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MULTILABORATORY ANALYTICAL
QUALITY CONTROL FOR THE
HYDROCHEMICAL AND STREAM
SEDIMENT RECONNAISSANCE

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MULTILABORATORY ANALYTICAL QUALITY CONTROL
FOR THE
HYDROCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE

Quality Control Report for February 1978

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FOREWORD

Dr. D. H. Dahlem, Project Officer - Geochemistry, National Uranium Resource Evaluation (NURE) Project Office, Department of Energy, Grand Junction, Colorado, has directed that commencing immediately, the multilaboratory analytical quality control reports issued by the Ames Laboratory, Department of Energy and Iowa State University, Ames, Iowa, on behalf of the Hydrochemical and Stream Sediment Reconnaissance of the NURE program be in the public domain. Thus, a copy of this report will be sent to the Technical Information Center, Oak Ridge, Tennessee, to be issued as a NTIS report. Since this is the first of a continuing sequence of NTIS reports, a summary of the scope of the analytical quality control program is presented.

The objective of this study is to develop and operate a multilaboratory quality assurance (MQA) program for the hydrogeochemical and stream sediment reconnaissance (HSSR) of the National Uranium Resource Evaluation (NURE) program of ERDA. The four ERDA laboratories participating in the HSSR program are Los Alamos Scientific Laboratory (LASL), Lawrence Livermore Laboratory (LLL), Savannah River Laboratory (SRL) and Oak Ridge Laboratory (ORGDP). These four laboratories have been designated to conduct extensive field surveys for locating potential uranium deposits in this country and in the process are expected to collect and characterize nearly a million and a half of water and stream sediment samples. The samples are being analyzed for uranium. The uranium content of these samples is expected to range from 0.1 to 100 ppb in the water samples and 0.2 to 100 ppm in sediment samples. All the participating laboratories have set up new facilities to perform these analytical tasks using different techniques. All laboratories also favor analysis of field samples for "path finder elements" e.g. As, Mo, Sc, V, etc., which are known to have important geochemical association with uranium (ORGDP Report #K/Vr-1). The laboratories propose to perform simultaneous multi-element analysis, perhaps with Induction Coupled Plasma - Optical Emission Spectrometry (ICP-OES), a technique developed at the Ames Laboratory.

A multilaboratory quality assurance program is essential to ensure that reliable analytical measurements are obtained by the four laboratories involved in the HSSR program. Such a program insures that variation in measurements between laboratories are detected and controlled to acceptable levels, so that significant variations in the uranium content of field samples can be readily discerned. The reliability of the data from the HSSR project can be only guaranteed by an adequate quality-assurance program.

The analytical measurement uncertainties for the data obtained in this program are likely to be different for each laboratory because of the different methods of analysis used. The determination of the accuracy and precision of an analytical measurement is best obtained by the analysis of a set of standardized control samples. Analytical results from the laboratories on a common set of control samples make

it feasible to compare and evaluate interlaboratory accuracy, bias and precision. When significant differences are observed, appropriate action can be taken to identify and reduce the sources of error. A multilaboratory quality assurance program requires the preparation and distribution of control samples, procedures for sub-sampling, evaluation of the data returned by the participating laboratories, summarization of the mean, standard deviation, bias and "out of control" data on all control samples. Interlaboratory comparisons showing bias and standard deviations of the participating laboratories are also to be provided.

Initially, water and sediment control samples, each at three levels of uranium content, are to be prepared and the uranium content determined by isotope dilution mass spectrometry or other similar "referee" method of analysis. These are to be distributed to the participating laboratories periodically and will be analyzed by techniques being used for the analysis of field samples. The four participating laboratories have expressed an interest in the inclusion of several path finder elements in the control samples and to obtain quality assurance data for these elements. Such an expansion merits serious consideration as both ORGDP and the U.S. Geological Survey together recommend that at least 23 other elements be determined for the NURE hydrogeochemical survey.

Prior to 1976 the MQA program was operated by ORGDP, one of the HSSR participants. The other participants desired that the MQA program be administered by an independent agency. Thus the Ames Laboratory was requested to operate the MQA program.

MULTILABORATORY QUALITY CONTROL REPORT
FOR THE
HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE

Report for February 1978

SUMMARY

For the month of February 1978, Ames Laboratory received the following number of results:

<u>Batch</u>	<u>Number of Results</u> <u>LASL</u>
Water A2 - 0.98 ppb U	6F
Water B2 - 9.98 ppb U	6F

F - Fluorometric

CONTROL DATA INDICATIONS

The control status observations on the water and sediment batch control charts are presented in Table 1. The LASL control chart for water B2 shows negative bias.

Table 1
Status of Control Batches for
February 1978

Chart No.	Lab	Batch and Method of Analysis	Status
1	LASL	A2 - 0.98 ppb U,F	OK
2	LASL	B2 - 9.98 ppb U,F	level shift after pt. 28 -2.68 $\pm$ 0.84 bias

FLUOROMETRIC

CHART 1 LASL

WATER BATCH A2

0.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 28	28	0.85 +/- 0.07	0.18	22.2%
CURRENT	29 - 34	6	1.03 +/- 0.25	0.24	23.2%
STD +/- 95% CONF LIMITS			0.98 +/- 0.04		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS			0.05 +/- 0.26		

COMMENT:

OUTLIER PTS

LEVEL SHIFT AFTER PT

VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS

TREND FOR PTS

CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 25 OMITTING OUTLIERS

FLUOROMETRIC

CHART 1A LASL

WATER BATCH A2

0.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 28	28	0.85 +/- 0.07	0.18	22.%
CURRENT	29 - 34	6	1.03 +/- 0.25	0.24	23.%
STD +/- 95% CONF LIMITS			0.98 +/- 0.04		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS			0.05 +/-	0.26	

