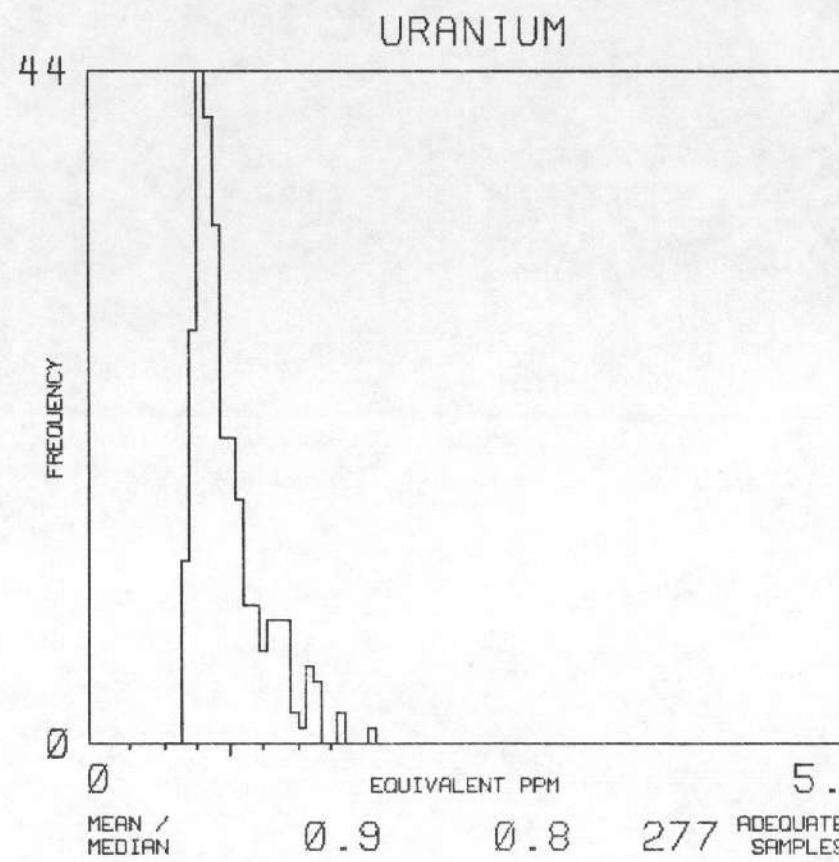
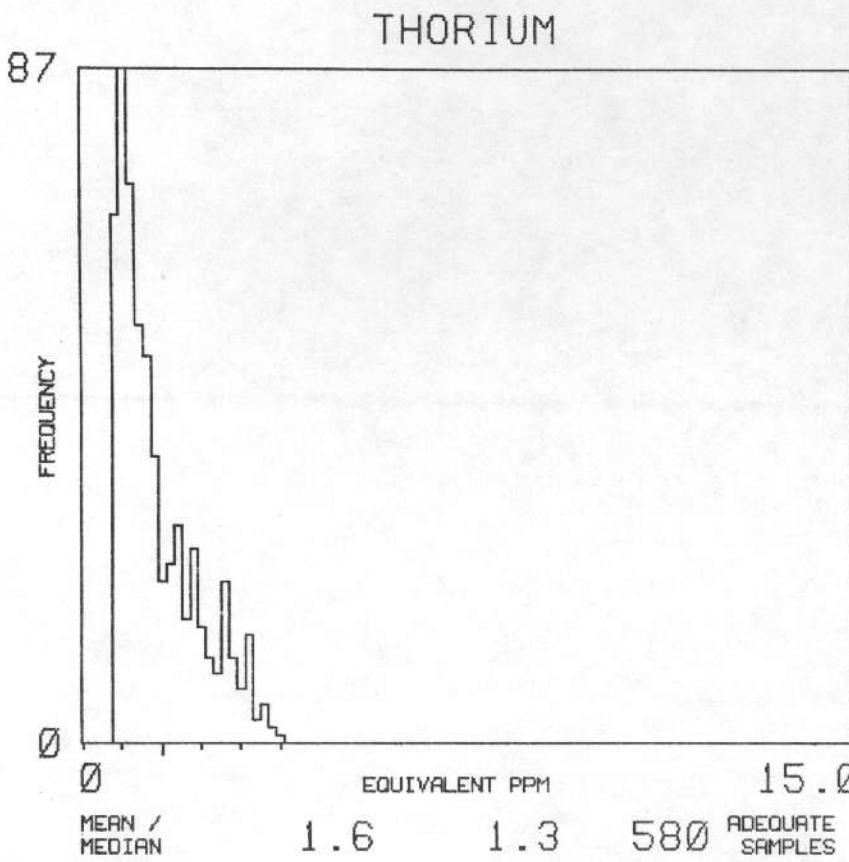
2192



NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

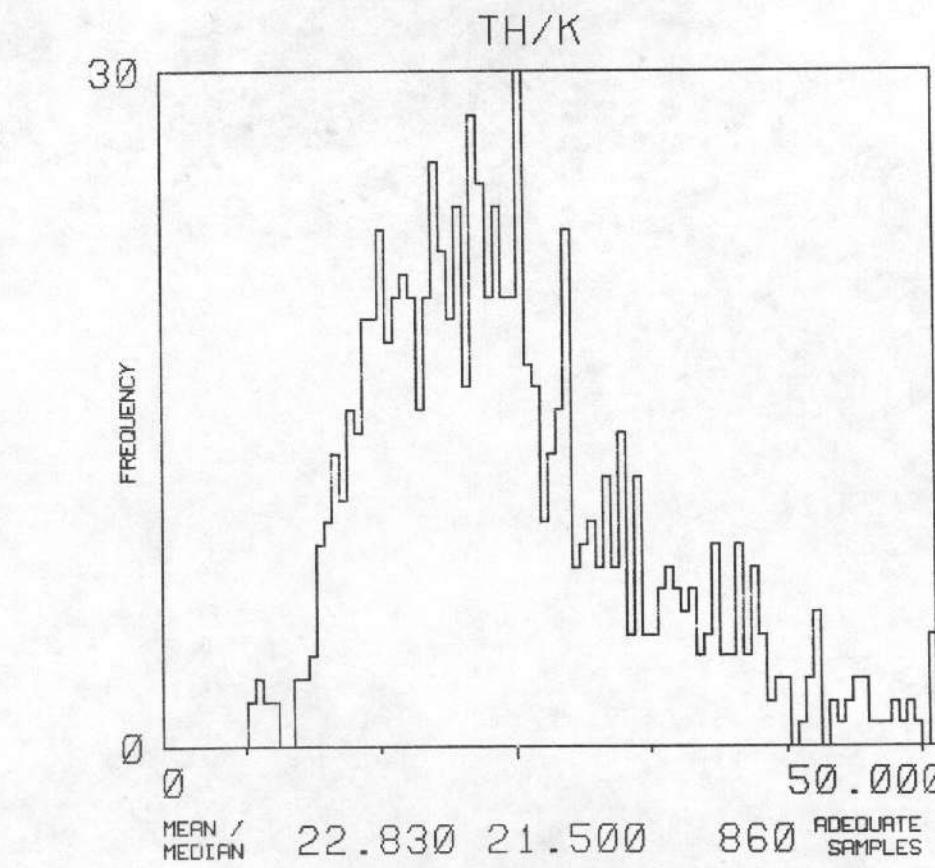
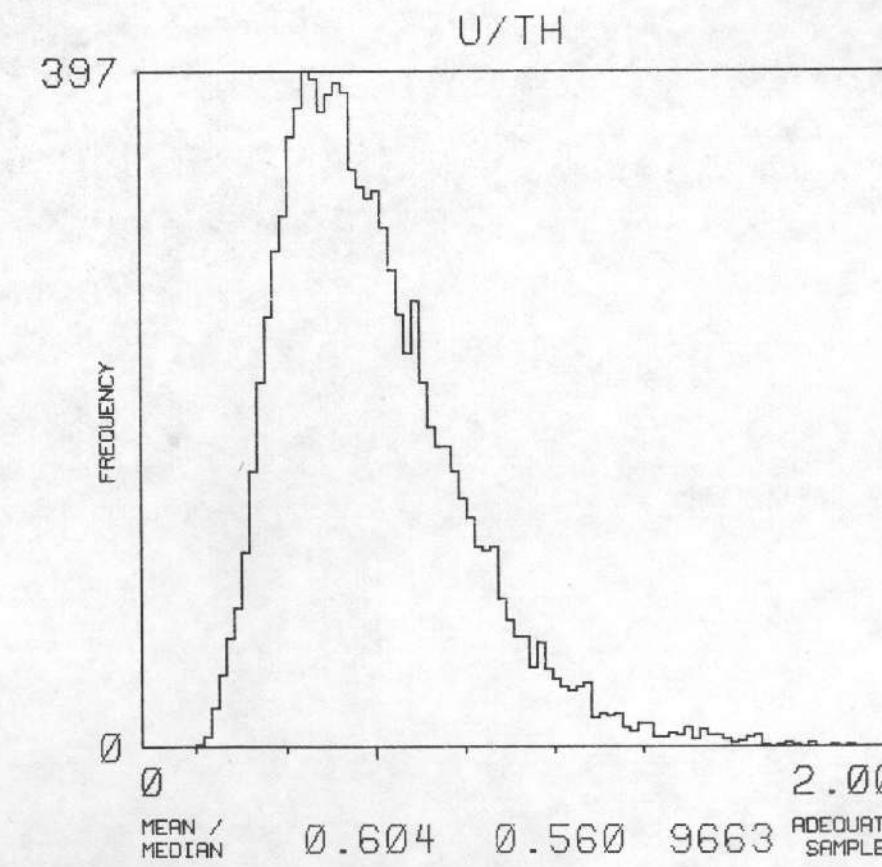
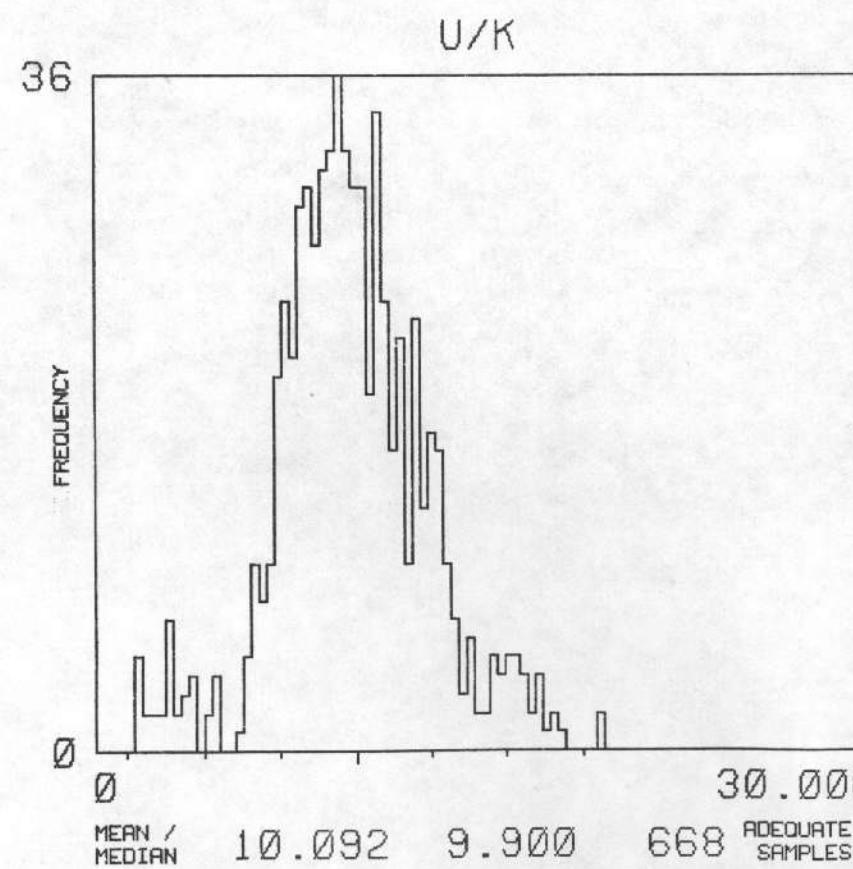
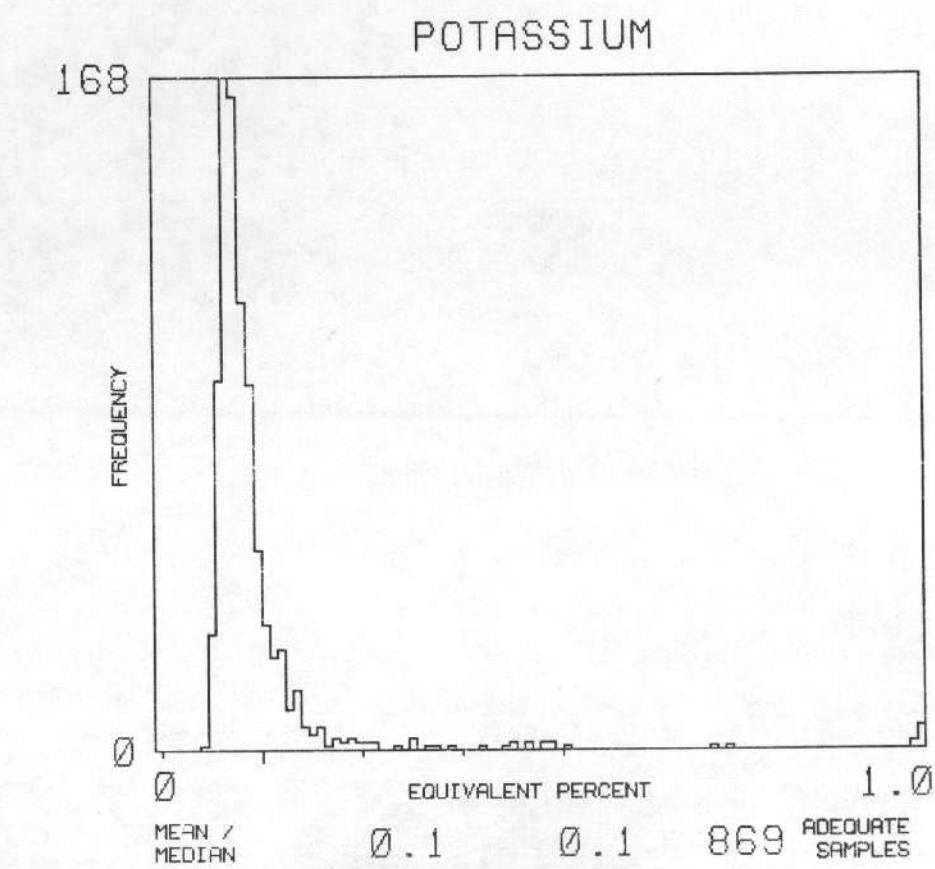
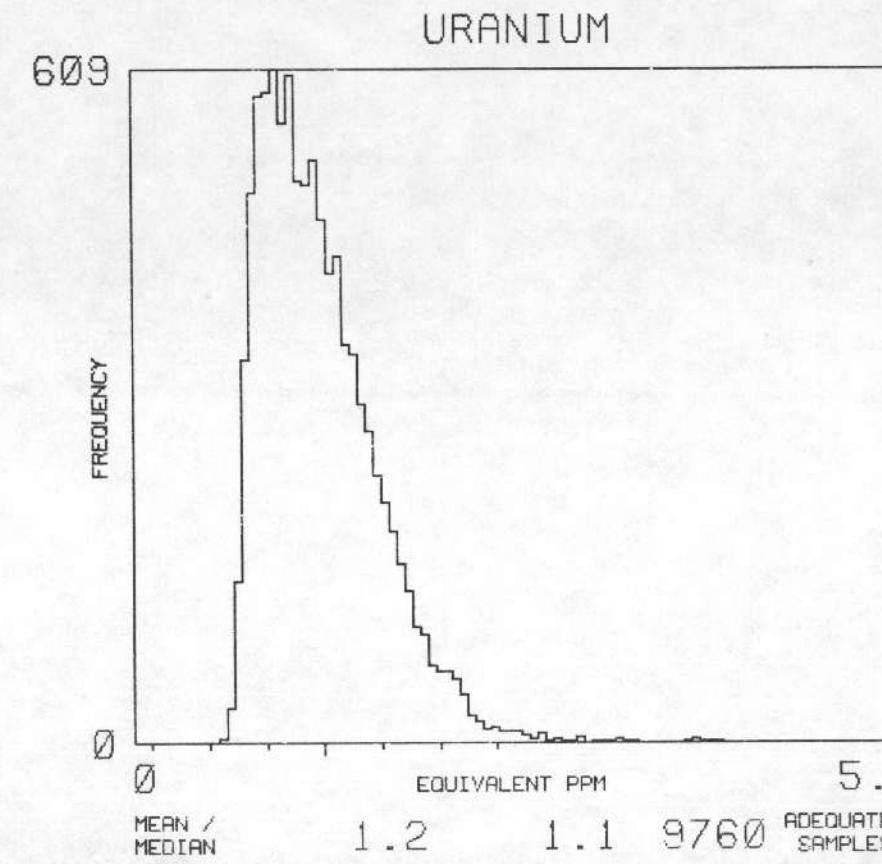
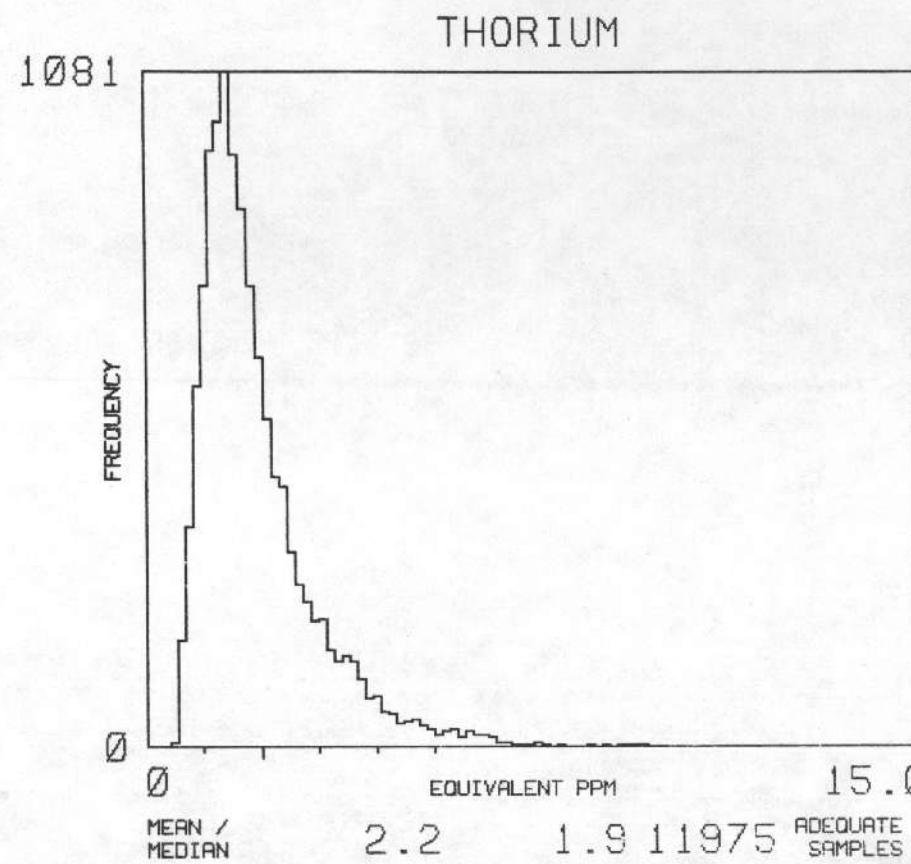
MAP UNIT : QTWI TOTAL NUMBER OF SAMPLES 677

