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National Uranium Resource Evaluation

**Airborne Gamma-Ray Spectrometer
And Magnetometer Survey
Weed Quadrangle, California**

Final Report - Volume I

**DO NOT MICROFILM
COVER**

**Aero Service Division
Western Geophysical Company of America
Houston, Texas 77001**

April 1981

**PREPARED FOR U.S. DEPARTMENT OF ENERGY
Assistant Secretary for Resource Applications
Grand Junction Office, Colorado**

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AIRBORNE GAMMA-RAY SPECTROMETER
AND
MAGNETOMETER SURVEY

WEED QUADRANGLE
CALIFORNIA

FINAL REPORT
VOLUME I

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AERO SERVICE DIVISION
WESTERN GEOPHYSICAL COMPANY
OF AMERICA
HOUSTON, TEXAS

MAY, 1981

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PREPARED FOR THE U. S. DEPARTMENT OF ENERGY
ASSISTANT SECRETARY FOR RESOURCE APPLICATIONS
GRAND JUNCTION OFFICE, COLORADO
UNDER CONTRACT NO. DE-AC13-76GJ01664
AND BENDIX FIELD ENGINEERING CORPORATION
SUBCONTRACT NO. 80-460
PROJECT NO. IGO205

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Figure 1

WEED QUADRANGLE

INDEX MAP

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INTRODUCTION

During the months of August, September, and October of 1980, Aero Service Division Western Geophysical Company of America conducted an airborne high sensitivity gamma-ray spectrometer and magnetometer survey over ten (10) areas over northern California and southwestern Oregon. These include the 2° x 1° NTMS quadrangles of Roseburg, Medford, Weed, Alturas, Redding, Susanville, Ukiah, and Chico along with the 1° x 2° areas of the Coos Bay quadrangle and the Crescent City/Eureka areas combined. This report discusses the results obtained over the Weed, California, map area.

Traverse lines were flown in an east-west direction at a line spacing of six (6) miles. Tie lines were flown north-south approximately eighteen (18) miles apart. A total of 16,880.5 line miles of geophysical data were acquired, compiled, and interpreted during the survey, of which 1,652.6 line miles are in this quadrangle.

This report is a result of work performed under Bendix Field Engineering Corporation Subcontract No. 80-460, Project No. IG0205, as part of the National Uranium Resources 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.

The data were reduced and compiled in accordance with the technical specifications of the contract as stated in BFEC 1200-C and BFEC 1250-A. The parameters used in the processing of the radiometric data have been substantiated in a previously submitted calibration report of the Sikorsky S-58T installed airborne gamma-ray spectrometer system.

AERO SERVICE
HOUSTON, TEXAS 77001

X.....FILM IDENTIFIED TRAVERSE/TIE LINE INTERSECTION
A.....FILM IDENTIFIED GROUND CONTROL
□.....INDEX FIDUCIAL (100 FIDUCIAL INTERVALS)
FLOREN 1980

FLIGHT PATH
WEED
NK 10-8
DOE/MURE

FIGURE 2
9/10

DATA ACQUISITION

Aircraft

The survey was conducted using a Sikorsky S-58T helicopter, registration N94523, owned and operated by Carson Helicopters, Inc., Perkasié, Pennsylvania. The flight crew consisted of a pilot (Carson), a navigator (Aero), and an electronics system operator (Aero). Some of the more pertinent characteristics and specifications of the aircraft are listed below:

T A B L E I

Aircraft Specifications and Characteristics

Aircraft	Sikorsky Model S-58T, Registration N94523
Engine	Pratt - Whitney PT 6T Twinpack
Take off power	1875 Shaft HP.
Fuel Capacity	350 U. S. Gal.
Hourly Fuel Consumption	100 U. S. Gal.
Range at Cruise Speed	350 Miles
Rate of Climb	1200 Feet per Min.
Service Ceiling	12500 Feet
Maximum Gross Weight	13000 Lbs.
Empty Weight	7200 Lbs.
Useful Load	5800 Lbs.
Pay Load	1700 Lbs.

Gamma-Ray Spectrometer System

The survey was conducted using Aero Service's HISENS A(irborne) G(amma)-R(ay) S(pectrometer) 2000 R system shown in block diagrammatic form in Figure 3, page 12.

The detector assembly of the spectrometer consists of a primary detector, sensing data over a 4π solid angle, and an upward looking detector, sensing data over a 2π solid angle only. The primary detector package consists of 12

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AERO SERVICE
HOUSTON TEXAS

DWN	DATE
CHKD	

TITLE
BLOCK DIAGRAM
HISENS AGRS 2000R SYSTEM

SIZE	DRAWING NO	REV	SHEET
B			

logs of 4" x 4" x 16" of Polyscin®, NaI(Tl), each hermetically sealed in a steel container and coupled to a high quality photo-multiplier tube. The sensors are assembled in three slabs of four logs each. Each slab is enclosed in a heated and thermally stabilized container. Total volume of the primary detector is 3072 cubic inches (50.34 liters).

The upward looking detector consists of two 4" x 4" x 16" logs of Polyscin®, each hermetically sealed in a steel container and coupled to a high quality photo-multiplier tube and enclosed within separate heated and thermally stabilized containers. Each of the upward looking detectors is mounted on top of one of the primary detector packages, separated by a 0.75" slab of lead shielding, in order to provide the 85% shielding effect @ 3.000 MeV.

The preamplifiers provide, with the photo-multipliers, virtually the total signal amplification. In order to ensure maximum stability, the preamplifiers are enclosed within the thermally stabilized packages.

The combined signal of each detector slab is output into the amplifiers, whose main purpose is summing the incoming pulses and shaping them into a bipolar gaussian form.

The summed and shaped signal from the amplifiers is input into the pulse height converter. This unit performs basically three functions: it determines whether a pulse has been received, it determines its amplitude and it converts the amplitude into a digital number. Since a successive approximation analog to digital converter is used, total dead time of the system is the same regardless of the energy of the pulse. This dead time is approximately 8 μ seconds per pulse due to the converter and approximately 1.5 μ seconds due to the remainder of the electronic circuit, for a combined total dead time of approximately 9.5 μ seconds per pulse. The exact system dead time, or rather live time, is measured in microseconds and recorded in milliseconds as channel zero (0) of the multispectral gamma-ray data.

The function of pulse height analyzer is performed by the HP 21 MX series Hewlett Packard minicomputer, which also stores and formats the data, outputs them on tape and compares the recorded data with the data stored in memory for a fool-proof read after write check.

The gamma-ray spectrometer system includes further a Rosemount barometric

altimeter, a Honeywell radar altimeter and a temperature transducer. A discrete interface exists in the Hewlett Packard minicomputer to accommodate a Doppler navigation system as well as other navigation systems, such as ANA, LORAN-C, OMEGA and others, although none of these were used.

Two tape drives are employed to record the data and automatic switching between the two occurs as each tape ends. Data are collected each second and recorded every five seconds. In addition to the gamma-ray spectrometer data of both the primary and upward looking systems, radar altimeter, barometric altimeter, atmospheric temperature, real time, gamma-ray spectrometer live time and magnetometer data are recorded.

Additional ancillary equipment carried aboard the helicopter includes a cathode ray tube display, a 6-channel heat sensitive analog recorder and a 35mm camera, triggered by the data controller at a preselected interval.

Magnetometer

The magnetic sensor used for the survey was a Varian V-85 proton free-precession magnetometer. This sensor was housed in a fiberglass bird and trailed approximately 100' below the aircraft to ensure optimal signal sensitivity without need for extensive aircraft compensation. The magnetic data were recorded in increments of 0.01 gammas, with a sensitivity of 0.1 gammas.

PRODUCTION SUMMARY

The 2° x 1° NTMS quadrangle of Weed, California, was surveyed as part of a subcontract covering ten (10) areas located over northern California and southwestern Oregon. These include the 2° x 1° quadrangles of Roseburg, Medford, Weed, Alturas, Redding, Susanville, Ukiah, and Chico along with the 1° x 2° areas of the Coos Bay quadrangle and the Crescent City/Eureka areas combined. The subcontract covered the flying of a total of 16,880.5 line miles, of which 1,652.6 miles are in the Weed quadrangle.

Four main bases of operations were used during the survey. Eugene, Oregon, located just north of the Roseburg quadrangle, was used from the commencement of operations through Flight 27 on August 22, 1980. Medford, Oregon, in the Medford quadrangle, was then used up through Flight 86 on September 19th. The aircraft and crew then moved to Redding, California, for operations through Flight 130 on October 2, 1980. The final base of operations was located at Yuba City, California, in the Chico quadrangle. Throughout the survey, extensive use was made of both a fuel truck and smaller, secondary airstrips for remote refueling stops, thus extending the helicopter's effective production range.

The first production flight was made on August 11, 1980. A total of 143 flights were made with the last flight being completed on October 9, 1980. Production flights were not possible for twenty of the sixty-one days the aircraft and crew were on site. One day was used to complete the high altitude calibration flight, ten days were lost to inclement weather conditions, six days were lost to aircraft maintenance, one day to electronic maintenance, and two days to the illness of the AGRS system operator. Many of these nonproduction days were used to complete the three moves to new operations bases. A complete summary of daily operations is given in Table II, pages 16, 17 and 18.

Total flying time was 253.2 hours for an average production rate of 66.7 miles per hour. An average of 118.1 miles were acquired per production flight and 411.7 miles were acquired each production day. When computed over the total number of days on site, data acquisition averaged 276.7 miles per day.

Flight line directions and spacing for the Weed quadrangle were east-west traverse lines 6 miles apart and north-south tie lines flown at 18 mile intervals. The nominal terrain clearance for the survey was 400 feet.

T A B L E II
Daily Production Summary

<u>DATE</u>	<u>BASE</u>	<u>ACTIVITY</u>	<u>FLIGHT NO.</u>
08/09/80	Eugene, Oregon	Ferry to Eugene, Ore.	
08/10/80	Eugene, Oregon	High altitude test	
08/11/80	Eugene, Oregon	Production	11, 12
08/12/80	Eugene, Oregon	Weather	
08/13/80	Eugene, Oregon	Weather	
08/14/80	Eugene, Oregon	Production	13, 14
08/15/80	Eugene, Oregon	Abort - helicopter	15
08/16/80	Eugene, Oregon	Helicopter maintenance	
08/17/80	Eugene, Oregon	Helicopter maintenance	
08/18/80	Eugene, Oregon	Helicopter maintenance	
08/19/80	Eugene, Oregon	Helicopter maintenance	
08/20/80	Eugene, Oregon	Production	16, 17, 18, 19
08/21/80	Eugene, Oregon	Production	20, 21, 22
08/22/80	Eugene, Oregon	Production	23, 24, 25, 26, 27
08/23/80	Medford, Oregon	Weather	
08/24/80	Medford, Oregon	Production	28, 29, 30, 31
08/25/80	Medford, Oregon	Production	32, 33, 34, 35, 36
08/26/80	Medford, Oregon	Production	37, 38, 39
08/27/80	Medford, Oregon	Weather	
08/28/80	Medford, Oregon	Production	40
08/29/80	Medford, Oregon	Production	41, 42, 43, 44, 45
08/30/80	Medford, Oregon	Production	46
08/31/80	Medford, Oregon	Abort-cloud cover	47
09/01/80	Medford, Oregon	Production	48, 49, 50
09/02/80	Medford, Oregon	Weather	
09/03/80	Medford, Oregon	Production	51, 52, 53
09/04/80	Medford, Oregon	Production	54, 55, 56
09/05/80	Medford, Oregon	Weather	
09/06/80	Medford, Oregon	Production	57, 58, 59, 60

Daily Production Summary

<u>DATE</u>	<u>BASE</u>	<u>ACTIVITY</u>	<u>FLIGHT NO.</u>
09/07/80	Medford, Oregon	Production then high winds	61, 62
09/08/80	Medford, Oregon	Magnetometer failure then production	63, 64, 65
09/09/80	Medford, Oregon	Helicopter maintenance	
09/10/80	Medford, Oregon	Production	66, 67
09/11/80	Medford, Oregon	Production	68, 69, 70, 71, 72
09/12/80	Medford, Oregon	Weather	
09/13/80	Medford, Oregon	Weather	
09/14/80	Medford, Oregon	Clouds and fog, then production	73, 74, 75, 76, 77
09/15/80	Medford, Oregon	Production	78, 79, 80, 81, 82
09/16/80	Medford, Oregon	Production	83, 84, 85
09/17/80	Medford, Oregon	Production	86
09/18/80	Redding, California	Weather	
09/19/80	Redding, California	Production	87, 88
09/20/80	Redding, California	Production	89
09/21/80	Redding, California	Production	90, 91, 92, 93, 94
09/22/80	Redding, California	Production	95, 96, 97, 98
09/23/80	Redding, California	Production	99, 100, 101, 102
09/24/80	Redding, California	Production	103, 104, 105, 106
09/25/80	Redding, California	Production	107, 108, 109, 110, 111
09/26/80	Redding, California	Production	112, 113, 114, 115
09/27/80	Redding, California	Production	116, 117, 118, 119
09/28/80	Redding, California	Production	120, 121
09/29/80	Redding, California	Production	122, 123, 124, 125
09/30/80	Redding, California	Production	126
10/01/80	Redding, California	Production	127, 128, 129, 130
10/02/80	Redding, California	Operator sick	
10/03/80	Yuba, California	Operator sick	
10/04/80	Yuba, California	Production	131, 132, 133, 134
10/05/80	Yuba, California	Production	135, 136, 137, 138
10/06/80	Yuba, California	Production	139, 140, 141, 142, 143

Daily Production Summary

<u>DATE</u>	<u>BASE</u>	<u>ACTIVITY</u>	<u>FLIGHT NO.</u>
10/07/80	Yuba, California	Production	144, 145, 146, 147
10/08/80	Yuba, California	Production	148, 149, 150, 151
10/09/80	Yuba, California	Production	152, 153

Figure 4 shows a histogram of the terrain clearance of the helicopter as recorded by the radar altimeter. The histogram takes into account all final samples in this quadrangle. The mean terrain clearance, as observed, is approximately 420 feet. The ground speed of the aircraft, as determined from the distances between samples based on their final X-Y positions, is depicted in graphic form in the histogram of Figure 5, page 21.

387 POINTS GREATER THAN 1000 FEET

AERC SERVICE
QUAD WEED

GROUND SPEED
JOB 627

HISTOGRAM

21/22

Figure 5

DATA REDUCTION

The data reduction process as used in the processing of the airborne gamma-ray spectrometer and magnetometer data obtained within the Department of Energy (DOE) National Uranium Resource Evaluation (NURE) program is shown in flow chart form in Figure 6, page 24.

Upon arrival in the Houston office, the digital data are edited and a back-up tape is generally produced. The EDIT consists partly of a data quality check, enabling the elimination of single record spikes in any field, outside a specified preselected limit. The EDIT program further checks for data continuity and flags all data acquired at terrain clearances exceeding the survey specification. The EDIT further sums a preselected number of spectral records at the beginning and end of each survey line and fits a gaussian curve to diagnostic photopeaks, such as the Tl^{208} peak at 2614.5 KeV and the K^{40} peak at 1460 KeV for low altitude lines and the annihilation peak at 511 KeV and the K^{40} peak at 1460 KeV for high altitude lines. The position of these photopeaks is determined with an accuracy of better than 0.1 of a channel and is used to determine the exact position of the energy windows with regard to channel numbers. At the same time the calculated standard deviations of the fitted gaussian curves serve to obtain the system resolution at the photopeaks used. Note that the 2π system resolutions as determined at the K^{40} photopeak proved to exceed the 8% specification throughout much of the survey. This was most likely due to a small crack in one of the two 2π crystals. However, this condition proved not to adversely affect the acquisition or reduction of the radiometric data and it was decided, after consultation with BFEC, not to replace the crystal in the interest of expediting the completion of the survey. The window count rates are normalized for live time and are calculated as follows:

K	:	1362 KeV - 1566 KeV (Channel 114 → 130, @ 12 KeV/Channel)
U	:	1662 KeV - 1866 KeV (Channel 139 → 155, @ 12 KeV/Channel)
T	:	2406 KeV - 2826 KeV (Channel 201 → 235, @ 12 KeV/Channel)
T.C.	:	390 KeV - 2982 KeV (Channel 33 → 248, @ 12 KeV/Channel)
Cosmic	:	3054 KeV - 6000 KeV (Channel 255)
$U_{2\pi}$	:	1662 KeV - 1866 KeV (Channel 139 → 155, @ 12 KeV/Channel)

The above channel numbers are valid only if system gain corresponds

exactly to 12 KeV per channel and there is no zero shift.

The CORRECT program applies the background and cosmic corrections to the single record window count rates, corrects the data for Compton scatter and atmospheric radon, and normalizes the terrain clearance. Background count rates and cosmic factors were determined from high altitude test data acquired over the Pacific Ocean, offshore California.

Potassium Background	=	50.04 counts per second
Uranium Background	=	8.21 counts per second
Thorium Background	=	7.26 counts per second
Total Count Background	=	286.06 counts per second
2 π Bismuth Background	=	0.81 counts per second

Potassium Cosmic factor	=	0.250	c.p.s. per count 4 π cosmic
Uranium Cosmic factor	=	0.202	c.p.s./cps 4 π cosmic
Thorium Cosmic factor	=	0.278	c.p.s./cps 4 π cosmic
Total Count Cosmic factor	=	4.438	c.p.s./cps 4 π cosmic
2 π Bismuth Cosmic factor	=	0.0505	c.p.s./cps 4 π cosmic

The Compton scatter functions were determined from data obtained over the Grand Junction test pads, using the radiometric analysis of the bulk sample with natural water content.

$$\begin{aligned}T/U &= \tau = 0.08 \\U/T &= \alpha = 0.30 + 0.02 + 0.000076H \\K/T &= \beta = 0.37 \\K/U &= \gamma = 0.90\end{aligned}$$

The 2 π and 4 π uranium window count rates are related through the geometric or equivalency factor. For the present system, installed in the Sikorsky S-58T, this factor, $f = 5.1$. Part of the terrestrial radiation of energy higher than 1662 KeV - the lower threshold of the uranium window - is detected in the uranium window of the upward looking detector, due to incomplete shielding, skyshine and shine-around. This shine-through/shine-around effect is assumed to be a function of both the intensity of the terrestrial uranium and thorium radiation and of the aircraft terrain clearance. From multi-altitude data acquired over the Lake Mead Dynamic Test

Range the shine-through/shine-around effect was determined for each altitude level. The data provided a best fit for a linear terrain clearance function as follows:

$$\text{shine-through/shine-around} = (0.067 - 2.6 \times 10^{-5}H) (U_{4\pi} + 0.30T_{4\pi})$$

The shine-through/shine-around corrected Biair Count rate is then:

$$U_{2\pi c} = \frac{U_{2\pi} - (U_{4\pi} + 0.30T) (0.067 - 2.6 \times 10^{-5}H)}{1 - 5.1 (0.067 - 2.6 \times 10^{-5}H)}$$

The shine-through/shine-around correction is applied to the $U_{2\pi}$ count rate at each single record. The single record $U_{2\pi}$ count rates are then averaged over 35 records to make them statistically compatible with the data of the primary system. The atmospheric radon correction is applied to both the $U_{4\pi}$ and the Total Count count rates. The equivalency factor for the $U_{4\pi}/U_{2\pi} = 5.1$, for Total Count/ $U_{2\pi}$ it is 73.5.

Within the CORRECT program the data are normalized to a common datum of 400 feet terrain clearance. An exponential formula is used, based on an air column reduced to a standard temperature and pressure of 0°C and 760mm Hg. (32°F and 29.92" Hg). The air absorption coefficients used are those derived from the multiple altitude flight over the Lake Mead Dynamic Test Range for thorium, potassium and Total Count. The air absorption factor for uranium is obtained by straight interpolation between the potassium and thorium air absorption factors. Their values are respectively:

$$\begin{aligned}\mu_K &= 2.67 \times 10^{-3} \text{ per foot} \\ \mu_U &= 2.52 \times 10^{-3} \text{ per foot} \\ \mu_T &= 2.11 \times 10^{-3} \text{ per foot} \\ \mu_{TC} &= 2.16 \times 10^{-3} \text{ per foot}\end{aligned}$$

The formula used for the altitude normalization is:

$$N_{400} = N_H \cdot e^{\mu(400 - \frac{273}{273+t} \cdot \frac{P}{29.92} \cdot H)}$$

Where N_{400} , N_H are respectively the count rates at 400 feet and at altitude H, μ is air absorption factor, t is temperature in degrees Celsius and P is barometric pressure in inches Hg.

The last operation in the CORRECT program is the determination of statistical adequacy of the data. The criteria for adequacy of the data are based on the work of Lloyd A. Currie (op.cit.). A critical level is recognized, below which all observations made fail to detect a signal, i.e. 95% of all measurements fall within the "normal" distribution of "noise". The detection level is similarly defined as the level above which 95% of the measurements made fall within the normal Poisson distribution of "signal". Currie's critical level has been adopted as the count rate level below which data are inadequate. Data with count rates above the critical level but below the detection level are considered marginal. Above the detection level data are considered adequate. For the single record data the formulas are then:

Count Rate ≤ 2.33 (Sum Corrections)^{1/2}: data inadequate
2.33 (Sum Corrections)^{1/2} < Count Rate $\leq 2.71 + 4.65$ (Sum Corrections)^{1/2}:
data marginal
Count Rate $> 2.71 + 4.65$ (Sum Corrections)^{1/2}: data adequate

No ratios have been calculated involving inadequate data in either numerator or denominator. Ratios have been calculated when the data in the numerator are marginal, provided the data in the denominator are adequate.

The thorium, uranium and potassium data are subsequently averaged over 9 records in the SPECAVG program. The output is a spectrometer master tape containing both averaged and single record data.

Parallel with the radiometric data reduction process, the magnetic data are edited and processed. Using the recovered film intersections and the established ground identities, preliminary flight paths are prepared. The flight path is refined in the magnetic adjustment program until an accurate final flight path has been obtained. The reduced spectrometer data are then merged with the final X-Y position of the data points, the reduced magnetic data and the digitized geology, and a master tape is produced with data that pertain to each quadrangle only. The REGROUP program then eliminates all duplicate line segments, inserts reflight segments where required, orders the remaining line segments and renumbers the fiducials of these segments such that the resulting line is directionally consistent with location sequential sample numbers. The renumbered fiducials increase from west to east for traverse lines and south to north for tie lines. A listing relating the

renumbered fiducials to the original fiducial numbers as recorded in flight is included in this volume as Appendix N and can also be found in the back of Volume II. This listing gives both the line number as it appears on all final data and the line number as recorded in flight. Similarly, the start and end fiducials of each final line and/or line segment shown on the flight path base map are given along with the corresponding start and end fiducials as recorded in flight. When correlated with the final fiducial numbers, the original fiducials will increase sequentially for lines flown west to east or south to north and decrease for lines flown in the opposite directions.

The following processing steps are STATANAL and HISTGRM. HISTGRM groups the radiometric data by geological cell units, determines the distribution of the data as normal or lognormal, calculates the mean (for normally distributed data) or the mode (for lognormal distributions) as well as the standard deviations. The results from HISTGRM are used in the STATANAL program, which calculates the signed standard deviation from the mean for each averaged sample for each of the six radiometric parameters. Its output is the Final Spectrometer Master Tape, from which the anomaly maps, the statistical analysis tape, the averaged record and single record reduced data tapes and listings, the flight path maps and the radiometric and magnetic profiles are produced.

DATA PRESENTATION

General

The final data are presented in four different forms: on magnetic tape; on microfiche; in graphic form as profiles and histograms; and in map form as anomaly maps, flight path maps, and computer printer maps.