COMMENT:

OUTLIER PTS

LEVEL SHIFT AFTER PT

VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS

TREND FOR PTS

CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 25 OMITTING OUTLIERS

N= 0 S= 0.06			LOWER= 0.80		UPPER= 1.16	
PT	DATE	RESULT	XBAR= 0.98			
1	10-03-77	0.8		*		
2	10-03-77	0.8		*		
3	10-11-77	1.2				*
4	10-11-77	0.8		*		
5	10-21-77	0.7	*			
6	10-21-77	0.5	*			
7	11-01-77	0.9			*	
8	11-01-77	0.9			*	
9	11-04-77	1.1				*
10	11-04-77	0.8		*		
11	11-16-77	0.7	*			
12	11-16-77	0.8		*		
13	11-22-77	0.5	*			
14	11-22-77	0.8		*		
15	12-06-77	0.9			*	
16	12-06-77	0.9			*	
17	12-14-77	0.7	*			
18	12-14-77	1.2				*
19	12-16-77	1.0			*	
20	12-16-77	0.9			*	
21	12-19-77	0.7	*			
22	12-19-77	1.1				*
23	1-18-78	0.8		*		
24	1-18-78	1.0			*	
25	1-23-78	0.8		*		
26	1-23-78	1.1				*
27	1-30-78	0.6	*			
28	1-30-78	0.9			*	
29	2-14-78	1.3				*
30	2-14-78	0.7	*			
31	2-17-78	1.2				*
32	2-17-78	0.8		*		
33	2-24-78	1.0			*	
34	2-24-78	1.2				*

FLUOROMETRIC

CHART 2 LASL

WATER BATCH B2.

9.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 28	28	8.24 +/- 0.31	0.79	10.0%
CURRENT	29 - 34	6	7.30 +/- 0.82	0.78	11.0%
STD +/- 95% CONF LIMITS			9.98 +/- 0.20		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS					-2.68 +/- 0.84

COMMENT:

OUTLIER PTS

SIGNIFICANT BIAS YES

LEVEL SHIFT AFTER PT

TREND FOR PTS

VARIATION CHANGE AFTER PT

CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 25 OMITTING OUTLIERS

N= 25 S= 0.61 LOWER= 6.21 XBAR= 8.06 UPPER= 9.90

FLUOROMETRIC

CHART 2A LASL

WATER BATCH 82

9.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 28	28	8.24 +/- 0.31	0.79	10.0%
CURRENT	29 - 34	6	7.30 +/- 0.82	0.78	11.0%
STD +/- 95% CONF LIMITS 9.98 +/- 0.20					
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -2.68 +/- 0.84					

COMMENT:

OUTLIER PTS

LEVEL SHIFT AFTER PT

VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS YES

TREND FOR PTS

CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 25 OMITTING OUTLIERS

TOPO EXTRACTION-FLUOROMETRIC

CHART 3 ORGDP

WATER BATCH A2

0.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 2	2	0.685 +/- 0.318	0.035	5.1%
CURRENT	3 - 4	2	1.055 +/- 0.064	0.007	1.1%
STD +/- 95% CONF LIMITS			0.980 +/- 0.040		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS 0.075 +/- 0.075					

COMMENT:

OUTLIER PTS

LEVEL SHIFT AFTER PT

VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS

TREND FOR PTS

CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 4 OMITTING OUTLIERS

N= 4 S= 0.215			LOWER= 0.226		UPPER= 1.514	
			XBAR= 0.870			
PT	DATE	RESULT	-----			
1	10-06-77	0.66			*	
2	10-28-77	0.71			*	
3	1-03-78	1.05				*
4	1-03-78	1.06				*

CHART 3A ORGDP
 TOPD EXTRACTION-FLUOROMETRIC WATER BATCH A2 0.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 2	2	0.685+/- 0.318	0.035	5.0%
CURRENT	3 - 4	2	1.055+/- 0.064	0.007	1.0%
STD +/- 95% CONF LIMITS			0.980 +/- 0.040		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS 0.075 +/- 0.075					

COMMENT:
 OUTLIER PTS
 LEVEL SHIFT AFTER PT
 VARIATION CHANGE AFTER PT
 SIGNIFICANT BIAS
 TREND FOR PTS
 CYCLES FOR PTS

CHART OF INDIVIDUALS
 XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 4 OMITTING OUTLIERS

N=	0	S=	0.060	LOWER=	0.800	XBAR=	0.980	UPPER=	1.160
PT	DATE	RESULT							
1	10-06-77	0.66	*						
2	10-28-77	0.71	*						
3	1-03-78	1.05					*		
4	1-03-78	1.06					*		

TOPO EXTRACTION-FLUOROMETRIC

CHART 4 ORGDP

WATER BATCH B2

9.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 2	2	9.630 +/- 12.579	1.400	15.%
CURRENT	3 - 4	2	9.595 +/- 4.002	0.445	5.%
STD +/- 95% CONF LIMITS			9.980 +/- 0.220		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.365 +/- 4.009					

COMMENT:

OUTLIER PTS

LEVEL SHIFT AFTER PT

VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS

TREND FOR PTS

CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 4 OMITTING OUTLIERS

N= 4 S= 0.849			LOWER= 7.067	XBAR= 9.612	UPPER= 12.158
PT	DATE	RESULT			
1	10-06-77	10.62		*	*
2	10-28-77	8.64		*	*
3	1-03-78	9.91		*	*
4	1-03-78	9.28		*	*