F15_{wb}



NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

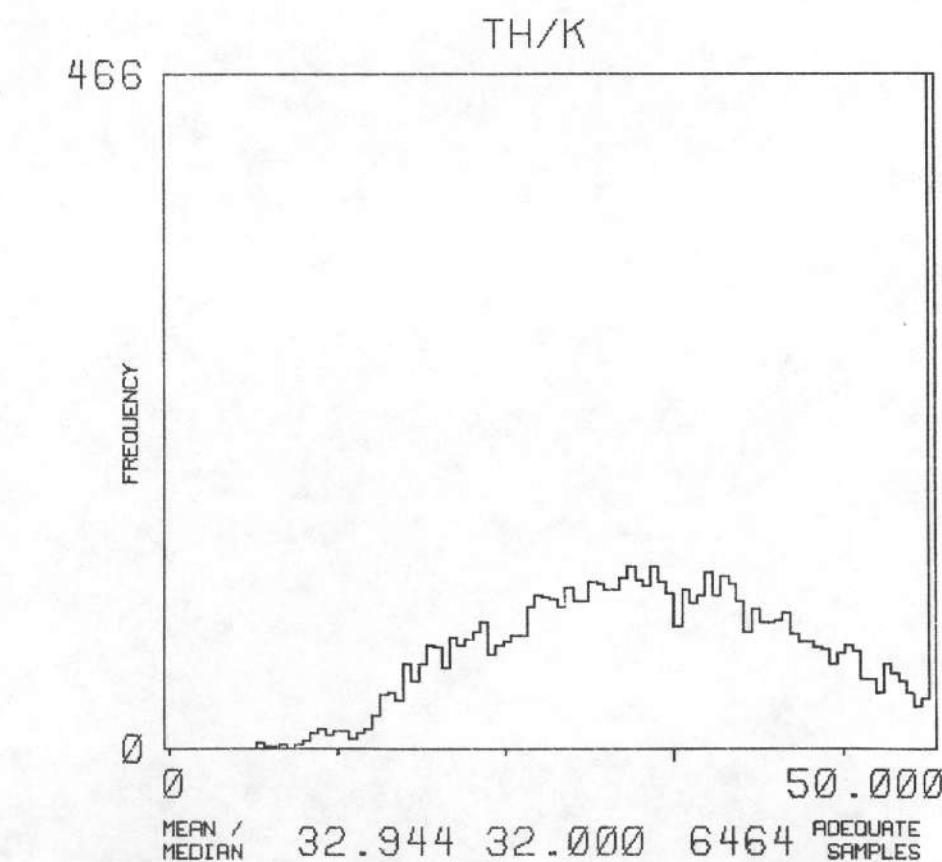
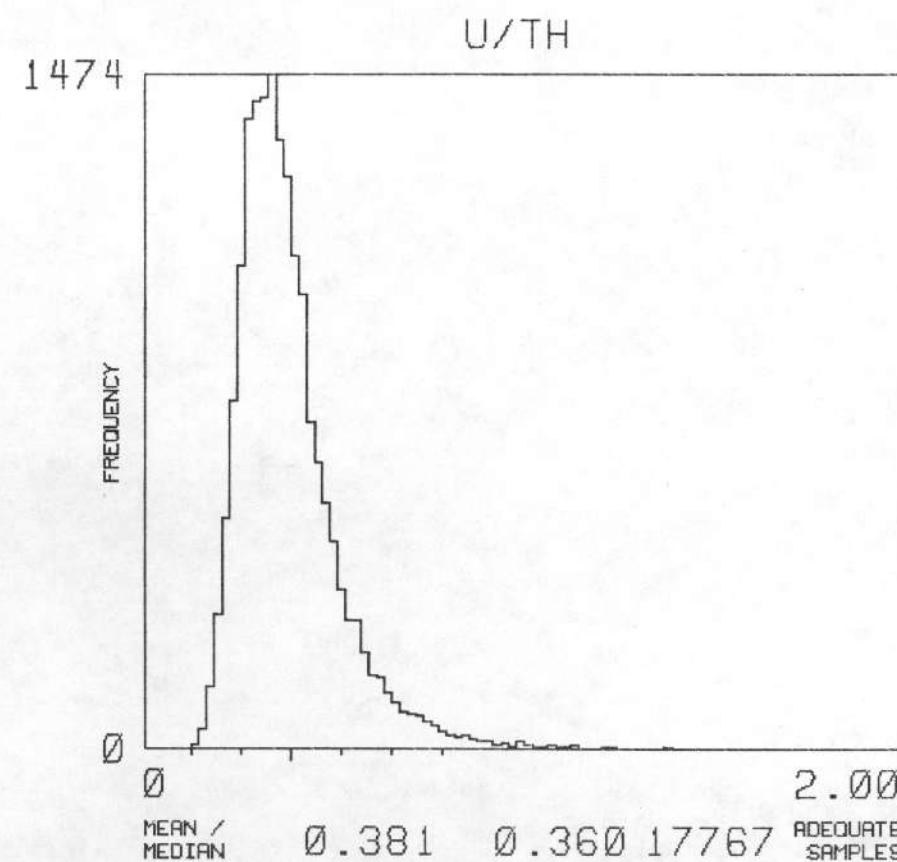
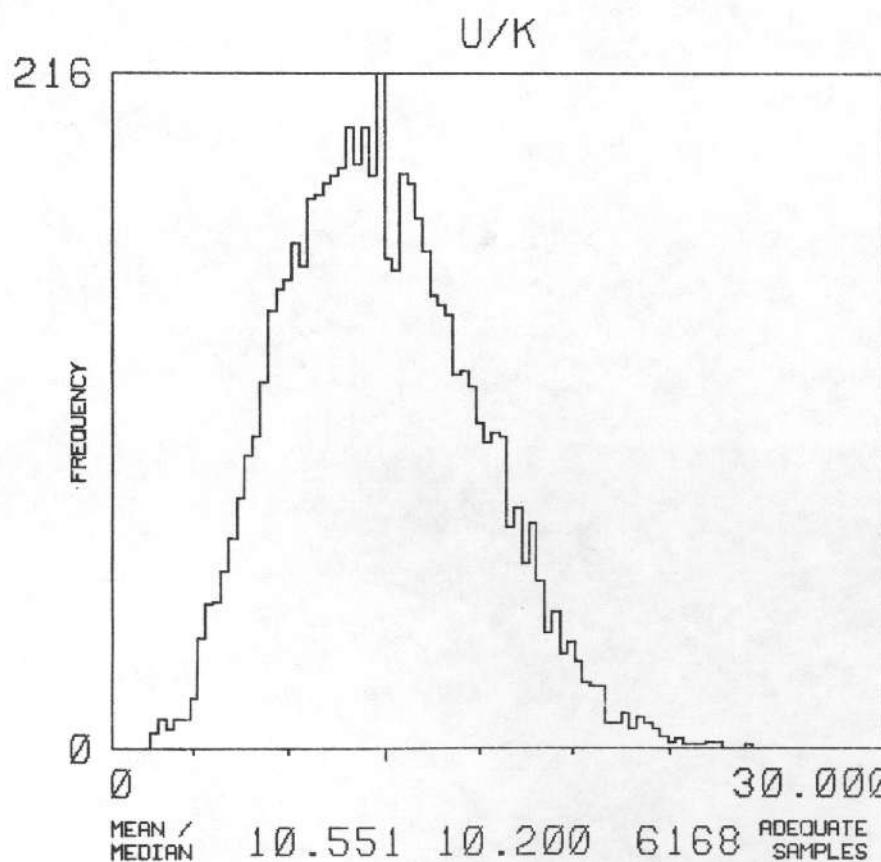
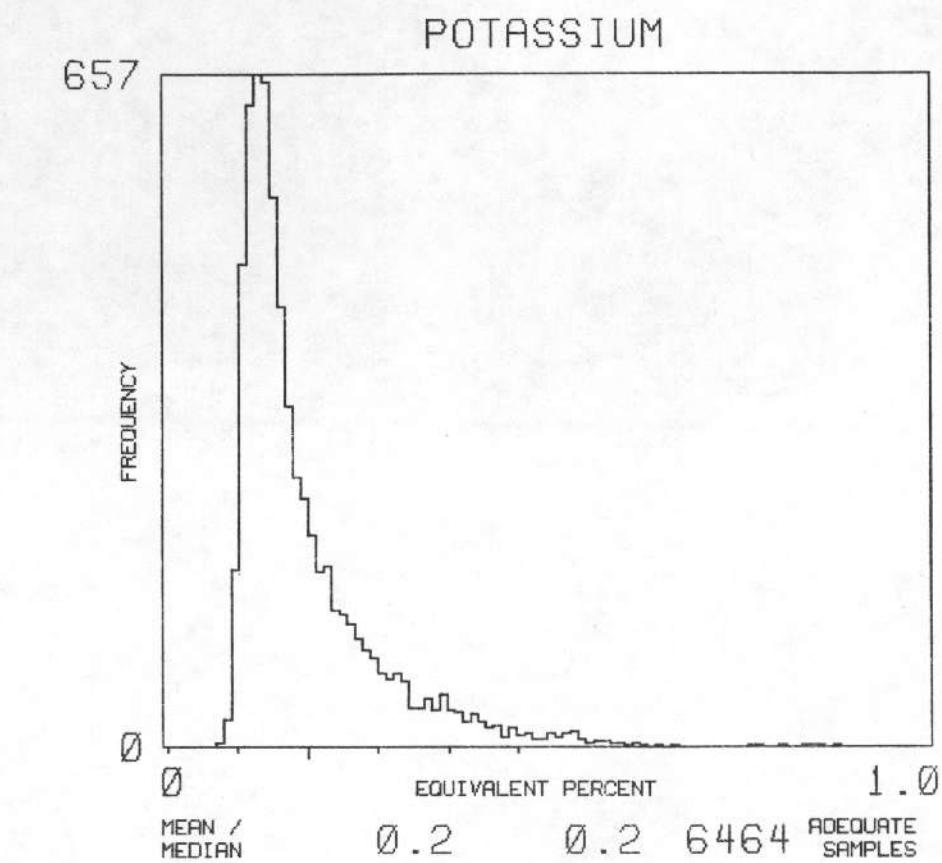
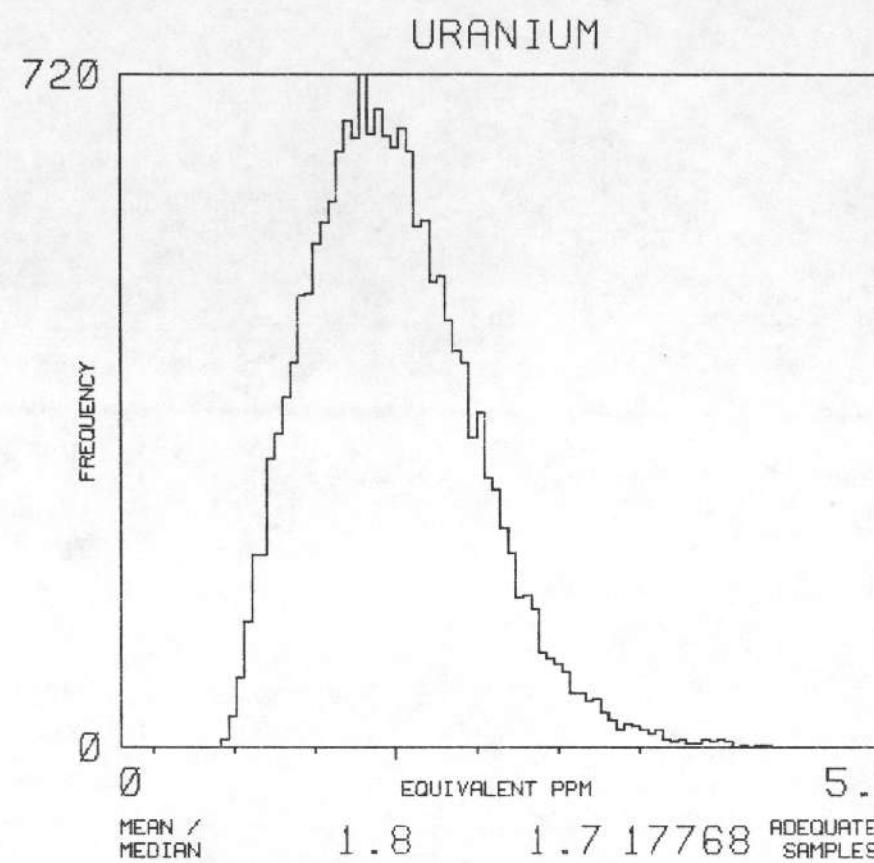
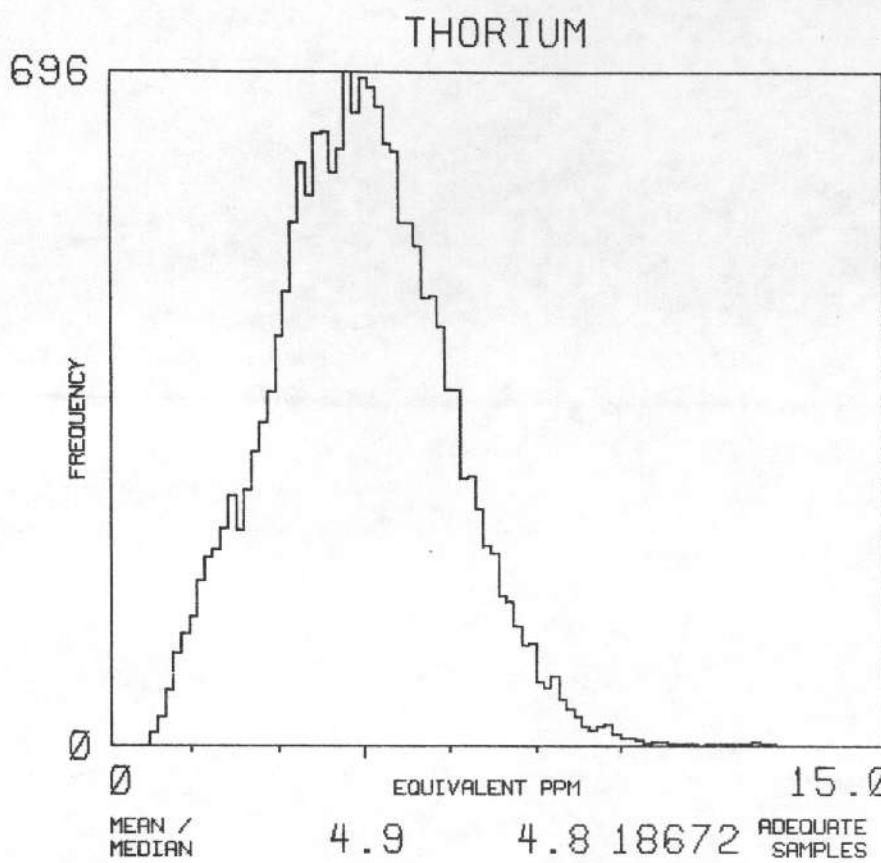
MAP UNIT : QTPPS TOTAL NUMBER OF SAMPLES 12391



NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

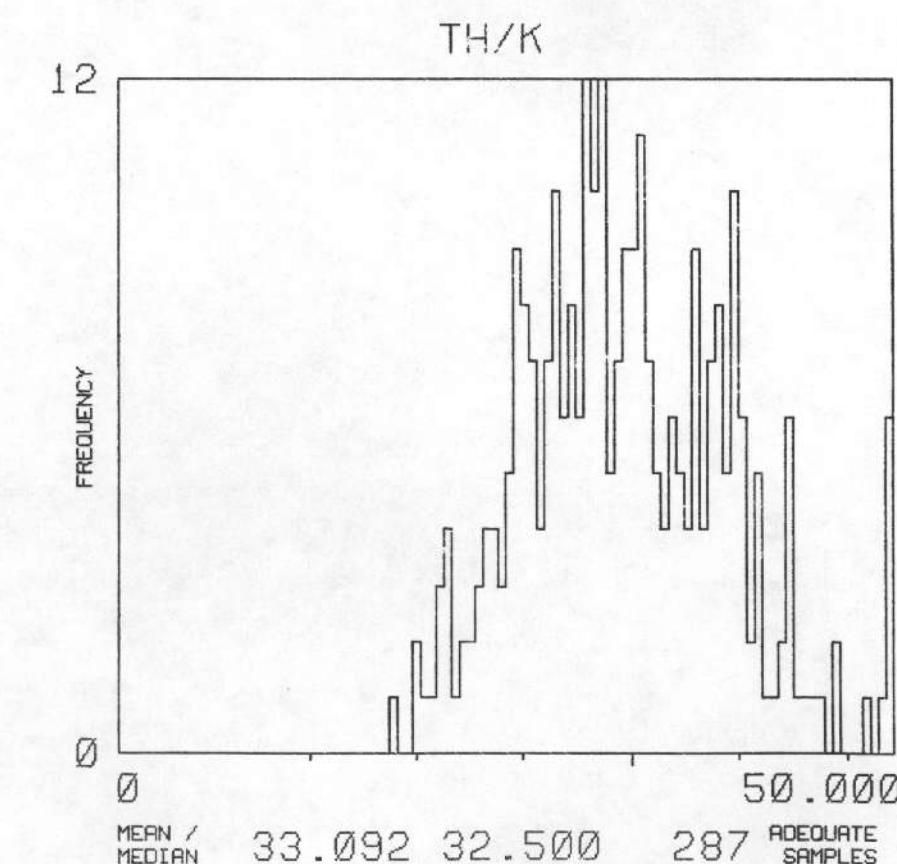
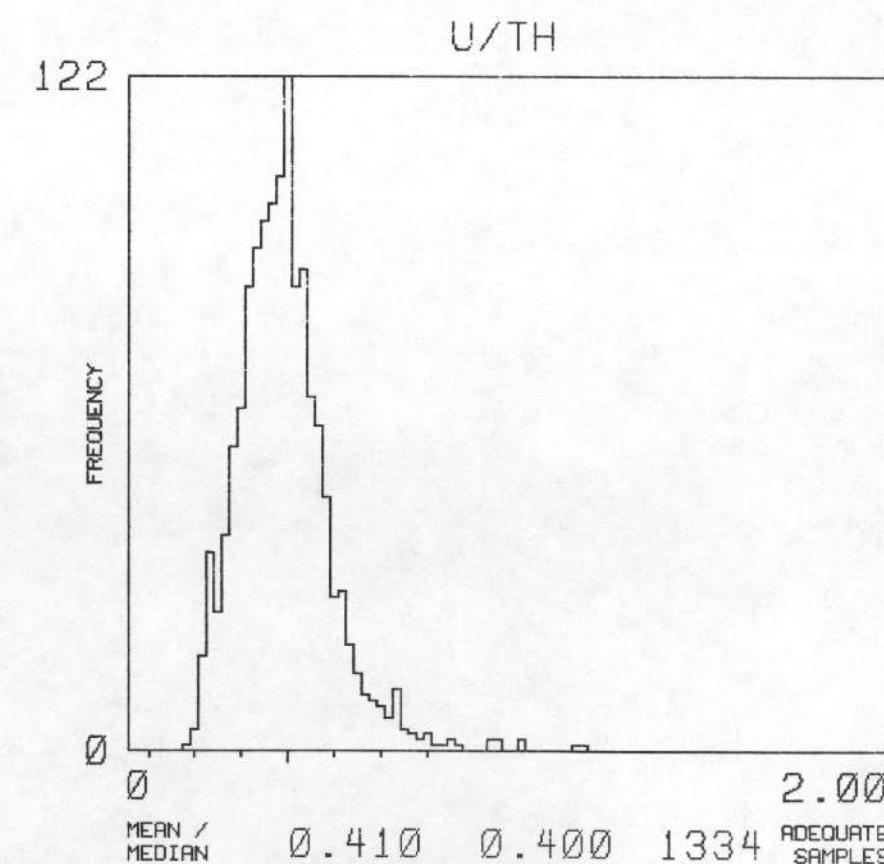
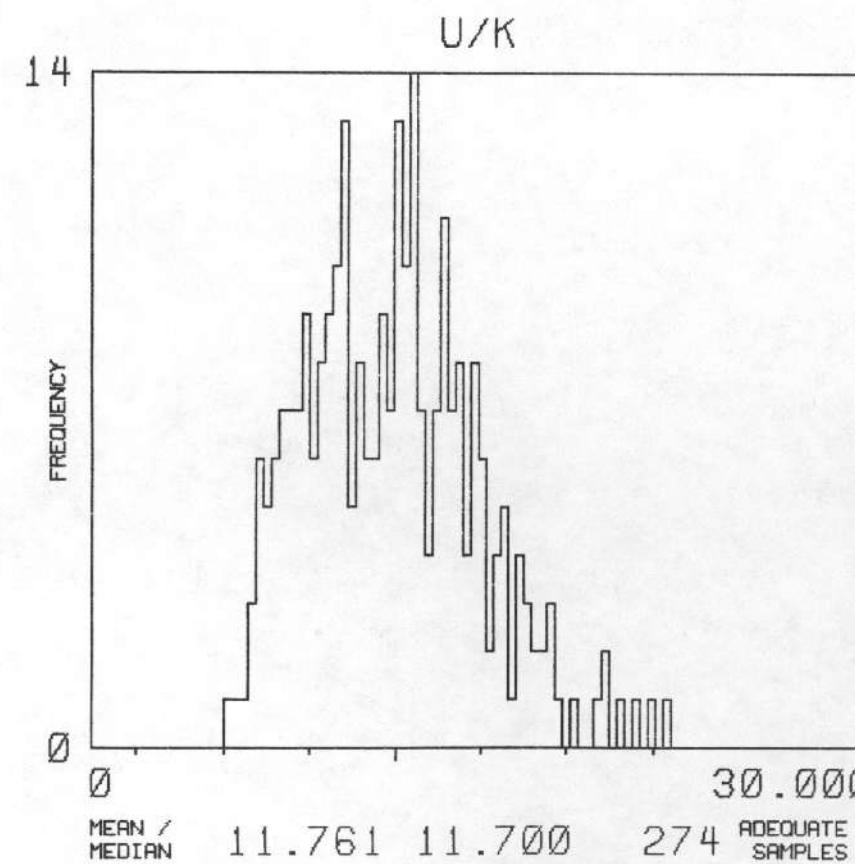
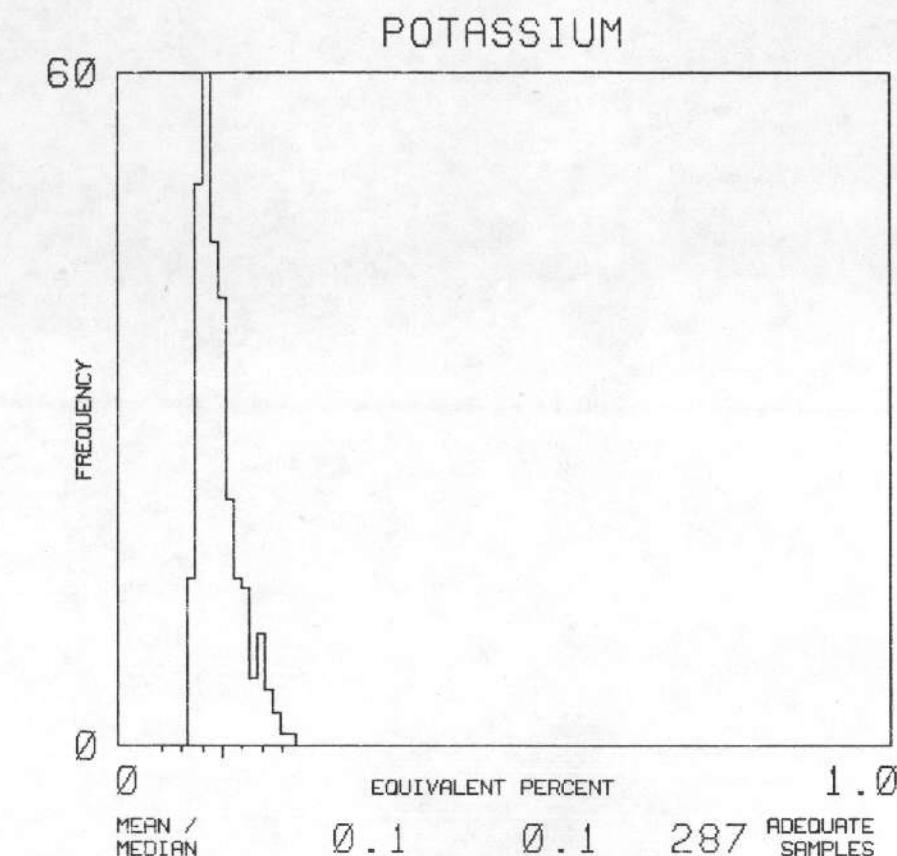
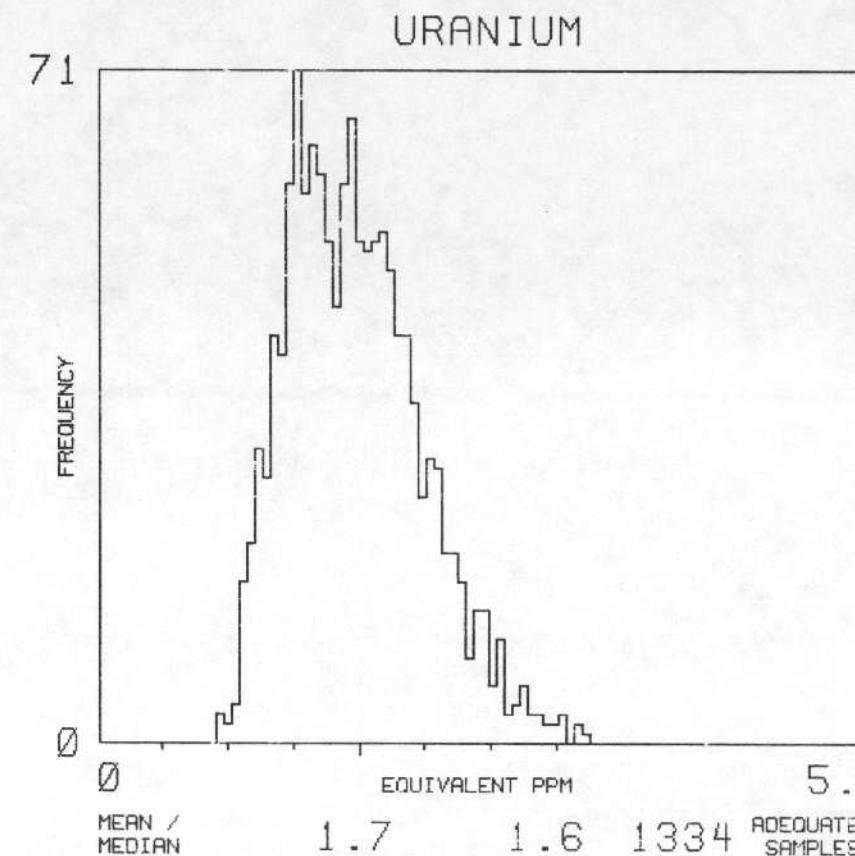
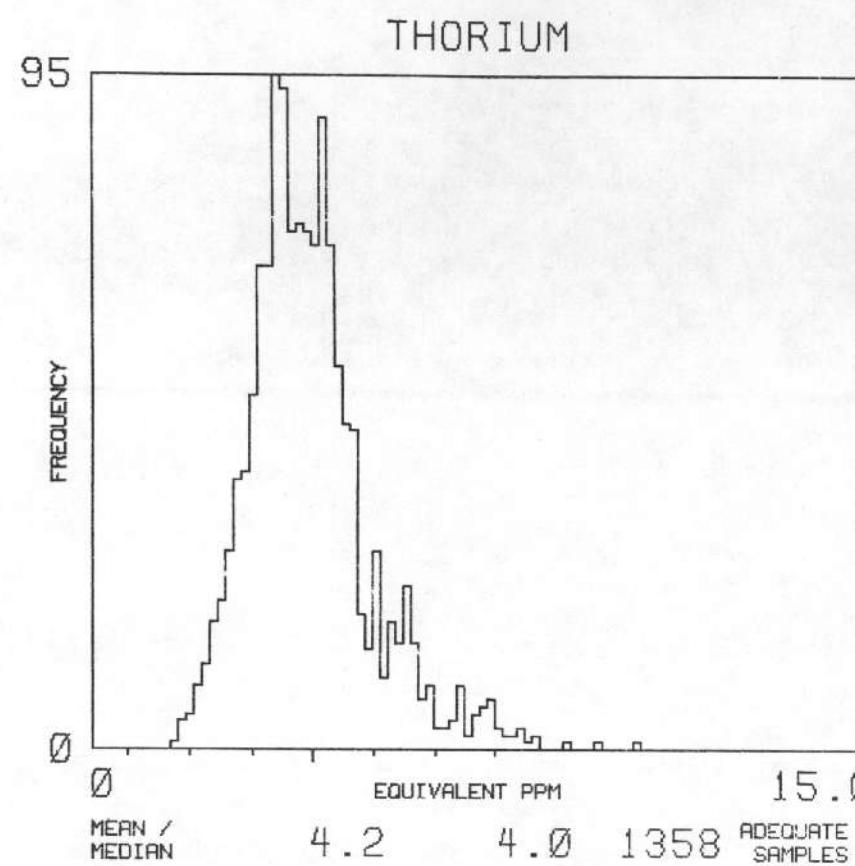
MAP UNIT : TPMU TOTAL NUMBER OF SAMPLES 18673

F17_{wb}



NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : TMH TOTAL NUMBER OF SAMPLES 1358

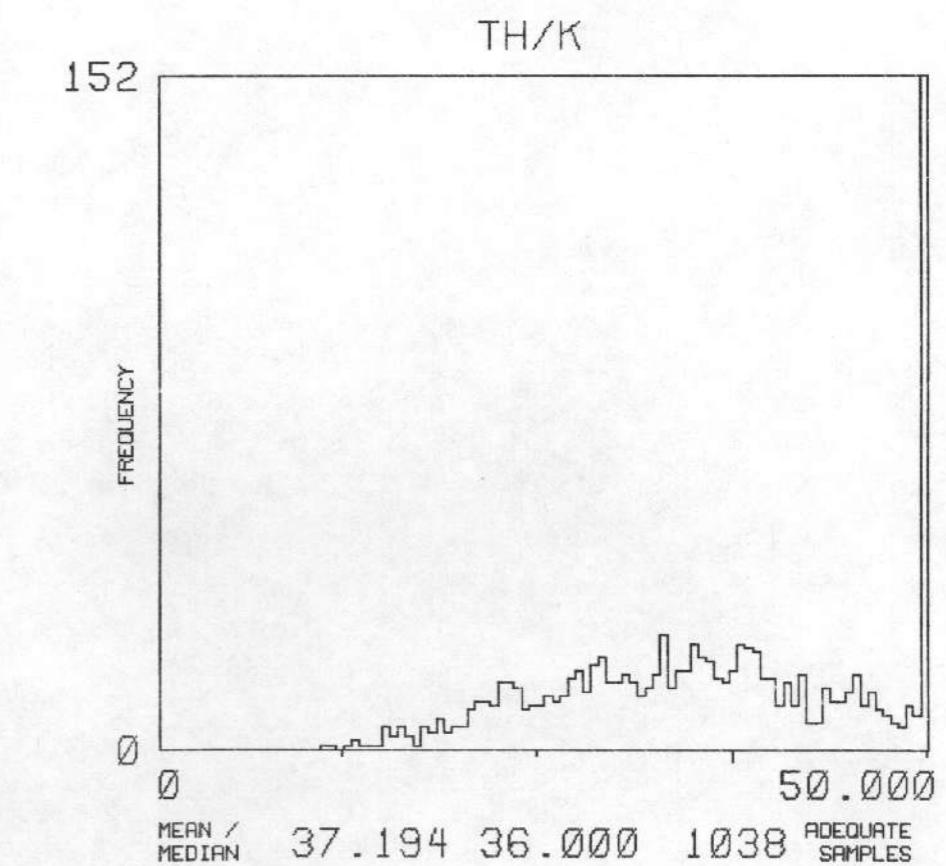
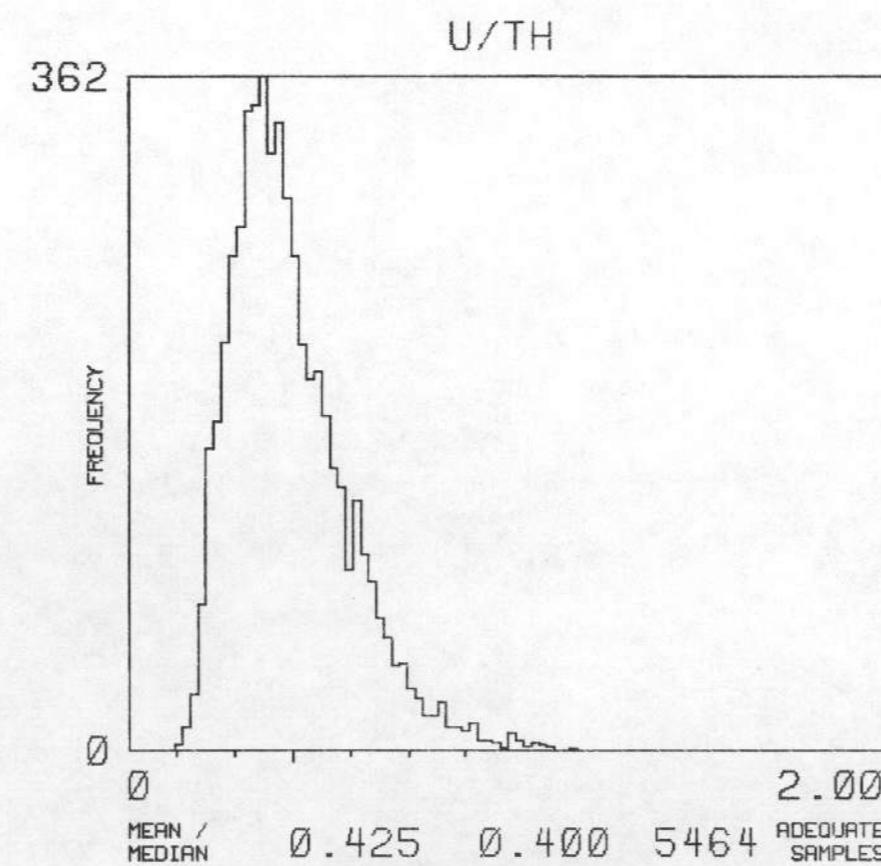
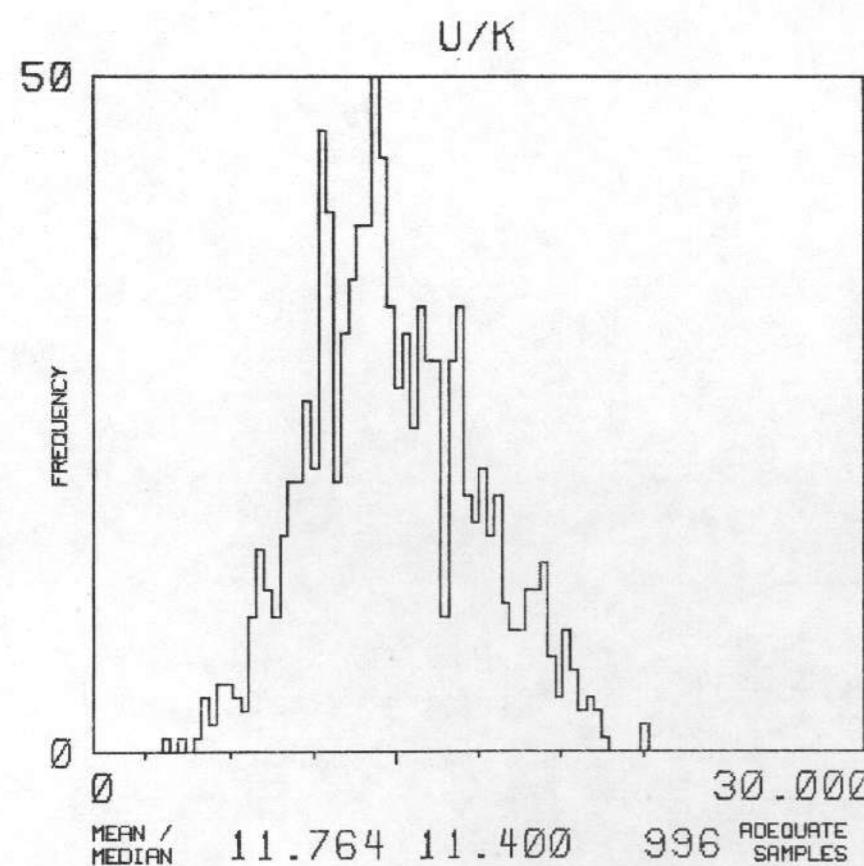
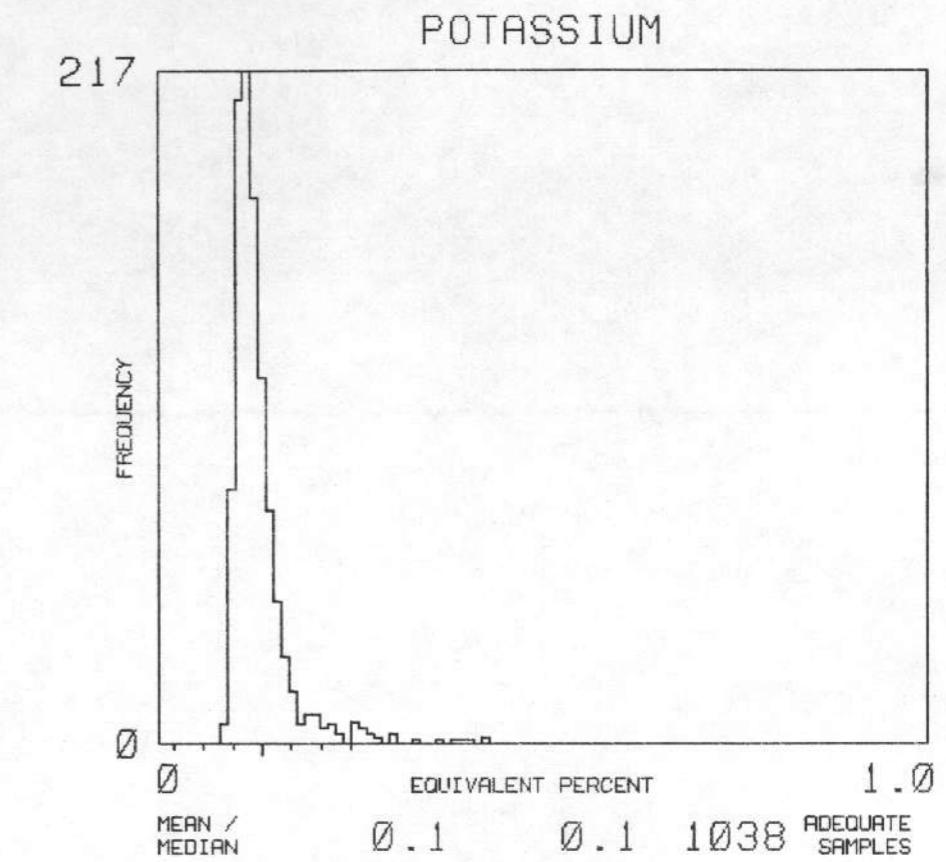
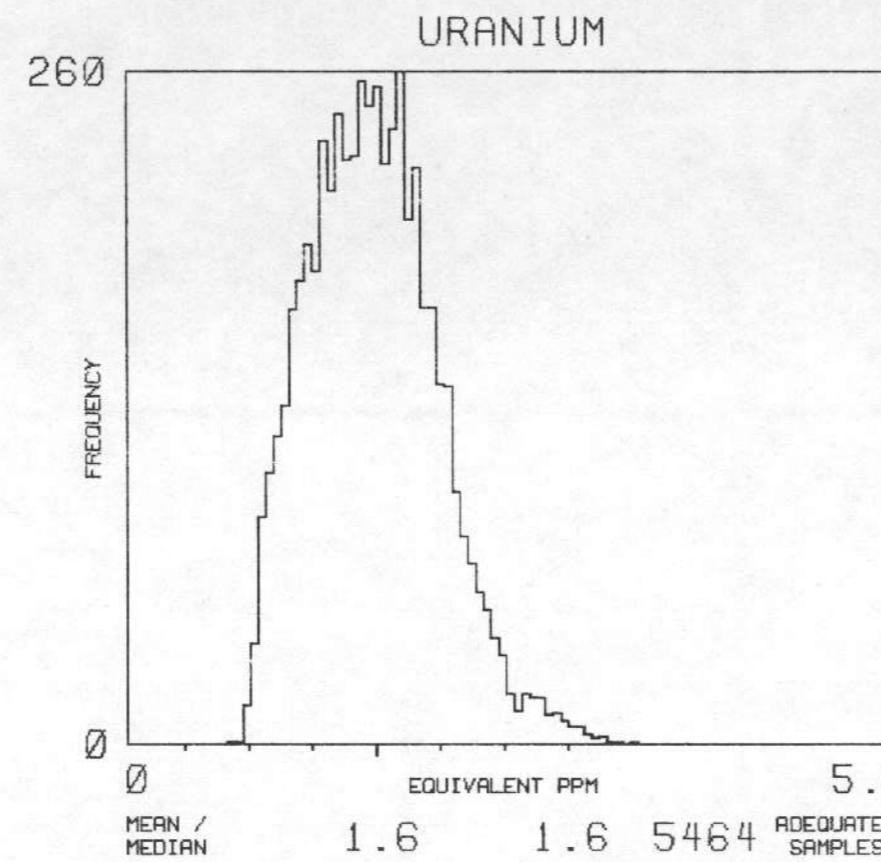
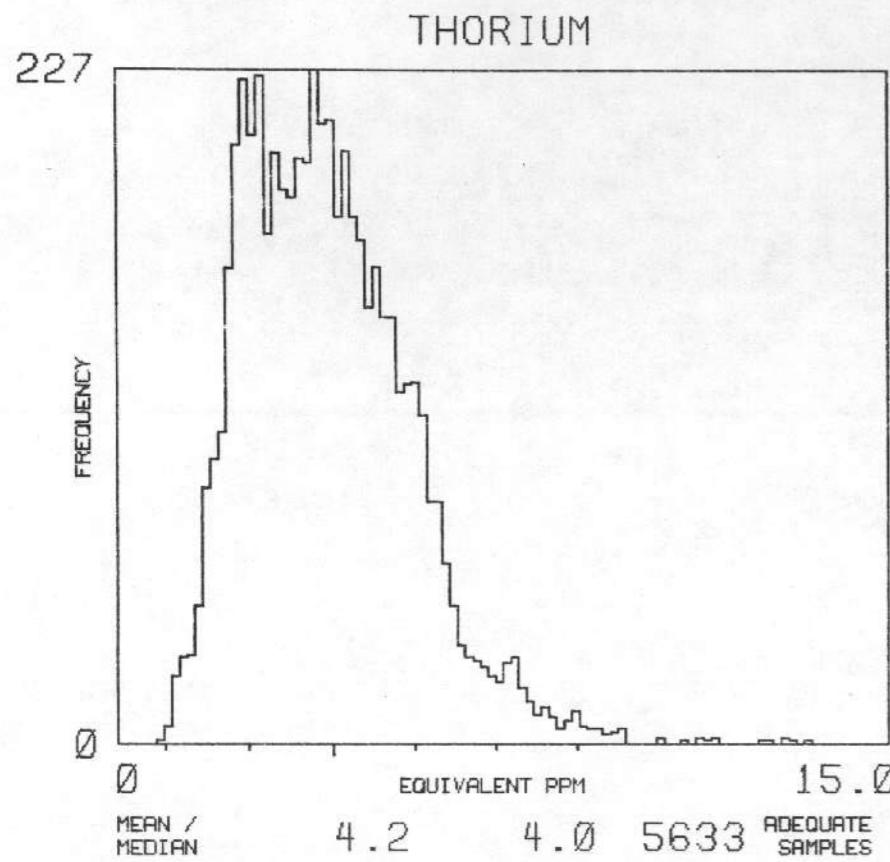


NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : TMM

TOTAL NUMBER
OF SAMPLES

5633

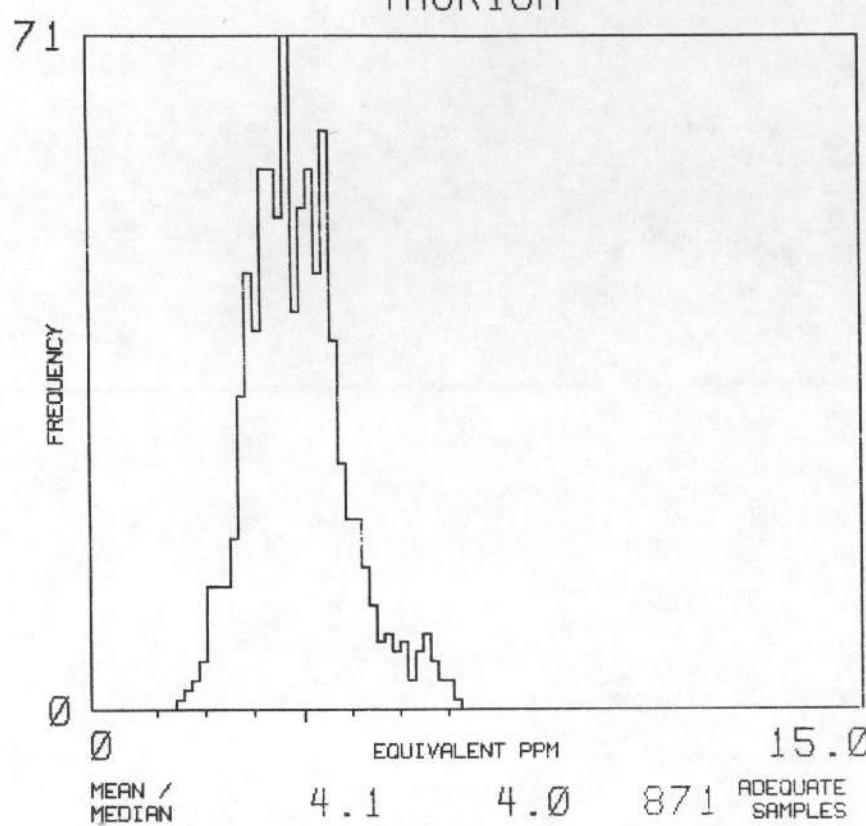


NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

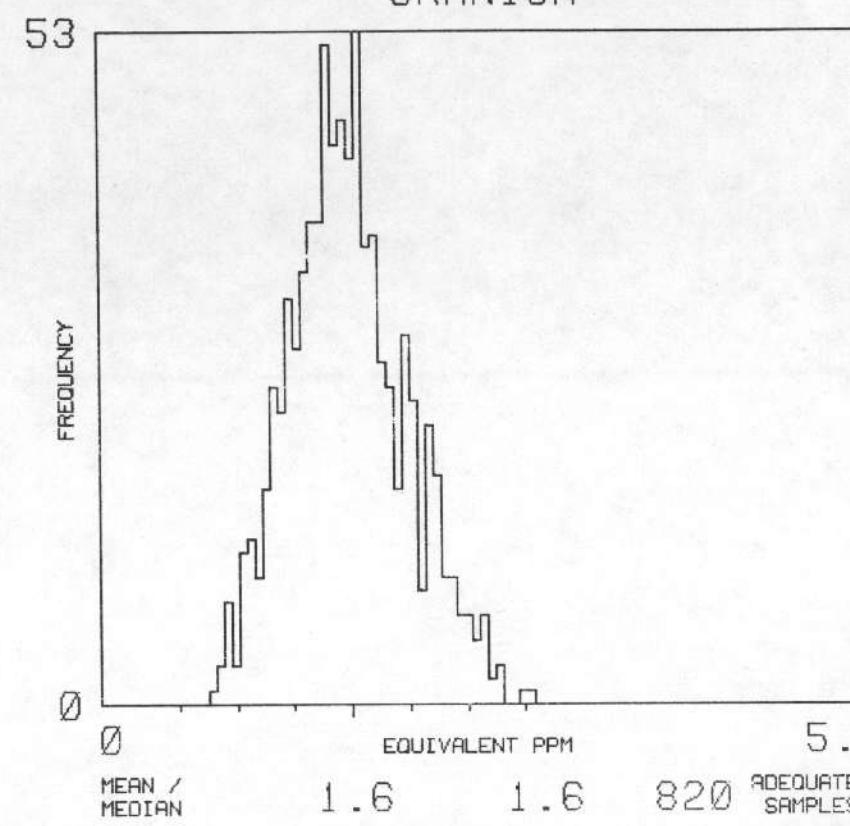
MAP UNIT : TOS TOTAL NUMBER OF SAMPLES

871

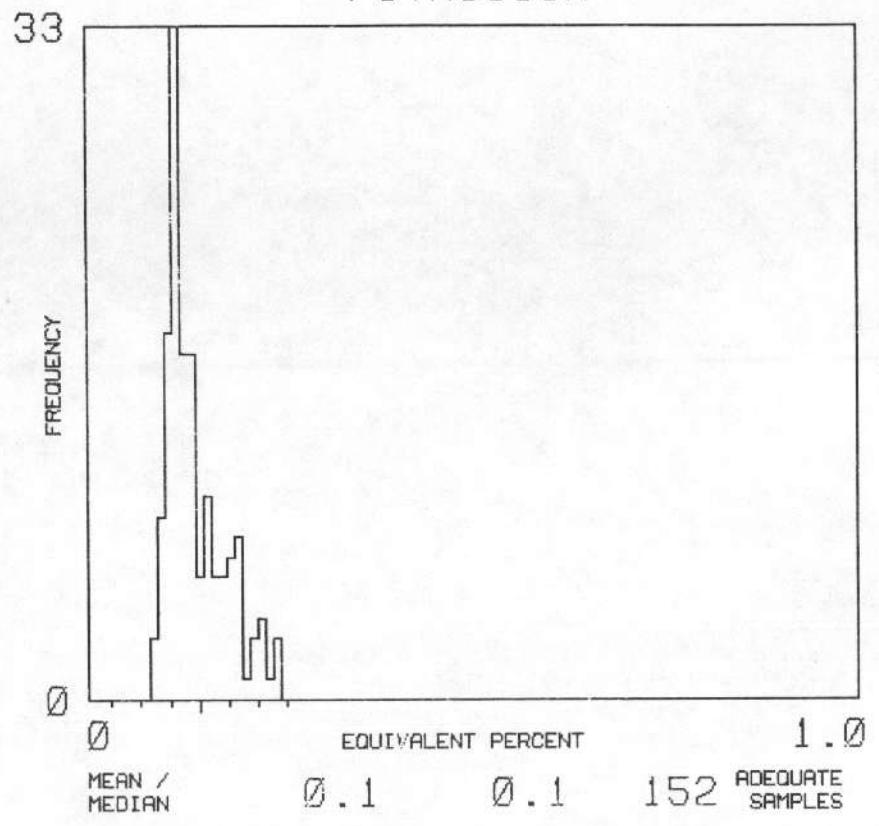
THORIUM



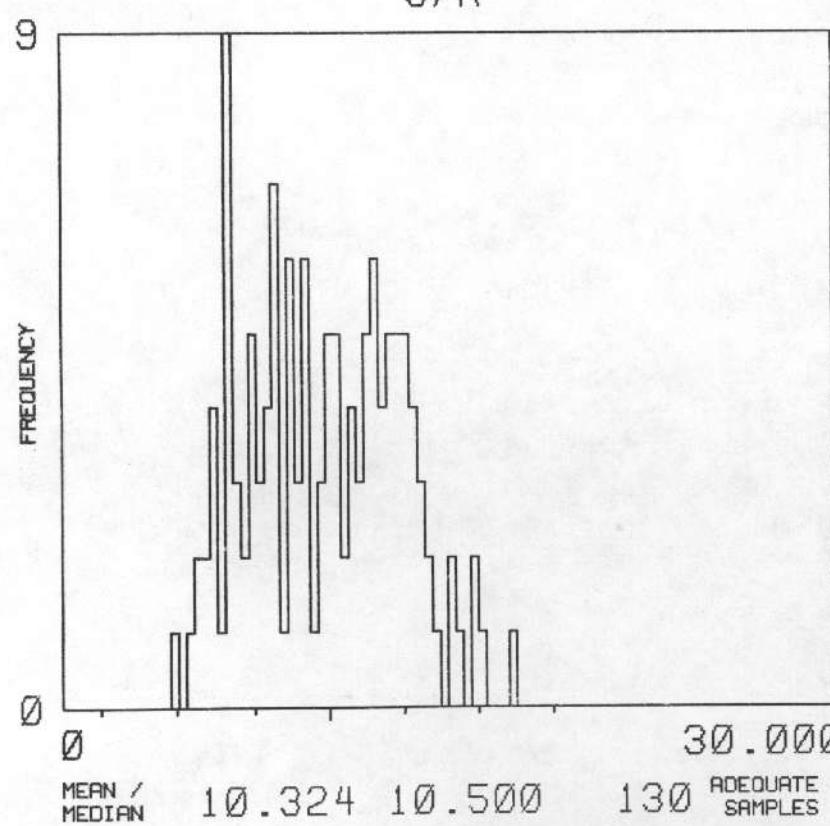
URANIUM



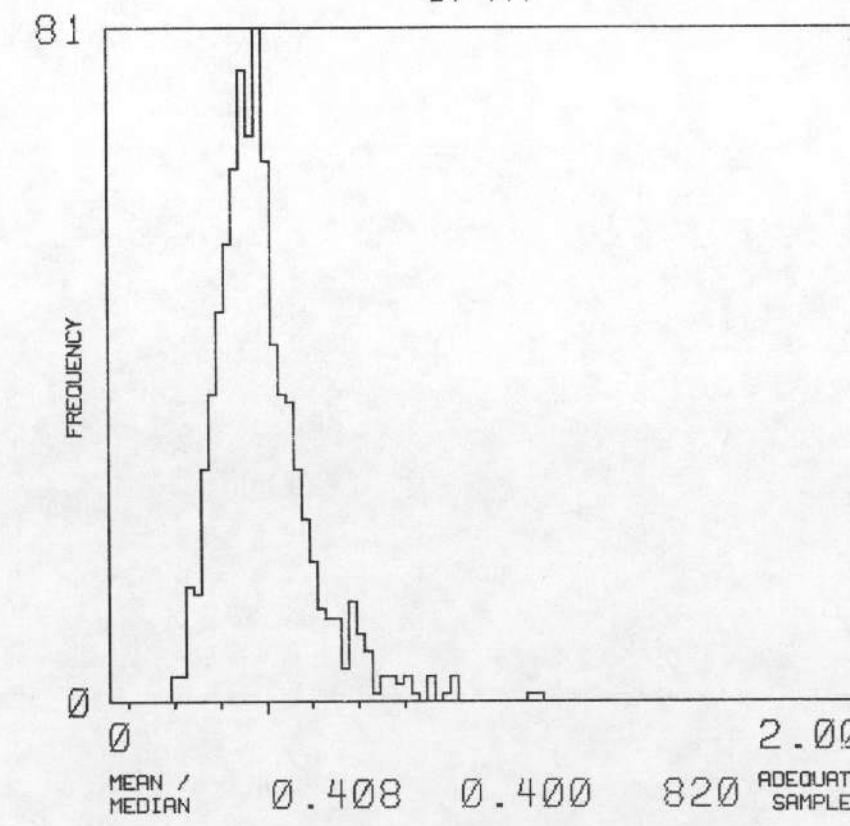
POTASSIUM



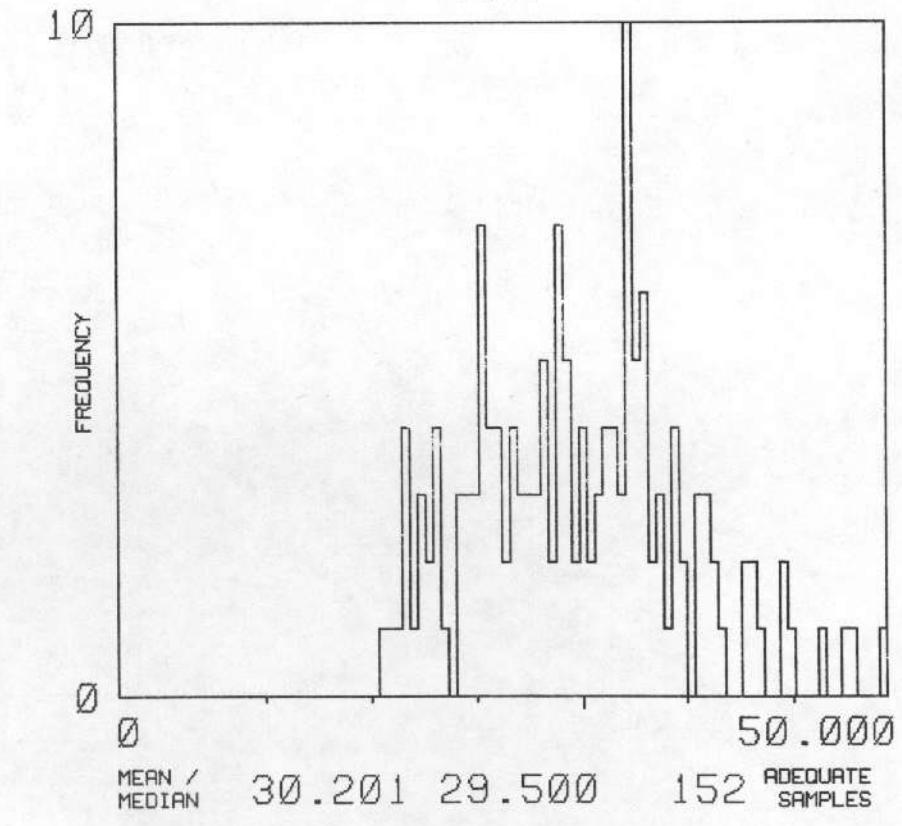
U/K



U/TH



TH/K



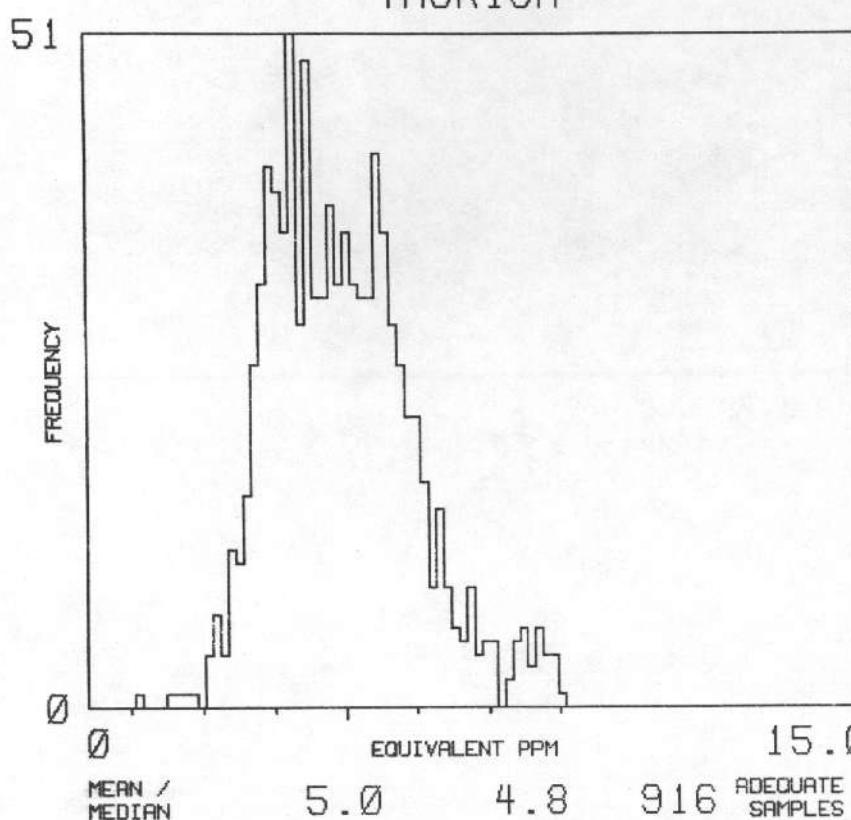
NTMS NH 17-1/2 WAYCROSS/BRUNSWICK

MAP UNIT : TEO

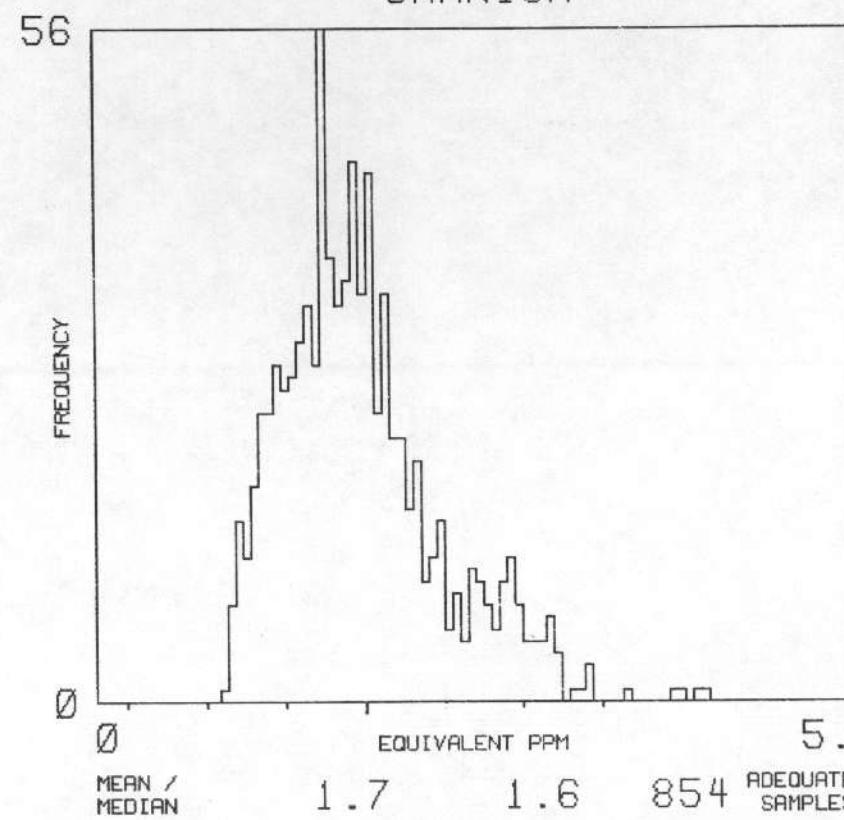
TOTAL NUMBER
OF SAMPLES

920

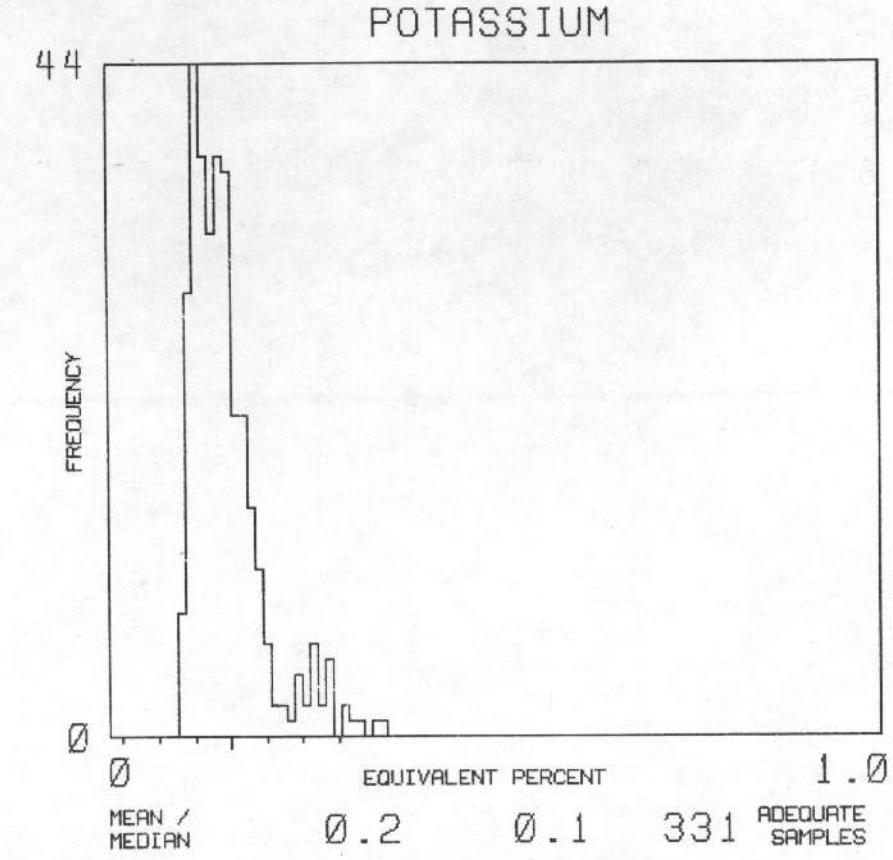
THORIUM



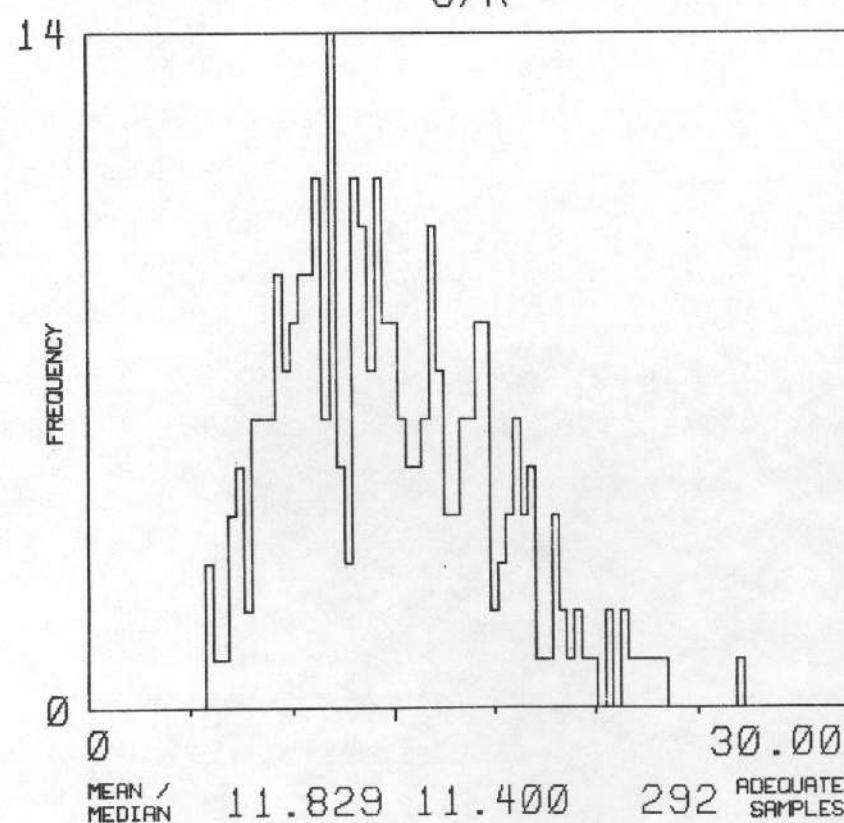
URANIUM



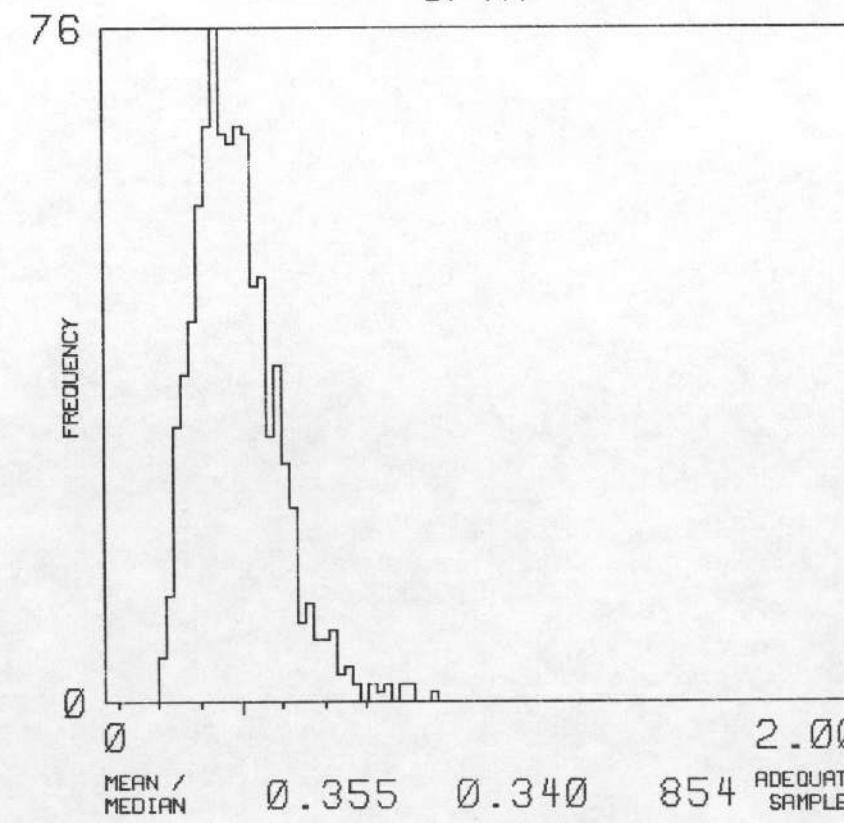
POTASSIUM



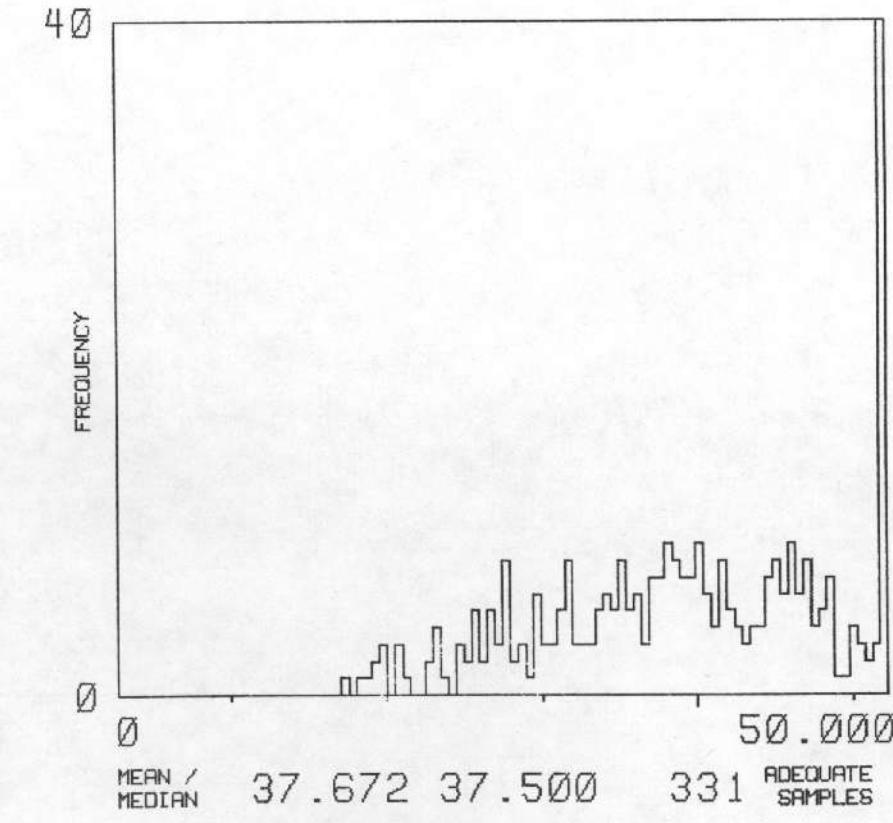
U/K



U/TH



TH/K



WAYCROSS AND BRUNSWICK QUADRANGLESComputer Map Unit Symbol Conversion Table

<u>Computer Map Unit Symbol</u>	<u>Geologic Map Unit Symbol</u>
QAL	Qal
QS	Qs
QHM	Qhm
QHI	Qhi
QTSB	Qtsb
QTPRAM	Qtpram
QTPRAI	Qtprai
QTPAM	Qt pam
QTPAI	Qt pa i
QTTM	Qt tm
QT TI	Qt ti
QTPEM	Qt pem
QTPEI	Qt pe i
QTWM	Qt w m
QTWI	Qt w i
QT PPS	Qt pps
*TPCD	Tpcd
TPMU	Tpmu
TMH	Tmh
TMM	Tmm
TOS	Tos
TEO	Teo

NOTES:

On the following pages, histograms for each computer map unit are included in the same order as they appear on the above list.

Geologic descriptions of original geologic map units are in Appendix A.

Areas over water or cultural features were assigned separate map unit symbols and were removed from the data block during processing.

*Statistical analysis was not performed on these units due to there being an inadequate number of samples.

**APPENDIX G - Uranium Anomaly Summary and
Statistical Tables**

ANOMALY SUMMARY TABLE

ANOMALY	FLIGHT	COMPUTER MAP UNIT AND NO.	ANOMALOUS SAMPLES IN UNIT	PEAK PPM	NUMBER OF SAMPLES WITH A STANDARD DEVIATION OF :							
					1	2	3	4	5	6	7	GT7
1 C	700	TMM	/ 3	/ 0	/ 0	3.0	0	2	1	0	0	0
2 C	700	TMH	/ 1	/ 0	/ 0	3.0	0	0	1	0	0	0
3 C	700	TMM	/ 5	/ 0	/ 0	2.4	3	2	0	0	0	0
4 C	700	QAL	/ 3	/ 0	/ 0	3.2	1	2	0	0	0	0
5 C	700	QTPAM	/ 1	/ 0	/ 0	3.9	0	0	1	0	0	0
6 C	710	TMM	/ 1	/ 0	/ 0	2.7	0	0	1	0	0	0
7 C	710	TMM	/ 3	/ 0	/ 0	2.9	1	1	1	0	0	0
8 C	710	TMH	/ 3TMM	/ 1	/ 0	2.5	2	2	0	0	0	0
9 C	720	TMH	/ 2TMM	/ 1	/ 0	2.2	2	1	0	0	0	0
10 C	720	QTPAM	/ 3	/ 0	/ 0	3.7	1	1	1	0	0	0