The histograms and the multiparameter profiles are presented with the anomaly maps and flight path map in a separate bound volume. Complete data listings of both the reduced single record and the reduced averaged record data are found in the back of this report. The format of the printout of the microfiches and the format of the data files delivered on magnetic tape are in accordance with the specifications of the BFEC 1200-C and are described in appendices F through L of this report.

Radiometric Multiple-Parameter Stacked Profiles

The radiometric profiles have been prepared at the horizontal scales of 1:250,000 and 1:500,000 on an automated flatbed plotter. Displayed are from top to bottom: total magnetic intensity, IGRF removed, in gammas; radar altimeter, in feet; ratio of eT concentration in ppm/potassium concentration in %; ratio of eU/K; eU/eT ratio, atmospheric radon (BIAC) in counts per second, equivalenced to the 4π count rate; apparent concentration of terrestrial eT in ppm, apparent concentration of terrestrial eU in ppm; apparent concentration of potassium in %; "Total Count" count rate. Flags are indicated, where needed, below the base line of the corresponding parameter. A short flag indicates marginal data, including terrain clearances between 700 and 1000 feet, while a long flag indicates inadequate data. Fiducial markers are plotted every 200 records, along the top of the profile, every 10 records near the bottom.

The flight path and the geologic formations overflown along the line are shown on the bottom of both the radiometric and magnetic multiple-parameter stacked profiles below the lower fiducial markers. Six tiers of formation identifiers along with short markers on the flight line are used to indicate changes along the profile with the base of the identifier letters aligned with the corresponding marker. The first identifier found on the westernmost end of the profile applies to the start of the line and this formation continues until the next marker is encountered. Subsequent changes to the geology are

similarly indicated along the profile.

Magnetic and Ancillary Parameter Stacked Profiles

The magnetic profiles have also been plotted at scales of 1:250,000 and 1:500,000 on an automated flatbed plotter. The plotting sequence of the profiles is, from top to bottom: barometric pressure at aircraft altitude in mm Hg; atmospheric ambient temperature in degrees Celsius, terrain clearance in feet; magnetic variations at base station, in gammas; total magnetic intensity, IGRF removed, plotted at 50 gammas per scale division. Fiducial markers are again plotted every 200 records along the top of the profiles, every 10 records near the bottom.

Histograms

Histograms have been prepared for the six radiometric parameters for each geologic cell unit of the NTMS quadrangle area. The horizontal scale of the plots is constant for each of the parameters. Frequency grouping has generally been done in 100 groups per full scale, although in some cases more groups may have been used for better definition. In all cases the vertical scale was normalized to the number of samples observed in the group with the highest sample frequency.

For each histogram the frequency distribution type (normal or lognormal) is listed, as well as the mean (or mode in case of lognormal distribution) and the signed standard deviations. Note that for both the normal and lognormal distribution curves the standard deviation is given in terms of the parameter value (K , eU , eT , eU/K , eU/eT and eT/K). The actual standard deviation is obtained by subtracting the mean parameter value from the +1 standard deviation figure in case of a normal distribution, by dividing the mode value into the +1 standard deviation figure in case of a lognormal distribution. In case of lognormal distribution curves the standard deviation is thus a multiplication factor.

Each histogram further lists the total number of samples observed in the geologic unit and the number of statistically adequate/marginal data samples in each parameter plot.

Anomaly Maps

The anomaly maps have been prepared at scales of 1:250,000 and 1:500,000

on an automated flatbed plotter. The fiducial numbers along the flight lines match those of the corresponding profiles. Positive signed deviations of the mean are indicated by a plus sign to the north or west of the flight lines, while negative signed deviations are indicated by a minus, plotted to the south or east of the line. The number of pluses or minuses corresponds with the levels of standard deviation from the mean. To avoid crowding, standard deviation signs are calculated and plotted for every fifth sample only.

Computer Printer Maps

Computer printer plots are produced for the total field and the six radiometric channels. Upper and lower limits were chosen based on the minimum and maximum values of the gridded data. Ten intervals are represented by the contour values 0 to 9. A minus (-) or a plus (+) sign represents those values less than the lower limit or those values higher than the upper limit.

The interval for each integer contour is further divided into two groups. For those values less than .5, the contour is printed; e.g. for values 4.0 to 4.5, the value 4 is printed, while values of 4.6 through 4.9 are left blank.

GEOLOGY

General

The Weed quadrangle is located in northern California and occupies the area between 41° to 42° north latitude and 122° to 124° west longitude. Parts of four geomorphic provinces are contained within the quadrangle.

The Klamath Mountains, which comprise most of the area, are characterized by complex and rugged topography with prominent peaks and ridges reaching 6000 to 8000 feet above sea level. Drainage in the area is transverse and irregular. The entire orogenic complex, an uplifted plateau, has been dissected by the Klamath River. Successive beaches with significant percentages of auriferous gravels are located along canyon margins. Lithologies of the Klamath Province relate this region most similarly to the Sierra Nevada.

The Northern Coast Ranges enter the quadrangle to a very limited extent in the southwest corner of the map area. The topography, a system of longitudinal ridges and valleys trending generally N35°W, is controlled by folding and faulting in the area. Landforms in this province are characteristically irregular, knobby and prone to landslides. Geology of the Northern Coast Ranges seems closely related to the Klamath Mountains even though the regional trends follow those of the Coast Ranges.

The Cascade Range, which comprises in part an eastern portion of the Weed quadrangle, is a chain of volcanic cones with elevations which reach over 14,000 feet at Mount Shasta. Glacially cut topography is common in the high elevations.

The Modoc Plateau is an interior platform, the southern extension of the Oregon lava plateau, and it comprises the northeastern corner of the quadrangle. Thick accumulations of lava flows and tuff beds and many small volcanic cones are characteristic of the area. Occasional lakes and sluggishly flowing streams are typical of the drainage.

The geology of the area was taken from the Geologic Map of California, Weed Sheet, published by the California Division of Mines and Geology.

Stratigraphy

A large variety of rock types of differing ages occur in the Klamath

Mountains Province. In the east-central portion of the quadrangle Ordovician and Silurian sediments are surrounded by younger Mesozoic igneous and metamorphic rocks. Elsewhere, pre-Silurian through Jurassic metasediments and metavolcanics are partially overlain by Quaternary glacial, alluvial and nonmarine terrace deposits dispersed throughout the area.

In the southwesternmost corner of the Weed quadrangle, rocks of the Franciscan Formation and pre-Cretaceous metasediments of the Northern Coast Ranges Province crop out.

To the east and northeast, the Cascade Range Province is comprised predominantly of volcanics, which consist of Tertiary to Pleistocene basalts and pyroclastic rocks along with Mesozoic intrusives of granitic to dioritic composition. Mississippian and upper Cretaceous marine sediments occur locally as do Recent glacial and alluvial deposits.

With very similar lithologies, the Modoc Plateau is primarily comprised of Pliocene to Recent basaltic flows and pyroclastic rocks. Quaternary lake and alluvial deposits occur in the vicinity of Butte Reservoir. A unit by unit description of the rock types occurring in the Weed quadrangle follows, beginning with the oldest.

Ordovician Marine Sedimentary and Metasedimentary Rocks (O)

The Ordovician marine sediments and metasediments consist of pale gray-green schistose graywackes interbedded with phyllite, limestone, chert and greenstone.

Pre-Silurian Metavolcanic Rocks (pSv)

Throughout the area, the pre-Silurian metavolcanics consist chiefly of hornblende schists. In the Redding quadrangle to the south, relatively extensive amphibolite, hornfels and migmatite also occur.

Pre-Silurian (?) Metamorphic Rocks, Undifferentiated (pS)

Undifferentiated metamorphic rocks of questionable pre-Silurian age are characterized by hornblende, mica plagioclase and chlorite schists.

Pre-Silurian Metasedimentary Rocks (pSs)

Pre-Silurian metasediments consist of recrystallized carbonate rich schists, local calc-silicate rocks, mica schists and hornblende schists.

Silurian Marine Sedimentary and Metasedimentary Rocks (S)

The marine sediments and metasediments of Silurian age consist chiefly of slate, graywacke, mudstone and siltstone. Locally, there occur gritty to conglomeratic beds and also metamorphosed dikes and sills of undifferentiated rock types.

Devonian and Pre-Devonian (?) Metavolcanic Rocks (Dv), (Dv?)

Metavolcanics in the Weed quadrangle consist chiefly of meta-andesite and tuff breccia. In the Redding quadrangle, Devonian metavolcanics include silicic flows interlayered with fine to coarse-grained pyroclastics. Of questionable pre-Devonian age, there also occur fine grained keratophyre, tuff, amygdaloidal pillow lava and diabase dikes.

Devonian Marine Sedimentary and Metasedimentary Rocks (D)

The Devonian marine sediments and metasediments in the area are comprised of metashales, mudstones and fossiliferous limestone. Locally, large dark and dense metamorphosed coral reefs occur.

Mississippian Marine Sedimentary and Metasedimentary Rocks (CM)

The marine sediments and metasediments of Mississippian age are comprised of metamorphosed shale, chert, mudstone and sandstone which are often characterized by conglomeratic or tuffaceous beds. Metavolcanic flows of undifferentiated type occur locally throughout the area.

Undivided Carboniferous Marine Sedimentary and Metasedimentary Rocks (C)

The undivided Carboniferous marine sediments are predominantly comprised of mudstone, locally fossiliferous limestone, tuff, conglomerate and sandstone.

Permian Volcanic Rocks (Rv)

A variety of Permian age volcanic rocks occur in the area. They generally consist of augite-andesite, metabreccia, metatuff, keratophyre porphyry sills or flows and diabase and amphibolitic rocks. This section is further characterized by locally interbedded carbonates.

Permian Marine Sedimentary and Metasedimentary Rocks (R)

The Permian marine sediments consist typically of locally fossiliferous limestones, mudstone and chert.

The rocks of this section occurring in the Susanville quadrangle to the southeast, also include tuff, slate, quartzite and some metavolcanic breccia and conglomerate.

Pre-Cretaceous Metavolcanic Rocks (Mv)

The pre-Cretaceous metavolcanics in the area consist of massive amphibolite, chlorite schist and tuffaceous schist which are locally cut by metamorphosed diabase dikes. Occurring more rarely are beds of metachert, argillite and limestone.

Pre-Cretaceous Metasedimentary Rocks (ms)

The pre-Cretaceous metasediments are comprised typically of mica and quartz rich phyllites and schists, metamorphic chert, quartzite and slate.

Pre-Cretaceous Metamorphic Rocks, Undifferentiated (m-ls)

The undifferentiated metamorphic rocks of pre-Cretaceous age consist of chert, metaquartzite, locally graphitic and micaceous phyllites and schists. Also occurring more rarely are beds of dolomite and limestone (ls).

Jurassic and/or Triassic Metavolcanic Rocks (JTv)

These metavolcanic rocks include metadacites and meta-andesites which occur as sills and flows. Also occurring are volcanic breccias and locally fossiliferous tuff.

Triassic Marine Sedimentary and Metasedimentary Rocks (T)

The Triassic marine sediments consist of interbedded limestone, sandstone and shale with locally occurring hornfels, quartzite and volcanic conglomerate.

Mesozoic Ultrabasic Intrusives (ub)

The ultrabasic intrusives of Mesozoic age which occur in the area are largely serpentized peridotite, pyroxenite and dunite. Talc schist and soapstone occur only locally.

Middle and Lower Jurassic Marine Sedimentary and Metasedimentary Rocks (Jml)

Middle and lower Jurassic marine sediments include argillites, tuffaceous sandstone and shale, along with locally fossiliferous limestone. Slates and

metaconglomerates generally comprise the metamorphic rocks.

Upper Jurassic Marine Sedimentary and Metasedimentary Rocks (Ju)

The upper Jurassic marine unit consists largely of shale and slate, phyllite, bedded to massive sandstone and graywacke interbedded with locally fossiliferous tuff.

Mesozoic Basic Intrusives (bi)

The Mesozoic basic intrusive rocks consist chiefly of locally schistose hornblende gabbro, amphibolite, and hornfels.

Mesozoic Granitic Rocks (gr)

Granitic rocks of the Mesozoic include varying sized pods and plugs of gabbro, trondhjemite, granodiorite, quartz monzonite, granite and adamellite (gr^a), and tonalite and diorite (gr^g).

Franciscan Formation (Kjf)

This unit is composed of massive graywacke and minor amounts of dark-gray shale, thin bedded chert, greenstone, and glaucophane schist.

Franciscan Volcanic and Metavolcanic Rocks (Kjfv)

The volcanic and metavolcanic rocks of the Franciscan Formation consist primarily of diabase, basalt, and agglomerate.

Upper Cretaceous Marine Sedimentary Rocks (Ku)

The marine sediments of upper Cretaceous age consist of interbedded sandstone, shale and locally massive conglomerate. The sequence is locally fossiliferous in the Susanville quadrangle.

Tertiary Volcanic Rocks (Tv)

The volcanics of the Tertiary period in the area are comprised of light colored andesite flows (Tv^a), basaltic flows and plugs (Tv^b), locally pyroclastic tuffs and breccias (Tv^p) and basalts (Tv^b).

Tertiary Intrusive Rocks (Ti)

Intrusives include rhyolite plugs (Ti^r), andesitic breccias (Ti^a) along with basaltic dikes and plugs (Ti^b).

Tertiary Marine Sedimentary Rocks (Tm)

Locally fossiliferous mudstone, shale and sandstone comprise the Tertiary marine sediments. They are further characterized by local sand lenses and conglomeratic thin beds.

Tertiary Nonmarine Sedimentary Rocks (Tc)

Nonmarine sediments are characterized by auriferous gravel deposits which are locally interbedded with sandstone and conglomerate.

Upper Miocene Marine Sedimentary Rocks (Mu)

The upper Miocene marine sediments occur as mudstones and siltstone along with some shale and sandstone. Mudstones in the Redding quadrangle are locally diatomaceous.

Pliocene Volcanic Rocks (Pv)

The Pliocene volcanics in the Chico, Susanville and Alturas quadrangles consist of rhyolites (Pv^r), andesites (Pv^a), basaltic flows and breccias (Pv^b), along with pyroclastic tuffs (Pv^p) and mudflows. The Weed, Eureka and Redding volcanics are essentially the same assemblage with the exception of the rhyolites. Basalts and tuffs are the prevalent volcanic rock types in the Ukiah quadrangle.

Upper Pliocene Marine Sedimentary Rocks (Pu)

The upper Pliocene marine sediments consist chiefly of interbedded sandstone, mudstone and siltstone with locally conglomeratic beds. Rocks along the coast in the Eureka quadrangle are typically very fossiliferous.

Quaternary and/or Pliocene Cinder Cones (*)

Locally basaltic cinder cones occur in the Susanville and Alturas quadrangles and are associated with volcanic tuffs in their occurrence in the Chico quadrangle.

Pliocene - Pleistocene Nonmarine Sedimentary Deposits (QP)

Largely undifferentiated lacustrine and fluvial deposits containing local conglomerates and interbedded sandstones and claystone comprise the bulk of the Pliocene - Pleistocene nonmarine sediments in the area.

Pleistocene Volcanic Rocks (Qpv)

Basaltic flows (Qpv^b) and pyroclastic tuffs (Qpv^p) occur throughout the area in all but the Ukiah and Redding quadrangles. The Pleistocene volcanics in the Alturas, Susanville and Weed quadrangles are comprised predominantly of andesites (Qpv^a) and rhyolites (Qpv^r).

Pleistocene Nonmarine Sedimentary Deposits (Qc)

Pleistocene nonmarine sediments consist generally of fanglomerates, deltaic sandstones, siltstones, gravel and clay. In the Susanville, Chico and Redding quadrangles the sediments also include intercolated volcanic ash or debris.

Pleistocene Marine and Marine Terrace Deposits (Qm)

The Pleistocene marine terrace deposits are predominantly comprised of alternating facies of sands and clays.

Quaternary Nonmarine Terrace Deposits (Qt)

The Quaternary nonmarine terraces include river, stream and lake terrace deposits, along with some fanglomerates, deltaic and slopewash deposits.

Quaternary Glacial Deposits (Qg)

Terminal and lateral moraines, till and fluvoglacial deposits along with later associated accumulations, such as bog and soil, make up the major Quaternary glacial deposits throughout the area.

Quaternary Lake Deposits (Ql)

The Quaternary lake deposits include sand, silt, ash and local diatomaceous earth in playa-like deposits in scattered basins of interior drainage. This part of the section in the Weed and Redding quadrangles also includes predominant glacial lake deposits.

Recent Volcanic Rocks (Qrv)

Basaltic (Qrv^b), rhyolitic (Qrv^r) and pyroclastic (Qrv^p) volcanics occur throughout the area. Rocks in the Susanville, Alturas and Weed quadrangles are further characterized by the occurrence of tuff, lapilli, and local obsidian and cinders.

Recent Alluvium (Qal)

Alluvial silt to coarse gravel which is locally brecciated or conglomeratic, occurs in the Great Valley and is often associated with fan, terrace or local lacustrine deposits. Recent alluvium in the Weed and Susanville quadrangles also includes areas of local glacial outwash.

Recent Dune and Coast Sand (Qs)

Well sorted dune sand and older eolian sand occur along coastal areas.

Structure

A complex network of faulting presents the most pervasive large scale structural aspect of the Weed quadrangle. On the western side of the map area, faults such as the Bald Mountain Thrust, the South Fork Mountain Fault, the Grogan Fault and the long inactive subduction zone boundary, the Coast Range Thrust, trend generally northwest-southeast. The east side blocks are most commonly upthrown, and control to a large extent the topography of the area. Another system of randomly aligned through generally southward trending faults including the Orleans, East Fork and Mallethead thrusts and the Twin Sisters, North Fork and Grouse Point Faults, cut the section in the central to eastern portion of the quadrangle. The most recent seismic activity has been recorded in the eastern part. Volcanic cones, the most prominent of which is at Mt. Shasta, occur in a generally north-south belt in the Cascade Range in the eastern portion of the Weed quadrangle.

INTERPRETATION

General

The airborne gamma-ray spectrometer survey is conducted in support of the Department of Energy's National Uranium Resource Evaluation (NURE) program. The primary purpose of the survey is regional resource evaluation as opposed to local anomaly identifications. The interpretation of the radiometric data is directed towards determining zones of possible depletion of uranium which may have served as possible uranium sources, outlining areas of regional enrichment in uranium and indicating the geological formations which are most likely to be mineralized within a possible uranium province.

The areas of possible uranium depletion/enrichment are outlined with the aid of anomaly maps, which have been previously described. Enrichment or depletion of uranium on a regional scale is assumed to have taken place if the U/T and U/K ratio values remain higher/lower than at least one standard deviation above/below the mean for a distance of at least a mile, provided the K, U and T count rates are at the same time not less than one standard deviation below the mean. One mile equals approximately 35 samples.

The probability of a geologic formation to be mineralized by a given element may be estimated from the dispersion of the geochemical distribution curve (i.e. the smaller the ratio of the standard deviation over the mean) the less the likelihood that an extremely high concentration of that element exists within that formation. Obviously, the opposite holds true as well.

The decision of both the "favorability" of a formation and of the presence of a regional geochemical anomaly is influenced to a large extent by the choice of the geological cell units used in the correlation of the radiometric and geologic data.

The radiometric parameters used in the present report are concentrations in parts per million of equivalent uranium and equivalent thorium and in percent of potassium and their ratios. The radiometric count rates of the helicopter borne A.G.R.S. (Airborne Gamma-Ray Spectrometer) system were calibrated at the Lake Mead Dynamic Test Range against sources of known concentrations of potassium, uranium and thorium. The sensitivities of the A.G.R.S. system, normalized to 400 feet terrain clearance at standard temperature and pressure are:

<u>Radioelement</u>	<u>Count Rate</u>	<u>Concentration</u>
Potassium	105.71	1%K
Uranium	12.05	1ppm eU
Thorium	7.32	1ppm eT

Geochemical Analysis

A total of forty-four discrete rock units were distinguished and sampled in the course of the quadrangle survey, plus two additional surficial entities: water, and a few small areas that have not been geologically mapped. Many of the forty-four rock units were not sampled sufficiently to permit reliable statistical analysis.

The various volcanic members of the Tertiary volcanic (Tv) suite, ranging from rhyolite through basalt, have been grouped together because contacts have not been established for these facies on the geologic map within the undifferentiated Tertiary volcanics in the northeastern part of the quadrangle.

The most widely exposed of the metamorphic rock units, the undifferentiated pre-Cretaceous metamorphic rocks (m), is mapped in a broad, irregular belt striking north-south across the central part of the quadrangle. The histogram distributions display well defined peaks, lognormal in the thorium and uranium windows and normal in the potassium channel. All three show evidence of "tailing" into the higher concentrations. Consideration of the curves suggests that the pre-Cretaceous metamorphics (m) include a diverse suite of rock types. The pre-Cretaceous metamorphic rocks that are differentiated as being of metavolcanic origin are lognormal in all spectral windows and they display extreme tailing in the thorium and potassium spectral windows. This suggests great diversity of composition.

The pre-Cretaceous metasedimentary rocks (ms), principally recognized in the southwestern part of the quadrangle, have normal distribution in all three spectral channels. The mean concentrations of the diagnostic elements are unusually high, especially in the thorium channel. This is consistent with the sedimentary origin of the rock unit.

The pre-Silurian metamorphic rocks (pS, pSs, and pSv) and the Permian metavolcanic rocks (P_m v) show generally irregular histogram curves because they have not been sampled extensively. The pre-Silurian metasediments (pSs)

have much greater dispersion in their histogram curves, and much higher mean concentrations of the diagnostic elements than the recognized metavolcanics facies or the undifferentiated pre-Silurian metamorphics (pS), as might be anticipated from rocks of sedimentary origin with a high proportion of oxide and silicate minerals. Conversely, the mean concentrations and the standard deviations of the metavolcanics (pSv) are so low that it may be concluded that they are mafic in composition. The mean concentrations of the undifferentiated pre-Silurian metamorphics (pS) are intermediate between those of the metasediments and metavolcanics, as is to be expected.

The Jurassic/Triassic metavolcanics (JTv) show lognormal distribution, low mean elemental concentrations and slight dispersion on all three spectral channels. The mean concentrations are low, but some tailing into higher concentrations indicates generally mafic composition with minor constituents of more felsic composition.

The Permian metavolcanics (Pm v), with only four hundred seventy-four samples, display normal distribution on the thorium and potassium spectral channels and lognormal distribution on the uranium channel, with modest dispersion.

Of the intrusive rock bodies, the relatively mafic members show markedly lower mean concentrations and far less dispersion than the relatively felsic intrusive rocks. The undifferentiated granitic rocks of Mesozoic age (gr), widely exposed in the center and west center and generally intrusive into the pre-Cretaceous metamorphic basement, display broad lognormal histogram distributions with broad dispersion, especially in the potassium spectral channel. The granodiorite member was only sampled four hundred thirty-three times and; therefore, its histogram distribution is extremely irregular. Nevertheless, it shows high mean elemental concentrations and apparent double peaking in the thorium and potassium channels, suggestive of at least two compositional components. In contrast, the Mesozoic basic intrusive (bi) bodies and the widely exposed Mesozoic ultrabasic (ub) bodies have narrow, well defined histogram "spikes", with low mean elemental concentrations. The only indication of variegated composition is the tailing on the lognormal distribution curves.

Of the volcanic rocks, the Tertiary volcanics (Tv), undifferentiated in this study, are the most frequently sampled. The thorium and uranium channels

have normal distribution and the potassium channel has lognormal distribution. Elemental mean concentrations are comparatively high, suggesting that the felsic rocks predominate.