CHART 4A GRGDP
 TOPO EXTRACTION-FLUOROMETRIC WATER BATCH B2 9.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 2	2	9.630 +/- 12.579	1.400	15.%
CURRENT	3 - 4	2	9.595 +/- 4.002	0.445	5.%
STD +/- 95% CONF LIMITS			9.980 +/- 0.220		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.385 +/- 4.009					

COMMENT:

OUTLIER PTS

LEVEL SHIFT AFTER PT

VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS

TREND FOR PTS

CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 4 OMITTING OUTLIERS

N=	0	S=	0.660	LOWER=	8.000	XBAR=	9.980	UPPER=	12.000
PT	DATE	RESULT							
1	10-06-77	10.62							
2	10-28-77	8.64			*				
3	1-03-78	9.91				*			
4	1-03-78	9.28				*			

DELAYED NEUTRON COUNTING

CHART 5 LASL

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

	POINTS		XBAR +/-			
	OMITTING		95% CONFIDENCE			COEFFICIENT OF
	OUTLIERS	N	LIMITS		STD DEV	VARIATION
PRIOR	1 - 42	42	5.41+/-	0.05	0.17	3.0%
CURRENT	43 - 64	22	5.28+/-	0.04	0.08	2.0%
STD +/- 95% CONF LIMITS			NONE			
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS						-0.13 +/- 0.06

COMMENT:

OUTLIER PTS
LEVEL SHIFT AFTER PT
VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS YES
TREND FOR PTS
CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 64 OMITTING OUTLIERS

(CHART CONTINUATION)

CHART 5 LASL

DELAYED NEUTRON COUNTING

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

41	6-14-77	5.5				*	
42	6-14-77	5.6					*
43	1-12-78	5.2			*		
44	1-12-78	5.2			*		
45	1-12-78	5.4				*	
46	1-12-78	5.2			*		
47	1-12-78	5.2			*		
48	1-12-78	5.3				*	
49	1-12-78	5.3				*	
50	1-12-78	5.4					*
51	1-12-78	5.3				*	
52	1-13-78	5.4					*
53	1-13-78	5.2			*		
54	1-13-78	5.3				*	
55	1-13-78	5.2			*		
56	1-13-78	5.2			*		
57	1-13-78	5.2			*		
58	1-13-78	5.2			*		
59	1-16-78	5.3				*	
60	1-16-78	5.3				*	
61	1-16-78	5.4					*
62	1-16-78	5.4					*
63	1-16-78	5.3				*	
64	1-16-78	5.3				*	

DELAYED NEUTRON COUNTING

CHART 6 LASL
SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

	POINTS		XBAR +/-			
	OMITTING		95% CONFIDENCE			COEFFICIENT OF
	OUTLIERS	N	LIMITS		STD DEV	VARIATION
PRIOR	1 - 39	39	11.44+/-	0.05	0.15	1%
CURRENT	40 - 66	27	11.06+/-	0.11	0.28	2%
STD +/- 95% CONF LIMITS			NONE			
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS						-0.38 +/- 0.12

COMMENT:

OUTLIER PTS	SIGNIFICANT BIAS	YES
LEVEL SHIFT AFTER PT	TREND FOR PTS	
VARIATION CHANGE AFTER PT	CYCLES FOR PTS	

CHART OF INDIVIDUALS
XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 66 OMITTING OUTLIERS

(CHART CONTINUATION)
 CHART 6 LASL
 SEDIMENT BATCH S1.

DELAYED NEUTRON COUNTING

APPROX 10 PPM URANIUM

41	1-12-78	11.1			*		
42	1-12-78	10.8			*		
43	1-12-78	11.0			*		
44	1-12-78	11.0			*		
45	1-12-78	11.0			*		
46	1-12-78	11.1			*		
47	1-12-78	11.0			*		
48	1-12-78	10.9			*		
49	1-13-78	10.8			*		
50	1-13-78	11.0			*		
51	1-13-78	11.0			*		
52	1-13-78	10.9			*		
53	1-13-78	10.8			*		
54	1-13-78	11.1			*		
55	1-13-78	11.2			*		
56	1-13-78	11.0			*		
57	1-13-78	11.0			*		
58	1-13-78	10.8			*		
59	1-13-78	10.8			*		
60	1-13-78	10.9			*		
61	1-16-78	11.1			*		
62	1-16-78	11.4			*		*
63	1-16-78	11.0			*		
64	1-16-78	11.3			*		
65	1-16-78	11.1			*		
66	1-16-78	12.2			*		*

DELAYED NEUTRON COUNTING

CHART 7 LASL

SEDIMENT BATCH T1

APPROX 95 PPM URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 98	98	97.16+/-	3.61	4.%
CURRENT	99 - 133	35	95.39+/-	2.56	3.%
STD +/- 95% CONF LIMITS			NONE		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -1.77 +/- 1.14					
COMMENT:					

OUTLIER PTS	SIGNIFICANT BIAS YES
LEVEL SHIFT AFTER PT	TREND FOR PTS
VARIATION CHANGE AFTER PT	CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 133 OMITTING OUTLIERS

N= 133 S= 3.44 LOWER= 86.36 XBAR= 96.69 UPPER= 107.02

(CHART CONTINUATION)

