MASTER

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 March 1978

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MULTILABORATORY QUALITY CONTROL REPORT
FOR THE
HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE

Report for March 1978

SUMMARY

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

<u>Batch</u>	<u>Number of Results</u>	
	<u>LASL</u>	<u>ORGDP</u>
Water A2 - 0.98 ppb U	6F	4F
Water B2 - 9.98 ppb U		5F
Sediment R1 - 5 ppm U		10F, 8DNC
Sediment S1 - 10 ppm U		9F, 8DNC

F - Fluorometric; DNC - Delayed Neutron Counting

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 A2 shows negative bias. The ORGDP control charts for sediment batch R1 analyzed by fluorometric and delayed neutron counting techniques show negative bias. The interlaboratory comparison for water batch A2 shows LASL and ORGDP to be in agreement.

Table 1
Status of Control Batches for
March 1978

Chart No.	Lab	Batch and Method of Analysis	Status
1	LASL	A2 - 0.98 ppb U, F	-0.13 $\pm$ 0.10 bias
2	ORGDP	A2 - 0.98 ppb U, F	level shift after pt. 2
3	ORGDP	B2 - 9.98 ppb U, F	DOWN SHIFT after pt. 7
4	ORGDP	R1 - 5 ppm U, F	-0.143 $\pm$ 0.141 bias
5	ORGDP	S1 - 10 ppm U, F	OK
6	ORGDP	R1 - 5 ppm U, DNC	-0.157 $\pm$ 0.130 bias
7	ORGDP	S1 - 10 ppm U, DNC	OK

Table 2

Interlaboratory Comparison of Means
and Standard Deviations

Figure	Labs in Comparison	Batch
1	LASL, ORGEP	A2-0.98 ppb U

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 - 34	34	0.89 +/- 0.07	0.20	23.0%
CURRENT	35 - 40	6	0.85 +/- 0.09	0.08	10.0%
STD +/- 95% CONF LIMITS			0.98 +/- 0.04		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS			-0.13 +/- 0.10		

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	

N= 25 S= 0.18 LOWER= 0.31 XBAR= 0.85 UPPER= 1.39

PT	DATE	RESULT
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	1-3--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
35	3-15-78	0.8
36	3-15-78	1.0
37	3-24-78	0.8
38	3-24-78	0.8
39	3-28-78	0.9
40	3-28-78	0.8

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 - 34	34	0.89 +/- 0.07	0.20	23.%
CURRENT	35 - 40	6	0.85 +/- 0.09	0.08	10.%
STD +/- 95% CONF LIMITS			0.98 +/- 0.04		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS					-0.13 +/- 0.10

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

			LOWER= 0.80		UPPER= 1.16	
N=	0 S= 0.06		XBAR= 0.98			
PT	DATE	RESULT				
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				*
35	3-15-78	0.8		*		
36	3-15-78	1.0			*	
37	3-24-78	0.8		*		
38	3-24-78	0.8		*		
39	3-28-78	0.9			*	
40	3-28-78	0.8		*		

CHART 2 CRGDP
 TOPO EXTRACTION-FLUOROMETRIC WATER BATCH A2 0.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 4	4	0.870 +/- 0.342	0.215	25.1%
CURRENT	5 - 8	4	0.977 +/- 0.177	0.111	11.1%
STD +/- 95% CONF LIMITS			0.980 +/- 0.040		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.003 +/- 0.182					

COMMENT:
 OUTLIER PTS SIGNIFICANT BIAS
 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- 8 OMITTING OUTLIERS

N= 8 S= 0.168			LOWER= 0.418	UPPER= 1.429
PT	DATE	RESULT	XBAR= 0.924	
1	10-06-77	0.66		*
2	10-28-77	0.71		*
3	1-03-78	1.05		*
4	1-03-78	1.06		*
5	3-15-78	0.86		*
6	3-27-78	0.91		*
7	3-27-78	1.10		*
8	3-27-78	1.04		*