The Pliocene volcanics include an andesitic (Pv^a) and a basaltic (Pv^b) component. The corresponding histogram curves of the two rock types are similar in shape and mean concentration, except that the andesitic rocks have more erratic curves and lognormal distribution in the uranium and potassium windows. This may be an effect of inadequate sampling (two hundred seventy-six samples).

The same appears to be the case with regard to the Recent volcanics of andesitic and basaltic composition (Qrv^a and Qrv^b). They exhibit almost identical histogram distributions, mean elemental concentrations and dispersions. Their differentiation is, presumably, based on very subtle compositional differences.

The undifferentiated Pleistocene volcanics display irregular histogram curves, although their distribution is normal. The irregularity may be a reflection of the variegated compositional facies or of the paucity of sampling.

The most widely exposed of the sedimentary rock units are the undifferentiated upper Jurassic marine sedimentary and metasedimentary rocks (Ju), exposed in a wide north-south striking belt along the western edge of the map sheet. They are extensively intruded by Mesozoic granitic and ultramafic rocks. The histogram curves are normal in distribution, although they show irregularity and broad dispersion. The thorium distribution curve has a double peak and the potassium curve has three peaks, indicating a complex composition, perhaps signifying metamorphosed and nonmetamorphosed facies.

The Franciscan Formation (KJf), is exposed in the extreme west in fault contact with the upper Jurassic marine rocks and ultrabasic intrusives. The histogram curves have normal distribution, moderate dispersion, and mean elemental concentrations consistent with a sedimentary rock system.

Quaternary alluvium (Qal) overlies the floor of Scott Valley in the center of the quadrangle, Shasta Valley in the northeast, and the region south of Meiss Lake in the extreme northeast. The histogram curves show clear

double peaks in the thorium and potassium spectral windows. The implication of this is that there are at least two compositional types of alluvium, or that there are "wet" and "dry" phases. The same is true of the Quaternary glacial deposits (Qg) encountered north and east of Mount Shasta, and the possibility of wet and dry phases is considered most likely.

Marine Ordovician sediments and metasediments (O) exposed in a large area in the east central part of the Weed quadrangle, are described as consisting of schistose graywackes interbedded with phyllite, limestone, chert and greenstone. The formation has, in addition, been thrust eastward over younger (Silurian) rocks and is, therefore, likely to be locally metamorphosed. This diverse compositional suite is supported by extremely irregular, asymmetrical histogram distribution curves, particularly in the thorium and potassium windows.

Other sedimentary formations were insufficiently sampled and are generally irregular in histogram shape. They are not amenable to reliable analysis.

Computer Printer and Anomaly Map Analysis

Computer generated maps were prepared for the total magnetic intensity, the three diagnostic gamma radiation windows, and their comparative ratios at a scale of 1:500,000 to supplement the 1:250,000 standard deviation anomaly maps. The grid spacing of the 1:500,000 maps is 1270 meters by 2117 meters. This coarseness of sampling precludes the possibility of detailed interpretation.

The generalized map of the total magnetic intensity indicates that the maximum magnetic excursions are located in the southeast, over the areas where Mesozoic ultrabasic intrusives (ub) are exposed. In this region the local magnetic relief exceeds one thousand gammas. A broad, poorly defined zone of low magnetic intensity and minimal relief trends northeast-southwest across the central part of the Weed quadrangle. It is generally correlated with the pre-Cretaceous metamorphic rocks (m) and the Mesozoic granitic rocks (gr) intrusive into them. In the northwestern part of the map sheet, there is another area of increased magnetic intensity, and this is attributed to exposures of Mesozoic ultrabasic intrusive rocks.

TABLE III

LEGEND TO TOTAL FIELD MAP (GAMMA)

CONTOUR VALUE	LOWER LIMIT	UPPER LIMIT
-		52750.0
0	52750.0	52850.0
1	52850.0	52950.0
2	52950.0	53050.0
3	53050.0	53150.0
4	53150.0	53250.0
5	53250.0	53350.0
6	53350.0	53450.0
7	53450.0	53550.0
8	53550.0	53650.0
9	53650.0	53750.0
1	53750.0	

```
X3= 597560.0
Y3= 4658069.0
```

Y2= 55 75 60 .0
Y2= 455 80 00 .0

TABLE IV

LEGEND TO POTASSIUM AVERAGE MAP (PERCENT)

<u>CONTOUR VALUE</u>	<u>LOWER LIMIT</u>	<u>UPPER LIMIT</u>
-		0.05
0	0.05	0.20
1	0.20	0.35
2	0.35	0.50
3	0.50	0.65
4	0.65	0.80
5	0.80	0.95
6	0.95	1.10
7	1.10	1.25
8	1.25	1.40
9	1.40	1.55
+	1.55	

X4= 415000.0

Y4= 4658669.0

Y3= 597500.0

Y3= 4658669.0

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0 3 2 4
. 000000000 1111 2456664210 12343 3332222222100000 12211 1 23 4 55444 5555443332222 3468++++ 9777665 55554322 22 33332 3443 344444 5
. 0 11 234 55432 1 1 23 333 22 1 1 1 2 34 5 55 5 4444333 45678999998 76 5 5 4333333 3 3 3 3 4 555
. 0 1 2 33 33 2 111111 2 22 1 1 2 3 4 555 5 555 4 4 5678 88 8 76666 5555444 3 3 3 4 55 6
. 0 00 12 34432 111 00 1 2 2 1 1 2 3 45 55 5 5543 346 7 88 89 976 55555 6665 4 3 3 4 56666
.00 0 01 246642 0 012 2 11 1 12 3456665 5 54 45531 2477 8986 6 853 34 579986543 2 24678777
. 0 0 01 2455321 00 12 2 1 1 1 12 3456 6 55 5 4 4 432 4677 876 69 86444 5 67887654 33 333 457777
. 0 0 0 1 2 33332 111 1 2 222 22222 111111111 2 345 54 4 5677 77 66 788 7666666 77 65 4 3 3 4 56 7
. 0 0 0 12 2 1 1 2 22 22 2 34433 2 3 4 5 5444 5 678887 6 55 67 89997 653 4 3 345 6 6
. 0 0 0 1 2 2 2221 00 1 23 443333333 2 2 34 43 2 2 34 5 5 4 578 97654 457 7 78987 6 5 4 3 345 66
.00 0 02333 2 233321 0 01232 2465444444432 3565432 1 134 4 566 66654 457 98642 36887 55 6 6 54 3 345 6 6
. 0 0000 1 2 22222222 1 0 1234433 4 444 4 4 3 2 3 44 3 2 2 3 4 5 6 7 89 875433 4567 6 5 55 6 6 5 4 3 3 4 5 5
. 0 1 0 01 11 345555444 3333 3 3 333 2 2 3 4 5 678888 8888765 4 55 6 6 55 6 66 5 44 33 3 4 5
. 0 121100 1 1111111 2456665 43 22 3 3 22 2 11 234 5 66 666 77 765 4 5666 6 55 6 776 5 44 3 3 4 4
.0- 012343321 1 1 1 1 2456 6542 1 2 34 3 2 2 2 1 0 134 4 5666 567 765 46787 6666 5 5 78875 43 3 4 4
. 0 134555431 0121 11 1246776420 0123443 21 123 21 0 024 4 4567754 4567764 469 86 67765 579985 5554 3 4 3
. 01 234 5 421 1 1 111 22 3 543211 2 3 3 211 2 2 11 1 234 5 666555 6 655 6788877665 56 665 4 333 4 44
. 11 2 33 2 1 1111 22221 123 3222 3 3 22222 22222 3 4 55 6 6 5 6 77 88 876 5 4 5 555 44444 444444 4
. 22 23332 1 11 22 3321 123 3 33 2 2 3 3 4 566 77 66 5 4 68998 999875 4 4 444 4 3 4 555
.431 13431 1 22 2 1 123 4 33322 3443 3 321 1 2 33 333 3566 7 8877 652 26 8 9 85 4 44 4 4 3 4 55 5
. 322 222 1 1 2 2 11 23 444443 3 33 2 1 2 222 3 4 5 6 7 7 65 68 9 97654444 444 4 3 4 5 5
. 3332 3 4332 2222 2 3 3 3333 22 2 3 4 55 55 6 7 888 9 987654 4 4444 5 5
. 33 3 355543 22 2 3444 33 3 3 2 111 2 3456 5 4 567 8 9999 9865 4 4 555 44 44 55
.34443 245543 22 2 23454 3 3 4444 3 2221 1 1 245677654 456 78 87554 4 5 5 555 4 4 455
. 344 3 4565432 233 21 235654 3 3 4 5 43 21 1246788643 34578 864 3 3 4 5 665 5665 4 455
. 33 3 22 3 3 22 3 333 3 44 4 333 4 44 3 33 2111111 23466665444 5789 987 66554 4 5 555555 44 4 4
. 33 321 12 333 4444 4 3 3 444 4 33 3333 3333222222 3 45 66655 6789 98876 5 444444 5 55 444 4
. 33 444321 123 4444 5555554 444 4 5 4 3 2 3 3 3 444432 235788766 68 97543 222 234 4 4 44 4
.43 4555420 02344 5555 6 753 354 456643 2 2 3 44 333 45676310 148 876 79 9630 0 1 355 4 4 555 4 44 4 4
. 3 4 5 5421 2344 4 4 5 5554 3 4 444 5 5 433333 44 44 4 44321 24689987 8 98653100 123 44 4 44 4
. 3 4 44322 3 3 3 4 4443 2 3 4 5 5 44 44 5555 44 33333 345788 8 777 89 9876542 1 1 23 4 555 4444 4
. 2 3 44 4333 2 111 2344 32 224 56665 4 567766 54 3 2 2222 3568999 865 689 987543 21 0000 12 3 4 5 44 44
. 2 3 444 44431 0 0 1344 32 2345677654 56899876542 2 1 23589 99998775 68 97532 1 0 0123 4 4 55 4 33 3
.012 3 56554 321 0 123 32 234 56 655 567777 654 22221 1 259 9 9 87 79 97642 1 00000 123444 44+444 4 5543 3 44
. 2 3 4 4 32 1 11 23 44 32 3 4 5 6 65 5 6 65 433 222 34689 99999 98 77 6432 1 12221 2 3 4 333 4
. 2 3 4 5 4 32 1 1 2 3 44 5554 4 5 6 6 54 3 3 45678999 8 76555555 43 2 1 0 0 1 2 3 44
. 23 44 5 55 4321 00 123 4 555 4 5 555 6 65 4 3 2 3 4 56789 998654 4 43 2222 1 0 1 2 344 333 444444 3
.23 455 4 4 420 01234 567654 444 5 5 567765432 2 3555 67899 85 56520 0 11 12344 3 3 4 4 4
. 3 44 55555 43100 1 24 555 4 4 5 555 555432 2 3 45 6 77777654 321111 1 1 234 4 333 4 4444 3
. 3 44 5 66 5 43221 2 3 4 5 6654 333 4 5 555 4432 2333 44 5 55555555 4 333 22222 1 1 23455 4 3 4444 4
. 3 4 5 5 4 333333 34 5 544 3 345 5 44 444443 44 55 44444 33 3 333 21 12456654 34 55 4 333 4
. 3 4 5 666554 3 44443 35 6531 22 2 23566 5 43 35665444 4 55 4 333 22 3 3 222 345421 0 2579963 245665 4444 3 345
.23455 6 6 543 34555443 4 5542 2 33 2 35776 42 36 654 4 45 54 3 2 1 13 32 2466530 0 0 259 730 2467765 4 3 33
. 3 44 5677654 3 4 44 433333 33 45 6 5 4 33 45 54 4 4 4 3 2 11 11 1 23 33210 0 24677532 345665 55 4 33 3
.23 44 5 6 65 444 4 4444444 5 5 4 4 5 544 33 4 4 3 22 1 1 111111 1 23 3333 4 55 5 4 44
.23 44 5 5 4 4 4 4 5 66665 55 5 4 333 456543 2 3 4 4 4 3 2 1 0 000 1 11 2 3455 54 333 44
.2 34 5 5 5 43 34 55 4 468 974 5666 5 432 235432 23 3 4 43 2 1 0 0 0 11 0 0 1456555555 3 4 4
.23 4 5 5 4 4 44 444 5677655 66 5 4 322 3 33 2 2 3 44 3 222 34321 000 11111 0 11 2344 4444333 44
.23 4 5666 5 4 4 4 5 6 66 5 4 32 2 2 3 3 2 234554321111 2222 1 1 22 3 44 444 4
.23 4 5 5 4 3 4 555555 5 667 6 6 5 4 322 2 1111 23 3 2 1 234544321 12344321 0 123 44 55 4 55 44
.23 4 5 6 5 4 3 345 5 5 5 78886 6 6 5555 42 12343 2 1 123 44431 00 12456421 24565410 0 13555 566545 3 444 555 4443
.2 3 4 4 45 6 55422 34665 5 6 77 1 1 0 0 012345431 - 0 235 0- 0 00000 00 555

```

X1= 415000.0

Y1= 4538000.0

Y2= 597500.0

Y2= 4538000.0

TABLE V

LEGEND TO URANIUM AVERAGE MAP (PPM)

<u>CONTOUR VALUE</u>	<u>LOWER LIMIT</u>	<u>UPPER LIMIT</u>
-		0.25
0	0.25	0.40
1	0.40	0.55
2	0.55	0.70
3	0.70	0.85
4	0.85	1.00
5	1.00	1.15
6	1.15	1.30
7	1.30	1.45
8	1.45	1.60
9	1.60	1.75
+	1.75	

X3= 597500.0

$$Y_3 = 4658669.0$$
$$2 = 597509.0$$

Y2= 4558000.0

TABLE VI

LEGEND TO THORIUM AVERAGE MAP (PPM)

CONTOUR VALUE	LOWER LIMIT	UPPER LIMIT
-		0.70
0	0.70	1.40
1	1.40	2.10
2	2.10	2.80
3	2.80	3.50
4	3.50	4.20
5	4.20	4.90
6	4.90	5.60
7	5.60	6.30
8	6.30	7.00
9	7.00	7.70
+	7.70	

$$Y_3 = 597560.0$$
$$Y_3 = 465.8069.0$$
$$X_2 = 59.7564 \text{ y}$$

72-1037500-1
 72-1037500-2

TABLE VII

LEGEND TO URANIUM/POTASSIUM RATIO MAP

<u>CONTOUR VALUE</u>	<u>LOWER LIMIT</u>	<u>UPPER LIMIT</u>
-		0.70
0	0.70	0.92
1	0.92	1.14
2	1.14	1.36
3	1.36	1.58
4	1.58	1.80
5	1.80	2.02
6	2.02	2.24
7	2.24	2.46
8	2.46	2.68
9	2.68	2.90
1	2.90	

```
X4= 415000.0
Y4= 4658669.0
```

```
X3= 597560.0
Y3= 4658669.0
```

```

. 6 3210 2344310 0 21 0 01 2 2221 12578 333333311- 013321 233321000- 0 12222111111000000000 - - - - 00 000 133320- 000- - - - -
. 4 32 2 34 32111 22111 233 2 22 345665544443 22 1 1 2 22 33 211 11111 2 2 1 0 0 0 1 2 2 100 0 -
. 66654333 33222 3333 4443 33 4 55 55432 1 2 21 1 22 22 2 1 111111111100 0 00 1 1 0 -
. 89987544 4 553 345555543 3 44 5 6654 44321 1 2 2 2 1 123 21 1 1 23331 0 0 0 0 122222110 -
. 899854 44 4 57642 3666 543 34555 4 56764 49 93 01233332 23432 10 03554 20 0221 12321 00 0 0 10 023432 10 -
. 8887 5 4 4 6764 467 654 357654 456763 26750 123 33 2 3 32 1 0 13443 221 1 21 12 210 0 0 0 0 23321 0 000
. 8 8876 55 4 5 6543 456 66643 33 455 4 5543 24664100 12 22222 1 0 1 2 22 1 1 2 22211 0 0 1 2 221100 0 0
. 7 766 555 44444 5 6 5 4 33 3 4 444 3333 2 3332 2222 1110 01 11 11 2 1 0 00 1 2 222 1 0 0
. 7 8 77666 54 33 4666 555 4 3 4 4 3 2 1 1245542 1 11111 000 1 1 1 2 1 12222 1 00 0 0 1 11 1 0
. 8888 8 876 66432 3478754 332 22 2 345 43 3 31 1367521 11 1 000 110 03431 0123 221 0 01 0 0 1221 1 1 0
. 7 89988 77 6654 33 4666543 2 3 4 4 3 3 22 333 4654321 1 0 0 11 00 121 0 1 11 000 00 0 0 1 111 1 0
. 7 79 98 6 5 555555 44 4432 2 3 45555 4 3 2 3 333333 333221111110 0 1 1111 1 1 0 0 0 1 221 1 1 0
. +87 69 96 4 56 766654 5665432 23456775 4 33 32 2 2 23455321 1111100 1 11 0 0 111111 2 333322 1 0
. +96 3433 454 4568 77753 25887532 369 9743 2 4 3 23321 267741 1 2210 0 12221 11 0 0 1 23444 3 21 1
. +85 2 44 4568 7 853 26897532 2 26 83 2 244322 33321 257741 1 22 10 0 12321 1 11 11 1 1 22 2444 33321 0
. + 853 3 33 444 56 777764 4677654433 35677643 2 3 33 4433 21 24543 1 222210 11 2 1 1111 1 2 22 22 3322 2 2 111
. 9875421 24555555 6 6 5 4 69 85 3 4 55 4 3 22222 333 3 22 3 2 111111 1 11 1 00 111 22 2 33 3 222 2 1
. 6654 32 2467765 4 55 4 4 7 74 2 3 4 432 1111 13 333 2 11 1 0 111 0 1222 1 1 0 0 1 222 2 3333 32 1 2 2 1
. 8775 479987654 564 4 43 4566653 1 2 455420 02355543 3431 1 0 010 14541 1 10 01233332 2 3333 44444 5531 12 2 1
. 7654 4677665 44 4 3 3 4 554211 2 33 211 2 3 4444 32111 1111 000 110 12 2 1 11 0 0 1 2 2 2 3 4 44 4321 12 21
. 6 5 444 4 5 4444 4 3 333 2 11 2 22 22 35899754 4 32 111 233211 1111 000 12 22 3 333 22 1 2 2 1
. 55 5554 3333 33 4 554 33333 3 1 1 111 2 3578 865 432 22 11 1 12222 2 3 3 2 1 1 2 2 1
. 555 45665 33 2 34554 3 3 3 210 0 00 1 22 3467866 45641 1 2 2222 1 11 0 1 2 2 3 432 11 1 1 12 21
. 65 5664 2 3 2 34554 343 2 21 0 01210 0145766 46751 0233 2 1 11 111 0 0 11 2 2 2 2 34421 1 1 2332 1
. 5 4 56432 23 22 344 3 3 32 21 000 0 11 21 357764444444322 22 1 1 11 1111 1 1 2 21 0000 1 1
. 4 444 5555443 3 222 3444432 1 1111 2 2 34 4 33333 44433 22 1 1 1 2222 1 1 111111 0 0 01 1
. 4 3 456789854 2 2 344 43211 0 1233322 2 3322 1111 23566532 11 11 1 000000 1 22222 3 444332 1 000 0 0 0 1 1 1
. 4443 3 46 63 2 2 2 3 443211 0145532 2 343210 0 137875432 1 23320 01233 3456 7532 1 1 0 1111 221 1 1
. 44 33 47 41 2 2 2 33 32 100 123 3 2 2 3332100 13455432 1 11 000000 1 2 2 3 456 6421 1 00 00 1 11 1
. 4 4 45787421 2 222 345788743 1111 2 2 111 1 11 2 33 22 1 111111 1 2 2 344432 1 000 00 1 2222
. 5554444 45 432 2 333 59 94 1 0 123321 00 1 111 22 11 1 00 123321 00 1 11 2 3 32 1 0 0111111 2 11 2 333
. 665 5 4 4 542 2 3 3 4 45532 2 1 024431 01 221 0 1221 1 1 0 0 122 1 10 0 1 1 1 2 1 2210 122 2 11 21 123 4
. 77654 44 454 2 2 33 33 44 4 43 22 100 12 32 10 123331 01220 011 0 01221 210 11 1 11 1 12210 132222 2 1 1 1244 32
. 776544 4 4333 44 45664 22111 2 2 11 3455421 2 211111 0 0 122 3332222222222222 1 12 2100 12 33333211 1 2 3 3
. 88765544 33 4 5 67654 3 3 4 54 22222 222 2222 3 444332 22 1 000 12 33 4 54433333333 44443 33333211 2 34444 32 2 3 3
. +9877643 3 4678587543 3 43 34 432 25432 1 2 222 4566543333 2 1 0 0122 3479974 456554 4566655555432 23566555432 22 3 3
. 9+ 97 77753 3568 863 2 4 44 455432 35652 1332 4 6 3 43 1 0 035541 4 3 47996 579988866 7752 258977665433332 3 3
. 998777643 3479 8642 234 4 554332 34 432 2 33 3468997543 3322 1110 12 3 347 974 4677766 88 99 88776432 35677 65 67765433 444
. 7 77 654 33 4 56788754 2 34 5 554444 4433333 457887644333 2222222 22 3455 4 5678887 88 9 998753 345777 66 7 765555544
. 4 44 55 55555 4 44 43 4 5 6666 6665 4 44
```