11 C	760	TPMU	/ 3	/ 0	/ 0	2.8	2	1	0	0	0	0
12 C	760	TPMU	/ 5	/ 0	/ 0	3.0	4	1	0	0	0	0
13 C	760	QTTPPS	/ 5	/ 0	/ 0	2.1	3	2	0	0	0	0
14 C	760	QTTPPS	/ 1	/ 0	/ 0	2.5	0	0	0	1	0	0
15 C	760	QTTPPS	/ 4	/ 0	/ 0	2.0	3	1	0	0	0	0
16 C	760	QTPAM	/ 3	/ 0	/ 0	3.3	1	2	0	0	0	0
17 C	770	TPMU	/ 1	/ 0	/ 0	3.2	0	0	1	0	0	0
18 C	770	TPMU	/ 3	/ 0	/ 0	3.1	1	2	0	0	0	0
19 C	770	TPMU	/ 2	/ 0	/ 0	3.6	0	0	1	1	0	0
20 C	770	TPMU	/ 1	/ 0	/ 0	3.1	0	0	1	0	0	0
21 C	770	QTTPPS	/ 1	/ 0	/ 0	2.3	0	0	1	0	0	0
22 C	770	QTTPPS	/ 3TPMU	/ 2	/ 0	2.2	3	1	1	0	0	0
23 C	770	QTTPPS	/ 2	/ 0	/ 0	2.0	0	2	0	0	0	0
24 C	770	QTTPPS	/ 3	/ 0	/ 0	1.8	2	1	0	0	0	0
25 C	770	QTPAM	/ 1	/ 0	/ 0	3.8	0	0	1	0	0	0
26 C	780	QTTPPS	/ 1	/ 0	/ 0	2.2	0	0	1	0	0	0
27 C	790	QAL	/ 3	/ 0	/ 0	3.8	1	1	1	0	0	0
28 C	800	TEO	/ 2QAL	/ 2	/ 0	2.8	2	2	0	0	0	0
29 C	800	TEO	/ 2	/ 0	/ 0	2.7	0	2	0	0	0	0
30 C	800	TEO	/ 1TOS	/ 8	/ 0	2.5	4	5	0	0	0	0
31 C	800	TPMU	/ 1	/ 0	/ 0	3.2	0	0	1	0	0	0
32 C	800	TPMU	/ 1	/ 0	/ 0	3.3	0	0	1	0	0	0
33 C	800	TPMU	/ 10	/ 0	/ 0	3.8	1	3	5	1	0	0
34 C	800	TPMU	/ 2	/ 0	/ 0	3.5	0	0	2	0	0	0
35 C	800	TPMU	/ 1	/ 0	/ 0	3.2	0	0	1	0	0	0
36 C	800	TPMU	/ 2	/ 0	/ 0	3.5	0	1	1	0	0	0
37 C	800	QAL	/ 4	/ 0	/ 0	3.9	0	3	1	0	0	0
38 C	800	QAL	/ 1	/ 0	/ 0	4.3	0	0	1	0	0	0
39 C	800	TPMU	/ 2	/ 0	/ 0	3.5	0	0	2	0	0	0
40 C	800	TPMU	/ 4	/ 0	/ 0	3.3	0	2	2	0	0	0
41 C	800	TPMU	/ 4	/ 0	/ 0	2.8	2	2	0	0	0	0
42 C	800	TPMU	/ 2	/ 0	/ 0	3.1	0	2	2	0	0	0
43 C	800	TPMU	/ 2	/ 0	/ 0	3.4	0	2	2	0	0	0
44 C	800	QAL	/ 4	/ 0	/ 0	3.8	1	2	1	0	0	0
45 C	800	QAL	/ 2	/ 0	/ 0	4.1	0	1	1	0	0	0
46 C	800	TPMU	/ 1	/ 0	/ 0	3.5	0	0	1	0	0	0
47 C	810	TEO	/ 1	/ 0	/ 0	3.8	0	0	0	1	0	0
48 C	810	TOS	/ 3	/ 0	/ 0	2.2	2	1	0	0	0	0
49 C	810	QAL	/ 3	/ 0	/ 0	3.8	2	0	1	0	0	0
50 C	810	QAL	/ 1	/ 0	/ 0	4.6	0	0	0	1	0	0

ANOMALY	FLIGHT	COMPUTER MAP UNIT AND NO.	ANOMALOUS SAMPLES IN UNIT	PEAK PPM	NUMBER OF SAMPLES WITH A STANDARD DEVIATION OF :							
					1	2	3	4	5	6	7	G7
51 C	810	QAL	/ 1TPMU	/ 2	/ 0	2.6	2	1	0	0	0	0
52 C	810	TPMU	/ 2	/ 0	/ 0	2.8	0	2	0	0	0	0
53 C	810	TPMU	/ 4	/ 0	/ 0	2.7	3	1	0	0	0	0
54 C	810	QTTPS	/ 1	/ 0	/ 0	2.6	0	0	0	1	0	0
55 C	1150	TMH	/ 1	/ 0	/ 0	2.9	0	0	1	0	0	0
56 C	1150	TPMU	/ 1	/ 0	/ 0	3.1	0	0	1	0	0	0
57 C	1170	TMM	/ 2	/ 0	/ 0	2.8	0	1	1	0	0	0
58 C	1170	TMM	/ 1	/ 0	/ 0	2.9	0	0	1	0	0	0

NOTES: M INDICATES THAT THE ANOMALY LIES OVER
A URANIUM MINE OR PROSPECT.

C INDICATES THAT THE ANOMALY LIES OVER A CULTURAL FEATURE.

W INDICATES POSSIBLE INTERFERENCE BY WEATHER PHENOMENA.