CHART 7 LASL

DELAYED NEUTRON COUNTING

SEDIMENT BATCH T1

APPROX 95 PPM URANIUM

41	5-02-77	97.6
42	5-02-77	98.1
43	5-16-77	100.2
44	5-16-77	100.9
45	5-16-77	97.8
46	5-16-77	99.0
47	5-16-77	100.9
48	5-16-77	99.2
49	5-23-77	98.1
50	5-23-77	101.2
51	5-23-77	99.7
52	5-23-77	97.4
53	5-23-77	103.2
54	5-23-77	106.9
55	5-23-77	101.2
56	5-23-77	98.1
57	6-09-77	94.7
58	6-09-77	96.4
59	6-09-77	94.9
60	6-10-77	95.3
61	6-10-77	99.0
62	6-10-77	96.2
63	6-10-77	98.1
64	6-10-77	98.8
65	6-10-77	98.2
66	6-10-77	102.5
67	6-10-77	100.3
68	6-10-77	97.4
69	6-10-77	97.8
70	6-10-77	95.5
71	6-10-77	97.9
72	6-10-77	98.7
73	6-10-77	97.7
74	6-13-77	99.0
75	6-13-77	98.9
76	6-14-77	98.1
77	6-14-77	98.0
78	6-14-77	99.7
79	6-14-77	97.7
80	6-15-77	97.9
81	6-15-77	96.4
82	6-15-77	97.6
83	6-15-77	97.7
84	6-15-77	99.9
85	6-15-77	98.6
86	6-15-77	97.9
87	6-15-77	99.4
88	6-15-77	98.6
89	6-15-77	97.0
90	6-16-77	96.2

(CHART CONTINUATION)

CHART 7 LASL

SEDIMENT BATCH T1

APPROX 95 PPM URANIUM

DELAYED NEUTRON COUNTING

91	6-16-77	96.2
92	6-16-77	95.6
93	6-20-77	97.1
94	6-20-77	97.2
95	6-20-77	97.8
96	6-20-77	97.3
97	6-20-77	98.4
98	6-20-77	101.5
99	1-12-78	93.1
100	1-12-78	96.4
101	1-12-78	93.8
102	1-12-78	91.5
103	1-12-78	90.9
104	1-13-78	94.6
105	1-13-78	97.8
106	1-13-78	94.7
107	1-13-78	90.8
108	1-16-78	97.0
109	1-16-78	101.0
110	1-16-78	101.1
111	1-16-78	99.5
112	1-16-78	95.8
113	1-16-78	98.1
114	1-16-78	94.7
115	1-17-78	95.9
116	1-17-78	96.9
117	1-17-78	96.0
118	1-17-78	99.3
119	1-17-78	96.5
120	1-17-78	95.6
121	1-17-78	94.2
122	1-20-78	97.2
123	1-20-78	94.0
124	1-20-78	95.8
125	1-20-78	92.4
126	1-20-78	93.2
127	1-20-78	95.2
128	1-20-78	95.4
129	1-20-78	95.5
130	1-20-78	92.2
131	1-24-78	95.7
132	1-24-78	93.0
133	1-24-78	93.7

TOPO EXTRACTION-FLUOROMETRIC

CHART 8 ORGDP

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 165	165	3.561+/- 0.071	0.463	13.0%
CURRENT	166 - 167	2	3.935+/- 1.588	0.177	4.0%
STD +/- 95% CONF LIMITS			NONE		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS 0.374 +/- 1.590					

COMMENT:

OUTLIER PTS
LEVEL SHIFT AFTER PT
VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS
TREND FOR PTS
CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 167 OMITTING OUTLIERS

N= 167 S= 0.462 LOWER= 2.179 XBAR= 3.565 UPPER= 4.951

PT	DATE	RESULT
1	2-27-76	2.94
2	2-27-76	2.79
3	3-08-76	3.30
4	3-08-76	3.24
5	3-08-76	3.07
6	3-08-76	3.62
7	3-08-76	3.16
8	3-15-76	3.21
9	3-18-76	3.02
10	3-18-76	3.17
11	3-31-76	3.00
12	3-31-76	3.63
13	4-08-76	3.25
14	4-08-76	3.28
15	4-14-76	2.74
16	4-21-76	3.12
17	4-22-76	3.39
18	4-22-76	3.11
19	5-10-76	3.11
20	5-10-76	3.42
21	5-10-76	3.49
22	5-10-76	3.67
23	5-24-76	3.27
24	6-07-76	3.83
25	6-07-76	3.61
26	6-28-76	3.66
27	6-28-76	3.67
28	6-28-76	3.56
29	6-28-76	4.04
30	7-06-76	2.98
31	7-06-76	3.43
32	7-14-76	3.58
33	7-14-76	3.16
34	7-14-76	3.07
35	7-14-76	3.14
36	7-16-76	3.74
37	7-16-76	3.52
38	7-21-76	3.40
39	7-28-76	3.58
40	8-18-76	3.29

(CHART CONTINUATION)

CHART 8 ORGDP

TOPO EXTRACT ION-FLUOROMETRIC

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

41	8-20-76	3.09
42	8-23-76	3.33
43	8-23-76	3.69
44	9-08-76	3.56
45	9-20-76	3.09
46	9-20-76	3.26
47	9-20-76	3.63
48	9-20-76	2.80
49	9-23-76	2.85
50	9-23-76	3.75
51	9-23-76	3.99
52	9-23-76	3.52
53	10-04-76	3.86
54	10-04-76	3.68
55	10-27-76	4.82
56	10-27-76	4.83
57	11-03-76	3.22
58	11-03-76	2.79
59	11-15-76	3.48
60	11-15-76	3.00
61	11-15-76	3.22
62	11-18-76	3.72
63	12-06-76	4.24
64	12-06-76	4.08
65	12-06-76	3.84
66	1-06-77	4.25
67	1-06-77	3.61
68	1-31-77	4.32
69	2-01-77	2.99
70	2-03-77	3.54
71	2-03-77	4.25
72	2-09-77	3.72
73	2-09-77	4.91
74	2-22-77	3.64
75	2-22-77	4.28
76	2-28-77	3.49
77	2-28-77	3.56
78	3-23-77	3.52
79	3-23-77	3.76
80	3-25-77	4.25
81	3-25-77	3.65
82	3-25-77	3.88
83	3-25-77	3.62
84	3-30-77	3.85
85	3-31-77	3.09
86	4-13-77	3.86
87	4-13-77	3.54
88	4-26-77	3.90
89	4-26-77	4.08
90	4-26-77	3.69