```

X1= 415000.0
Y1= 4538000.0

```

```

X2= 597560.0
Y2= 4538000.0

```

TABLE VIII

LEGEND TO TOTAL FIELD MAP (GAMMA)

<u>CONTOUR VALUE</u>	<u>LOWER LIMIT</u>	<u>UPPER LIMIT</u>
-		0.150
0	0.150	0.185
1	0.185	0.220
2	0.220	0.255
3	0.255	0.290
4	0.290	0.325
5	0.325	0.360
6	0.360	0.395
7	0.395	0.430
8	0.430	0.465
9	0.465	0.500
+	0.500	

Y3= 59 75 60.0

Y3= 4058069.0

• 6 55 12220 655310 1 2 344442 3 322 468 4 444320-- 124421 246432 2210 0 357662 33211 233333 2100 123 22 543 32211 100000--
• 55 43322 2 34 4322222222 35676533 333 45 55444 3 21 0 1 23 333 4 433 33333 3 45543 3 22 3 32 22 2 2 333 3 3221 11 0
• 4444444 55544 4 4332 11 23 4 44444 3 4 44 3321 11 2 3 4 43 45554444 4 33 3 44 567653 2 222 3 3 22 1 0
• 33 333 46665444 5544210 0123 3 44 33 4 4 33 2 1 11 2 3 33 4 44432 3 4555543 333 4 7 74 3332 11 2545554332 11111
• 2 3 3 2 257764 356655420 123443 3 44 4 43 2 210 01222 24543 34 555543 4567653 233 365 4 4 543 4542 1357764 21 1 10
• 333 2 1 135664 567766420 1245543 3 34 432 221 12332 245543 34 4 554 4 5 543 23 3 35543 2 443 35421 123466543 21 2 3
• 43 3210 13455 6 77665310 134789864443 4 4 333 35776432 3 44 433 4 4 4 333 4 444 33 3 4 4444433 3 3 21 2 345 66654322 2
• 444 3221 23456 77 7 655444443 345 44 55 444 5 5 665544444 4 321 123 3 4 4 333333 3 2222 3 4 444 433 2
• 54444432 3456 7899987 66555 67886 5 555 6654 3 45 66655 4 33 4443222 3 3 3 45653 34 43 22 3 32 2 3 4 43 34 54 321
• 854 47863 2466 79 87 65 5 665 5 56776 56653 3 3567776 5532 24 4443 4543 2 332 36862 2466421 1244420 13444 44 499864 321
• 8766 6532 4567 9999 877 6 5 54 4 5555 66 6 5 67655555 6 66 5 4333 32 1 2 2 4554 2 3321 1 23 3 22 3 4 4 666543 21
• + 87 8 97 7 88888 76 5 6777765 5 666 6 55555 66 5 4 32 1 1 2 3 33 210 012 3 3333 4 432 23433 21
• ++ 8 66 7666 77 8875 6788765 56 777776 55 54 3 45 6 5 5 4 3333 32 2 333333 22 2 210 12 3 44444 33 4 555554 3 2 1
• ++ 95 4 46 77 7 8974 5898654 56798 88764 6543 35666 5 5 4 3 44 3 3 44432 3 34443 2 2 2 332 233 455 43 3 4 5 54 33 2 11
• +96 23443 3567 7 7 78972 16 8654 468 9 99863 665 4567754 4 553 34 43 56653 2 34 43 2 2 33 45 4 566543 3456765 3 2 1 0
• +864 4 554 56 7 777 88743 5664 3 46788887654 5 55 66 6 54 4 3 33 3 4443 2 3 332 1111 2344 55 5443 4 5 543 22 111
• +975 43 3456 666 7 6555 67776544 5 6 7 7 655 4 56666 6 5 4 3 22 22 1 00 1 2344 5 555555 54433 2222
• 976 4 43 3456 55 56 6 5 5 5788765 4 4 56 77 6543 3467 6 54 3 22 222 332 2 33 2 1 0 012 3 4 44 5 6666 552 2 333 2
• 9864 578 988 6 5 7875 57654 456 7543 347999643 2367 8 7 653 3 43 2 1 2210 03443 1 0 1345554 456 77 87 7763 12344332
• 7654 5543 456 5 5 66 55 5 56 654 3 4 567 6544444 567 7 65444 322 22 2 211 2332 1 0 0 1 3 5 4 456 77 766 555421 3 3
• 66655 5444 5 55 5 5 55 5 44 33 4 5 5 5 58 9 7 6 54 333 345532 22 1 000 1 2 34 5 6 77 766 5 443 2 3 3
• 655 6898765 5 6 55 5 4 5 5 4 3 3 4 44 5 5 6788877 654 3 332 222 1 1 1246665 5 6 77 765 43 3 44 3
• 554 59 5 46 65 45653 35 666664 3 3 2 344 45654 58 97 6 6 653 3 4 554322 2 2 1 1 1 1 233 4 5 677 8 9864 3 3 2 45432
• 54 47975 3 36764 5653 35 6 7763 322 343 46652 236 55 67632 2345665 2 2 2 21 12321 1 23 4 4 5787 89 9642 2 32 2455433
• 444 5652 2344 4 3 4 4 4 56 7 7643 3 3 4433 4 43 6 85 4444 3 44 554332 2 11 2 21111 1 2 3 45 6 6 776543222222 3 44 3
• 333 45 66655 44444 444 5 6799864 3 3 4 44 33 4 567665 4 333 44 55 4 3222 2 222222 23 4 5 5555 4 3321 234 4 3
• 222 3479 8654 3 4 4 4 5 7 87643 3467653 2 34 4 33 2222 345555 55421 1 111 23 433 222222 3 3 4 43 2 3321 23444444
• 21 234 56765 3 3 4554 34 5 55554321 248 8531 1 3576521 11 236776 5444331 1 235554 21 13543 233 34431 245 6 775 3
• 2222 3 4 66532 23 4 444 55 4 4 322 45664321 2345543 1 1 1 2345 55 4321 111 111 2344 3 21 12332 3 333 4 3222 3456 665554444
• 2 3 4 5 542 2 3 4 5 6666555 4 3 3 4 43 2222 33 2 11 234 5 5 4444444322 2 3 33 21 2 3 33 4 3 444 43 4 5 5555
• 2 3 44444 5543222 3 4 5 68 654332 2 3432 11 23 3 2 111 12345 543 4566422 2222 33 222 2 35 654 4 44 55555 65 44 56 7
• 33 443 3456421 12 3 456 7543 45677541 145420 01 23321 0 0356 543 1 2 443 2 32 23 3 2 3 467753 3 4 564 5665 554 3 56 78
• 4443 344 5665322 33 45 67 65 66 6644222 3 44 2 2 345431 0 25665420 0 23333 4 3 32 2 3 3 45654 4 5 674 57863 332 3567776
• 4 44443 34554444444444 5 68 96 544333 4 3333 69 84222111 2345 543211 2 34444433 32 2 3 3 3 45 54 4 4 55 543333 45 65
• 5555 44444 55 66555 4 554 467 6 55 5544 44 568998754332 3 4 4 3 4 55555555444 322 3 33 4 6 765 4 3 4 5 5 43 2 3 4 55
• 666 543 34 67888665 4 45 555 666 5 56775 3

Y2= 597300.0

$$Y2 = 4538000.0$$

TABLE IX

LEGEND TO THORIUM/POTASSIUM RATIO MAP

CONTOUR VALUE	LOWER LIMIT	UPPER LIMIT
-		2.75
0	2.75	3.25
1	3.25	3.75
2	3.75	4.25
3	4.25	4.75
4	4.75	5.25
5	5.25	5.75
6	5.75	6.25
7	6.25	6.75
8	6.75	7.25
9	7.25	7.75
+	7.75	