MAP UNIT QAL							
	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	-0.1502	-0.0047	0.1408	0.2863	0.4318	0.5773	0.7228
URANIUM DIST NORMAL	-0.2331	0.4897	1.2125	1.9353	2.6581	3.3809	4.1037
THORIUM DIST NORMAL	-0.6126	1.4475	3.5076	5.5677	7.6278	9.6879	11.7480
U/K DIST NORMAL	-2.6365	0.8603	4.3571	7.8539	11.3507	14.8475	18.3443
U/TH DIST NORMAL	0.0332	0.1355	0.2378	0.3401	0.4424	0.5447	0.6470
TH/K DIST NORMAL	-8.4434	2.4842	13.4118	24.3394	35.2670	46.1946	57.1222

MAP UNIT GS							
	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	0.0686	0.1049	0.1412	0.1775	0.2138	0.2501	0.2864
URANIUM DIST NORMAL	0.4820	0.6669	0.8518	1.0367	1.2216	1.4065	1.5914
THORIUM DIST NORMAL	-0.5162	0.3409	1.1980	2.0551	2.9122	3.7693	4.6264
U/K DIST NORMAL	0.2624	2.0307	3.7990	5.5673	7.3356	9.1039	10.8722
U/TH DIST NORMAL	-0.2541	0.0030	0.2601	0.5172	0.7743	1.0314	1.2885
TH/K DIST NORMAL	1.4572	5.5381	9.6190	13.6999	17.7808	21.8617	25.9426

MAP UNIT QHM							
	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	-0.0235	0.0554	0.1343	0.2132	0.2921	0.3710	0.4499
URANIUM DIST NORMAL	-0.1709	0.3337	0.8383	1.3429	1.8475	2.3521	2.8567
THORIUM DIST NORMAL	-2.1310	-0.5548	1.0214	2.5976	4.1738	5.7500	7.3262
U/K DIST NORMAL	-2.3058	0.5305	3.3668	6.2031	9.0394	11.8757	14.7120
U/TH DIST NORMAL	-0.0267	0.1042	0.2351	0.3660	0.4969	0.6278	0.7587
TH/K DIST NORMAL	-10.1061	-2.5508	5.0045	12.5598	20.1151	27.6704	35.2257

MAP UNIT QHI							
	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	-0.0375	0.0489	0.1353	0.2217	0.3081	0.3945	0.4809
URANIUM DIST NORMAL	-0.3931	0.1763	0.7457	1.3151	1.8845	2.4539	3.0233
THORIUM DIST NORMAL	-4.0181	-1.5764	0.8653	3.3070	5.7487	8.1904	10.6321
U/K DIST NORMAL	-1.6817	0.5469	2.7755	5.0041	7.2327	9.4613	11.6899
U/TH DIST NORMAL	0.0365	0.1260	0.2155	0.3050	0.3945	0.4840	0.5735
TH/K DIST NORMAL	-13.9962	-4.8129	4.3704	13.5537	22.7370	31.9203	41.1036

MAP UNIT QTSA							
	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	-0.0074	0.0637	0.1348	0.2059	0.2770	0.3481	0.4192
URANIUM DIST NORMAL	-0.2714	0.4084	1.0882	1.7680	2.4478	3.1276	3.8074
THORIUM DIST NORMAL	-1.4634	0.8163	3.0960	5.3757	7.6554	9.9351	12.2148
U/K DIST NORMAL	-4.4428	0.1483	4.7394	9.3305	13.9216	18.5127	23.1038
U/TH DIST NORMAL	0.0470	0.1340	0.2210	0.3080	0.3950	0.4820	0.5690
TH/K DIST NORMAL	-29.2201	-10.0987	9.0227	28.1441	47.2655	66.3869	85.5083

MAP UNIT QTPRAM							
	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	-0.0449	0.0275	0.0999	0.1723	0.2447	0.3171	0.3895
URANIUM DIST NORMAL	-0.8618	-0.0225	0.8168	1.6561	2.4954	3.3347	4.1740
THORIUM DIST NORMAL	-4.7093	-1.7036	1.3021	4.3078	7.3135	10.3192	13.3249
U/K DIST NORMAL	-6.1417	-0.9470	4.2477	9.4424	14.6371	19.8318	25.0265
U/TH DIST NORMAL	0.0964	0.1760	0.2556	0.3352	0.4148	0.4944	0.5740
TH/K DIST NORMAL	-30.4147	-11.0573	8.3001	27.6575	47.0149	66.3723	85.7297

MAP UNIT QTPRAI

	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	-0. 0047	0. 0533	0. 1113	0. 1693	0. 2273	0. 2853	0. 3433
URANIUM DIST NORMAL	-0. 3944	0. 2900	0. 9744	1. 6588	2. 3432	3. 0276	3. 7120
THORIUM DIST NORMAL	-2. 5368	-0. 1454	2. 2460	4. 6374	7. 0288	9. 4202	11. 8116
U/K DIST NORMAL	-1. 0689	2. 3666	5. 8021	9. 2376	12. 6731	16. 1086	19. 5441
U/TH DIST NORMAL	0. 0127	0. 1202	0. 2277	0. 3352	0. 4427	0. 5502	0. 6577
TH/K DIST NORMAL	-14. 3437	-0. 6034	13. 1369	26. 8772	40. 6175	54. 3578	68. 0981

MAP UNIT QTPAM

	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	-0. 0435	0. 0611	0. 1657	0. 2703	0. 3749	0. 4795	0. 5841
URANIUM DIST NORMAL	0. 0696	0. 6900	1. 3104	1. 9308	2. 5512	3. 1716	3. 7920
THORIUM DIST NORMAL	-0. 3418	1. 7756	3. 8930	6. 0104	8. 1278	10. 2452	12. 3626
U/K DIST NORMAL	-2. 4705	1. 0026	4. 4757	7. 9488	11. 4219	14. 8950	18. 3681
U/TH DIST NORMAL	0. 0888	0. 1644	0. 2400	0. 3156	0. 3912	0. 4668	0. 5424
TH/K DIST NORMAL	-6. 2125	4. 2393	14. 6911	25. 1429	35. 5947	46. 0465	56. 4983

MAP UNIT QTPAI

	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	-0. 1132	-0. 0115	0. 0902	0. 1919	0. 2936	0. 3953	0. 4970
URANIUM DIST NORMAL	0. 1365	0. 6610	1. 1855	1. 7100	2. 2345	2. 7590	3. 2835
THORIUM DIST NORMAL	-3. 4709	-0. 7390	1. 9929	4. 7248	7. 4567	10. 1886	12. 9205
U/K DIST NORMAL	-2. 5913	1. 8745	6. 3403	10. 8061	15. 2719	19. 7377	24. 2035
U/TH DIST NORMAL	0. 0889	0. 1642	0. 2395	0. 3148	0. 3901	0. 4654	0. 5407
TH/K DIST NORMAL	-30. 7255	-11. 4365	7. 8525	27. 1415	46. 4305	65. 7195	85. 0085

MAP UNIT QTMM

	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	-0. 0992	0. 0104	0. 1200	0. 2296	0. 3392	0. 4488	0. 5584
URANIUM DIST NORMAL	-0. 4936	0. 1959	0. 8854	1. 5749	2. 2644	2. 9539	3. 6434
THORIUM DIST NORMAL	-3. 3934	-0. 9731	1. 4472	3. 8675	6. 2878	8. 7081	11. 1284
U/K DIST NORMAL	-1. 4538	1. 7243	4. 9024	8. 0805	11. 2586	14. 4367	17. 6148
U/TH DIST NORMAL	-0. 1900	0. 0061	0. 2022	0. 3983	0. 5944	0. 7905	0. 9866
TH/K DIST NORMAL	-5. 4095	4. 9385	15. 2865	25. 6345	35. 9825	46. 3305	56. 6785

MAP UNIT GTTI

	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	-0. 1953	-0. 0416	0. 1121	0. 2658	0. 4195	0. 5732	0. 7269
URANIUM DIST NORMAL	-0. 2971	0. 2050	0. 7071	1. 2092	1. 7113	2. 2134	2. 7155
THORIUM DIST NORMAL	-2. 3451	-0. 6699	1. 0053	2. 6805	4. 3557	6. 0309	7. 7061
U/K DIST NORMAL	-0. 2863	1. 9868	4. 2599	6. 5330	8. 8061	11. 0792	13. 3523
U/TH DIST NORMAL	-0. 0511	0. 1054	0. 2619	0. 4184	0. 5749	0. 7314	0. 8879
TH/K DIST NORMAL	3. 3110	9. 2076	15. 1042	21. 0008	26. 8974	32. 7940	38. 6906

MAP UNIT QTPEM

	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	-0. 0758	0. 0119	0. 0996	0. 1873	0. 2750	0. 3627	0. 4504
URANIUM DIST NORMAL	-0. 0407	0. 4641	0. 9689	1. 4737	1. 9785	2. 4833	2. 9881
THORIUM DIST NORMAL	-2. 0256	0. 0070	2. 0396	4. 0722	6. 1048	8. 1374	10. 1700
U/K DIST NORMAL	-0. 3337	3. 0692	6. 4721	9. 8750	13. 2779	16. 6808	20. 0837
U/TH DIST NORMAL	-0. 0208	0. 1075	0. 2358	0. 3641	0. 4924	0. 6207	0. 7490
TH/K DIST NORMAL	-8. 0182	5. 3986	18. 8154	32. 2322	45. 6490	59. 0658	72. 4826

MAP UNIT QTPEI

	-3	-2	-1	0	+1	+2	+3
POTASSIUM DIST NORMAL	-0. 0161	0. 0381	0. 0923	0. 1465	0. 2007	0. 2549	0. 3091
URANIUM DIST NORMAL	-0. 0442	0. 3771	0. 7984	1. 2197	1. 6410	2. 0623	2. 4836
THORIUM DIST NORMAL	-2. 0947	-0. 3523	1. 3901	3. 1325	4. 8749	6. 6173	8. 3597
U/K DIST NORMAL	0. 4225	2. 9323	5. 4421	7. 9519	10. 4617	12. 9715	15. 4813
U/TH DIST NORMAL	-0. 0588	0. 0844	0. 2276	0. 3708	0. 5140	0. 6572	0. 8004
TH/K DIST NORMAL	-4. 0683	6. 3415	16. 7513	27. 1611	37. 5709	47. 9807	58. 3905

MAP UNIT QTWM

	-3	-2	-1	0	+1	+2	+3
POTASSIUM DIST NORMAL	-0. 1366	-0. 0268	0. 0830	0. 1928	0. 3026	0. 4124	0. 5222
URANIUM DIST NORMAL	-0. 2247	0. 3396	0. 9039	1. 4682	2. 0325	2. 5968	3. 1611
THORIUM DIST NORMAL	-2. 5103	-0. 5876	1. 3351	3. 2578	5. 1805	7. 1032	9. 0259
U/K DIST NORMAL	-2. 2207	1. 7248	5. 6703	9. 6158	13. 5613	17. 5068	21. 4523
U/TH DIST NORMAL	-0. 0719	0. 0947	0. 2613	0. 4279	0. 5945	0. 7611	0. 9277
TH/K DIST NORMAL	-6. 0485	5. 3795	16. 8075	28. 2355	39. 6635	51. 0915	62. 5195

MAP UNIT QTWI

	-3	-2	-1	0	+1	+2	+3
POTASSIUM DIST NORMAL	0. 0265	0. 0554	0. 0843	0. 1132	0. 1421	0. 1710	0. 1999
URANIUM DIST NORMAL	0. 2659	0. 4816	0. 6973	0. 9130	1. 1287	1. 3444	1. 5601
THORIUM DIST NORMAL	-0. 7075	0. 0480	0. 8035	1. 5590	2. 3145	3. 0700	3. 8255
U/K DIST NORMAL	2. 4570	4. 3767	6. 2964	8. 2161	10. 1358	12. 0555	13. 9752
U/TH DIST NORMAL	-0. 1168	0. 1253	0. 3674	0. 6095	0. 8516	1. 0937	1. 3358
TH/K DIST NORMAL	0. 0994	6. 2102	12. 3210	18. 4318	24. 5426	30. 6534	36. 7642

MAP UNIT QTPPS

	-3	-2	-1	0	+1	+2	+3
POTASSIUM DIST NORMAL	-0. 2501	-0. 1200	0. 0101	0. 1402	0. 2703	0. 4004	0. 5305
URANIUM DIST NORMAL	0. 1161	0. 4868	0. 8575	1. 2282	1. 5989	1. 9696	2. 3403
THORIUM DIST NORMAL	-1. 1425	-0. 0294	1. 0837	2. 1968	3. 3099	4. 4230	5. 5361
U/K DIST NORMAL	1. 2245	4. 1804	7. 1363	10. 0922	13. 0481	16. 0040	18. 9599
U/TH DIST NORMAL	-0. 0892	0. 1418	0. 3728	0. 6038	0. 8348	1. 0658	1. 2968
TH/K DIST NORMAL	-3. 3476	5. 3781	14. 1038	22. 8295	31. 5552	40. 2809	49. 0066

MAP UNIT TPMU

	-3	-2	-1	0	+1	+2	+3
POTASSIUM DIST NORMAL	-0. 0841	0. 0071	0. 0983	0. 1895	0. 2807	0. 3719	0. 4631
URANIUM DIST NORMAL	0. 2101	0. 7337	1. 2573	1. 7809	2. 3045	2. 8281	3. 3517
THORIUM DIST NORMAL	-0. 1405	1. 5350	3. 2105	4. 8860	6. 5615	8. 2370	9. 9125
U/K DIST NORMAL	-0. 5416	3. 1560	6. 8536	10. 5512	14. 2488	17. 9464	21. 6440
U/TH DIST NORMAL	-0. 0075	0. 1219	0. 2513	0. 3807	0. 5101	0. 6395	0. 7689
TH/K DIST NORMAL	0. 3200	11. 1945	22. 0690	32. 9435	43. 8180	54. 6925	65. 5670

MAP UNIT TMH

	-3	-2	-1	0	+1	+2	+3
POTASSIUM DIST NORMAL	0. 0576	0. 0834	0. 1092	0. 1350	0. 1608	0. 1866	0. 2124
URANIUM DIST NORMAL	0. 3956	0. 8200	1. 2444	1. 6688	2. 0932	2. 5176	2. 9420
THORIUM DIST NORMAL	0. 6791	1. 8678	3. 0565	4. 2452	5. 4339	6. 6226	7. 8113
U/K DIST NORMAL	1. 7185	5. 0661	8. 4137	11. 7613	15. 1089	18. 4565	21. 8041
U/TH DIST NORMAL	0. 0528	0. 1720	0. 2912	0. 4104	0. 5296	0. 6488	0. 7680
TH/K DIST NORMAL	12. 3181	19. 2427	26. 1673	33. 0919	40. 0165	46. 9411	53. 8657

MAP UNIT TMM							
	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	0. 0200	0. 0583	0. 0966	0. 1349	0. 1732	0. 2115	0. 2498
URANIUM DIST NORMAL	0. 3795	0. 7915	1. 2035	1. 6155	2. 0275	2. 4395	2. 8515
THORIUM DIST NORMAL	-0. 6498	0. 9519	2. 5536	4. 1553	5. 7570	7. 3587	8. 9604
U/K DIST NORMAL	2. 0504	5. 2882	8. 5260	11. 7638	15. 0016	18. 2394	21. 4772
U/TH DIST NORMAL	-0. 0228	0. 1264	0. 2756	0. 4248	0. 5740	0. 7232	0. 8724
TH/K DIST NORMAL	-0. 7793	11. 8785	24. 5363	37. 1941	49. 8519	62. 5097	75. 1675

MAP UNIT TOS							
	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	0. 0309	0. 0688	0. 1067	0. 1446	0. 1825	0. 2204	0. 2583
URANIUM DIST NORMAL	0. 5123	0. 8838	1. 2553	1. 6268	1. 9983	2. 3698	2. 7413
THORIUM DIST NORMAL	1. 2822	2. 2243	3. 1664	4. 1085	5. 0506	5. 9927	6. 9348
U/K DIST NORMAL	1. 5202	4. 4549	7. 3896	10. 3243	13. 2590	16. 1937	19. 1284
U/TH DIST NORMAL	0. 0490	0. 1686	0. 2882	0. 4078	0. 5274	0. 6470	0. 7666
TH/K DIST NORMAL	9. 6631	16. 5091	23. 3551	30. 2011	37. 0471	43. 8931	50. 7391

MAP UNIT TEO							
	-3	-2	-1	0	+1	+2	+3
POTASIUM DIST NORMAL	0. 0186	0. 0651	0. 1116	0. 1581	0. 2046	0. 2511	0. 2976
URANIUM DIST NORMAL	0. 2049	0. 7148	1. 2247	1. 7346	2. 2445	2. 7544	3. 2643
THORIUM DIST NORMAL	0. 8324	2. 2226	3. 6128	5. 0030	6. 3932	7. 7834	9. 1736
U/K DIST NORMAL	-0. 0441	3. 9136	7. 8713	11. 8290	15. 7867	19. 7444	23. 7021
U/TH DIST NORMAL	0. 0351	0. 1417	0. 2483	0. 3549	0. 4615	0. 5681	0. 6747
TH/K DIST NORMAL	7. 4142	17. 5001	27. 5860	37. 6719	47. 7578	57. 8437	67. 9296

LINE BASED MEAN CONCENTRATIONS
AND RATIOS PER ROCK TYPE

MAP UNIT QAL

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.250	0.152	0.182	0.187	0.150	0.236	0.276	0.364	0.285	0.347	0.423	0.299	0.143	0.000	0.000
URANIUM	2.357	1.646	1.422	1.646	1.375	1.456	1.670	1.940	2.008	2.345	2.758	2.258	1.536	0.000	0.000
THORIUM	7.073	4.815	3.875	5.064	3.333	3.965	4.168	5.187	5.591	7.334	6.616	5.800	5.213	0.000	0.000
U/K	11.120	11.671	8.989	9.108	9.366	7.646	6.722	5.459	7.574	7.812	7.495	9.531	10.542	0.000	0.000
U/TH	0.340	0.337	0.347	0.312	0.421	0.360	0.418	0.363	0.333	0.316	0.429	0.385	0.291	0.000	0.000
TH/K	31.989	35.109	27.413	29.532	25.956	23.057	18.171	14.514	20.962	25.485	17.901	26.686	38.823	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.378	0.286	0.329	0.307	0.198	0.364	0.000
URANIUM	2.075	1.760	1.600	1.580	1.470	1.605	0.000
THORIUM	6.855	6.244	5.530	5.131	5.057	5.078	0.000
U/K	5.805	6.036	6.245	6.315	8.207	4.754	0.000
U/TH	0.304	0.251	0.296	0.303	0.278	0.295	0.000
TH/K	19.351	23.925	21.408	23.348	28.464	15.378	0.000

MAP UNIT QS

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.141	0.000	0.000	0.000
URANIUM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.185	0.000	0.000	0.000
THORIUM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.583	0.000	0.000	0.000
U/K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.246	0.000	0.000	0.000
U/TH	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.759	0.000	0.000	0.000
TH/K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	11.915	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.199	0.000	0.000	0.000	0.000	0.000
URANIUM	0.000	0.929	0.000	0.000	0.000	0.000	0.000
THORIUM	0.000	2.915	0.000	0.000	0.000	0.000	0.000
U/K	0.000	4.593	0.000	0.000	0.000	0.000	0.000
U/TH	0.000	0.341	0.000	0.000	0.000	0.000	0.000
TH/K	0.000	14.750	0.000	0.000	0.000	0.000	0.000

MAP UNIT QHM

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.207	0.189	0.229	0.221	0.195	0.194	0.202	0.219	0.221	0.213	0.238	0.218	0.000	0.000	0.000
URANIUM	1.153	1.419	1.405	1.383	1.118	1.067	1.401	1.642	1.161	1.619	0.976	1.144	0.000	0.000	0.000
THORIUM	2.229	2.504	3.436	2.626	2.517	2.306	3.050	2.540	2.977	2.266	2.196	2.148	0.000	0.000	0.000
U/K	5.118	6.940	6.523	7.309	6.796	5.795	7.620	7.045	5.833	6.565	4.959	5.110	0.000	0.000	0.000
U/TH	0.351	0.293	0.349	0.291	0.368	0.321	0.381	0.427	0.339	0.353	0.416	0.443	0.000	0.000	0.000
TH/K	11.066	13.283	15.759	12.292	14.266	12.163	15.423	10.249	14.232	10.442	9.661	10.415	0.000	0.000	0.000

	1180	1190	1200	1210	1220	1230	1240
POTASIUM	0.000	0.000	0.000	0.000	0.000	0.236	0.204
URANIUM	0.000	0.000	0.000	0.000	0.000	1.830	1.044
THORIUM	0.000	0.000	0.000	0.000	0.000	4.845	2.003
U/K	0.000	0.000	0.000	0.000	0.000	7.563	4.619
U/TH	0.000	0.000	0.000	0.000	0.000	0.336	0.442
TH/K	0.000	0.000	0.000	0.000	0.000	20.693	10.238

MAP UNIT QHI

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.256	0.164	0.321	0.000	0.000	0.000	0.318	0.000	0.000	0.000	0.234	0.000	0.000	0.000	0.000
URANIUM	0.908	0.816	1.383	0.000	0.000	0.000	1.629	0.000	0.000	0.000	1.537	0.000	0.000	0.000	0.000
THORIUM	4.396	2.375	4.046	0.000	0.000	0.000	5.068	0.000	0.000	0.000	5.961	0.000	0.000	0.000	0.000
U/K	3.501	5.352	4.682	0.000	0.000	0.000	5.116	0.000	0.000	0.000	5.720	0.000	0.000	0.000	0.000
U/TH	0.212	0.350	0.336	0.000	0.000	0.000	0.321	0.000	0.000	0.000	0.254	0.000	0.000	0.000	0.000
TH/K	17.733	15.126	13.297	0.000	0.000	0.000	16.023	0.000	0.000	0.000	22.863	0.000	0.000	0.000	0.000