(CHART CONTINUATION)

CHART 8 ORGDP

TOPO EXTRACTION-FLUOROMETRIC

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

91	4-26-77	3.77
92	4-26-77	4.58
93	4-27-77	3.70
94	4-22-77	3.51
95	4-22-77	3.61
96	4-22-77	4.02
97	4-22-77	2.90
98	5-05-77	4.06
99	5-05-77	3.18
100	5-05-77	3.65
101	5-05-77	3.17
102	5-05-77	3.39
103	5-06-77	3.01
104	5-17-77	4.21
105	5-17-77	4.51
106	5-17-77	3.36
107	5-17-77	3.15
108	5-18-77	3.58
109	5-18-77	3.36
110	5-20-77	3.77
111	5-20-77	3.73
112	5-31-77	3.07
113	5-31-77	3.17
114	5-31-77	3.97
115	5-31-77	3.60
116	6-03-77	3.58
117	6-03-77	4.23
118	6-03-77	4.56
119	6-03-77	3.83
120	6-10-77	3.64
121	6-10-77	3.96
122	6-10-77	4.05
123	6-15-77	3.20
124	6-15-77	3.30
125	7-05-77	3.50
126	7-05-77	3.50
127	7-05-77	2.60
128	7-28-77	3.35
129	7-28-77	3.49
130	7-28-77	3.02
131	7-28-77	3.24
132	7-28-77	3.03
133	7-28-77	3.55
134	7-28-77	3.15
135	7-28-77	2.56
136	8-19-77	3.03
137	8-19-77	3.18
138	8-19-77	2.77
139	8-19-77	3.04
140	9-08-77	3.88

(CHART CONTINUATION)

CHART 8 ORGDP

TOPO EXTRACTION-FLUOROMETRIC

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

141	9-08-77	4.63
142	9-08-77	4.59
143	9-08-77	4.13
144	9-15-77	3.15
145	9-22-77	4.27
146	9-22-77	4.01
147	9-22-77	3.90
148	9-22-77	3.77
149	9-22-77	3.79
150	9-28-77	4.13
151	9-28-77	3.35
152	10-07-77	3.35
153	10-07-77	3.61
154	10-21-77	3.54
155	10-21-77	3.39
156	11-01-77	3.99
157	11-01-77	2.99
158	11-01-77	4.50
159	11-01-77	3.73
160	11-11-77	3.81
161	11-11-77	3.33
162	11-30-77	3.66
163	11-30-77	3.61
164	11-30-77	3.60
165	11-30-77	3.57
166	12-02-77	3.81
167	12-02-77	4.06

	POINTS		XBAR +/-			
	OMITTING		95% CONFIDENCE			COEFFICIENT OF
	OUTLIERS	N	LIMITS		STD DEV	VARIATION
PRIOR	1 - 164	164	9.214+/-	0.159	1.031	11.1%
CURRENT	165 - 166	2	9.850+/-	1.652	0.184	2.1%
STD +/- 95% CONF LIMITS			NONE			
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS			0.636 +/- 1.659			

COMMENT:

OUTLIER PTS
LEVEL SHIFT AFTER PT
VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS
TREND FOR PTS
CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 166 OMITTING OUTLIERS

N= 166 S= 1.028 LOWER= 6.139 XBAR= 9.222 UPPER= 12.304

(CHART CONTINUATION)

CHART 9 ORGDP

TOPO EXTRACTION-FLUOROMETRIC

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

41	8-20-76	8.13
42	8-23-76	8.97
43	8-23-76	7.60
44	9-08-76	8.84
45	9-20-76	8.19
46	9-20-76	8.98
47	9-20-76	8.16
48	9-20-76	8.11
49	9-23-76	8.30
50	9-23-76	7.34
51	9-23-76	9.95
52	9-23-76	9.00
53	10-04-76	8.75
54	10-04-76	9.34
55	10-27-76	9.51
56	10-27-76	10.02
57	11-03-76	8.57
58	11-03-76	8.70
59	11-15-76	8.10
60	11-15-76	9.39
61	11-15-76	8.33
62	11-18-76	9.93
63	12-06-76	10.30
64	12-06-76	11.10
65	12-06-76	10.22
66	1-06-77	12.23
67	1-06-77	7.32
68	1-31-77	9.91
69	2-01-77	10.04
70	2-03-77	10.23
71	2-09-77	8.71
72	2-09-77	8.06
73	2-22-77	10.05
74	2-22-77	8.91
75	2-22-77	10.31
76	2-28-77	8.97
77	2-28-77	8.26
78	3-23-77	8.90
79	3-23-77	9.65
80	3-25-77	8.90
81	3-25-77	10.00
82	3-25-77	8.41
83	3-25-77	10.46
84	3-31-77	9.28
85	3-31-77	7.73
86	4-13-77	8.48
87	4-22-77	7.76
88	4-22-77	8.27
89	4-22-77	7.15
90	4-22-77	8.48

(CHART CONTINUATION)