```
X3= 597560.0
Y3= 4658069.0
```

• Figure 13
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Twelve anomalous areas attributable to gamma radiation in the uranium spectral window, and twenty-three in the thorium channel, have been recognized and delineated on the Weed quadrangle. The majority of the uranium anomalies are located in the southwestern part of the map sheet. Most of these are correlated with the pre-Cretaceous metamorphic rock system (m, ms) and the Mesozoic granitic rocks (gr) intrusive into it.

Of the twenty-three anomalous areas of increased gamma radiation in the thorium spectral window, most are located in the northeast and east center in a north-south trending belt. However, this apparent alignment is probably fortuitous as the individual anomalies are correlated with several different rock formations. Three are correlated with upper Cretaceous marine sediments (Ku), six with Ordovician marine sediments (O), two with Mesozoic granitic intrusives (gr), and two with Silurian marine sediments (S).

In the northwestern part of the quadrangle, four thorium radiation anomalies are delineated over exposures of upper Jurassic marine rocks (Ju).

Anomaly 6, in the southwest, warrants attention as it suggests strong radiation in the uranium channel with little or no thorium radiation. The uranium/thorium and uranium/potassium ratio anomalies are also strong, supporting the likelihood of uranium enrichment. The feature is located on line 540, fiducials 7700-7720.

Anomaly 7, on line 540, fiducials 8390-8420, shows similar characteristics although a minor thorium excursion is present. Anomaly 10, on line 3010 fiducials 9820-9840, is also characterized by a strong uranium radiation spike, with minor thorium radiation. The uranium/thorium and uranium/potassium ratio anomalies are well defined and relatively intense.

LEGEND
 ③ URANIUM ANOMALY NO. 3
 IV THORIUM ANOMALY NO. 4

INTERPRETATION MAP
 WEED QUADRANGLE
 U.S. DEPARTMENT OF ENERGY

FIGURE 14
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A P P E N D I X A

Geologic Legend

GEOLOGIC LEGEND

<u>Aero Symbol</u>	<u>Map Symbol</u>	<u>Unit Description</u>
---	Qs	Recent dune and coast sand
QAL	Qal	Recent alluvium
QRV	Qrv	Recent volcanic rocks, including: rhyolite andesite basalt pyroclastic rocks
---	Qrv ^r	
QRVA	Qrv ^a	
QRVB	Qrv ^b	
QRVP	Qrv ^p	
QL	Ql	Quaternary lake deposits
QG	Qg	Quaternary lake deposits
QT	Qt	Quaternary nonmarine terrace deposits
---	Qm	Pleistocene marine and marine terrace deposits
QC	Qc	Pleistocene nonmarine sedimentary deposits
QPV	Qpv	Pleistocene volcanic rocks, including: rhyolite andesite basalt pyroclastic rocks
---	Qpv ^r	
QPVA	Qpv ^a	
QPVB	Qpv ^b	
QPVP	Qpv ^p	
QP	QP	Pliocene-Pleistocene nonmarine sedimentary deposits
---	*	Quaternary and/or Pliocene cinder cones
---	Pu	Upper Pliocene marine sedimentary rocks
---	Pv	Pliocene volcanic rocks, including: rhyolite andesite basalt pyroclastic rocks
---	Pv ^r	
PVA	Pv ^a	
PVB	Pv ^b	
PVP	Pv ^p	
---	Mu	Upper Miocene marine sedimentary rocks
---	Tc	Tertiary nonmarine sedimentary rocks
---	Tm	Tertiary marine sedimentary rocks
---	Ti	Tertiary intrusive rocks, including: rhyolite andesite basalt
---	Ti ^r	
TIA	Ti ^a	
---	Ti ^b	

<u>Aero Symbol</u>	<u>Map Symbol</u>	<u>Unit Description</u>
TV	Tv & Tv ^r & Tv ^a & Tv ^b & Tv ^p	Tertiary volcanic rocks, including: rhyolite andesite basalt pyroclastic rocks
KU	Ku	Upper Cretaceous marine sedimentary rocks
—	Kjfv	Franciscan volcanic and metavolcanic rocks
KJF	KJf	Franciscan Formation
GR GRA GRG	gr Gr ^a Gr ^g	Mesozoic granitic rocks including: granite and adamellite tonalite and diorite
BI	bi	Mesozoic basic intrusives
JU	Ju	Upper Jurassic marine sedimentary and metasedimentary rocks
JML	Jml	Middle and lower Jurassic marine sedimentary and metasedimentary rocks
UB	ub	Mesozoic ultrabasic intrusives
TR	T	Triassic marine sedimentary and metasedimentary rocks
JTRV	JTv	Jurassic and/or Triassic metavolcanic rocks
M	m	Pre-Cretaceous metamorphic rocks, undifferentiated, including:
LS	ls	limestone and dolomite
MS	ms	Pre-Cretaceous metasedimentary rocks
MV	mv	Pre-Cretaceous metavolcanic rocks
PCM	P _m & C	Permian marine sedimentary and metasedimentary rocks Undivided Carboniferous marine sedimentary and metasedimentary rocks
PMV	P _m v	Permian volcanic rocks
CM	CM	Mississippian marine sedimentary and metasedimentary rocks
D	D	Devonian marine sedimentary and metasedimentary rocks

<u>Aero Symbol</u>	<u>Map Symbol</u>	<u>Unit Description</u>
S	s	Silurian marine sedimentary and metasedimentary rocks
PSS	pSs	Pre-Silurian metasedimentary rocks
PS	pS	Pre-Silurian (?) metamorphic rocks, undifferentiated
PSV	pSv	Pre-Silurian metavolcanic rocks
O	O	Ordovician marine sedimentary and metasedimentary rocks
UNK	—	Unknown or incompletely mapped geology
W	—	Water

A P P E N D I X B

List of Geologic Units by Anomaly

List of Geologic Units by Anomaly

(Uranium Anomalies)

<u>Anomaly</u>	<u>Formations</u>	<u>Line</u>	<u>Fiducial Interval</u>	<u>Brief Description</u>
1	Tv	3040	6810-6900	Modest regional U, no Th, strong U/Th, minor U/K
2	m	3020	8700-8720	U spike, no Th, U/Th, U/K and Th/K indecipherable
3	m	3020	8350-8390	Small U, no Th, strong U/Th
4	m	530	11930-12110	Small regional U, lower Th, good U/Th, weak U/K
5	m	3020	7620-7660	Small U, minor Th, minor U/Th
6	ms	540	7700-7720	U spike, no Th, strong U/Th and U/K
7	gr	540	8390-8420	U spike, feeble Th, strong U/Th and U/K
8	m	540	8470-8500	U spike, regional Th, weak U/Th
9	m	540	8830-8890	Strong U spike, no Th, strong U/Th and U/K
10	gr	3010	9820-9840	Strong U spike, minor Th, strong U/K and U/Th
11	m	3020	7290-7330	Modest U peak, no Th, good U/Th and U/K
12	Rm v	3050	2370-2410	Small U spike, no Th, strong U/Th, minor U/K

List of Geologic Units by Anomaly

(Thorium Anomalies)

<u>Anomaly</u>	<u>Formations</u>	<u>Line</u>	<u>Fiducial Interval</u>	<u>Brief Description</u>
I	Ju	450	4750-5000	Regional irregular Th, Weak U, no U/Th, U/K, Th/K
II	gr, Ku	450	6870-7130	Regional irregular Th, slight U no U/Th, U/K, Th/K
III	Tv	450	7180-7200	Moderate Th spike, small U, no U/Th, U/K, Th/K
IV	Ju	460	1180-1250	Moderate Th spike, small U, no U/Th, U/K, Th/K
V	Ku	460	3400-3500	Strong Th increase, slight U, no U/Th, U/K, Th/K
VI	Tv	460	3730-3770	Moderate Th spike, slight U, no U/Th, U/K, Th/K
VII	Ju	470	6230-6280	Modest Th, slight U, no U/Th, U/K, Th/K
VIII	gr	470	8080-8220	Broad, strong irregular Th, weak U, no U/Th, U/K, Th/K
IX	mv	470	8440-8500	Modest irregular Th, slight U, no U/Th, U/K, Th/K
X	Ku	480	12120-12150	Poorly defined Th spike, no U, no U/Th, U/K, Th/K
XI	Ju	490	7070-7130	Modest Th spike, minor U, no U/Th, U/K, Th/K
XII	O, Qal	490	8520-8860	Broad regional Th, Slight U, no U/Th, U/K, Th/K
XIII	pSs, ms	500	12040-12150	Regional irregular Th, slight U, no U/Th, U/K, Th/K
XIV	O, Qal	500	12330-12780	Very broad regional Th, slight U, no U/Th, U/K, Th/K
XV	O, Qal, S	510	15210-15540	Very broad irregular regional Th, low U, no U/Th, U/K, Th/K

<u>Anomaly</u>	<u>Formations</u>	<u>Line</u>	<u>Fiducial Interval</u>	<u>Brief Description</u>
XVI	O, Qal	3030	2720-2790	Irregular increase in Th, minor U, no U/Th, U/K, Th/K
XVII	ub	520	18100-18140	Abrupt isolated Th, slight U, no U/Th, U/K, Th/K
XVIII	O, S	520	18220-18350	Irregular regional Th, slight U, no U/Th, U/K, Th/K
XIX	O, Qal, ub	3030	2510-2610	Irregular increase in Th, slight U, no U/Th, U/K, Th/K
XX	KJf	3000	570-600	Th spike, lower U, good U/K strong Th/K
XXI	gr	550	780-860	Abrupt Th spike, little U, no U/Th, U/K, Th/K
XXII	gr	550	1730-1760	Abrupt Th spike, little U, no U/Th, U/K, Th/K
XXIII	CM	560	4810-4930	Regional increase in Th, irregular smaller U, slight U/Th, no U/K, no Th/K

A P P E N D I X C

List of Anomalies by Geologic Unit

List of Anomalies by Geologic Unit

<u>Aero Symbol</u>	<u>Map Symbol</u>	<u>No. of Samples</u>	<u>No. of U. Anomalies</u>	<u>No. of Th. Anomalies</u>
QAL	Qal	3407	-	5
TV	Tv	2290	1	2
KU	Ku	407	-	3
KJF	KJf	2350	-	1
GR	gr	5773	2	4
UB	ub	8662	-	2
JU	Ju	5500	-	4
M	m	7283	7	-
MS	ms	2422	1	1
MV	mv	2595	-	1
PMV	Pm v	474	1	-
CM	CM	615	-	1
S	S	208	-	2
O	O	1391	-	6
PSS	pSs	517	-	1

A P P E N D I X D

Mean Radiometric Values by Geologic Unit

MEAN VALUE BY GEOLOGIC MAP UNIT

WEED

QUAD

LINE 450

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
UB	0.07	0.37	3.38	0.275	1.285	4.606
GR	0.18	0.88	10.09	0.286	1.129	3.570
JTRV	0.08	0.40	4.58	0.271	1.099	3.280
BI	0.05	0.29	1.84	0.0	1.332	5.573
JU	0.32	1.14	23.56	0.253	1.263	4.946
M	0.12	0.51	6.40	0.264	1.153	3.982
UNK	0.05	0.22	1.68	0.252	1.456	6.056
MV	0.10	0.49	4.07	0.261	1.251	4.715
PVP	0.11	0.53	6.63	0.304	1.405	4.287

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
PS	0.21	0.98	9.85	0.287	1.236	4.132
KU	0.47	1.52	22.86	0.223	0.956	4.304
TV	0.16	0.64	11.52	0.252	0.715	2.983
TIA	0.10	0.35	7.84	0.213	0.673	2.049
PVB	0.14	0.48	8.34	0.180	0.743	3.610
CRVB	0.08	0.30	4.67	0.234	1.101	3.602
W	0.07	0.32	5.75	0.282	0.804	2.858
QL	0.19	0.31	12.71	0.118	0.356	3.234

LINE 460

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
UB	0.08	0.47	3.98	0.304	1.600	4.989
JTRV	0.06	0.40	2.47	0.355	2.161	4.574
JU	0.25	1.28	11.85	0.352	1.381	4.316
GR	0.09	0.62	4.66	0.327	1.441	3.780
GRG	0.04	0.0	1.13	0.0	0.0	0.0
M	0.12	0.59	6.84	0.373	1.329	4.451
UNK	0.08	0.23	2.79	0.249	1.229	5.713

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
MV	0.15	0.76	6.60	0.252	1.104	4.745
MS	0.28	1.31	14.88	0.340	1.272	3.951
PS	0.24	1.09	11.41	0.284	1.257	4.281
KU	0.43	1.97	23.59	0.334	1.253	3.775
TV	0.19	0.83	13.31	0.294	0.857	3.050
PVB	0.12	0.50	7.12	0.289	1.067	3.630
QL	0.21	0.67	14.36	0.218	0.692	3.275

LINE 470

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
JTRV	0.06	0.50	2.17	0.380	2.458	5.811
UB	0.07	0.48	3.54	0.354	1.760	4.348
JU	0.21	1.09	9.74	0.362	1.684	4.717
PS	0.14	0.81	8.85	0.397	1.459	3.262
GRG	0.09	0.61	7.74	0.410	1.161	2.416
GR	0.25	1.07	15.55	0.291	0.885	3.192
OT	0.22	1.04	9.53	0.335	1.590	4.982
M	0.16	0.77	8.08	0.307	1.305	4.385
GRA	0.20	0.70	13.76	0.258	0.756	3.089
QAL	0.23	0.72	13.75	0.216	0.757	3.536

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
MV	0.17	0.72	9.79	0.216	1.091	3.452
MS	0.25	0.90	15.64	0.248	0.804	3.249
PSS	0.22	1.07	11.98	0.340	1.294	3.830
KU	0.31	1.62	17.79	0.363	1.356	3.729
QC	0.26	0.76	10.39	0.206	1.092	5.303
TV	0.19	0.73	13.16	0.269	0.804	3.005
PVB	0.09	0.55	6.94	0.417	1.158	2.692
PVA	0.09	0.37	6.08	0.296	0.904	2.985
QL	0.19	1.08	12.95	0.366	1.151	3.128

LINE 480

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
MS	0.20	0.73	10.72	0.272	1.018	3.954
UB	0.12	0.57	4.84	0.287	1.400	4.814
JU	0.19	0.97	8.75	0.326	1.653	4.935
GR	0.08	0.51	2.94	0.405	2.010	5.282
M	0.14	0.81	6.64	0.413	1.986	4.680
BI	0.11	0.59	6.22	0.374	1.312	3.540
PS	0.05	0.23	3.15	0.296	0.591	3.562
MV	0.21	0.85	13.57	0.249	0.863	3.168
PVB	0.15	0.91	6.85	0.416	1.931	4.642

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
PSS	0.32	1.28	15.42	0.282	1.226	4.412
QAL	0.20	0.74	11.95	0.276	0.929	3.511
C	0.14	0.51	7.99	0.242	0.871	3.203
KU	0.34	1.07	22.55	0.226	0.692	3.126
QC	0.30	0.91	17.08	0.211	0.804	3.857
TV	0.26	1.07	15.85	0.289	1.005	3.658
QRVA	0.19	0.76	10.44	0.285	1.069	3.800
QRVP	0.20	0.74	12.05	0.263	0.885	3.383

MEAN VALUE BY GEOLOGIC MAP UNIT

WEED

QUAC

LINE 490

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
KJF	0.23	1.69	8.95	0.458	2.616	5.714
JU	0.13	0.95	6.16	0.421	1.863	4.187
UB	0.09	0.56	3.57	0.356	2.091	5.307
GR	0.13	0.71	6.89	0.391	1.657	4.079
M	0.13	0.63	7.02	0.340	1.368	3.924
QAL	0.27	0.82	13.55	0.225	0.894	4.002
MV	0.34	0.55	19.30	0.197	0.697	3.720

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
PSS	0.30	0.94	15.95	0.213	0.838	3.876
O	0.60	1.47	24.47	0.178	0.894	5.259
TV	0.19	1.00	10.73	0.379	1.378	3.677
QRVB	0.19	0.84	9.48	0.314	1.291	4.227
PVP	0.18	0.90	8.21	0.360	1.624	4.548
QRVA	0.23	0.88	10.86	0.267	1.187	4.468
QG	0.25	1.07	12.64	0.293	1.230	4.230

LINE 500

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
KJF	0.26	1.13	9.64	0.301	1.716	5.714
JU	0.18	0.90	9.43	0.355	1.385	4.125
UB	0.19	0.85	9.62	0.276	1.250	4.261
GR	0.13	0.55	8.41	0.277	0.907	3.290
M	0.13	0.58	6.41	0.309	1.310	4.223
W	0.10	0.39	7.74	0.290	0.803	2.745
UNK	0.11	0.46	6.62	0.323	1.774	3.798
MS	0.34	1.54	18.22	0.319	1.228	3.904
QAL	0.25	1.02	14.22	0.315	1.111	3.732

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
PSS	0.39	1.42	16.81	0.254	1.246	4.947
C	0.55	1.59	26.87	0.205	0.863	4.247
TV	0.19	0.85	11.13	0.316	1.101	3.523
CPVA	0.18	0.89	10.79	0.369	1.308	3.490
QPVP	0.08	0.58	5.37	0.522	1.652	2.960
QRVB	0.18	0.72	10.06	0.284	1.073	3.763
GRA	0.32	1.46	18.80	0.319	1.130	3.548
QG	0.21	0.58	10.26	0.209	0.870	4.248
PVA	0.23	0.87	11.35	0.259	1.050	4.043

LINE 510

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
KJF	0.31	1.04	10.51	0.235	1.499	6.502
QAL	0.18	0.72	10.79	0.293	1.062	3.582
JU	0.23	1.00	10.99	0.301	1.372	4.618
UB	0.07	0.51	2.65	0.311	1.709	5.062
M	0.14	0.72	8.06	0.302	1.189	4.059
GR	0.16	0.73	8.97	0.312	1.340	3.766
MS	0.26	0.92	11.47	0.253	1.155	4.625
MV	0.10	0.61	5.72	0.293	1.199	3.719
GRG	0.26	1.22	22.98	0.327	0.767	2.380
PVA	0.18	0.74	10.04	0.274	1.024	3.695

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
PSV	0.26	1.41	22.67	0.376	0.899	2.412
C	0.53	1.41	27.08	0.191	0.763	4.070
S	0.44	2.06	22.46	0.332	1.338	4.105
TV	0.24	0.95	11.70	0.278	1.157	4.201
QRVB	0.14	0.56	10.68	0.287	0.759	2.728
QRV	0.13	0.38	10.45	0.205	0.530	2.682
QG	0.16	0.67	10.58	0.305	0.936	3.200
QPVA	0.17	1.31	12.88	0.528	1.477	2.825
QRVA	0.11	0.47	8.97	0.295	0.777	2.532

LINE 520

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
QP	0.08	0.37	2.28	0.348	2.140	7.365
KJF	0.25	0.99	8.89	0.281	1.760	6.445
JU	0.17	0.95	7.65	0.348	1.601	4.598
UB	0.09	0.54	4.35	0.284	1.134	4.015
M	0.19	0.84	9.20	0.324	1.377	4.757
GR	0.30	1.05	18.62	0.254	0.835	3.522
UNK	0.29	1.04	10.74	0.255	1.413	5.593
MS	0.21	0.54	10.37	0.251	1.167	3.886
MV	0.06	0.27	4.11	0.199	0.892	3.226
QPVP	0.21	0.59	8.16	0.208	1.076	5.356

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
BI	0.07	0.28	2.88	0.120	0.485	4.737
PS	0.30	0.87	21.39	0.200	0.576	2.950
QAL	0.21	0.92	12.48	0.326	1.134	3.423
C	0.29	0.91	16.72	0.250	0.923	3.748
S	0.30	1.21	16.36	0.235	0.884	3.367
CG	0.11	0.89	7.08	0.432	1.358	3.193
TV	0.14	0.52	7.73	0.254	1.024	3.889
QRVA	0.13	0.62	9.78	0.279	0.923	2.674
GPV	0.17	0.69	10.48	0.295	0.997	3.413

WEED

QUAC

LINE 530

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
KJF	0.29	1.64	9.73	0.394	2.485	6.435
JU	0.25	1.15	10.52	0.332	1.680	5.018
MS	0.19	0.93	8.47	0.347	1.566	4.838
UB	0.09	0.62	3.55	0.396	2.116	5.435
QAL	0.23	1.03	9.80	0.304	1.606	5.261
QT	0.46	2.29	23.17	0.344	1.431	4.190
GR	0.23	0.90	14.20	0.288	1.058	3.641
M	0.24	1.27	12.32	0.366	1.506	4.182
MV	0.13	0.85	6.52	0.473	2.421	4.304
GRG	0.24	1.03	19.37	0.306	0.770	2.605
QPV	0.24	0.88	8.83	0.260	1.440	5.554

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
PSS	0.24	1.27	22.72	0.373	0.806	2.174
BI	0.05	0.68	1.69	0.497	3.149	3.225
O	0.20	1.03	11.06	0.318	1.249	3.477
QG	0.03	0.0	1.98	0.0	0.0	3.692
TV	0.07	0.51	1.96	0.423	2.740	4.189
DV	0.17	0.51	10.91	0.205	0.680	3.368
CM	0.25	0.75	10.43	0.207	1.016	4.988
QL	0.25	0.87	7.60	0.248	1.720	6.864
QPV	0.20	0.88	7.31	0.304	1.766	5.885
QVVB	0.16	0.80	9.19	0.364	1.277	3.617

LINE 540

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
MS	0.24	1.18	9.26	0.325	1.822	5.808
KJF	0.34	1.30	12.23	0.269	1.553	5.881
QP	0.34	1.19	9.41	0.243	1.815	7.478
JU	0.20	1.28	9.94	0.419	1.722	4.095
UB	0.08	0.56	3.04	0.378	3.093	6.105
M	0.26	1.15	10.79	0.312	1.558	4.900
GR	0.14	0.79	10.60	0.425	1.451	3.562
PSS	0.23	0.67	8.78	0.222	1.148	5.432
PSV	0.14	0.69	5.86	0.320	1.810	4.826
PCM	0.34	1.78	13.93	0.365	1.835	5.032

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
QG	0.18	0.55	8.42	0.238	1.352	4.998
RI	0.06	0.39	2.75	0.165	2.761	4.537
UNK	0.06	0.57	5.65	0.476	2.189	3.266
QAL	0.20	0.92	7.81	0.327	1.858	5.582
DV	0.29	1.65	13.59	0.381	1.669	4.368
D	0.38	2.21	15.08	0.401	2.133	5.375
CM	0.31	1.20	11.62	0.285	1.506	5.784
QPV	0.22	1.09	5.81	0.354	2.781	8.003
PVB	0.25	1.00	6.20	0.287	2.432	8.622

LINE 550

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
MS	0.26	1.19	9.26	0.319	1.991	6.086
KJF	0.34	1.09	11.85	0.235	1.387	5.971
UB	0.07	0.39	2.28	0.322	1.888	5.524
M	0.25	0.92	10.82	0.237	1.124	4.691
QP	0.24	0.76	8.97	0.230	1.241	5.507
JU	0.23	1.01	11.60	0.300	1.247	4.137
GR	0.19	0.84	11.20	0.270	0.928	3.515
LS	0.23	1.03	16.96	0.304	0.872	2.856
PSS	0.10	0.41	5.95	0.220	0.750	3.452
PSV	0.06	0.37	3.60	0.238	1.492	3.706
UNK	0.13	1.04	9.63	0.553	1.641	2.966

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
GRG	0.21	0.73	10.93	0.244	0.989	4.058
BI	0.05	0.36	1.51	0.365	2.427	4.738
QAL	0.05	0.53	2.60	0.0	2.931	4.575
QG	0.07	1.54	2.02	0.0	0.0	0.0
QVVB	0.18	0.55	2.77	0.230	0.0	0.0
DV	0.10	0.59	4.20	0.292	1.874	4.801
D	0.31	2.10	14.58	0.492	2.144	4.414
CM	0.30	1.47	12.55	0.349	1.739	5.020
PCM	0.28	1.05	11.99	0.280	1.324	4.795
PMV	0.10	0.63	7.42	0.457	1.468	3.062

LINE 560

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
KJF	0.31	1.19	11.32	0.265	1.592	6.095
MS	0.28	0.86	10.14	0.216	1.256	5.921
UB	0.09	0.65	2.82	0.379	2.304	7.101
M	0.21	0.89	9.21	0.255	1.320	4.500
JU	0.24	1.23	12.02	0.341	1.452	4.161
QT	0.17	0.67	11.12	0.256	0.840	3.241
GR	0.18	0.90	11.81	0.348	1.174	3.376
LS	0.19	0.86	8.71	0.308	1.402	4.586
PSV	0.07	0.45	3.20	0.320	1.608	4.331
QG	0.18	0.80	10.55	0.277	0.993	3.385
TV	0.19	0.69	8.96	0.260	1.124	4.331

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
W	0.05	0.48	2.60	0.0	0.0	0.359
DV	0.16	1.16	8.94	0.326	1.236	3.519
CM	0.31	1.43	13.45	0.324	1.568	4.886
QAL	0.04	0.37	1.47	0.0	0.0	0.0
QVVB	0.10	0.48	3.93	0.318	1.826	5.806
PCM	0.20	1.13	14.04	0.382	1.134	2.959
PMV	0.11	0.47	7.26	0.285	1.046	3.292
TR	0.18	1.13	10.42	0.431	1.479	3.571
JTRV	0.20	1.40	11.13	0.493	1.813	3.734
JML	0.18	1.29	10.44	0.513	1.788	3.590

MEAN VALUE BY GEOLOGIC MAP UNIT

WEED

QUAD

LINE 3000

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
KJF	0.34	1.22	12.95	0.252	1.409	5.612
JU	0.21	1.01	9.55	0.291	1.367	4.560
JTRV	0.09	0.36	2.93	0.316	1.931	6.650

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
UB	0.05	0.35	1.34	0.309	2.396	7.333
GR	0.08	0.33	6.02	0.234	0.699	2.819

LINE 3010

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
JU	0.21	1.27	9.97	0.404	1.797	4.537
GR	0.17	1.06	10.02	0.382	1.418	3.670
QT	0.18	0.86	11.96	0.359	1.064	3.132

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
M	0.11	0.86	5.58	0.464	2.325	4.632
UB	0.16	0.95	7.73	0.392	2.110	4.260

LINE 3020

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
M	0.16	1.06	8.30	0.430	1.869	4.170
MV	0.10	0.68	4.80	0.317	1.718	3.909
MS	0.18	0.91	8.60	0.361	1.535	4.348
GR	0.15	0.84	9.13	0.391	1.383	3.412
W	0.08	1.49	4.25	1.268	5.097	3.743
PS	0.04	0.41	2.58	0.485	2.406	3.217

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
LS	0.05	0.60	2.81	0.0	3.243	3.536
BI	0.11	0.52	6.04	0.308	1.288	3.875
UB	0.09	0.47	4.59	0.260	1.160	3.591
GRA	0.23	0.80	12.68	0.240	0.923	3.874
GAL	0.19	0.96	11.73	0.356	1.222	3.419

LINE 3030

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
QG	0.16	0.62	8.94	0.311	1.148	3.539
UB	0.20	0.85	9.68	0.306	1.419	4.750
PSV	0.05	0.51	2.25	0.489	3.333	4.737
GR	0.15	0.66	7.52	0.296	1.352	4.345
BI	0.14	1.06	5.83	0.558	2.990	5.127
M	0.15	0.62	9.86	0.268	0.842	3.265

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
O	0.27	0.97	13.34	0.284	1.146	4.249
CAL	0.31	1.04	15.11	0.244	1.088	4.474
PSS	0.35	1.42	17.34	0.289	1.193	4.151
MV	0.27	0.96	14.72	0.256	1.050	4.055
MS	0.29	1.10	15.86	0.271	1.038	3.850

LINE 3040

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
UB	0.06	0.43	1.53	0.335	2.771	6.882
BI	0.05	0.25	1.35	0.0	0.0	5.792
QAL	0.14	0.67	7.57	0.276	1.144	3.955
D	0.05	0.33	2.61	0.256	1.804	4.072
UNK	0.05	0.45	1.22	0.336	0.0	3.738

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
QG	0.06	0.69	1.53	0.0	0.0	7.408
GR	0.17	0.53	8.14	0.249	0.857	4.241
TV	0.19	0.78	11.48	0.304	0.962	3.441
QC	0.25	0.58	12.45	0.161	0.716	4.234
KU	0.43	1.77	22.45	0.286	1.150	4.024

LINE 3050

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
TR	0.20	1.44	10.69	0.502	1.887	3.867
PMV	0.11	1.18	8.85	0.738	2.036	2.775
PCM	0.19	1.24	6.23	0.503	3.115	6.508
CM	0.35	1.60	11.79	0.321	1.992	6.258
QAL	0.22	0.93	9.76	0.293	1.437	4.713
QPV	0.23	1.00	8.55	0.300	1.806	5.760
QPVA	0.13	0.37	7.46	0.206	0.743	3.582
TV	0.13	0.60	8.00	0.336	1.102	3.355

UNIT	E THOR	E URN	POT PCT	U/TH	U/K	TH/K
QG	0.17	0.81	10.99	0.343	1.086	3.313
QPVP	0.15	0.79	8.89	0.378	1.285	3.405
CRVA	0.21	0.73	10.58	0.270	1.035	4.126
PVA	0.19	0.37	9.51	0.131	0.567	4.160
CRVB	0.17	0.72	9.36	0.302	1.159	3.904
CRVP	0.15	0.84	8.65	0.390	1.429	3.634
PVB	0.13	0.48	6.76	0.273	1.081	4.114

93/94

A P P E N D I X E

Standard Deviation Table

WFFD

QUAD

FORMATION

QAL

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	3386	3.48	NORMAL	-1.53	0.14	1.81	5.15	6.83	8.50
E URANIUM	3089	0.80	NORMAL	-0.41	-0.09	0.40	1.21	1.61	2.01
POTASSIUM	3397	0.73	LOGNORMAL	0.22	0.23	0.49	1.08	1.60	2.38
EU/K	3054	0.75	LOGNORMAL	0.12	0.22	0.41	1.37	2.51	4.60
EU/ETH	2999	0.23	NORMAL	-0.06	0.04	0.12	0.32	0.43	0.52
ETH/K	3049	2.97	NORMAL	0.58	1.71	2.84	5.10	6.22	7.35

FORMATION

GRV

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	58	1.96	NORMAL	0.92	1.27	1.62	2.31	2.66	3.00
E URANIUM	47	0.30	NORMAL	-0.04	0.07	0.18	0.41	0.52	0.64
POTASSIUM	58	0.77	NORMAL	0.55	0.62	0.73	0.84	0.91	0.98
EU/K	47	0.37	NORMAL	-0.13	0.03	0.20	0.52	0.70	0.86
EU/ETH	47	0.16	NORMAL	-0.01	0.05	0.10	0.22	0.28	0.34
ETH/K	47	2.39	NORMAL	0.72	1.28	1.83	2.95	3.51	4.06

FORMATION

QRVA

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	632	3.01	NORMAL	0.22	1.15	2.08	3.94	4.87	5.80
E URANIUM	582	0.67	NORMAL	-0.18	0.10	0.39	0.96	1.25	1.53
POTASSIUM	642	0.77	NORMAL	0.50	0.59	0.68	0.86	0.94	1.03
EU/K	582	0.85	NORMAL	-0.32	0.07	0.46	1.22	1.62	2.01
EU/ETH	575	0.18	LOGNORMAL	0.04	0.07	0.11	0.29	0.47	0.77
ETH/K	581	3.81	NORMAL	1.41	2.21	3.01	4.60	5.40	6.20

FORMATION

QRVB

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	860	2.55	NORMAL	0.78	1.39	1.99	3.16	3.79	4.40
E URANIUM	772	0.64	NORMAL	-0.13	0.12	0.38	0.90	1.16	1.42
POTASSIUM	860	0.70	NORMAL	0.34	0.46	0.58	0.82	0.94	1.06
EU/K	772	0.85	NORMAL	-0.37	0.05	0.47	1.30	1.72	2.14
EU/ETH	770	0.24	NORMAL	-0.07	0.13	0.14	0.34	0.45	0.55
ETH/K	772	3.56	NORMAL	1.22	2.00	2.78	4.35	5.13	5.91

WEC

QUAD

FORMATION

GRVP

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	55	2.63	NORMAL	1.07	1.59	2.11	3.15	3.67	4.19
E URANIUM	55	0.71	NORMAL	0.29	0.43	0.57	0.85	0.99	1.13
POTASSIUM	55	0.75	NORMAL	0.31	0.45	0.60	0.90	1.05	1.20
EU/K	55	0.95	NORMAL	0.06	0.36	0.65	1.25	1.55	1.85
EU/ETH	55	0.27	NORMAL	0.05	0.13	0.20	0.34	0.41	0.48
ETH/K	55	3.34	NORMAL	2.09	2.51	2.93	3.76	4.18	4.59

FORMATION

QL

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	262	3.24	NORMAL	0.39	1.34	2.29	4.18	5.13	6.08
E URANIUM	204	0.66	NORMAL	-0.48	-0.10	0.28	1.04	1.42	1.81
POTASSIUM	261	1.00	NORMAL	0.06	0.37	0.68	1.31	1.62	1.94
EU/K	204	0.65	NORMAL	-0.56	-0.15	0.25	1.05	1.46	1.86
EU/ETH	204	0.19	NORMAL	-0.04	0.04	0.12	0.27	0.35	0.42
ETH/K	204	3.36	NORMAL	1.33	2.01	2.68	4.03	4.70	5.38

FORMATION

QG

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	937	2.35	NORMAL	-1.64	-0.31	1.02	3.68	5.01	6.34
E URANIUM	730	0.74	NORMAL	-0.26	0.07	0.41	1.07	1.40	1.73
POTASSIUM	940	0.67	NORMAL	-0.38	-0.03	0.32	1.02	1.37	1.72
EU/K	686	0.92	NORMAL	-0.31	0.10	0.51	1.22	1.74	2.15
EU/ETH	677	0.27	NORMAL	-0.12	0.01	0.14	0.41	0.54	0.67
ETH/K	686	3.31	NORMAL	1.07	1.82	2.57	4.06	4.81	5.56

FORMATION

QT

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	120	2.68	LCGNORMAL	0.84	1.24	1.82	3.92	5.77	8.48
E URANIUM	112	1.05	NORMAL	-0.93	-0.26	0.42	1.76	2.43	3.10
POTASSIUM	120	0.92	NORMAL	-0.38	0.06	0.45	1.26	1.80	2.24
EU/K	112	1.10	NORMAL	-0.02	0.35	0.72	1.47	1.84	2.21
EU/ETH	111	0.26	NORMAL	0.06	0.12	0.15	0.32	0.39	0.46
ETH/K	112	4.06	NORMAL	0.91	1.06	3.01	5.11	6.16	7.22

WFEC

QUAD

FORMATION 00

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	245	4.20	NORMAL	2.08	2.77	3.50	4.91	5.62	6.33
E URANIUM	215	0.67	NORMAL	-0.12	0.14	0.41	0.94	1.20	1.47
POTASSIUM	245	0.97	NORMAL	0.22	0.47	0.72	1.22	1.47	1.73
EU/K	215	0.65	NORMAL	-0.25	0.05	0.38	1.00	1.32	1.63
EU/ETH	215	0.15	NORMAL	-0.01	0.04	0.10	0.21	0.26	0.32
ETH/K	215	4.45	NORMAL	0.75	1.99	3.24	5.74	6.58	8.23

FORMATION QPV

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	440	3.32	NORMAL	-0.02	1.09	2.21	4.43	5.55	6.66
E URANIUM	430	0.82	NORMAL	-0.38	0.02	0.42	1.23	1.63	2.03
POTASSIUM	440	0.65	NORMAL	0.21	0.35	0.50	0.80	0.94	1.09
EU/K	430	0.88	LEGNORMAL	0.17	0.29	0.51	1.52	2.63	4.56
EU/ETH	428	0.24	NORMAL	-0.04	0.05	0.15	0.32	0.42	0.52
ETH/K	430	3.65	LEGNORMAL	1.21	1.75	2.54	5.35	7.77	11.26

FORMATION QPVA

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	58	2.41	NORMAL	0.60	1.21	1.81	3.01	3.62	4.22
E URANIUM	88	0.76	NORMAL	-0.70	-0.21	0.28	1.25	1.74	2.22
POTASSIUM	58	0.74	NORMAL	0.09	0.30	0.52	0.95	1.17	1.39
EU/K	88	0.97	NORMAL	-0.53	-0.03	0.47	1.47	1.56	2.46
EU/ETH	88	0.14	LEGNORMAL	0.03	0.05	0.08	0.25	0.44	0.76
ETH/K	88	3.18	NORMAL	1.49	2.06	2.62	3.74	4.30	4.86

FORMATION QPVB

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	121	3.06	NORMAL	1.72	2.17	2.62	3.51	3.96	4.41
E URANIUM	119	0.77	NORMAL	-0.11	0.18	0.48	1.06	1.36	1.65
POTASSIUM	121	0.50	NORMAL	0.29	0.36	0.42	0.58	0.65	0.72
EU/K	116	1.50	NORMAL	-0.16	0.40	0.95	2.05	2.60	3.15
EU/ETH	119	0.25	NORMAL	-0.04	0.05	0.15	0.34	0.44	0.54
ETH/K	116	5.82	NORMAL	3.53	4.29	5.06	6.55	7.35	8.12

WEED

GUAD

FORMATION

CPVP

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	31	2.19	NORMAL	-1.59	-0.33	0.93	3.45	4.71	5.97
E URANIUM	27	0.54	NORMAL	0.06	0.23	0.40	0.73	0.90	1.07
POTASSIUM	31	0.54	NORMAL	0.08	0.23	0.38	0.65	0.84	0.99
EU/K	27	0.96	LCGNORMAL	0.44	0.58	0.74	1.25	1.61	2.08
EU/ETH	25	0.31	NORMAL	-0.21	-0.03	0.14	0.48	0.65	0.82
ETH/K	27	3.35	LCGNORMAL	1.67	2.10	2.65	4.22	5.32	6.71

FORMATION

CP

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	56	3.63	NORMAL	-0.99	0.55	2.09	5.17	6.71	8.25
E URANIUM	50	0.74	NORMAL	-0.12	0.17	0.45	1.02	1.31	1.59
POTASSIUM	56	0.55	NORMAL	0.03	0.21	0.40	0.77	0.96	1.15
EU/K	50	1.12	NORMAL	-0.00	0.38	0.75	1.51	1.89	2.27
EU/ETH	50	0.19	NORMAL	0.02	0.08	0.13	0.25	0.39	0.36
ETH/K	50	5.85	NORMAL	1.90	3.22	4.53	7.17	8.48	9.87

FORMATION

PVA

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	276	2.37	NORMAL	-1.14	0.03	1.20	3.54	4.71	5.88
E URANIUM	203	0.26	LCGNORMAL	0.05	0.08	0.15	0.47	0.83	1.49
POTASSIUM	276	0.53	LCGNORMAL	0.21	0.28	0.35	0.71	0.97	1.32
EU/K	203	0.76	NORMAL	-0.31	0.04	0.40	1.11	1.47	1.83
EU/ETH	190	0.22	NORMAL	-0.04	0.04	0.13	0.31	0.39	0.48
ETH/K	203	3.37	NORMAL	0.11	1.20	2.29	4.46	5.55	6.63

FORMATION

PVB

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	1930	2.13	NORMAL	-0.77	0.20	1.16	3.10	4.06	5.03
E URANIUM	1314	0.52	NORMAL	-0.30	-0.03	0.25	0.79	1.07	1.34
POTASSIUM	1930	0.53	NORMAL	0.09	0.24	0.38	0.67	0.82	0.96