MAP UNIT GTSB

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.000	0.000	0.224	0.171	0.000	0.135	0.000	0.284	0.000	0.194	0.329	0.000	0.000	0.000	0.000
URANIUM	0.000	0.000	1.061	2.089	0.000	1.766	0.000	2.476	0.000	1.945	0.967	0.000	0.000	0.000	0.000
THORIUM	0.000	0.000	2.726	6.635	0.000	7.125	0.000	5.929	0.000	4.412	2.773	0.000	0.000	0.000	0.000
U/K	0.000	0.000	5.006	13.129	0.000	12.385	0.000	10.916	0.000	9.295	3.079	0.000	0.000	0.000	0.000
U/TH	0.000	0.000	0.389	0.311	0.000	0.241	0.000	0.376	0.000	0.257	0.371	0.000	0.000	0.000	0.000
TH/K	0.000	0.000	12.601	41.448	0.000	55.413	0.000	20.189	0.000	23.118	8.470	0.000	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.000	0.000	0.000	0.000	0.000	0.000
URANIUM	0.000	0.000	0.000	0.000	0.000	0.000	0.000
THORIUM	0.000	0.000	0.000	0.000	0.000	0.000	0.000
U/K	0.000	0.000	0.000	0.000	0.000	0.000	0.000
U/TH	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TH/K	0.000	0.000	0.000	0.000	0.000	0.000	0.000

MAP UNIT GTPRAM

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.136	0.000	0.256	0.000	0.000	0.163	0.000	0.000	0.000	0.000	0.000	0.208	0.000	0.000	0.000
URANIUM	1.573	0.000	0.000	3.303	0.000	2.226	0.000	0.000	0.000	0.000	0.000	1.850	0.000	0.000	0.000
THORIUM	4.246	0.000	2.206	10.880	0.000	7.448	0.000	0.000	0.000	0.000	0.000	5.087	0.000	0.000	0.000
U/K	10.422	0.000	0.000	0.000	0.000	18.962	0.000	0.000	0.000	0.000	0.000	8.859	0.000	0.000	0.000
U/TH	0.339	0.000	0.000	0.312	0.000	0.237	0.000	0.000	0.000	0.000	0.000	0.319	0.000	0.000	0.000
TH/K	30.647	0.000	8.628	0.000	0.000	89.394	0.000	0.000	0.000	0.000	0.000	25.229	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.000	0.000	0.000	0.000	0.140	0.000
URANIUM	0.000	0.000	0.000	0.000	0.000	1.140	0.000
THORIUM	0.000	0.000	0.000	0.000	0.000	2.717	0.000
U/K	0.000	0.000	0.000	0.000	0.000	7.655	0.000
U/TH	0.000	0.000	0.000	0.000	0.000	0.367	0.000
TH/K	0.000	0.000	0.000	0.000	0.000	22.174	0.000

MAP UNIT QTPRAI

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.000	0.194	0.216	0.140	0.145	0.127	0.244	0.154	0.000	0.137	0.000	0.000	0.000	0.000	0.000
URANIUM	0.000	1.083	2.130	1.387	1.086	1.097	0.000	1.509	0.000	2.023	0.000	0.000	0.000	0.000	0.000
THORIUM	0.000	3.054	7.449	3.609	5.397	3.610	1.747	4.011	0.000	6.036	0.000	0.000	0.000	0.000	0.000
U/K	0.000	5.663	10.373	6.841	7.551	11.115	0.000	9.766	0.000	9.906	0.000	0.000	0.000	0.000	0.000
U/TH	0.000	0.336	0.295	0.323	0.200	0.325	0.000	0.433	0.000	0.331	0.000	0.000	0.000	0.000	0.000
TH/K	0.000	16.736	37.075	22.740	37.852	28.494	7.265	28.370	0.000	30.358	0.000	0.000	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.000	0.000	0.000	0.000	0.000	0.128
URANIUM	0.000	0.000	0.000	0.000	0.000	0.000	0.000
THORIUM	0.000	0.000	0.000	0.000	0.000	0.000	2.047
U/K	0.000	0.000	0.000	0.000	0.000	0.000	0.000
U/TH	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TH/K	0.000	0.000	0.000	0.000	0.000	0.000	16.928

MAP UNIT QTPAM

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.211	0.258	0.318	0.236	0.219	0.245	0.224	0.300	0.307	0.384	0.276	0.366	0.000	0.000	0.000
URANIUM	1.989	2.205	2.761	1.880	1.924	1.867	2.029	2.117	1.962	1.601	1.543	1.717	0.000	0.000	0.000
THORIUM	6.542	7.420	9.000	6.706	6.807	6.167	5.681	5.441	6.016	5.087	4.906	4.994	0.000	0.000	0.000
U/K	10.108	8.937	9.711	8.619	9.497	8.546	9.719	7.444	6.717	4.453	6.099	4.894	0.000	0.000	0.000
U/TH	0.297	0.296	0.312	0.270	0.274	0.307	0.364	0.336	0.321	0.312	0.322	0.329	0.000	0.000	0.000
TH/K	33.220	30.343	31.395	31.826	34.443	27.915	26.977	21.229	20.927	14.482	19.129	15.134	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.000	0.000	0.000	0.000	0.252	0.252
URANIUM	0.000	0.000	0.000	0.000	0.000	2.070	1.449
THORIUM	0.000	0.000	0.000	0.000	0.000	6.538	4.225
U/K	0.000	0.000	0.000	0.000	0.000	9.170	6.178
U/TH	0.000	0.000	0.000	0.000	0.000	0.315	0.342
TH/K	0.000	0.000	0.000	0.000	0.000	28.558	18.268

MAP UNIT QTPAI

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.000	0.146	0.000	0.113	0.000	0.193	0.275	0.000	0.162	0.000	0.000	0.478	0.000	0.000	0.000
URANIUM	0.000	0.000	0.000	1.709	0.000	2.210	0.000	0.000	1.721	0.000	0.000	2.289	0.000	0.000	0.000
THORIUM	0.000	1.606	0.000	5.554	0.000	8.967	1.641	0.000	4.169	0.000	0.000	5.798	0.000	0.000	0.000
U/K	0.000	0.000	0.000	11.513	0.000	13.340	0.000	0.000	13.251	0.000	0.000	4.796	0.000	0.000	0.000
U/TH	0.000	0.000	0.000	0.316	0.000	0.248	0.000	0.000	0.244	0.000	0.000	0.397	0.000	0.000	0.000
TH/K	0.000	11.209	0.000	50.518	0.000	54.406	5.976	0.000	23.977	0.000	0.000	12.182	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.000	0.000	0.000	0.000	0.156	0.123
URANIUM	0.000	0.000	0.000	0.000	0.000	1.465	1.170
THORIUM	0.000	0.000	0.000	0.000	0.000	4.049	2.486
U/K	0.000	0.000	0.000	0.000	0.000	10.599	10.649
U/TH	0.000	0.000	0.000	0.000	0.000	0.333	0.433
TH/K	0.000	0.000	0.000	0.000	0.000	27.563	25.534

MAP UNIT QTMM

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.000	0.000	0.127	0.089	0.122	0.099	0.331	0.161	0.165	0.291	0.000	0.000	0.000	0.000	0.000
URANIUM	0.000	0.000	0.996	0.851	1.127	1.048	2.258	1.441	1.396	1.910	0.000	0.000	0.000	0.000	0.000
THORIUM	0.000	0.000	2.497	2.176	2.824	3.189	6.140	2.525	5.367	6.070	0.000	0.000	0.000	0.000	0.000
U/K	0.000	0.000	8.233	0.000	9.678	0.000	8.777	10.306	9.069	6.798	0.000	0.000	0.000	0.000	0.000
U/TH	0.000	0.000	0.408	0.378	0.396	0.356	0.382	0.614	0.263	0.309	0.000	0.000	0.000	0.000	0.000
TH/K	0.000	0.000	22.402	27.148	24.507	39.233	24.961	25.388	36.158	21.572	0.000	0.000	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.000	0.000	0.000	0.000	0.229	0.000
URANIUM	0.000	0.000	0.000	0.000	0.000	1.516	0.000
THORIUM	0.000	0.000	0.000	0.000	0.000	2.971	0.000
U/K	0.000	0.000	0.000	0.000	0.000	8.434	0.000
U/TH	0.000	0.000	0.000	0.000	0.000	0.450	0.000
TH/K	0.000	0.000	0.000	0.000	0.000	25.989	0.000

MAP UNIT GTTI

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.121	0.116	0.112	0.000	0.089	0.117	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
URANIUM	0.923	0.903	0.925	0.975	1.129	1.502	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
THORIUM	1.968	1.897	2.049	2.208	2.793	3.601	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
U/K	8.067	8.312	7.641	0.000	0.000	11.555	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
U/TH	0.435	0.381	0.477	0.406	0.361	0.403	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TH/K	25.210	29.673	23.013	0.000	20.087	32.179	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.000	0.000	0.000	0.000	0.390	0.000
URANIUM	0.000	0.000	0.000	0.000	0.000	1.658	0.000
THORIUM	0.000	0.000	0.000	0.000	0.000	4.175	0.000
U/K	0.000	0.000	0.000	0.000	0.000	5.576	0.000
U/TH	0.000	0.000	0.000	0.000	0.000	0.415	0.000
TH/K	0.000	0.000	0.000	0.000	0.000	17.651	0.000

MAP UNIT GTPEM

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.145	0.155	0.159	0.209	0.125	0.138	0.140	0.257	0.000	0.000	0.000	0.000	0.000	0.000	0.000
URANIUM	1.604	1.113	1.292	1.841	1.407	1.492	1.582	1.890	0.000	0.000	0.000	0.000	0.000	0.000	0.000
THORIUM	4.524	3.213	3.749	4.317	3.961	4.217	4.402	4.632	0.000	0.000	0.000	0.000	0.000	0.000	0.000
U/K	15.694	9.649	7.747	9.939	13.287	9.926	11.346	8.277	0.000	0.000	0.000	0.000	0.000	0.000	0.000
U/TH	0.386	0.373	0.359	0.281	0.358	0.357	0.378	0.424	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TH/K	57.561	40.250	28.324	34.394	46.527	37.454	40.605	20.460	0.000	0.000	0.000	0.000	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.000	0.000	0.090	0.113	0.000	0.000
URANIUM	0.000	0.000	0.000	0.843	1.588	0.000	0.000
THORIUM	0.000	0.000	0.000	1.580	4.804	0.000	0.000
U/K	0.000	0.000	0.000	8.996	13.555	0.000	0.000
U/TH	0.000	0.000	0.000	0.539	0.281	0.000	0.000
TH/K	0.000	0.000	0.000	25.670	47.811	0.000	0.000

MAP UNIT QTPEI

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.000	0.100	0.104	0.088	0.106	0.084	0.122	0.000	0.112	0.190	0.000	0.000	0.000	0.000	0.000
URANIUM	1.558	1.100	1.443	0.780	1.023	0.976	1.649	0.000	0.824	0.927	0.000	0.000	0.000	0.000	0.000
THORIUM	4.049	3.069	3.865	1.528	2.128	1.184	4.493	0.000	1.890	2.586	0.000	0.000	0.000	0.000	0.000
U/K	0.000	10.555	8.123	8.557	9.015	0.000	9.192	0.000	0.000	3.701	0.000	0.000	0.000	0.000	0.000
U/TH	0.349	0.372	0.402	0.516	0.472	0.770	0.339	0.000	0.482	0.369	0.000	0.000	0.000	0.000	0.000
TH/K	0.000	33.246	19.284	14.873	26.620	12.362	30.830	0.000	16.884	16.461	0.000	0.000	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.000	0.000	0.000	0.156	0.100	0.000
URANIUM	0.000	0.000	0.000	0.000	1.225	0.951	0.000
THORIUM	0.000	0.000	0.000	0.000	4.735	2.130	0.000
U/K	0.000	0.000	0.000	0.000	7.988	9.158	0.000
U/TH	0.000	0.000	0.000	0.000	0.251	0.478	0.000
TH/K	0.000	0.000	0.000	0.000	32.710	21.084	0.000

MAP UNIT QTWM

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.088	0.088	0.000	0.136	0.000	0.129	0.000	0.186	0.119	0.232	0.000	0.000	0.000	0.000	0.000
URANIUM	0.000	0.849	0.000	1.155	1.253	1.184	1.563	1.521	1.566	1.806	0.000	0.000	0.000	0.000	0.000
THORIUM	0.803	1.195	0.000	2.486	2.860	2.742	2.145	2.867	4.017	4.511	0.000	0.000	0.000	0.000	0.000
U/K	0.000	0.000	0.000	8.116	0.000	11.076	0.000	10.307	11.416	9.809	0.000	0.000	0.000	0.000	0.000
U/TH	0.000	0.879	0.000	0.489	0.450	0.440	0.689	0.527	0.377	0.373	0.000	0.000	0.000	0.000	0.000
TH/K	0.000	8.987	0.000	26.527	0.000	32.709	0.000	28.762	31.213	30.980	0.000	0.000	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.000	0.000	0.103	0.215	0.142	0.000
URANIUM	0.000	0.000	0.000	0.845	1.446	1.270	0.000
THORIUM	0.000	0.000	0.000	2.096	3.764	2.567	0.000
U/K	0.000	0.000	0.000	9.538	9.068	9.293	0.000
U/TH	0.000	0.000	0.000	0.399	0.342	0.535	0.000
TH/K	0.000	0.000	0.000	23.035	27.515	19.656	0.000

MAP UNIT QTWI

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.100	0.000	0.000	0.000	0.000	0.090	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
URANIUM	0.820	0.889	0.750	0.000	0.000	1.174	1.108	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
THORIUM	1.241	1.669	0.870	0.000	0.000	1.961	2.317	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
U/K	9.484	0.000	0.000	0.000	0.000	9.537	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
U/TH	0.659	0.609	0.942	0.000	0.000	0.560	0.502	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TH/K	16.497	0.000	0.000	0.000	0.000	10.318	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.000	0.000	0.000	0.095	0.138	0.000	0.000
URANIUM	0.000	0.000	0.000	0.807	1.097	0.000	0.000
THORIUM	0.000	0.000	0.000	1.265	2.905	0.000	0.000
U/K	0.000	0.000	0.000	7.630	7.860	0.000	0.000
U/TH	0.000	0.000	0.000	0.691	0.379	0.000	0.000
TH/K	0.000	0.000	0.000	14.079	23.239	0.000	0.000

MAP UNIT QTTPS

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.117	0.107	0.145	0.113	0.102	0.111	0.143	0.134	0.113	0.114	0.115	0.133	0.000	0.000	0.000
URANIUM	1.022	1.069	1.169	1.164	1.275	1.137	1.653	1.519	1.309	1.184	1.312	1.861	0.000	0.000	0.000
THORIUM	1.468	1.594	1.923	2.002	2.295	2.132	3.077	2.607	2.657	2.089	2.842	3.992	0.000	0.000	0.000
U/K	9.355	10.049	9.285	10.348	10.600	9.970	11.809	11.116	10.966	9.860	11.859	15.062	0.000	0.000	0.000
U/TH	0.736	0.730	0.650	0.621	0.575	0.588	0.598	0.661	0.533	0.605	0.475	0.522	0.000	0.000	0.000
TH/K	19.283	24.551	19.909	21.274	22.714	24.677	20.143	27.191	27.471	21.085	25.186	37.064	0.000	0.000	0.000

1180 1190 1200 1210 1220 1230 1240

POTASIUM	0.093	0.157	0.219	0.118	0.134	0.000	0.000
URANIUM	1.167	1.109	1.110	1.238	1.452	0.000	0.000
THORIUM	1.802	2.006	2.291	2.871	5.379	0.000	0.000
U/K	10.530	9.171	8.264	7.776	10.620	0.000	0.000
U/TH	0.652	0.584	0.487	0.454	0.274	0.000	0.000
TH/K	17.606	23.649	21.207	21.575	40.577	0.000	0.000

MAP UNIT TPMU

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.000	0.104	0.124	0.179	0.128	0.158	0.164	0.169	0.196	0.224	0.208	0.216	0.157	0.136	0.159
URANIUM	0.000	1.125	1.267	1.398	1.405	1.582	1.871	1.909	1.647	1.737	2.179	2.084	1.543	1.567	1.937
THORIUM	0.000	1.684	3.639	3.731	3.729	4.338	4.734	4.514	5.208	5.268	5.597	5.777	4.750	5.030	5.258
U/K	0.000	0.000	10.017	9.719	11.378	10.992	11.592	11.054	9.846	9.894	10.829	11.010	9.812	11.452	12.196
U/TH	0.000	0.701	0.345	0.414	0.415	0.384	0.408	0.452	0.335	0.341	0.397	0.374	0.332	0.321	0.388
TH/K	0.000	17.246	30.074	32.643	34.059	33.967	34.177	33.212	33.390	31.610	30.652	32.643	33.496	41.741	37.622

	1180	1190	1200	1210	1220	1230	1240
POTASIUM	0. 197	0. 233	0. 159	0. 208	0. 131	0. 000	0. 000
URANIUM	1. 758	1. 486	1. 309	1. 359	1. 310	0. 000	0. 000
THORIUM	5. 057	4. 212	3. 817	3. 797	4. 330	0. 000	0. 000
U/K	10. 491	8. 270	8. 421	7. 139	9. 979	0. 000	0. 000
U/TH	0. 379	0. 394	0. 361	0. 308	0. 293	0. 000	0. 000
TH/U	33. 685	27. 885	28. 930	26. 804	35. 387	0. 000	0. 000

MAP UNIT TMI

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0. 136	0. 125	0. 134	0. 133	0. 139	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 110	0. 147	0. 117
URANIUM	1. 734	1. 803	1. 668	1. 763	1. 427	1. 353	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	1. 674	1. 643	1. 345
THORIUM	4. 399	4. 103	3. 961	4. 727	4. 092	3. 892	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	4. 224	4. 597	3. 414
U/K	13. 360	13. 388	11. 918	11. 446	9. 422	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	11. 766	10. 815	10. 830
U/TH	0. 406	0. 456	0. 432	0. 389	0. 355	0. 355	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 401	0. 378	0. 421
TH/U	33. 038	33. 164	29. 216	35. 149	32. 788	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	36. 385	33. 666	32. 502

MAP UNIT TM

	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0. 123	0. 129	0. 144	0. 137	0. 136	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 127	0. 132	0. 118
URANIUM	1. 614	1. 654	1. 525	1. 588	1. 577	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	1. 718	1. 680	1. 710
THORIUM	3. 687	3. 505	3. 890	4. 375	4. 932	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	5. 273	5. 174	3. 293
U/K	13. 171	12. 026	11. 549	11. 121	10. 958	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	12. 565	13. 337	13. 714
U/TH	0. 464	0. 497	0. 423	0. 405	0. 332	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 341	0. 360	0. 537
TH/K	35. 417	28. 997	35. 897	36. 361	38. 889	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	0. 000	47. 688	45. 517	28. 630