CHART 9 ORGDP

TOPO EXTRACTION-FLUOROMETRIC

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

91	4-26-77	6.99
92	4-26-77	8.11
93	4-26-77	8.29
94	4-26-77	8.93
95	4-26-77	8.81
96	4-27-77	10.43
97	5-05-77	9.83
98	5-05-77	9.02
99	5-05-77	7.15
100	5-05-77	7.18
101	5-05-77	9.35
102	5-06-77	8.58
103	5-17-77	9.31
104	5-17-77	8.29
105	5-17-77	9.81
106	5-17-77	8.53
107	5-18-77	6.20
108	5-18-77	7.50
109	5-20-77	8.57
110	5-20-77	11.01
111	5-31-77	8.47
112	6-03-77	10.75
113	6-03-77	8.37
114	6-03-77	10.70
115	6-10-77	9.59
116	6-10-77	9.54
117	6-10-77	9.92
118	6-10-77	8.87
119	6-10-77	8.58
120	6-10-77	11.12
121	6-15-77	9.12
122	7-05-77	8.70
123	7-05-77	8.80
124	7-05-77	8.50
125	7-05-77	9.40
126	7-08-77	10.00
127	7-08-77	9.27
128	7-08-77	10.10
129	7-08-77	10.77
130	7-08-77	9.46
131	7-08-77	10.92
132	7-08-77	9.74
133	7-08-77	10.76
134	8-19-77	8.18
135	8-19-77	7.57
136	8-19-77	9.50
137	8-19-77	12.18
138	9-08-77	9.87
139	9-08-77	11.00
140	9-08-77	8.56

(CHART CONTINUATION)

CHART 9 ORGDP

TOPO EXTRACTION-FLUOROMETRIC

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

141	9-08-77	9.90
142	9-15-77	8.26
143	9-15-77	7.56
144	9-22-77	11.30
145	9-22-77	10.42
146	9-22-77	11.69
147	9-22-77	10.87
148	9-28-77	9.73
149	9-28-77	10.13
150	10-07-77	10.43
151	10-07-77	9.37
152	10-21-77	10.21
153	11-01-77	9.59
154	11-11-77	9.64
155	11-11-77	9.19
156	11-11-77	8.67
157	11-11-77	10.74
158	11-11-77	9.12
159	11-11-77	9.56
160	11-11-77	9.16
161	11-30-77	8.87
162	11-30-77	9.72
163	12-07-77	9.85
164	12-07-77	9.29
165	1-17-78	9.72
166	1-17-78	9.98

DELAYED NEUTRON COUNTING

CHART 10 ORGDP

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

	POINTS		XBAR +/-			
	OMITTING		95% CONFIDENCE			COEFFICIENT OF
	OUTLIERS	N	LIMITS		STD DEV	VARIATION
PRIOR	1 - 152	149	5.253+/-	0.023	0.145	3.0%
CURRENT	153 - 160	8	5.181+/-	0.110	0.132	3.0%
STD +/- 95% CONF LIMITS			NONE			
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.071 +/- 0.113						

COMMENT:

OUTLIER PTS 72,82,143

LEVEL SHIFT AFTER PT

VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS

TREND FOR PTS

CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 160 OMITTING OUTLIERS

N= 157 S= 0.145 LOWER= 4.914 XBAR= 5.249 UPPER= 5.684

PT	DATE	RESULT					
1	2-27-76	5.21			*		
2	2-27-76	5.03					
3	3-08-76	5.81		*			*
4	3-08-76	5.26			*		
5	3-08-76	5.02		*			
6	3-08-76	5.03		*			
7	3-08-76	5.15			*		
8	3-15-76	5.11			*		
9	4-08-76	5.54				*	
10	4-08-76	5.13			*		
11	4-30-76	5.00		*			
12	4-30-76	5.04		*			
13	4-30-76	5.20			*		
14	4-30-76	4.95		*			
15	4-30-76	5.22			*		
16	4-30-76	5.16			*		
17	4-30-76	5.15			*		
18	6-02-76	5.09		*			
19	6-02-76	5.00		*			
20	6-02-76	4.97		*			
21	6-02-76	5.03		*			
22	6-02-76	4.96		*			
23	6-02-76	5.49				*	
24	6-02-76	5.17			*		
25	6-02-76	5.07		*			
26	7-21-76	5.34			*		
27	7-21-76	5.12		*			
28	7-21-76	5.12		*			
29	7-21-76	5.49				*	
30	7-26-76	5.53				*	
31	7-26-76	5.20			*		
32	7-26-76	5.13		*			
33	7-30-76	5.27			*		
34	7-30-76	5.32			*		
35	7-30-76	5.06		*			
36	7-30-76	5.32			*		
37	8-13-76	5.35			*		
38	8-13-76	5.19		*			
39	8-13-76	5.13		*			
40	8-13-76	5.33			*		

(CHART CONTINUATION)
 CHART 10 ORGDP
 SEDIMENT BATCH R1

DELAYED NEUTRON COUNTING

APPROX 5 PPM URANIUM

41	8-13-76	5.50
42	8-13-76	5.26
43	8-13-76	5.58
44	8-13-76	5.33
45	8-13-76	5.20
46	8-13-76	5.14
47	9-23-76	5.38
48	9-23-76	5.20
49	9-23-76	5.33
50	9-23-76	5.46
51	9-23-76	5.20
52	9-23-76	5.15
53	9-23-76	5.18
54	9-23-76	5.18
55	9-23-76	5.37
56	9-23-76	5.18
57	9-23-76	5.45
58	9-23-76	5.51
59	10-05-76	5.72
60	10-05-76	5.27
61	10-06-76	5.20
62	10-06-76	5.29
63	10-06-76	5.06
64	10-06-76	5.16
65	10-06-76	5.29
66	11-11-76	5.27
67	11-11-76	5.25
68	11-15-76	5.27
69	11-16-76	5.32
70	11-16-76	5.10
71	11-16-76	5.30
72	11-30-76	6.49
73	11-30-76	5.44
74	11-30-76	5.27
75	11-30-76	5.28
76	11-30-76	5.29
77	3-29-77	5.31
78	3-29-77	5.32
79	3-29-77	5.30
80	3-29-77	5.12
81	4-18-77	5.21
82	4-18-77	6.29
83	4-29-77	5.34
84	4-29-77	5.26
85	4-29-77	5.33
86	4-29-77	5.18
87	4-29-77	5.27
88	4-29-77	5.37
89	4-29-77	5.37
90	4-29-77	5.20