EU/K	1314	1.00	NORMAL	-0.61	-0.08	0.46	1.54	2.09	2.61
EU/ETH	1290	0.19	LCGNORMAL	0.05	0.07	0.12	0.31	0.50	0.81
ETH/K	1314	4.23	NORMAL	-0.03	1.39	2.81	5.65	7.08	8.50

WEED

GLAD

FORMATION

PVP

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	110	1.56	NORMAL	-0.26	0.26	0.97	2.20	2.81	3.42
E URANIUM	80	0.44	NORMAL	0.04	0.18	0.31	0.58	0.71	0.85
POTASSIUM	110	0.22	LEGNORMAL	0.10	0.14	0.21	0.47	0.70	1.04
EU/K	80	1.16	NORMAL	-1.01	-0.29	0.42	1.88	2.61	3.33
EU/ETH	80	0.25	NORMAL	0.05	0.12	0.18	0.31	0.38	0.44
ETH/K	80	4.65	NORMAL	-4.41	-1.38	1.65	7.72	10.75	13.79

FORMATION

TIA

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	9	1.37	NORMAL	-1.14	-0.30	0.52	2.20	3.04	3.87
E URANIUM	9	0.27	NORMAL	0.01	0.10	0.18	0.35	0.44	0.53
POTASSIUM	13	0.57	NORMAL	-0.41	-0.09	0.24	0.90	1.23	1.55
EU/K	9	0.40	LEGNORMAL	0.13	0.18	0.27	0.59	0.87	1.28
EU/ETH	6	0.17	NORMAL	0.06	0.10	0.13	0.20	0.23	0.27
ETH/K	8	1.91	NORMAL	0.71	1.11	1.51	2.31	2.71	3.11

FORMATION

TV

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	2284	2.88	NORMAL	-0.07	0.92	1.90	3.87	4.85	5.83
E URANIUM	1903	0.72	NORMAL	-0.43	-0.05	0.34	1.10	1.48	1.86
POTASSIUM	2288	0.76	LEGNORMAL	0.20	0.32	0.50	1.22	1.91	3.00
EU/K	1894	0.74	NORMAL	-0.27	0.07	0.40	1.08	1.42	1.76
EU/ETH	1889	0.24	NORMAL	-0.08	0.13	0.13	0.34	0.45	0.55
ETH/K	1894	3.14	NORMAL	0.74	1.54	2.34	3.92	4.73	5.53

FORMATION

KU

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	407	6.91	NORMAL	2.33	3.35	5.28	8.44	9.97	11.50
E URANIUM	407	1.61	NORMAL	0.07	0.59	1.10	2.13	2.64	3.15
POTASSIUM	407	1.65	NORMAL	0.99	1.22	1.45	1.92	2.16	2.39
EU/K	407	0.86	NORMAL	-0.07	0.25	0.57	1.20	1.52	1.83
EU/ETH	407	0.23	NORMAL	0.00	0.08	0.15	0.30	0.38	0.45
ETH/K	407	3.81	NORMAL	1.97	2.58	3.20	4.42	5.04	5.66

-100-

WFFC

QUAD

DATA	SAMPLES	MEAN		FORMATION		KJF				
				-3	-2	-1	+1	+2	+3	
E THORIUM	2349	4.95	NORMAL	0.65	2.10	3.54	6.44	7.89	9.33	
E URANIUM	2294	1.15	NORMAL	-0.23	0.73	0.69	1.62	2.08	2.54	
POTASSIUM	2346	0.84	NORMAL	-0.05	0.25	0.55	1.14	1.44	1.74	
EU/K	2293	1.15	LCGNORMAL	0.26	0.42	0.70	1.89	3.12	5.14	
EU/ETH	2294	0.23	NORMAL	-0.04	0.15	0.14	0.31	0.40	0.49	
ETH/K	2293	5.88	NORMAL	2.48	3.61	4.75	7.01	8.14	9.27	

DATA	SAMPLES	MEAN		FORMATION		GR				
				-3	-2	-1	+1	+2	+3	
E THORIUM	5535	1.55	LCGNORMAL	0.19	0.39	0.78	3.22	6.54	13.26	
E URANIUM	4253	0.37	LCGNORMAL	0.05	0.39	0.18	0.74	1.49	2.90	
POTASSIUM	5592	0.55	LCGNORMAL	0.12	0.21	0.35	1.01	1.71	2.90	
EU/K	4115	0.73	LCGNORMAL	0.11	0.20	0.38	1.37	2.60	4.92	
EU/ETH	3929	0.22	LCGNORMAL	0.05	0.08	0.13	0.35	0.57	0.92	
ETH/K	4102	3.50	NORMAL	0.24	1.33	2.41	4.59	5.68	6.76	

DATA	SAMPLES	MEAN		FORMATION		GRA				
				-3	-2	-1	+1	+2	+3	
E THORIUM	95	3.32	NORMAL	-1.00	1.78	2.55	4.10	4.87	5.64	
E URANIUM	75	0.65	NORMAL	-0.22	0.09	0.39	1.00	1.30	1.61	
POTASSIUM	95	1.02	NORMAL	0.55	0.71	0.87	1.18	1.34	1.49	
EU/K	75	0.62	NORMAL	-0.19	0.08	0.25	0.89	1.17	1.44	
EU/ETH	75	0.21	NORMAL	-0.07	0.03	0.12	0.30	0.39	0.48	
ETH/K	75	3.10	NORMAL	0.68	1.49	2.29	3.91	4.72	5.53	

DATA	SAMPLES	MEAN		FORMATION		GRG				
				-3	-2	-1	+1	+2	+3	
E THORIUM	432	2.92	NORMAL	-1.32	0.10	1.51	4.35	5.77	7.18	
E URANIUM	390	0.82	NORMAL	-0.52	-0.07	0.38	1.28	1.73	2.18	
POTASSIUM	423	1.05	NORMAL	-0.54	0.00	0.55	1.64	2.18	2.73	
EU/K	390	0.71	NORMAL	-0.29	0.04	0.37	1.04	1.37	1.70	
EU/ETH	362	0.26	NORMAL	-0.06	0.04	0.15	0.36	0.47	0.57	
ETH/K	389	2.55	NORMAL	-0.37	0.61	1.58	3.52	4.49	5.47	

WFFC

QUAD

FORMATION 81

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	1321	0.86	NORMAL	-1.07	-0.42	0.22	1.51	2.15	2.79
E URANIUM	641	0.42	NORMAL	-0.31	-0.07	0.18	0.67	0.91	1.16
POTASSIUM	1320	0.08	LOGNORMAL	0.01	0.01	0.02	0.20	0.45	1.18
EU/K	349	1.08	LOGNORMAL	0.15	0.29	0.56	2.07	3.58	7.63
EU/ETH	312	0.30	NORMAL	-0.09	0.14	0.17	0.42	0.56	0.69
ETH/K	340	2.85	NORMAL	-0.14	1.20	2.55	5.24	6.58	7.93

FORMATION 82

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	7406	0.75	LOGNORMAL	0.06	0.14	0.33	1.70	3.90	8.91
E URANIUM	3822	0.32	LOGNORMAL	0.05	0.09	0.17	0.62	1.21	2.33
POTASSIUM	6658	0.08	LOGNORMAL	0.00	0.01	0.02	0.24	0.75	2.34
EU/K	2521	0.90	LOGNORMAL	0.11	0.22	0.44	1.82	3.74	7.63
EU/ETH	2465	0.22	LOGNORMAL	0.06	0.09	0.14	0.35	0.56	0.89
ETH/K	2456	4.16	LOGNORMAL	0.82	1.40	2.42	7.16	12.33	21.23

FORMATION 83

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	5435	3.20	NORMAL	-2.06	-0.31	1.44	4.95	6.70	8.45
E URANIUM	4564	1.00	NORMAL	-0.47	0.02	0.51	1.49	1.98	2.47
POTASSIUM	5409	0.71	NORMAL	-0.38	-0.01	0.35	1.08	1.44	1.87
EU/K	4461	1.30	NORMAL	-0.26	0.26	0.78	1.83	2.35	2.87
EU/ETH	4408	0.28	NORMAL	-0.03	0.08	0.18	0.38	0.45	0.59
ETH/K	4455	4.46	NORMAL	1.41	2.43	3.44	5.48	6.45	7.51

FORMATION 84

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	74	2.72	NORMAL	1.83	2.13	2.42	3.01	3.31	3.60
E URANIUM	74	1.21	NORMAL	0.28	0.59	0.90	1.51	1.82	2.13
POTASSIUM	74	0.77	NORMAL	0.43	0.54	0.65	0.88	0.99	1.11
EU/K	74	1.52	NORMAL	0.34	0.73	1.12	1.91	2.31	2.70
EU/ETH	74	0.42	NORMAL	0.06	0.19	0.31	0.55	0.67	0.79
ETH/K	74	3.38	NORMAL	1.64	2.22	2.80	3.97	4.55	5.13

VEET

QUAD

FORMATION

JTPV

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	452	0.77	LEGNORMAL	0.11	0.21	0.40	1.46	2.77	5.29
E URANIUM	298	0.32	LEGNORMAL	0.04	0.09	0.17	0.65	1.26	2.46
POTASSIUM	470	0.11	LEGNORMAL	0.01	0.02	0.05	0.24	0.52	1.11
EU/K	229	0.73	LEGNORMAL	0.10	0.19	0.37	1.42	2.77	5.41
EU/ETH	201	0.31	NORMAL	-0.17	-0.01	0.15	0.46	0.62	0.78
ETH/K	227	3.85	LEGNORMAL	1.00	1.57	2.47	6.11	9.60	15.09

FORMATION

TR

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	343	2.84	NORMAL	0.21	1.09	1.96	3.71	4.59	5.46
E URANIUM	288	0.70	LEGNORMAL	0.16	0.27	0.43	1.12	1.83	2.96
POTASSIUM	343	0.77	NORMAL	0.14	0.35	0.56	0.99	1.20	1.41
EU/K	288	1.42	NORMAL	-0.31	0.27	0.84	2.00	2.57	3.15
EU/ETH	288	0.35	NORMAL	-0.06	0.09	0.24	0.54	0.68	0.83
ETH/K	288	3.57	NORMAL	0.45	1.49	2.53	4.61	5.65	6.69

FORMATION

M

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	7072	1.65	LEGNORMAL	0.30	0.53	0.94	3.01	5.38	9.61
E URANIUM	5497	0.38	LEGNORMAL	0.05	0.10	0.19	0.77	1.55	3.11
POTASSIUM	7146	0.61	NORMAL	-0.46	-0.10	0.26	0.97	1.32	1.68
EU/K	5291	0.85	LEGNORMAL	0.14	0.26	0.48	1.65	3.06	5.68
EU/ETH	5069	0.20	LEGNORMAL	0.03	0.06	0.11	0.37	0.68	1.25
ETH/K	5250	4.28	NORMAL	0.27	1.61	2.95	5.62	6.96	8.29

FORMATION

LS

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	14	2.48	NORMAL	-2.03	-0.53	0.98	3.99	5.49	6.99
E URANIUM	14	0.77	NORMAL	0.19	0.38	0.57	0.96	1.15	1.35
POTASSIUM	14	0.72	NORMAL	-0.93	-0.38	0.18	1.29	1.84	2.40
EU/K	14	0.71	LEGNORMAL	0.13	0.23	0.40	1.24	2.19	3.85
EU/ETH	10	0.25	NORMAL	0.17	0.19	0.22	0.29	0.30	0.33
ETH/K	14	3.45	NORMAL	0.27	1.34	2.42	4.56	5.64	6.71

WFED

QUAD

FORMATION

MV

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	2256	0.62	LOGNORMAL	0.05	0.11	0.26	1.46	3.44	8.11
E URANIUM	1421	0.49	LOGNORMAL	0.10	0.17	0.29	0.83	1.40	2.38
POTASSIUM	2412	0.12	LOGNORMAL	0.01	0.02	0.04	0.30	0.79	2.07
EU/K	1287	0.60	LOGNORMAL	0.04	0.10	0.24	1.48	3.66	9.04
EU/ETH	1136	0.19	LOGNORMAL	0.03	0.06	0.11	0.34	0.61	1.08
ETH/K	1243	3.74	NORMAL	0.13	1.34	2.54	4.84	6.14	7.35

FORMATION

MS

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	2400	3.65	NORMAL	-1.20	0.42	2.04	5.27	6.89	8.50
E URANIUM	2140	0.91	NORMAL	-0.34	0.07	0.49	1.33	1.75	2.17
POTASSIUM	2491	0.75	NORMAL	-0.18	0.14	0.47	1.12	1.45	1.77
EU/K	2080	1.16	NORMAL	-0.40	0.12	0.64	1.68	2.20	2.72
EU/ETH	2060	0.24	NORMAL	-0.07	0.03	0.14	0.34	0.45	0.55
ETH/K	2087	4.71	NORMAL	0.08	1.62	3.17	6.25	7.80	9.34

FORMATION

PCM

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	191	3.44	NORMAL	-1.57	0.10	1.77	5.11	6.78	8.45
E URANIUM	191	1.15	NORMAL	-0.17	0.27	0.71	1.59	2.03	2.47
POTASSIUM	191	0.70	NORMAL	-0.38	-0.02	0.34	1.06	1.42	1.78
EU/K	191	1.07	LOGNORMAL	0.20	0.35	0.61	1.87	3.28	5.76
EU/ETH	191	0.32	LOGNORMAL	0.13	0.17	0.23	0.43	0.58	0.78
ETH/K	191	5.21	NORMAL	-2.41	0.13	2.67	7.75	10.29	12.83

FORMATION

PMV

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	471	1.70	NORMAL	-0.30	0.37	1.03	2.36	3.03	3.71
E URANIUM	403	0.60	LOGNORMAL	0.13	0.22	0.37	1.00	1.65	2.72
POTASSIUM	474	0.60	NORMAL	-0.02	0.19	0.40	0.81	1.01	1.22
EU/K	402	1.28	NORMAL	-0.71	-0.05	0.62	1.94	2.61	3.27
EU/ETH	383	0.33	LOGNORMAL	0.08	0.12	0.20	0.54	0.89	1.46
ETH/K	400	2.97	NORMAL	-0.88	0.40	1.69	4.26	5.54	6.83

WFEC

QUAD

FORMATION CM

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	614	4.88	NORMAL	1.41	2.57	3.72	6.04	7.19	8.35
E URANIUM	611	1.31	NORMAL	-0.15	0.34	0.83	1.80	2.29	2.78
POTASSIUM	614	0.92	NORMAL	0.32	0.53	0.73	1.14	1.34	1.54
EU/K	611	1.37	NORMAL	-0.18	0.34	0.85	1.88	2.40	2.92
EU/ETH	611	0.26	NORMAL	-0.02	0.08	0.17	0.35	0.45	0.54
ETH/K	611	5.15	NORMAL	1.28	2.57	3.86	6.44	7.73	9.02

FORMATION D

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	102	5.65	NORMAL	2.74	3.72	4.71	6.68	7.67	8.65
E URANIUM	102	1.97	LCGNORMAL	1.20	1.41	1.67	2.32	2.74	3.23
POTASSIUM	102	1.10	NORMAL	0.45	0.67	0.85	1.32	1.54	1.75
EU/K	102	1.84	NORMAL	0.89	1.21	1.52	2.15	2.47	2.79
EU/ETH	102	0.36	NORMAL	0.17	0.23	0.25	0.42	0.48	0.55
ETH/K	102	4.92	NORMAL	2.01	2.99	3.96	5.91	6.88	7.86

FORMATION S

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	208	5.70	NORMAL	-5.52	-1.78	1.96	9.44	13.18	16.92
E URANIUM	170	1.58	NORMAL	-0.46	0.22	0.90	2.26	2.94	3.62
POTASSIUM	208	1.42	NORMAL	-0.92	-0.14	0.64	2.20	2.57	3.75
EU/K	170	0.91	NORMAL	-0.12	0.23	0.57	1.25	1.59	1.93
EU/ETH	168	0.23	NORMAL	-0.01	0.07	0.15	0.31	0.40	0.48
ETH/K	170	3.82	NORMAL	1.26	2.11	2.97	4.66	5.53	6.39

FORMATION DV

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	241	1.05	LCGNORMAL	0.17	0.32	0.55	2.02	3.74	6.94
E URANIUM	157	0.62	LCGNORMAL	0.16	0.26	0.40	0.96	1.49	2.31
POTASSIUM	243	0.61	NORMAL	-0.87	-0.38	0.12	1.11	1.60	2.10
EU/K	140	1.05	NORMAL	-0.62	-0.07	0.45	1.60	2.16	2.72
EU/ETH	148	0.24	NORMAL	-0.06	0.04	0.14	0.34	0.45	0.55
ETH/K	140	3.91	NORMAL	-0.16	1.20	2.56	5.27	6.63	7.99

WCFE

QUAD

FORMATION

PSS

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	517	4.31	NORMAL	-1.44	0.48	2.39	6.22	8.14	10.06
E URANIUM	433	1.05	NORMAL	-0.39	0.09	0.57	1.53	2.01	2.49
POTASSIUM	517	1.00	NORMAL	-0.17	0.22	0.61	1.39	1.78	2.17
EU/K	433	0.93	NORMAL	-0.12	0.23	0.58	1.28	1.62	1.97
EU/ETH	432	0.22	NORMAL	-0.02	0.05	0.14	0.30	0.38	0.46
ETH/K	433	4.22	NORMAL	1.44	2.27	3.20	5.15	6.08	7.01

FORMATION

PS

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	1385	2.96	NORMAL	-3.25	-1.18	0.89	5.02	7.10	9.17
E URANIUM	1059	0.88	NORMAL	-0.63	-0.13	0.38	1.38	1.88	2.38
POTASSIUM	1435	0.72	NORMAL	-0.41	-0.02	0.35	1.10	1.48	1.86
EU/K	1055	1.05	NORMAL	-0.42	0.07	0.56	1.54	2.03	2.52
EU/ETH	984	0.25	NORMAL	-0.01	0.08	0.16	0.24	0.42	0.51
ETH/K	1046	3.82	NORMAL	-0.13	1.19	2.51	5.15	6.47	7.79

FORMATION

PSV

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	516	0.67	LEGNORMAL	0.08	0.17	0.34	1.34	2.67	5.32
E URANIUM	339	0.42	NORMAL	-0.31	-0.07	0.18	0.67	0.92	1.17
POTASSIUM	520	0.18	LEGNORMAL	0.02	0.04	0.08	0.38	0.83	1.80
EU/K	277	1.41	NORMAL	-0.90	-0.13	0.64	2.19	2.96	3.73
EU/ETH	165	0.25	NORMAL	-0.10	0.02	0.13	0.27	0.45	0.61
ETH/K	272	4.06	NORMAL	-0.89	0.76	2.41	5.71	7.36	9.01

FORMATION

Q

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	1391	7.31	NORMAL	-2.97	0.46	3.89	10.74	14.17	17.60
E URANIUM	1355	1.22	NORMAL	-0.35	0.18	0.70	1.75	2.28	2.80
POTASSIUM	1391	1.62	NORMAL	-0.53	0.19	0.50	2.34	3.06	3.77
EU/K	1355	0.72	NORMAL	-0.15	0.14	0.42	1.01	1.30	1.59
EU/ETH	1336	0.17	NORMAL	-0.03	0.04	0.10	0.24	0.31	0.38
ETH/K	1355	4.20	NORMAL	1.62	2.48	3.24	5.16	5.92	6.78

WEED

QUAD

FORMATION

UNK

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	114	0.75	LCGNORMAL	0.22	0.34	0.52	1.21	1.86	2.83
E URANIUM	93	0.25	LCGNORMAL	0.06	0.10	0.17	0.50	0.86	1.49
POTASSIUM	113	0.21	LCGNORMAL	0.02	0.05	0.10	0.44	0.92	1.91
EU/K	79	0.52	LCGNORMAL	0.05	0.11	0.24	1.15	2.54	5.61
EU/ETH	57	0.33	NORMAL	0.00	0.11	0.22	0.44	0.54	0.65
ETH/K	79	3.36	NORMAL	-2.69	-1.68	1.34	5.38	7.41	9.42

FORMATION

W

DATA	SAMPLES	MEAN		-3	-2	-1	+1	+2	+3
E THORIUM	49	0.90	NORMAL	-0.84	-0.26	0.32	1.48	2.06	2.64
E URANIUM	34	0.45	NORMAL	-0.27	-0.03	0.21	0.68	0.92	1.16
POTASSIUM	52	0.32	NORMAL	-0.40	-0.16	0.08	0.57	0.81	1.05
EU/K	28	0.58	LCGNORMAL	0.07	0.14	0.28	1.18	2.42	4.97
EU/ETH	23	0.17	LCGNORMAL	0.02	0.05	0.09	0.32	0.61	1.15
ETH/K	28	2.73	NORMAL	0.20	1.04	1.89	3.57	4.41	5.25

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A P P E N D I X F

Format, Single Record Data Listing

REC NO.	LAT	LONG	RESID MAG GAMMA	TERR CL FEET	FLG	GEOL UNIT	USM CPS	AIM CPS	TOTAL CPS	FLG	ETH PPM	FLG	EU PPM	FLG	K PCT	FLG	LU/ETH	EU/K	ETH/K	TEMP CELCIUS	BARO PRES MMHG
5079	64.0086	-160.9199	55305	763	MAR	W	31	1	-12	NAD	-1.1	NAD	-0.5	NAD	0.0	NAD	0.0	0.0	0.0	12.7	746.8
5080	64.0087	-160.9189	55305	751	MAR	W	28	1	36	MAR	0.0	NAD	0.1	NAD	0.1	NAD	0.0	0.0	0.0	12.7	747.1
5081	64.0087	-160.9176	55305	761	MAR	W	26	1	4	NAD	0.2	NAD	0.1	NAD	-0.1	NAD	0.0	0.0	0.0	12.7	747.4
5082	64.0088	-160.9166	55305	730	MAR	W	35	1	-60	NAD	0.0	NAD	0.3	NAD	-0.1	NAD	0.0	0.0	0.0	12.7	747.7
5083	64.0088	-160.9154	55305	722	MAR	W	26	1	-4	NAD	-2.7	NAD	2.3		-0.4	NAD	0.0	0.0	0.0	12.7	748.0
5084	64.0089	-160.9144	55305	712	MAR	W	28	1	-12	NAD	0.5	NAD	-1.7	NAD	0.0	NAD	0.0	0.0	0.0	12.7	748.1
5085	64.0089	-160.9131	55305	702	MAR	W	23	1	37	MAR	0.0	NAD	0.4	NAD	-0.3	NAD	0.0	0.0	0.0	12.7	748.5
5086	64.0090	-160.9121	55305	691		W	22	1	50		0.3	NAD	-0.1	NAD	0.0	NAD	0.0	0.0	0.0	12.7	748.8
5087	64.0091	-160.9109	55305	680		W	23	1	46		0.3	NAD	0.0	NAD	-0.0	NAD	0.0	0.0	0.0	12.7	749.1
5088	64.0092	-160.9099	55305	673		W	17	1	72		0.6	MAR	0.3	NAD	-0.3	NAD	0.0	0.0	0.0	12.8	749.3
5089	64.0092	-160.9087	55305	668		W	20	1	156		-1.6	NAD	0.7	MAR	-0.0	NAD	0.0	0.0	0.0	12.8	749.4
5090	64.0093	-160.9075	55304	666		W	32	1	113		0.0	NAD	0.6	MAR	0.0	NAD	0.0	0.0	0.0	12.8	749.4
5091	64.0093	-160.9064	55304	667		W	30	1	247		-0.2	NAD	0.6	MAR	0.1	NAD	0.0	0.0	0.0	12.8	749.3
5092	64.0094	-160.9052	55304	671		W	29	1	343		0.2	NAD	1.1		0.3		0.0	4.0	0.0	12.8	749.2
5093	64.0094	-160.9042	55304	679		W	23	1	659		2.9		-0.8	NAD	0.8		0.0	0.0	3.5	12.8	748.9
5094	64.0095	-160.9030	55304	683		W	34	0	965		3.2		1.4		0.8		0.5	1.9	4.1	12.9	748.5
5095	64.0096	-160.9017	55305	647		KS	24	0	1208		8.6		0.0	NAD	0.5		0.0	0.0	18.3	12.9	748.1
5096	64.0096	-160.9007	55305	663		KS	12	0	945		2.5		1.7		0.5		0.7	3.5	5.2	12.9	747.8
5097	64.0098	-160.8995	55305	655		KS	20	0	831		3.0		1.5		0.6		0.5	2.8	5.5	12.9	747.6
5098	64.0098	-160.8985	55305	657		KS	22	0	759		2.2		1.4		0.3		0.8	5.1	8.1	12.9	747.1
5099	64.0099	-160.8973	55305	665		KS	29	0	699		1.7		2.0		0.5		1.1	4.4	4.1	12.9	746.5
5100	64.0100	-160.8962	55305	679		KS	28	0	610		0.5	NAD	1.3		0.4		0.0	3.7	0.0	12.9	746.1
5101	64.0100	-160.8950	55305	697		KS	26	0	581		2.2		0.5	MAR	0.3		0.2	1.6	7.0	12.9	746.0
5102	64.0101	-160.8940	55304	518		KS	35	0	512		1.3		-0.2	NAD	0.3		0.0	0.0	4.2	12.9	745.7
5103	64.0101	-160.8928	55303	540		KS	20	0	677		2.1		1.0		0.2		0.5	5.6	11.2	12.8	745.5
5104	64.0102	-160.8918	55303	569		KS	26	0	579		1.7		1.2		0.1	MAR	0.7	12.6	17.8	12.8	745.5
5105	64.0103	-160.8905	55304	608		KS	21	-1	611		3.2		3.1		0.0	NAD	1.0	0.0	0.0	12.8	745.6
5106	64.0103	-160.8895	55303	614		KS	16	-1	551		3.7		0.2	NAD	0.3		0.0	0.0	11.1	12.8	745.5
5107	64.0104	-160.8883	55304	595		KS	37	-1	488		1.6		2.4		0.1	MAR	1.5	18.6	12.5	12.8	745.4
5108	64.0105	-160.8873	55302	575		KS	22	-1	510		0.2	NAD	1.3		0.3		0.0	5.1	0.0	12.8	745.3
5109	64.0106	-160.8860	55304	552		KS	28	-1	437		0.0	NAD	1.0		0.1	MAR	0.0	9.0	0.0	12.8	745.2
5110	64.0107	-160.8848	55305	532		KS	25	-1	405		0.9	NAD	1.1		0.3		0.0	4.0	0.0	12.8	745.1
5111	64.0107	-160.8838	55305	514		KS	25	-1	379		1.0	MAR	-0.1	NAD	0.3		0.0	0.0	3.0	12.8	744.7
5112	64.0108	-160.8826	55305	501		KS	35	-1	325		0.5	MAR	1.4		0.1	MAR	2.5	13.6	5.5	12.8	744.5
5113	64.0108	-160.8816	55305	490		KS	20	-1	411		0.0	NAD	1.1		0.0	NAD	0.0	0.0	0.0	12.8	744.3
5114	64.0109	-160.8803	55305	481		KS	22	-1	417		1.0		1.0		0.1	MAR	1.0	12.7	12.9	12.8	744.3
5115	64.0110	-160.8791	55305	477		KS	28	-1	517		0.8	MAR	1.1		0.3		1.3	4.0	3.1	12.8	744.1
5116	64.0110	-160.8781	55304	479		KS	17	0	616		1.4		0.7		0.5		0.5	1.4	2.8	12.8	744.0
5117	64.0111	-160.8769	55304	486		KS	23	0	623		4.3		0.8		0.6		0.2	1.4	7.0	12.8	743.9
5118	64.0111	-160.8759	55303	493		KS	22	0	607		2.5		1.5		0.1		0.6	10.2	17.5	12.8	744.0
5119	64.0112	-160.8746	55303	500		KS	21	0	693		3.5		0.5	MAR	0.5		0.2	1.1	7.4	12.8	744.2
5120	64.0113	-160.8734	55303	509		KS	22	-1	633		2.2		2.6		0.3		1.2	8.6	7.2	12.8	744.2
5121	64.0113	-160.8724	55302	516		KS	30	-1	636		3.7		0.2	NAD	0.3		0.0	0.0	10.9	12.8	744.5
5122	64.0113	-160.8712	55302	519		KS	25	-2	777		5.1		1.5		0.3		0.3	9.9	20.2	12.8	744.9
5123	64.0113	-160.8701	55302	518		KS	26	-2	658		3.8		0.9		0.4		0.2	2.2	9.0	12.8	745.1
5124	64.0113	-160.8689	55302	517		KS	32	-2	718		0.8	MAR	1.9		0.7		2.1	2.8	1.3	12.8	745.6
5125	64.0113	-160.8677	55302	523		KS	32	-2	763		2.7		2.2		0.2		0.8	13.0	16.0	12.8	746.1
5126	64.0114	-160.8667	55302	541		KS	25	-1	781		3.2		1.3		0.6		0.4	2.4	5.9	12.8	746.4
5127	64.0114	-160.8654	55301	559		KS	26	-1	736		1.1	MAR	2.6		0.3		2.2	8.2	3.8	12.9	746.8
5128	64.0114	-160.8644	55300	574		KS	23	-1	668		3.2		0.2	NAD	0.4		0.0	0.0	7.4	12.9	747.1
5129	64.0114	-160.8632	55300	592		KS	21	0	640		2.4		3.5		-0.0	NAD	1.4	0.0	0.0	12.9	747.3
5130	64.0113	-160.8620	55300	606		KS	14	0	696		1.9		1.9		0.3		1.0	7.1	6.9	12.9	747.3
5131	64.0113	-160.8609	55302	617		KS	27	0	595		1.4		0.7	MAR	0.3		0.5	2.4	4.4	13.0	747.7

SINGLE RECORD DATA

LINE

240

PAGE

1

FINISHED OUTPUTTING LINE 240

LINE 220 FIDS 2935 TO 4865 OUTPUT TO SRRO TAPE

A P P E N D I X G

Format, Average Record Data Listing

RECORD NUMBER	LATITUDE	LONGITUDE	REL. STD FIELD GAIN	GEO UNIT	CISM CPS	ATM. TRAN CPS	TOTAL COUNT CPS	STD ETH FLG	STD DEV	STD ETH FLG	STD DEV	POT FLG	STD DEV	FU		FU		ETH	
														RATIO	STD DEV	POTA	STD DEV	POTA	STD DEV
5238	64.0098	-160.7455	55285	M	33	-6	990	3.7	1	1.9	2	0.7	1	0.5	0	2.8	0	5.2	0
5239	64.0098	-160.7444	55283	KS	43	-6	952	3.7	0	1.9	0	0.7	0	0.5	1	2.9	0	5.3	0
5240	64.0099	-160.7434	55285	KS	27	-5	998	3.7	0	2.1	0	0.7	0	0.6	2	3.1	1	5.3	0
5241	64.0098	-160.7422	55287	KS	33	-5	1047	3.5	0	2.2	0	0.7	0	0.6	2	3.2	1	5.2	0
5242	64.0098	-160.7412	55288	KS	31	-5	1083	3.5	0	2.1	0	0.7	0	0.6	2	2.9	0	4.8	0
5243	64.0097	-160.7399	55287	KS	30	-4	1156	3.7	0	1.9	0	0.7	0	0.5	1	2.7	0	5.0	0
5244	64.0097	-160.7389	55287	KS	31	-4	1182	4.1	0	1.9	0	0.8	0	0.5	1	2.5	0	5.3	0
5245	64.0097	-160.7379	55286	KS	26	-4	1245	4.0	0	1.7	0	0.8	0	0.4	0	2.1	0	4.9	0
5246	64.0096	-160.7366	55285	KS	38	-4	1148	3.8	0	1.6	0	0.8	0	0.4	0	2.1	0	4.8	0
5247	64.0097	-160.7356	55285	KS	30	-3	1211	3.7	0	1.5	0	0.8	0	0.4	0	1.9	0	4.5	0
5248	64.0096	-160.7344	55295	KS	30	-3	1076	3.8	0	1.5	0	0.8	0	0.4	0	1.9	0	4.7	0
5249	64.0096	-160.7334	55284	KS	29	-3	1016	3.7	0	1.3	0	0.8	0	0.4	0	1.6	0	4.6	0
5250	64.0096	-160.7324	55283	KS	33	-3	975	3.7	0	1.2	0	0.8	0	0.3	0	1.6	0	4.8	0
5251	64.0095	-160.7311	55283	KS	23	-3	976	3.5	0	1.2	0	0.7	0	0.3	0	1.7	0	5.0	0
5252	64.0095	-160.7301	55283	KS	30	-3	948	3.7	0	1.1	0	0.7	0	0.3	0	1.6	0	5.1	0
5253	64.0095	-160.7299	55284	KS	33	-3	921	3.8	0	1.0	-1	0.7	0	0.3	0	1.4	-1	5.2	0
5254	64.0095	-160.7278	55284	KS	37	-2	803	4.0	0	1.0	-1	0.7	0	0.3	0	1.5	-1	5.6	0
5255	64.0095	-160.7266	55283	KS	23	-2	954	4.1	0	1.0	-1	0.7	0	0.3	-1	1.4	-1	5.5	0
5256	64.0094	-160.7256	55293	KS	29	-1	1006	4.3	0	1.0	-1	0.7	0	0.2	-1	1.3	-1	5.8	0
5257	64.0094	-160.7244	55283	KS	37	-1	1133	4.0	0	1.0	-1	0.7	0	0.2	-1	1.3	-1	5.5	0
5258	64.0094	-160.7233	55284	KS	23	0	1106	4.1	0	1.0	-1	0.7	0	0.2	-1	1.4	-1	5.9	0
5259	64.0094	-160.7221	55285	KS	28	0	1034	4.1	0	0.8	-1	0.7	0	0.2	-1	1.2	-1	6.1	0
5260	64.0094	-160.7211	55284	KS	21	0	963	4.1	0	0.8	-1	0.7	0	0.2	-1	1.3	-1	6.2	0
5261	64.0093	-160.7199	55294	KS	27	0	840	3.7	0	0.8	-1	0.6	0	0.2	-1	1.3	-1	6.1	0
5262	64.0093	-160.7188	55294	KS	29	0	718	3.2	0	0.9	-1	0.5	-1	0.3	0	1.7	0	6.0	0
5263	64.0092	-160.7176	55284	KS	33	0	605	2.5	-1	0.9	-1	0.5	-1	0.4	0	1.8	0	5.2	0
5264	64.0092	-160.7166	55294	KS	32	0	635	2.1	-1	0.0	-1	0.4	-1	0.4	0	1.9	0	5.2	0
5265	64.0093	-160.7156	55283	KS	35	0	507	1.7	-1	0.7	-1	0.3	-1	0.4	0	2.2	0	5.3	0
5266	64.0092	-160.7143	55283	KS	26	-1	521	1.6	-1	0.7	-1	0.3	-1	0.5	1	2.5	0	5.4	0
5267	64.0092	-160.7133	55283	KS	19	-1	465	1.4	-1	0.8	-1	0.3	-1	0.6	2	2.9	1	5.1	0
5268	64.0091	-160.7121	55283	M	34	-1	287	1.3	0	0.9	1	0.3	1	0.7	1	3.1	0	4.6	-1
5269	64.0091	-160.7110	55282	KS	29	-1	398	1.3	-1	1.0	-1	0.3	-1	0.8	3	3.4	1	4.4	0
5270	64.0092	-160.7100	55282	KS	42	-1	516	1.7	-1	1.1	0	0.3	-1	0.6	2	3.2	1	5.1	0
5271	64.0092	-160.7090	55283	KS	29	0	716	1.9	-1	1.0	-1	0.4	-1	0.6	2	2.8	0	5.1	0
5272	64.0092	-160.7078	55283	KS	25	0	781	2.1	-1	1.1	0	0.4	-1	0.5	1	2.9	0	5.2	0
5273	64.0092	-160.7068	55282	KS	32	0	738	2.4	-1	1.1	0	0.4	-1	0.5	1	2.7	0	6.0	0
5274	64.0091	-160.7057	55281	KS	25	0	853	2.5	-1	1.1	0	0.4	-1	0.5	1	2.7	0	5.9	0
5275	64.0091	-160.7047	55282	KS	22	0	796	2.5	-1	1.1	0	0.5	-1	0.4	0	2.4	0	5.8	0
5276	64.0091	-160.7037	55281	KS	21	0	904	2.9	-1	1.0	-1	0.5	-1	0.4	0	2.2	0	6.1	0
5277	64.0092	-160.7025	55281	KS	37	1	810	2.9	-1	1.0	-1	0.4	-1	0.4	0	2.3	0	6.5	0
5278	64.0092	-160.7014	55280	KS	27	2	764	3.0	0	0.9	-1	0.5	-1	0.3	0	1.9	0	6.3	0
5279	64.0092	-160.7004	55292	KS	31	1	750	2.9	-1	0.9	-1	0.5	-1	0.3	0	2.0	0	6.0	0
5280	64.0092	-160.6994	55283	KS	33	1	740	2.9	-1	1.0	-1	0.5	-1	0.3	0	2.1	0	6.2	0
5281	64.0092	-160.6984	55283	KS	32	1	745	3.3	0	0.8	-1	0.5	-1	0.2	-1	1.7	0	7.1	0
5282	64.0092	-160.6973	55283	KS	36	1	779	3.7	0	0.8	-1	0.5	0	0.2	-1	1.5	-1	6.5	0
5283	64.0092	-160.6963	55283	KS	31	1	821	3.8	0	0.8	-1	0.6	0	0.2	-1	1.4	-1	6.6	0
5284	64.0092	-160.6951	55283	KS	31	1	858	3.8	0	1.0	-1	0.6	0	0.3	0	1.8	0	6.5	0
5285	64.0092	-160.6941	55284	KS	30	1	948	3.7	0	1.2	0	0.6	0	0.3	0	2.0	0	6.0	0
5286	64.0093	-160.6931	55284	KS	26	0	1054	3.7	0	1.3	0	0.6	0	0.3	0	2.1	0	6.0	0
5287	64.0093	-160.6920	55292	KS	32	0	963	3.3	0	1.5	0	0.6	0	0.4	0	2.4	0	5.7	0
5288	64.0093	-160.6910	55281	KS	30	0	1040	3.3	0	1.3	0	0.6	0	0.4	0	2.1	0	5.5	0
5289	64.0093	-160.6900	55281	KS	25	0	997	3.3	0	1.3	0	0.6	0	0.4	0	2.2	0	5.5	0
5290	64.0093	-160.6890	55281	KS	32	0	944	3.0	0	1.5	0	0.6	0	0.5	1	2.5	0	5.0	0

A P P E N D I X H

Format, DOE SINGLE RECORD REDUCED DATA TAPE

DOE SINGLE RECORD REDUCED DATA TAPE

Line	Character Number											
Number	12345678901	2345678901	2345678901	2345678901	2345678901	2345678901	2345678901	2345678901	2345678901	2345678901	2345678901	2
1	02 0978 (DATA TAPE TYPE AND FORMAT SPECIFICATION DATE CODES)											
2												
3	SINGLE RECORD REDUCED DATA TAPE											
4												
5-	FORMAT FOR TAPE IDENTIFICATION BLOCK (SECOND BLOCK)											
6												
7	ITEM	FORMAT	DESCRIPTION									
8	1	A40	QUADRANGLE NAME AS PROJECT IDENTIFICATION									
9	2	A20	NAME OF SUBCONTRACTOR									
10	3	I4	APPROXIMATE DATE OF SURVEY (MONTH, YEAR)									
11	4	I1	NUMBER OF AERIAL SYSTEMS USED TO COLLECT DATA FOR									
12			THIS QUADRANGLE									
13	5	I1	AERIAL SYSTEM IDENTIFICATION CODE FOR FIRST SYSTEM									
14	6	A20	AIRCRAFT IDENTIFICATION BY TYPE AND FAA NUMBER FOR									
15			FIRST SYSTEM									
16	7	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO									
17			TERRESTRIAL POTASSIUM (K-40) TO ONE DECIMAL PLACE									
18			IN CPS PER PERCENT K FOR FIRST SYSTEM									
19	8	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO									
20			TERRESTRIAL URANIUM (BI-214) TO ONE DECIMAL PLACE									
21			IN CPS PER PPM EQUIVALENT U									
22	9	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO									
23			TERRESTRIAL THORIUM (TL-208) TO ONE DECIMAL PLACE									
24			IN CPS PER PPM EQUIVALENT TH									
25	10	I6	BLANK FIELD (999999)									
26	11	F6.3	4PI-SYSTEM DATA COLLECTION INTERVAL TO THREE DECIMAL									
27			PLACES IN SECONDS FOR FIRST SYSTEM									
28	12	F6.3	2PI-SYSTEM DATA COLLECTION INTERVAL TO THREE DECIMAL									
29			PLACES IN SECONDS FOR FIRST SYSTEM									
30	13	I3	NUMBER OF CHANNELS (0-3 MEV) IN 4 PI SYSTEM FOR FIRST									
31			AERIAL SYSTEM									
32	14	I3	NUMBER OF CHANNELS (0-3 MEV) IN 2 PI SYSTEM FOR FIRST									
33			AERIAL SYSTEM									
34	15-24	(SAME)	REPEAT OF ITEMS 5-14 FOR SECOND AERIAL SYSTEM									
35	*	*	*									
36	*	*	*									
37	*	*	*									
38	85-94	(SAME)	REPEAT OF ITEMS 5-14 FOR NINTH AERIAL SYSTEM									
39	95	I3	NUMBER OF FLIGHT LINES ON THIS TAPE									
40	96	I4	FIRST FLIGHT LINE NUMBER ON THIS TAPE									
41	97	I6	FIRST RECORD NUMBER OF FIRST FLIGHT LINE									
42	98	I3	JULIAN DATE (DAY OF YEAR) FIRST FLIGHT-LINE DATA WAS									
43			COLLECTED									
44	99-101	I4,6, &3	REPEAT OF ITEMS 96-98 FOR SECOND FLIGHT LINE ON THIS									
45			TAPE									
46	*	*	*									
47	*	*	*									
49	390-392	I4,6, &3	REPEAT OF ITEMS 96-98 FOR 99TH FLIGHT LINE ON THIS									
50			TAPE									
51												

Line	Character Number
Number	1234567890123456789012345678901234567890123456789012

52	FORMAT FOR SINGLE RECORD REDUCED DATA RECORD (THIRD THRU LAST BLOCK)		
53			
54	ITEM	FORMAT	DESCRIPTION
55	1	I1	AERIAL SYSTEM IDENTIFICATION CODE
56	2	I4	FLIGHT LINE NUMBER
57	3	I6	RECORD IDENTIFICATION NUMBER
58	4	I6	GMT TIME OF DAY (HHMMSS)
59	5	F8.4	LATITUDE TO FOUR DECIMAL PLACES IN DEGREES
60	6	F8.4	LONGITUDE TO FOUR DECIMAL PLACES IN DEGREES
61	7	F6.1	TERRAIN CLEARANCE TO ONE DECIMAL PLACE IN METERS
62	8	F7.1	RESIDUAL (IGRF REMOVED) MAGNETIC FIELD INTENSITY
63			TO ONE DECIMAL PLACE IN GAMMAS
64	9	A8	SURFACE GEOLOGIC MAP UNIT CODE
65	10	I4	QUALITY FLAG CODES
66	11	F6.1	APPARENT CONCENTRATION OF TERRESTRIAL POTASSIUM
67			(K-40) TO ONE DECIMAL PLACE IN PERCENT K
68	12	F4.1	UNCERTAINTY IN TERRESTRIAL POTASSIUM TO ONE DECIMAL
69			PLACE IN PERCENT K
70	13	F6.1	APPARENT CONCENTRATION OF TERRESTRIAL URANIUM
71			(BI-214) TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
72	14	F4.1	UNCERTAINTY IN TERRESTRIAL URANIUM TO ONE DECIMAL
73			PLACE IN PPM EQUIVALENT U
74	15	F6.1	APPARENT CONCENTRATION OF TERRESTRIAL THORIUM
75			(TL-208) TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH
76	16	F4.1	UNCERTAINTY IN TERRESTRIAL THORIUM TO ONE DECIMAL
77			PLACE IN PPM EQUIVALENT TH
78	17	F6.1	URANIUM-TO-THORIUM RATIO TO ONE DECIMAL PLACE IN
79			PPM EQUIVALENT U PER PPM EQUIVALENT TH
80	18	F6.1	URANIUM-TO-POTASSIUM RATIO TO ONE DECIMAL PLACE IN
81			PPM EQUIVALENT U PER PERCENT K
82	19	F6.1	THORIUM-TO-POTASSIUM RATIO TO ONE DECIMAL PLACE IN
83			PPM EQUIVALENT TH PER PERCENT K
84	20	F8.1	GROSS GAMMA (0.4-3.0 MEV) COUNT RATE TO ONE DECIMAL
85			PLACE IN COUNTS PER SECOND
86	21	F6.1	UNCERTAINTY IN GROSS GAMMA COUNT RATE TO ONE DECIMAL
87			PLACE IN COUNTS PER SECOND
88	22	F5.1	ATMOSPHERIC BI-214 4PI CORRECTION TO ONE DECIMAL
89			PLACE IN PPM EQUIVALENT U
90	23	F4.1	UNCERTAINTY IN ATMOSPHERIC BI-214 4PI CORRECTION
91			TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
92	24	F4.1	OUTSIDE AIR TEMPERATURE TO ONE DECIMAL PLACE IN
93			DEGREES CELSIUS
94	25	F5.1	OUTSIDE AIR PRESSURE TO ONE DECIMAL PLACE IN MMHG

A P P E N D I X I

Format, DOE RAW SPECTRAL DATA TAPE

DOE RAW SPECTRAL DATA TAPE

Line	Character number
Number	12345678901234567890123456789012345678901234567890123456789012