MAP UNIT TO

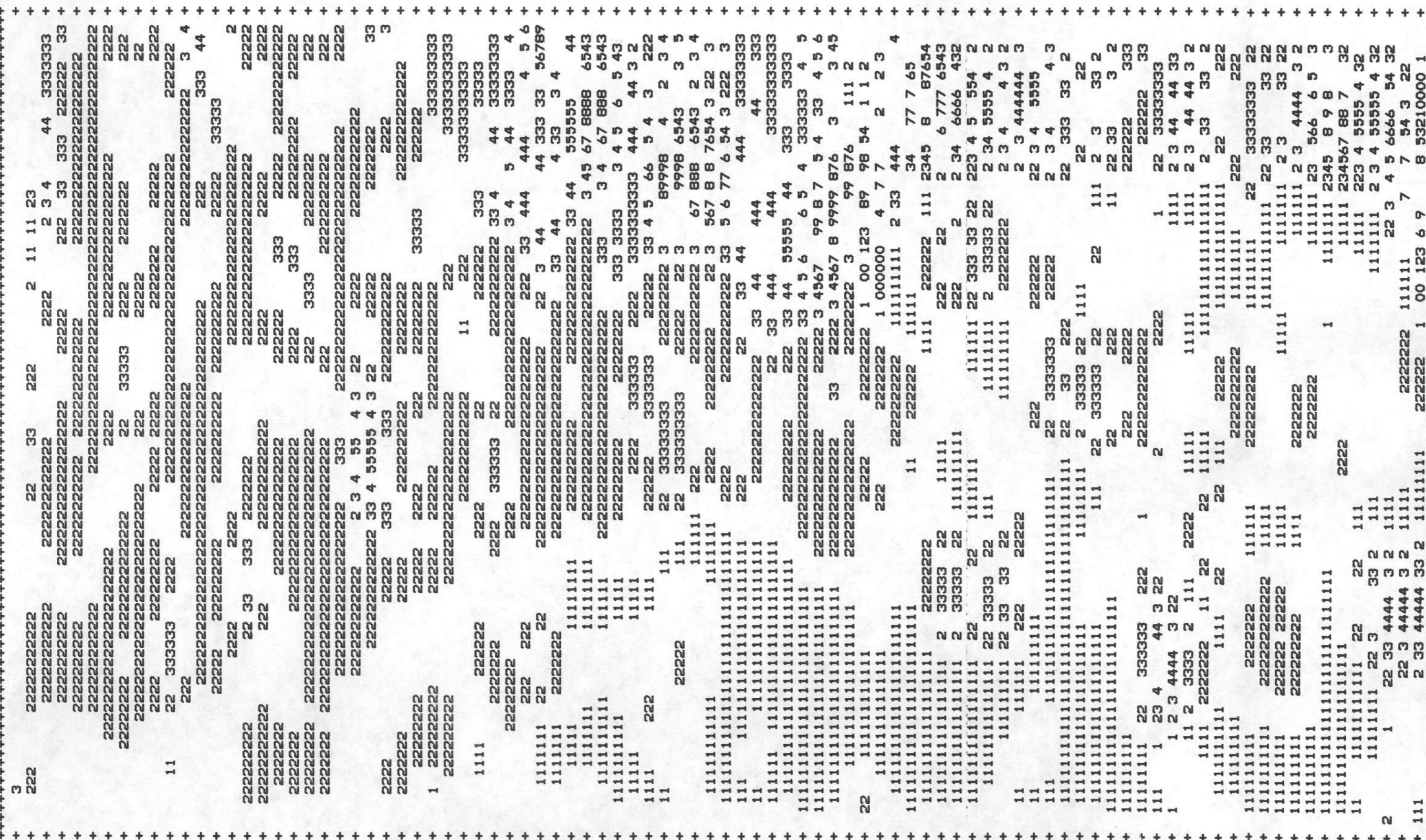
	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.000	0.000	0.000	0.000	0.000	0.141	0.144	0.168	0.117	0.121	0.140	0.186	0.131	0.000	0.000
URANIUM	0.000	0.000	0.000	0.000	0.000	1.735	2.004	1.699	1.400	1.544	2.107	1.755	1.427	0.000	0.000
THORIUM	0.000	0.000	0.000	0.000	0.000	4.400	5.325	4.678	3.829	3.607	3.812	4.285	3.914	0.000	0.000
U/K	0.000	0.000	0.000	0.000	0.000	12.108	12.293	8.363	11.507	10.980	16.307	9.225	9.805	0.000	0.000
U/TH	0.000	0.000	0.000	0.000	0.000	0.395	0.381	0.385	0.363	0.435	0.592	0.416	0.370	0.000	0.000
TH/K	0.000	0.000	0.000	0.000	0.000	31.467	37.583	25.757	31.801	31.519	24.153	24.637	32.977	0.000	0.000

MAP UNIT TEC

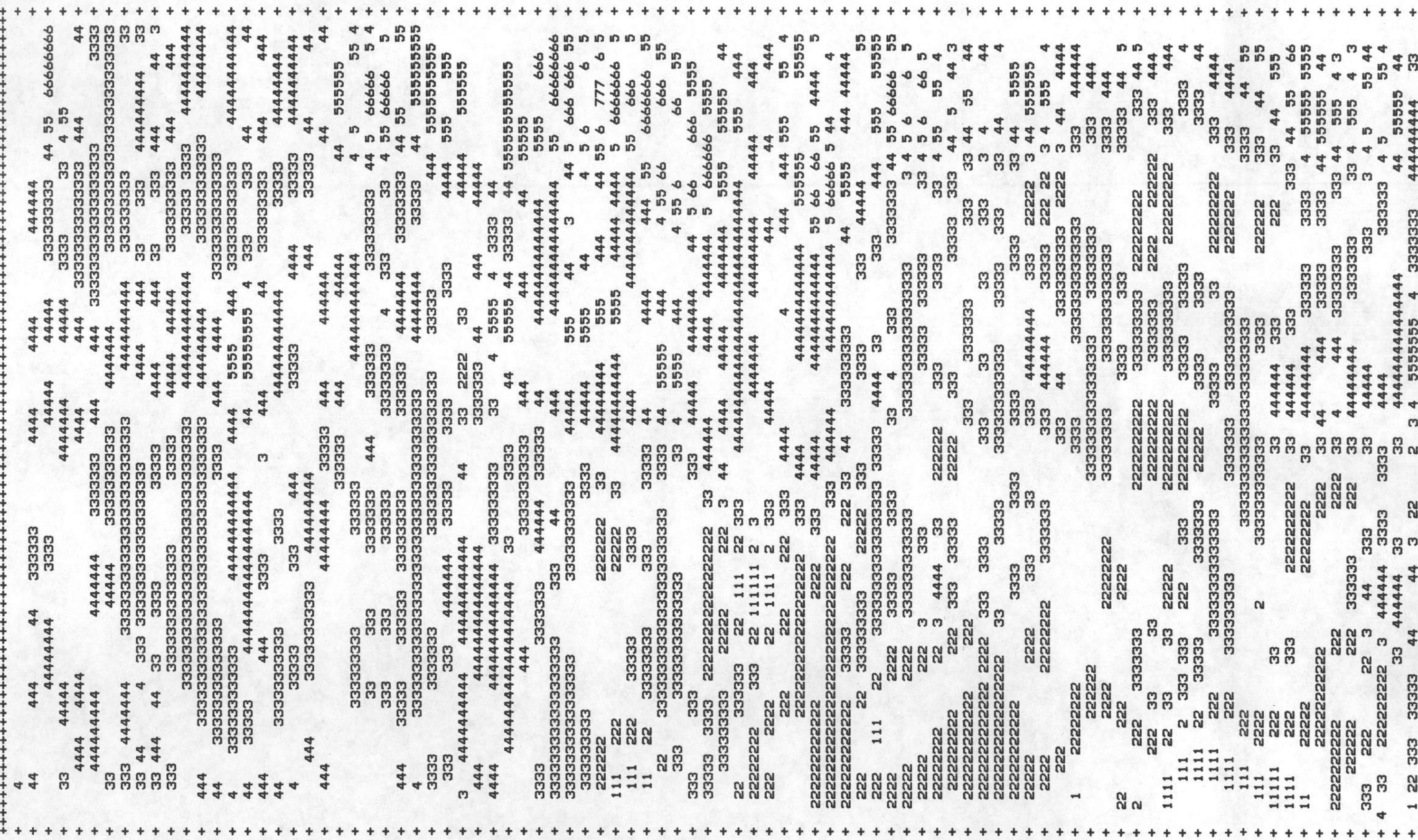
	700	710	720	730	740	750	760	770	780	790	800	810	1150	1160	1170
POTASIUM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.161	0.123	0.181	0.157	0.177	0.139	0.000	0.000
URANIUM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.778	1.298	1.458	2.014	2.030	1.636	0.000	0.000
THORIUM	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.298	4.310	5.372	4.646	5.688	4.659	0.000	0.000
U/K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.457	8.576	8.760	16.294	13.257	11.966	0.000	0.000
U/TH	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.340	0.312	0.287	0.439	0.359	0.359	0.000	0.000
TH/K	0.000	0.000	0.000	0.000	0.000	0.000	0.000	35.810	38.612	37.644	44.179	38.569	35.886	0.000	0.000

APPENDIX H - Pseudo Contour Maps

WAYCROSS



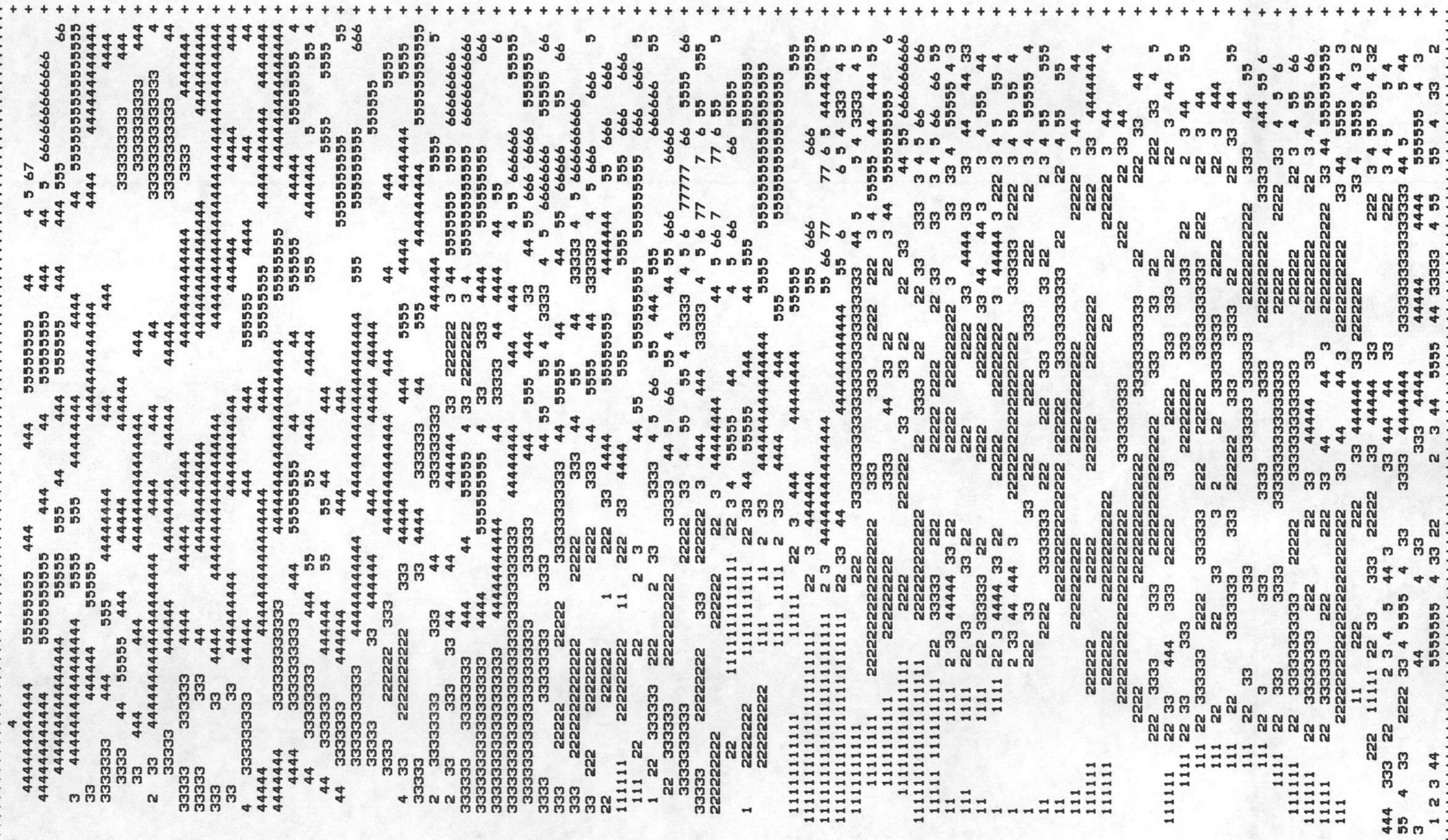
WAYCROSS



Uranium Pseudo-Contour Map - Waycross Quadrangle

SCALE IN EQUIVALENT PPM

WAYCROSS



Thorium Pseudo-Contour Map - Waycross Quadrangle

SCALE IN EQUIVALENT PPM

PRINT CHARACTER	VALUE
0	0.0000
1	0.6250
2	1.2500
3	1.8750
4	2.5000
5	3.1250
6	3.7500
7	4.3750
8	5.0000
9	5.6250
GT	6.2500
	6.8750
	7.5000
	8.1250
	8.7500
	9.3750
	10.0000
	10.6250
	11.2500

WAYCROSS

Thorium/Potassium Pseudo-Contour Map - Waycross Quadrangle

WAYCRO

Uranium/Potassium Pseudo-Contour Map - Waycross Quadrangle

WAYCROSS

Uranium/Thorium Pseudo-Contour Map - Waycross Quadrangle

EXPLANATION		
PRINT CHARACTER	LE	VALUE
0	0. 0000	0. 0000
	0. 0000	0. 0500
1	0. 0500	0. 1000
	0. 1000	0. 1500
2	0. 1500	0. 2000
	0. 2000	0. 2500
3	0. 2500	0. 3000
	0. 3000	0. 3500
4	0. 3500	0. 4000
	0. 4000	0. 4500
5	0. 4500	0. 5000
	0. 5000	0. 5500
6	0. 5500	0. 6000
	0. 6000	0. 6500
7	0. 6500	0. 7000
	0. 7000	0. 7500
8	0. 7500	0. 8000
	0. 8000	0. 8500
9	0. 8500	0. 9000

WAYCROSS



Residual Magnetic Pseudo-Contour Map - Waycross Quadrangle

SCALE IN GAMMAS

EXPLANATION

BRUNSWIC

EXPLANATION

PRINT CHARACTER	VALUE
0	LE 0. 0000
	0. 0000 0. 0250
1	0. 0250 0. 0500
	0. 0500 0. 0750
2	0. 0750 0. 1000
	0. 1000 0. 1250
3	0. 1250 0. 1500
	0. 1500 0. 1750
4	0. 1750 0. 2000
	0. 2000 0. 2250
5	0. 2250 0. 2500
	0. 2500 0. 2750
6	0. 2750 0. 3000
	0. 3000 0. 3250
7	0. 3250 0. 3500
	0. 3500 0. 3750
8	0. 3750 0. 4000
	0. 4000 0. 4250
9	0. 4250 0. 4500
	GT 0. 4500

BRUNSWICK

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EXPLANATION

PRINT CHARACTER	VALUE
0	0. 0000
	0. 0000 0. 2500
1	0. 2500 0. 5000
	0. 5000 0. 7500
2	0. 7500 1. 0000
	1. 0000 1. 2500
3	1. 2500 1. 5000
	1. 5000 1. 7500
4	1. 7500 2. 0000
	2. 0000 2. 2500
5	2. 2500 2. 5000
	2. 5000 2. 7500
6	2. 7500 3. 0000
	3. 0000 3. 2500
7	3. 2500 3. 5000
	3. 5000 3. 7500
8	3. 7500 4. 0000
	4. 0000 4. 2500
9	4. 2500 4. 5000
	GT 4. 5000

BRUNSWICK

Thorium Pseudo-Contour Map - Brunswick Quadrangle

EXPLANATION

PRINT CHARACTER		VALUE
0	LE	0. 0000
		0. 0000 0. 6250
1		0. 6250 1. 2500
		1. 2500 1. 8750
2		1. 8750 2. 5000
		2. 5000 3. 1250
3		3. 1250 3. 7500
		3. 7500 4. 3750
4		4. 3750 5. 0000
		5. 0000 5. 6250
5		5. 6250 6. 2500
		6. 2500 6. 8750
6		6. 8750 7. 5000
		7. 5000 8. 1250
7		8. 1250 8. 7500
		8. 7500 9. 3750
8		9. 3750 10. 0000
		10. 0000 10. 6250
9		10. 6250 11. 2500
	GT	11. 2500

SCALE IN EQUIVALENT PPM

BRUNSWICK

Thorium/Potassium Pseudo-Contour Map - Brunswick Quadrangle

BRUNSWICK

EXPLANATION

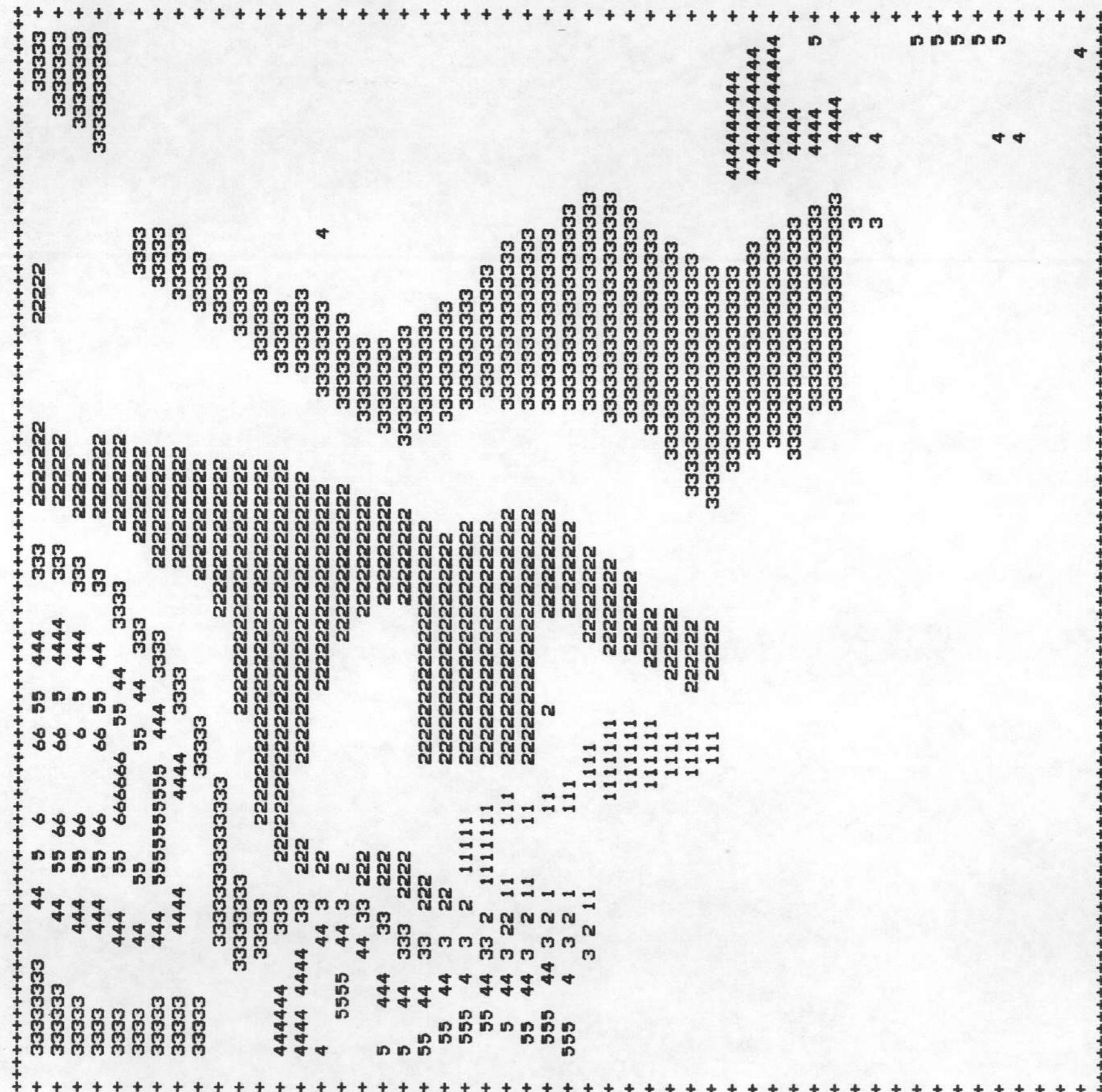
PRINT CHARACTER		VALUE
0	LE	0. 0000
	0. 0000	0. 7500
1	0. 7500	1. 5000
	1. 5000	2. 2500
2	2. 2500	3. 0000
	3. 0000	3. 7500
3	3. 7500	4. 5000
	4. 5000	5. 2500
4	5. 2500	6. 0000
	6. 0000	6. 7500
5	6. 7500	7. 5000
	7. 5000	8. 2500
6	8. 2500	9. 0000
	9. 0000	9. 7500
7	9. 7500	10. 5000
	10. 5000	11. 2500
8	11. 2500	12. 0000
	12. 0000	12. 7500
9	12. 7500	13. 5000
	GT	13. 5000

BRUNSWICK

EXPLANATION

PRINT CHARACTER		VALUE
0	LE	0. 0000
		0. 0000 0. 0500
1	0. 0500	0. 1000
		0. 1000 0. 1500
2	0. 1500	0. 2000
		0. 2000 0. 2500
3	0. 2500	0. 3000
		0. 3000 0. 3500
4	0. 3500	0. 4000
		0. 4000 0. 4500
5	0. 4500	0. 5000
		0. 5000 0. 5500
6	0. 5500	0. 6000
		0. 6000 0. 6500
7	0. 6500	0. 7000
		0. 7000 0. 7500
8	0. 7500	0. 8000
		0. 8000 0. 8500
9	0. 8500	0. 9000
		GT 0. 9000

BRUNSWICK



Residual Magnetic Pseudo-Contour Map - Brunswick Quadrangle

SCALE IN GAMMAS