(CHART CONTINUATION)

CHART 10 ORGDP

DELAYED NEUTRON COUNTING

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

91	6-06-77	5.59
92	6-06-77	5.33
93	6-06-77	5.35
94	6-06-77	5.29
95	7-21-77	5.26
96	7-21-77	5.36
97	8-02-77	5.33
98	8-02-77	5.40
99	8-03-77	5.37
100	8-03-77	5.26
101	8-03-77	5.32
102	8-03-77	5.24
103	8-03-77	5.37
104	8-03-77	5.27
105	8-03-77	5.28
106	8-03-77	5.20
107	8-03-77	5.05
108	8-03-77	5.08
109	8-03-77	5.39
110	8-03-77	5.18
111	8-03-77	5.08
112	8-03-77	5.20
113	8-03-77	5.10
114	8-03-77	5.34
115	8-04-77	5.25
116	8-04-77	5.42
117	8-04-77	5.05
118	8-05-77	5.13
119	8-05-77	5.29
120	8-05-77	5.27
121	8-05-77	5.21
122	8-05-77	5.17
123	8-05-77	5.16
124	8-05-77	5.26
125	8-05-77	5.18
126	8-05-77	5.33
127	8-05-77	5.15
128	8-05-77	5.39
129	8-05-77	5.31
130	8-05-77	5.41
131	8-05-77	5.24
132	8-05-77	5.36
133	9-29-77	5.09
134	9-29-77	5.53
135	9-29-77	5.20
136	9-29-77	5.20
137	9-29-77	5.39
138	9-29-77	5.32
139	9-29-77	5.15
140	9-29-77	5.14

(CHART CONTINUATION)

CHART 10 ORGOP

DELAYED NEUTRON COUNTING

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

141	9-29-77	5.10			*				
142	9-29-77	5.44					*		
143	9-29-77	5.96							*
144	9-29-77	5.29				*			
145	9-29-77	5.16			*				
146	9-29-77	5.26			*				
147	9-29-77	5.16			*				
148	9-29-77	5.18			*				
149	10-26-77	5.24			*				
150	10-26-77	5.34				*			
151	10-26-77	5.29			*				
152	10-26-77	5.21			*				
153	11-18-77	5.37				*			
154	11-18-77	5.16			*				
155	11-18-77	5.01		*					
156	11-18-77	5.39				*			
157	11-18-77	5.17			*				
158	11-18-77	5.11		*					
159	11-18-77	5.12		*					
160	11-18-77	5.12		*					

DELAYED NEUTRON COUNTING

CHART 11 ORGDP

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 163	162	10.76+/- 0.04	0.26	2.%
CURRENT	164 - 164	1	10.80+/- 0.0	0.0	0.%
STD +/- 95% CONF LIMITS			NONE		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS					0.04 +/- 0.04

COMMENT:

OUTLIER PTS 115

LEVEL SHIFT AFTER PT

VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS

TREND FOR PTS

CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 164 OMITTING OUTLIERS

N= 163 S= 0.26 LOWER= 10.00 XBAR= 10.76 UPPER= 11.53

PT	DATE	RESULT
1	2-27-76	10.9
2	2-27-76	10.6
3	3-11-76	10.6
4	3-11-76	10.7
5	3-11-76	10.7
6	3-11-76	10.6
7	3-11-76	10.9
8	3-11-76	10.6
9	4-02-76	10.4
10	4-02-76	10.7
11	4-30-76	10.4
12	4-30-76	10.1
13	4-30-76	10.6
14	4-30-76	10.9
15	4-30-76	10.4
16	4-30-76	10.9
17	4-30-76	10.7
18	6-02-76	10.1
19	6-02-76	10.4
20	6-02-76	10.3
21	6-02-76	10.3
22	6-02-76	10.5
23	6-02-76	10.5
24	6-02-76	10.5
25	6-02-76	10.1
26	7-21-76	10.4
27	7-21-76	10.6
28	7-21-76	10.5
29	7-21-76	10.8
30	7-26-76	10.4
31	7-26-76	10.7
32	7-26-76	10.6
33	7-30-76	10.7
34	7-30-76	10.2
35	7-30-76	10.5
36	7-30-76	10.5
37	8-11-76	10.5
38	8-13-76	10.6
39	8-13-76	10.8
40	8-13-76	10.6

(CHART CONTINUATION)

CHART 11 ORGDP

DELAYED NEUTRON COUNTING

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

41	8-13-76	10.7
42	8-13-76	10.9
43	8-13-76	10.7
44	8-13-76	10.6
45	8-13-76	10.6
46	8-13-76	10.8
47	8-13-76	11.1
48	9-23-76	10.6
49	9-23-76	10.5
50	9-23-76	10.5
51	9-23-76	10.8
52	9-23-76	10.8
53	9-23-76	10.6
54	9-23-76	10.6
55	9-23-76	10.6
56	9-23-76	10.7
57	9-23-76	10.5
58	9-23-76	10.6
59	9-23-76	10.8
60	9-23-76	10.7
61	10-05-76	10.5
62	10-05-76	10.7
63	10-05-76	10.7
64	10-06-76	10.7
65	10-06-76	10.7
66	10-06-76	10.6
67	10-06-76	10.7
68	10-06-76	10.5
69	11-11-76	10.7
70	11-11-76	11.0
71	11-16-76	11.0
72	11-16-76	11.2
73	11-16-76	10.8
74	11-30-76	10.8
75	11-30-76	10.7
76	11-30-76	11.0
77	11-30-76	11.0
78	11-30-76	11.1
79	3-29-77	11.0
80	3-29-77	10.5
81	3-29-77	10.8
82	3-29-77	10.7
83	4-18-77	10.8
84	4-18-77	11.1
85	4-29-77	11.0
86	4-29-77	10.7
87	4-29-77	10.6
88	4-29-77	10.8
89	4-29-77	11.0
90	4-29-77	11.1