```

1  01 0978 (DATA TAPE TYPE AND FORMAT SPECIFICATION DATE CODES)
2
3  RAW SPECTRAL DATA TAPE
4
5  FORMAT FOR TAPE IDENTIFICATION BLOCK (SECOND BLOCK ON TAPE)
6
7  ITEM      FORMAT  DESCRIPTION
8  1         A40     QUADRANGLE NAME AS PROJECT IDENTIFICATION
9  2         A20     NAME OF SUBCONTRACTOR
10 3         I4      APPROXIMATE DATE OF SURVEY (MONTH, YEAR)
11 4         I1      AERIAL SYSTEM IDENTIFICATION CODE
12 5         A20     AIRCRAFT IDENTIFICATION BY TYPE AND FAA NUMBER
13 6         I3      BEEC CALIBRATION REPORT NUMBER
14 7         F6.3    4PI SYSTEM DATA COLLECTION INTERVAL TO THREE DECIMAL
15                     PLACES IN SECONDS
16 8         F6.3    2PI SYSTEM DATA COLLECTION INTERVAL TO THREE DECIMAL
17                     PLACES IN SECONDS
18 9         I3      NUMBER OF CHANNELS (0-3 MEV) FOR 4PI SYSTEM
19 10        I3      NUMBER OF CHANNELS (0-3 MEV) FOR 2PI SYSTEM
20 11        I3      NUMBER OF FLIGHT LINES ON THIS TAPE
21 12        I4      FIRST FLIGHT LINE NUMBER ON THIS TAPE
22 13        I6      FIRST RECORD NUMBER OF FIRST FLIGHT LINE
23 14        I3      JULIAN DATE (DAY OF YEAR) FIRST FLIGHT LINE WAS
24                     COLLECTED
25 15-17     I4,6 &3 REPEAT OF ITEMS 12-14 FOR SECOND FLIGHT LINE ON THIS
26                     TAPE
27 *         *              *
28 *         *              *
29 *         *              *
30 306-308   I4,6 &3 REPEAT OF ITEMS 12-14 FOR 99TH FLIGHT LINE ON THIS
31                     TAPE
32
33 FORMAT FOR RAW SPECTRAL DATA RECORD (THIRD THRU LAST BLOCK ON TAPE)
34
35 ITEM      FORMAT  DESCRIPTION
36 1         I1      AERIAL SYSTEM IDENTIFICATION CODE
37 2         I4      FLIGHT LINE NUMBER
38 3         I6      RECORD IDENTIFICATION NUMBER
39 4         I6      GMT TIME OF DAY (HHMMSS)
40 5         F8.4    LATITUDE TO FOUR DECIMAL PLACES IN DEGREES
41 6         F8.4    LONGITUDE TO FOUR DECIMAL PLACES IN DEGREES
42 7         F6.2    TERRAIN CLEARANCE TO ONE DECIMAL PLACE IN METERS
43 8         F7.1    TOTAL MAGNETIC FIELD INTENSITY TO ONE DECIMAL PLACE
44                     IN GAMMAS
45 9         A8      SURFACE GEOLOGIC MAP UNIT CODE
46 10        I4      QUALITY FLAG CODES
47 11        F4.1    OUTSIDE AIR TEMPERATURE TO ONE DECIMAL PLACE IN
48                     DEGREES CELSIUS
49 12        F5.1    OUTSIDE AIR PRESSURE TO ONE DECIMAL PLACE IN MMHG
50 13        F5.3    LIVE TIME COUNTING PERIOD TO THREE DECIMAL PLACES IN
51                     SECONDS

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Line	Character Number																					
Number	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2
52	14		I4																			
53																						
54	15		I4																			
55	16		I4																			
56	*		*																			
57	*		*																			
58	*		*																			
59	270		I4																			

A P P E N D I X J

Format, DOE STATISTICAL ANALYSIS DATA TAPE

DOE STATISTICAL ANALYSIS DATA TAPE

Line	Character Number		
Number	12345678901	2345678901	234567890123456789012345678901234567890123456789012
1	03	0978	(DATA TAPE TYPE AND FORMAT SPECIFICATION DATE CODES)
2			
3			STATISTICAL ANALYSIS DATA TAPE
4			
5			FORMAT FOR TAPE IDENTIFICATION BLOCK (SECOND BLOCK)
6			
7	ITEM	FORMAT	DESCRIPTION
8	1	A40	QUADRANGLE NAME AS PROJECT IDENTIFICATION
9	2	A20	NAME OF SUBCONTRACTOR
10	3	I4	APPROXIMATE DATE OF SURVEY (MONTH, YEAR)
11	4	I1	NUMBER OF AERIAL SYSTEMS USED TO COLLECT DATA FOR
12			THIS QUADRANGLE
13	5	I1	AERIAL SYSTEM IDENTIFICATION CODE FOR FIRST SYSTEM
14	6	A20	AIRCRAFT IDENTIFICATION BY TYPE AND FAA NUMBER FOR
15			FIRST SYSTEM
16	7	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO
17			TERRESTRIAL POTASSIUM (K-40) TO ONE DECIMAL PLACE
18			IN CPS PER PERCENT K
19	8	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO
20			TERRESTRIAL URANIUM (B1-214) TO ONE DECIMAL PLACE
21			IN CPS PER PPM EQUIVALENT U
22	9	F6.1	NOMINAL ALTITUDE SYSTEM SENSITIVITY RELATIVE TO
23			TERRESTRIAL THORIUM (TL-208) TO ONE DECIMAL PLACE
24			IN CPS PER PPM EQUIVALENT TH
25	10	I6	BLANK FIELD (999999)
26	11	F6.3	4PI-SYSTEM DATA COLLECTION INTERVAL TO THREE DECIMAL
27			PLACES IN SECONDS FOR FIRST SYSTEM
28	12	F6.3	2PI-SYSTEM DATA COLLECTION INTERVAL TO THREE DECIMAL
29			PLACES IN SECONDS FOR FIRST SYSTEM
30	13	I3	NUMBER OF CHANNELS (0-3 MEV) IN 4 PI SYSTEM FOR FIRST
31			AERIAL SYSTEM
32	14	I3	NUMBER OF CHANNELS (0-30 MEV) IN 2 PI SYSTEM FOR FIRST
33			AERIAL SYSTEM
34	15-24	(SAME)	REPEAT OF ITEMS 5-14 FOR AERIAL SYSTEM
35	*	*	*
36	*	*	*
37	*	*	*
38	85-94	(SAME)	REPEAT OF ITEMS 5-14 FOR NINTH AERIAL SYSTEM
39	95	I3	NUMBER OF FLIGHT LINES ON THIS TAPE
40	96	I4	FIRST FLIGHT LINE NUMBER ON THIS TAPE
41	97	I6	FIRST RECORD NUMBER OF FIRST FLIGHT LINE
42	98	I3	JULIAN DATE (DAY OF YEAR) FIRST FLIGHT LINE DATA WAS
43			COLLECTED
44	99-101	I4,6 &3	REPEAT OF ITEMS 96-98 FOR SECOND FLIGHT LINE ONE THIS
45			TAPE
46	*	*	*
47	*	*	*
48	*	*	*
49	390-392	I4,6 &3	REPEAT OF ITEMS 96-98 FOR 99TH FLIGHT LINE ON THIS
50			TAPE
51			

Line Character Number
 Number 12345678901234567890123456789012345678901234567890123456789012

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52  FORMAT FOR STATISTICAL ANALYSIS DATA RECORD (THIRD THRU LAST BLOCK)
53
54  ITEM      FORMAT  DESCRIPTION
55  1         I1      AERIAL SYSTEM IDENTIFICATION CODE
56  2         I4      FLIGHT LINE NUMBER
57  3         I6      RECORD IDENTIFICATION NUMBER
58  4         I6      GMT TIME OF DAY (HHMMSS)
59  5         F.84    LATITUDE TO FOUR DECIMAL PLACES IN DEGREES
60  6         F8.4    LONGITUDE TO FOUR DECIMAL PLACES IN DEGREES
61  7         F6.1    TERRAIN CLEARANCE TO ONE DECIMAL PLACE IN METERS
62  8         F7.1    RESIDUAL (IGRF REMOVED) MAGNETIC FIELD INTENSITY
63              TO ONE DECIMAL PLACE IN GAMMAS
64  9         A8      SURFACE GEOLOGIC MAP UNIT CODE
65  10        I5      QUALITY FLAG CODES
66  11        F6.1    AVERAGED CONCENTRATION OF TERRESTRIAL POTASSIUM
67              (K-40) TO ONE DECIMAL PLACE IN PERCENT K
68  12        F4.1    UNCERTAINTY IN TERRESTRIAL POTASSIUM TO ONE DECIMAL
69              PLACE IN PERCENT K
70  13        F5.1    POTASSIUM STANDARD DEVIATION FROM THE MEAN TO ONE
71              DECIMAL PLACE AND ALGEBRAICALLY SIGNED
72  14        F6.1    AVERAGED CONCENTRATION OF TERRESTRIAL URANIUM
73              (BI-214) TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
74  15        F4.1    UNCERTAINTY IN TERRESTRIAL URANIUM TO ONE DECIMAL
75              PLACE IN PPM EQUIVALENT U
76  16        F5.1    URANIUM STANDARD DEVIATION FROM THE MEAN TO ONE
77              DECIMAL PLACE AND ALGEBRAICALLY SIGNED
78  17        F6.1    AVERAGED CONCENTRATION OF TERRESTRIAL THORIUM
79              (TL-208) TO ONE DECIMAL PLACE IN PPM EQUIVALENT TH
80  18        F4.1    UNCERTAINTY IN TERRESTRIAL THORIUM TO ONE DECIMAL
81              PLACE IN PPM EQUIVALENT TH
82  19        F5.1    THORIUM STANDARD DEVIATION FROM THE MEAN TO ONE
83              DECIMAL PLACE AND ALGEBRAICALLY SIGNED
84  20        F8.1    GROSS GAMMA (0.4-3.0 MEV) COUNT RATE TO ONE DECIMAL
85              PLACE IN COUNTS PER SECOND
86  21        F6.1    UNCERTAINTY IN GROSS GAMMA COUNT RATE TO ONE DECIMAL
87              PLACE IN COUNTS PER SECOND
88  22        F5.1    ATMOSPHERIC BI-214 4PI CORRECTION TO ONE DECIMAL
89              PLACE IN PPM EQUIVALENT U
90  23        F4.1    UNCERTAINTY IN ATMOSPHERIC BI-214 4PI CORRECTION
91              TO ONE DECIMAL PLACE IN PPM EQUIVALENT U
92  24        F6.1    AVERAGED URANIUM-TO-THORIUM RATIO TO ONE DECIMAL
93              PLACE IN PPM EQUIVALENT U PER PPM EQUIVALENT TH
94  25        F5.1    URANIUM-TO-THORIUM RATIO STANDARD DEVIATION FROM THE
95              MEAN TO ONE DECIMAL PLACE AND ALGEBRAICALLY SIGNED
96  26        F6.1    AVERAGED URANIUM-TO-POTASSIUM RATIO TO ONE DECIMAL
97              PLACE IN PPM EQUIVALENT U PER PERCENT K
98  27        F5.1    URANIUM-TO-POTASSIUM RATIO STANDARD DEVIATION FROM
99              THE MEAN TO ONE DECIMAL PLACE AND ALGEBRAICALLY
100             SIGNED
101  28        F6.1    AVERAGE THORIUM-TO-POTASSIUM RATIO TO ONE DECIMAL
102             PLACE IN PPM EQUIVALENT TH PER PERCENT K
103  29        F5.1    THORIUM-TO-POTASSIUM RATIO STANDARD DEVIATION FROM
104             THE MEAN TO ONE DECIMAL PLACE AND ALGEBRAICALLY
105             SIGNED

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A P P E N D I X K

Format, DOE STATISTICAL ANALYSIS SUMMARY DATA TAPE

DOE STATISTICAL ANALYSIS SUMMARY DATA TAPE

Line Character Number
Number 1234567890123456789012345678901234567890123456789012

1 05 0978 (DATA TAPE TYPE AND FORMAT SPECIFICATION DATE CODE)

2
3 STATISTICAL ANALYSIS SUMMARY TAPE (OR FILE)

4
5 FORMAT FOR TAPE IDENTIFICATION BLOCK (SECOND BLOCK)

6
7 ITEM FORMAT DESCRIPTION
8 1 A40 QUADRANGLE NAME AS PROJECT IDENTIFICATION
9 2 A20 NAME OF SUBCONTRACTOR
10 3 I4 APPROXIMATE DATE OF SURVEY (MONTH, YEAR)
11 4 I6 NUMBER OF GEOLOGIC MAP UNITS USED FOR THIS
12 QUADRANGLE

13
14 FORMAT FOR STATISTICAL ANALYSIS SUMMARY DATA RECORD (THIRD THRU LAST
15 BLOCK)

16
17 ITEM FORMAT DESCRIPTION
18 1 A8 SURFACE GEOLOGIC MAP UNIT IDENTIFYING CODE
19 2 I6 TOTAL RECORDS FOR GEOLOGIC MAP UNIT
20 3 I6 NUMBER OF POTASSIUM RECORDS COMPUTED FOR GEOLOGIC
21 UNITS
22 4 F6.1 POTASSIUM CONCENTRATION MEAN TO ONE DECIMAL PLACE
23 IN PERCENT K
24 5 F6.1 POTASSIUM CONCENTRATION STANDARD DEVIATION TO ONE
25 DECIMAL PLACE IN PERCENT K
26 6 A3 POTASSIUM CONCENTRATION DISTRIBUTION CODE
27 7 I6 NUMBER OF URANIUM RECORDS COMPUTED FOR GEOLOGIC UNIT
28 8 F6.1 URANIUM CONCENTRATION MEAN TO ONE DECIMAL PLACE
29 IN PPM EQUIVALENT U
30 9 F6.1 URANIUM CONCENTRATION STANDARD DEVIATION TO ONE
31 DECIMAL PLACE IN PPM EQUIVALENT U
32 10 A3 URANIUM CONCENTRATION DISTRIBUTION CODE
33 11 I6 NUMBER OF THORIUM RECORDS COMPUTED FOR GEOLOGIC UNIT
34 12 F6.1 THORIUM CONCENTRATION MEAN TO ONE DECIMAL PLACE IN
35 PPM EQUIVALENT TH
36 13 F6.1 THORIUM CONCENTRATION STANDARD DEVIATION TO ONE
37 DECIMAL PLACE IN PPM EQUIVALENT TH
38 14 A3 THORIUM CONCENTRATION DISTRIBUTION CODE
39 15 I6 NUMBER OF URANIUM-TO-THORIUM RATIO RECORDS COMPUTED
40 FOR GEOLOGIC UNIT
41 16 F6.1 URANIUM-TO-THORIUM RATIO MEAN TO ONE DECIMAL PLACE
42 IN PPM EQUIVALENT U PER PPM EQUIVALENT TH
43 17 F6.1 URANIUM-TO-THORIUM RATIO STANDARD DEVIATION TO ONE
44 DECIMAL PLACE IN PPM EQUIVALENT U PER PPM EQUIVALENT
45 TH
46 18 A3 URANIUM-TO-THORIUM RATIO DISTRIBUTION CODE
47 19 I6 NUMBER OF URANIUM-TO-POTASSIUM RATIO RECORDS
48 COMPUTED FOR GEOLOGIC UNIT
49 20 F6.1 URANIUM-TO-POTASSIUM RATIO MEAN TO ONE DECIMAL PLACE
50 IN PPM EQUIVALENT U PER PERCENT K

Line	Character Number																															
Number	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2

51	21	F6.1	URANIUM-TO-POTASSIUM RATIO STANDARD DEVIATION TO ONE
52			DECIMAL PLACE IN PPM EQUIVALENT U PER PERCENT K
53	22	A3	URANIUM-TO-POTASSIUM RATIO DISTRIBUTION CODE
54	23	I6	NUMBER OF THORIUM-TO-POTASSIUM RATIO RECORDS
55			COMPUTED FOR GEOLOGIC UNIT
56	24	F6.1	THORIUM-TO-POTASSIUM RATIO MEAN TO ONE DECIMAL PLACE
57			IN PPM EQUIVALENT TH PER PERCENT K
58	25	F6.1	THORIUM-TO-POTASSIUM RATIO STANDARD DEVIATION TO ONE
59			DECIMAL PLACE IN PPM EQUIVALENT TH PER PERCENT K
60	26	A3	THORIUM-TO-POTASSIUM RATIO DISTRIBUTION CODE

A P P E N D I X L

Format, DOE MAGNETIC DATA TAPE

DOE MAGNETIC DATA TAPE FORMAT

Line Character Number
 Number 1234567890123456789012345678901234567890123456789012

1 04 0978 (DATA TAPE TYPE AND FORMAT SPECIFICATION DATE CODES)
 2
 3 MAGNETIC DATA TAPE
 4
 5 FORMAT FOR TAPE IDENTIFICATION BLOCK (SECOND BLOCK)
 6
 7 ITEM FORMAT DESCRIPTION
 8 1 A40 QUADRANGLE NAME AS PROJECT IDENTIFICATION
 9 2 A20 NAME OF SUBCONTRACTOR
 10 3 I4 APPROXIMATE DATE OF SURVEY (MONTH, YEAR)
 11 4 I3 NUMBER OF FLIGHT LINES ON THIS TAPE
 12 5 I4 FIRST FLIGHT LINE OF THIS TAPE
 13 6 I6 FIRST RECORD NUMBER OF FIRST FLIGHT LINE
 14 7 I3 JULIAN DATE (DAY OF YEAR) FIRST FLIGHT LINE DATA WAS
 15 COLLECTED
 16 8 F8.4 LATITUDE OF GROUND BASE STATION TO FOUR DECIMAL
 17 PLACES IN DEGREES FOR FIRST FLIGHT LINE
 18 9 F8.4 LONGITUDE OF GROUND BASE STATION TO FOUR DECIMAL
 19 PLACES IN DEGREES FOR FIRST FLIGHT LINE
 20 10-14 (SAME) REPEAT OF ITEMS 5-9 FOR SECOND FLIGHT LINE ON THIS
 21 TAPE
 22 * * *
 23 * * *
 24 * * *
 25 495-499 (SAME) REPEAT OF ITEMS 5-9 FOR 99TH FLIGHT LINE ON THIS
 26 TAPE
 27
 28 FORMAT FOR MAGNETIC DATA RECORD (THIRD THRU LAST BLOCK)
 29
 30 ITEM FORMAT DESCRIPTION
 31 1 I1 AERIAL SYSTEM IDENTIFICATION CODE
 32 2 I4 FLIGHT LINE NUMBER
 33 3 I6 RECORD IDENTIFICATION NUMBER
 34 4 I6 GMT TIME OF DAY (HHMMSS)
 35 5 F8.4 LATITUDE TO FOUR DECIMAL PLACES IN DEGREES
 36 6 F8.4 LONGITUDE TO FOUR DECIMAL PLACES IN DEGREES
 37 7 F6.1 TERRAIN CLEARANCE TO ONE DECIMAL PLACE IN METERS
 38 8 F5.1 OUTSIDE AIR PRESSURE TO ONE DECIMAL PLACE IN MMHG
 39 9 A8 SURFACE GEOLOGIC MAP UNIT CODE
 40 10 F7.1 TOTAL MAGNETIC FIELD INTENSITY TO ONE DECIMAL PLACE
 41 IN GAMMAS
 42 11 F7.1 RESIDUAL (IGRF REMOVED) MAGNETIC FIELD INTENSITY
 43 TO ONE DECIMAL PLACE IN GAMMAS
 44 12 F7.1 DIURNAL MAGNETIC INTENSITY VARIATION TO ONE DECIMAL
 45 PLACE IN GAMMAS
 46 13 F7.1 MAGNETIC DEPTH-TO-BASEMENT TO ONE DECIMAL PLACE
 47 IN METERS (IF REQUIRED)

A P P E N D I X M

Reduced Calibration and Test Line Data

Reduced Calibration and Test Line Data

<u>Date</u>	<u>Flight</u>	<u>Res. Thor.</u>	<u>Res. Thor.</u>	<u>Low Preflight</u>			<u>Low Postflight</u>		
		<u>583</u>	<u>2615</u>	<u>Alt.</u>	<u>T.C.</u>	<u>2π</u>	<u>Alt.</u>	<u>T.C.</u>	<u>2π</u>
08/26/80	39	6.2%	8.9%	400'	1250	12	No test		
08/28/80	40	6.7%	9.2%	400'	1225	9	No test		
08/29/80	41	6.3%	9.3%	400'	1300	11	400'	1200	10
08/29/80	42	6.3%	9.3%	400'	1300	11	400'	1200	10
08/29/80	43	6.35	9.3%	400'	1300	11	400'	1200	10
09/06/80	57	6.2%	9.0%	400'	1250	12	400'	1250	11
09/06/80	58	6.2%	9.0%	400'	1250	12	400'	1250	11
09/06/80	59	6.2%	9.0%	400'	1250	12	400'	1250	11
09/07/80	61	6.0%	8.8%	400'	1225	10	400'	1225	9
09/17/80	86	5.9%	9.4%	No test			No test		
09/21/80	91	6.4%	8.6%	400'	1125	7	400'	N/A	7
09/21/80	92	6.4%	8.6%	400'	1125	7	400'	N/A	7
09/21/80	93	6.4%	8.6%	400'	1125	7	400'	N/A	7
09/22/80	96	6.3%	8.5%	400'	1150	7	No test		
09/22/80	97	6.3%	8.5%	400'	1150	7	No test		
09/23/80	101	5.5%	8.5%	400'	1175	8	400'	1150	7
09/26/80	113	6.1%	9.3%	400'	1200	12	400'	1150	10
09/27/80	117	5.3%	8.9%	400'	1225	14	400'	1175	9

N/A = NOT AVAILABLE

A P P E N D I X N

Remumbered to Original Fiducial Correlations

WEED QUADRANGLE

LINE 450 FLOWN AS LINE 451 AND 450
MAP FIDUCIALS 4226 TO 7300 CORRESPOND TO ORIGINAL FIDUCIALS 7300 TO 4226
MAP FIDUCIALS 7301 TO 8018 CORRESPOND TO ORIGINAL FIDUCIALS 19885 TO 19167

LINE 460 FLOWN AS LINE 461 AND 460
MAP FIDUCIALS 747 TO 3599 CORRESPOND TO ORIGINAL FIDUCIALS 3599 TO 747
MAP FIDUCIALS 3600 TO 4309 CORRESPOND TO ORIGINAL FIDUCIALS 15990 TO 16700

LINE 470 FLOWN AS LINE 471 AND 470
MAP FIDUCIALS 5971 TO 8602 CORRESPOND TO ORIGINAL FIDUCIALS 8602 TO 5971
MAP FIDUCIALS 8603 TO 9356 CORRESPOND TO ORIGINAL FIDUCIALS 15607 TO 14853

LINE 480 FLOWN AS LINE 481 AND 483
MAP FIDUCIALS 9479 TO 12329 CORRESPOND TO ORIGINAL FIDUCIALS 12329 TO 9479
MAP FIDUCIALS 12330 TO 13054 CORRESPOND TO ORIGINAL FIDUCIALS 4418 TO 2028

LINE 490 FLOWN AS LINE 491 AND 492
MAP FIDUCIALS 6137 TO 8937 CORRESPOND TO ORIGINAL FIDUCIALS 8937 TO 6137
MAP FIDUCIALS 8938 TO 9631 CORRESPOND TO ORIGINAL FIDUCIALS 5759 TO 7071

LINE 500 FLOWN AS LINE 501 AND 502
MAP FIDUCIALS 10333 TO 12846 CORRESPOND TO ORIGINAL FIDUCIALS 12846 TO 10333
MAP FIDUCIALS 12847 TO 13623 CORRESPOND TO ORIGINAL FIDUCIALS 232 TO 1008

LINE 510 FLOWN AS LINE 511 AND 510
MAP FIDUCIALS 13091 TO 15787 CORRESPOND TO ORIGINAL FIDUCIALS 15787 TO 13091
MAP FIDUCIALS 15788 TO 16550 CORRESPOND TO ORIGINAL FIDUCIALS 1799 TO 2561

LINE 520 FLOWN AS LINE 521 AND 520
MAP FIDUCIALS 16027 TO 18742 CORRESPOND TO ORIGINAL FIDUCIALS 18742 TO 16027
MAP FIDUCIALS 18743 TO 19554 CORRESPOND TO ORIGINAL FIDUCIALS 9256 TO 8444

LINE 530 FLOWN AS LINE 531 AND 530
MAP FIDUCIALS 10876 TO 14132 CORRESPOND TO ORIGINAL FIDUCIALS 14132 TO 10876
MAP FIDUCIALS 14133 TO 14339 CORRESPOND TO ORIGINAL FIDUCIALS 12680 TO 12887

LINE 540 FLOWN AS LINE 541 AND 540
MAP FIDUCIALS 7417 TO 10698 CORRESPOND TO ORIGINAL FIDUCIALS 10698 TO 7417
MAP FIDUCIALS 10699 TO 10931 CORRESPOND TO ORIGINAL FIDUCIALS 19897 TO 19664

LINE 550 FLOWN AS LINE 551 AND 550
MAP FIDUCIALS 28 TO 1960 CORRESPOND TO ORIGINAL FIDUCIALS 1960 TO 28
MAP FIDUCIALS 1961 TO 3815 CORRESPOND TO ORIGINAL FIDUCIALS 15779 TO 6271

LINE 560 FLOWN AS LINE 560 AND 561
MAP FIDUCIALS 2468 TO 5676 CORRESPOND TO ORIGINAL FIDUCIALS 5676 TO 2468
MAP FIDUCIALS 5677 TO 5958 CORRESPOND TO ORIGINAL FIDUCIALS 5617 TO 5335

LINE 3000 FLOWN AS LINE 3000
MAP FIDUCIALS 270 TO 2613 CORRESPOND TO ORIGINAL FIDUCIALS 2613 TO 270

WEED QUADRANGLE

LINE 3010 FLOWN AS LINE 3010
MAP FIDUCIALS 9656 TO 11950 CORRESPOND TO ORIGINAL FIDUCIALS 11950 TO 9656

LINE 3020 FLOWN AS LINE 3021
MAP FIDUCIALS 7110 TO 9623 CORRESPOND TO ORIGINAL FIDUCIALS 9623 TO 7110

LINE 3030 FLOWN AS LINE 3033
MAP FIDUCIALS 1818 TO 3956 CORRESPOND TO ORIGINAL FIDUCIALS 3956 TO 1818

LINE 3040 FLOWN AS LINE 3041
MAP FIDUCIALS 549 TO 4803 CORRESPOND TO ORIGINAL FIDUCIALS 4803 TO 549

LINE 3050 FLOWN AS LINE 3050
MAP FIDUCIALS 2206 TO 4528 CORRESPOND TO ORIGINAL FIDUCIALS 4528 TO 2206