(CHART CONTINUATION)
 CHART 11 ORGDP
 SEDIMENT BATCH S1

DELAYED NEUTRON COUNTING

APPROX 10 PPM URANIUM

91	4-29-77	11.1
92	4-29-77	11.3
93	6-06-77	10.9
94	6-06-77	10.8
95	6-06-77	11.0
96	6-06-77	11.1
97	6-06-77	11.1
98	6-06-77	11.2
99	7-21-77	10.7
100	7-21-77	11.0
101	8-02-77	10.6
102	8-02-77	10.8
103	8-03-77	10.9
104	8-03-77	10.6
105	8-03-77	10.5
106	8-03-77	10.6
107	8-03-77	10.8
108	8-03-77	10.8
109	8-03-77	10.7
110	8-03-77	10.5
111	8-03-77	10.8
112	8-03-77	10.5
113	8-03-77	10.9
114	8-03-77	11.0
115	8-03-77	12.0
116	8-03-77	10.7
117	8-03-77	10.7
118	8-03-77	10.8
119	8-04-77	10.5
120	8-04-77	10.6
121	8-04-77	10.7
122	8-05-77	11.3
123	8-05-77	10.9
124	8-05-77	11.1
125	8-05-77	11.0
126	8-05-77	11.0
127	8-05-77	11.2
128	8-05-77	11.2
129	8-05-77	11.1
130	8-05-77	10.9
131	8-05-77	11.0
132	8-05-77	10.7
133	8-05-77	10.8
134	8-05-77	10.8
135	8-05-77	11.3
136	8-05-77	10.7
137	9-29-77	10.6
138	9-29-77	10.5
139	9-29-77	10.7
140	9-29-77	10.9

(CHART CONTINUATION)
 CHART 11 ORGDP
 SEDIMENT BATCH S1

DELAYED NEUTRON COUNTING

APPROX 10 PPM URANIUM

141	9-29-77	10.7
142	9-29-77	10.6
143	9-29-77	10.6
144	9-29-77	10.9
145	9-29-77	10.9
146	9-29-77	11.1
147	9-29-77	11.0
148	9-29-77	10.9
149	9-29-77	10.9
150	9-29-77	10.8
151	9-29-77	11.1
152	9-29-77	10.6
153	10-26-77	11.2
154	10-26-77	11.1
155	10-26-77	10.6
156	10-26-77	11.2
157	11-18-77	11.3
158	11-18-77	11.1
159	11-18-77	11.3
160	11-18-77	11.0
161	11-18-77	10.9
162	11-18-77	11.4
163	11-18-77	10.7
164	12-06-77	10.8

DELAYED NEUTRON COUNTING

CHART 12 SRL

SEDIMENT BATCH R1 APPROX 5 PPM URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 25	25	5.15+/-	0.19	0.45
CURRENT	26 - 36	11	5.62+/-	0.12	0.18
STD +/- 95% CONF LIMITS			NONE		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS					0.47 +/- 0.22
COMMENT:					
OUTLIER PTS			SIGNIFICANT BIAS YES		
LEVEL SHIFT AFTER PT			TREND FOR PTS		
VARIATION CHANGE AFTER PT			CYCLES FOR PTS		

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 36 OMITTING OUTLIERS

DELAYED NEUTRON COUNTING

CHART 13 SRL

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

	POINTS		XBAR +/-			
	OMITTING		95% CONFIDENCE			COEFFICIENT OF
	OUTLIERS	N	LIMITS		STD DEV	VARIATION
PRIOR	1 - 25	25	10.74+/-	0.35	0.85	8.%
CURRENT	26 - 39	14	11.62+/-	0.28	0.48	4.%
STD +/- 95% CONF LIMITS			NONE			
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS					0.89 +/-	0.45

COMMENT:

OUTLIER PTS

LEVEL SHIFT AFTER PT

VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS YES

TREND FOR PTS

CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 39 OMITTING OUTLIERS

N= 39 S= 0.85 LOWER= 8.52 XBAR= 11.05 UPPER= 13.59

DELAYED NEUTRON COUNTING

CHART 14 SRL

SEDIMENT BATCH T1

APPROX 95 PPM URANIUM

	POINTS		XBAR +/-			
	OMITTING		95% CONFIDENCE			COEFFICIENT OF
	OUTLIERS	N	LIMITS		STD DEV	VARIATION
PRIOR	1 - 22	22	94.1 +/-	3.7	8.4	9.%
CURRENT	23 - 34	12	99.7 +/-	3.0	4.8	5.%
STD +/- 95% CONF LIMITS			NONE			
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS						4.6 +/- 4.8

COMMENT:

OUTLIER PTS
LEVEL SHIFT AFTER PT
VARIATION CHANGE AFTER PT

SIGNIFICANT BIAS
TREND FOR PTS
CYCLES FOR PTS

CHART OF INDIVIDUALS

XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 34 OMITTING OUTLIERS