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 4	4	0.870 +/- 0.342	0.215	25.%
CURRENT	5 - 8	4	0.977 +/- 0.177	0.111	11.%
STD +/- 95% CONF LIMITS			0.980 +/- 0.040		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.003 +/- 0.182					

COMMENT:

OUTLIER PTS	SIGNIFICANT BIAS
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- 8 OMITTING OUTLIERS

N= 0 S= 0.060			LOWER= 0.800		UPPER= 1.160	
			XBAR= 0.980			
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			*	
5	3-15-78	0.86		*		
6	3-27-78	1.10			*	
7	3-27-78	1.04			*	
8	3-27-78	0.91		*		

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 4	4	9.612 +/- 1.350	0.849	9.0%
CURRENT	5 - 10	5	9.054 +/- 0.936	0.753	8.0%
STD +/- 95% CONF LIMITS			9.980 +/- 0.220		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.926 +/- 0.961					

COMMENT:

OUTLIER PTS	SIGNIFICANT BIAS
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- 10 OMITTING OUTLIERS

N= 9 S= 0.800			LOWER= 6.901		UPPER= 11.703	
			XBAR= 9.302			
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				
5	3-15-78	9.58				
6	3-15-78	9.44				
7	3-15-78	9.77				
8	3-20-78	8.30				
9	3-31-78	4.11				
10	3-31-78	8.18				

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD. DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 4	4	9.612 +/- 1.350	0.849	9.0%
CURRENT	5 - 10	5	9.054 +/- 0.936	0.753	8.0%
STD +/- 95% CONF LIMITS			9.980 +/- 0.220		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.926 +/- 0.961					

COMMENT:

OUTLIER PTS	SIGNIFICANT BIAS
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- 10 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			*	
5	3-15-78	9.58			*	
6	3-15-78	9.44			*	
7	3-15-78	9.77			*	
8	3-20-78	8.30		*		
9	3-31-78	4.11	*			
10	3-31-78	8.18		*		

TOPO EXTRACTION-FLUOROMETRIC

CHART 4 CRGDP

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

	POINTS		XBAR +/-				
	OMITTING		95% CONFIDENCE				COEFFICIENT OF
	OUTLIERS	N	LIMITS		STD DEV		VARIATION
PRIOR	1 - 167	167	3.565+/-	0.071	0.462		13.x
CURRENT	168 - 177	10	3.422+/-	0.122	0.170		5.x
STD +/- 95% CONF LIMITS			NONE				
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.143 +/- 0.141							

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- 177 OMITTING OUTLIERS

N= 177 S= 0.452 LOWER= 2.202 XBAR= 3.557 UPPER= 4.912

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 4 ORGDP

TOPO EXTRACTION-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	2.59
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 4 CRGDP

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 4 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
168	3-20-78	3.44
169	3-20-78	3.68
170	3-20-78	3.56
171	3-20-78	3.46
172	3-20-78	3.37
173	3-20-78	3.32
174	3-20-78	3.43
175	3-20-78	3.61
176	3-27-78	3.21
177	3-27-78	3.14

TOPO EXTRACTION-FLUOROMETRIC

CHART 5 ORGDP
SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 166	166	9.222+/- 0.157	1.028	11.0%
CURRENT	167 - 175	9	9.082+/- 0.831	1.081	12.0%
STD +/- 95% CONF LIMITS			NONE		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.139 +/- 0.845					
COMMENT:					

OUTLIER PTS	SIGNIFICANT BIAS
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- 175 OMITTING OUTLIERS

N= 175 S= 1.028 LOWER= 6.132 XBAR= 9.214 UPPER= 12.297

PT	DATE	RESULT
1	2-27-76	8.56
2	2-27-76	7.56
3	3-11-76	10.59
4	3-11-76	9.68
5	3-11-76	9.38
6	3-11-76	9.91
7	3-11-76	9.70
8	3-11-76	9.91
9	3-18-76	9.56
10	3-18-76	9.20
11	3-18-76	8.86
12	3-31-76	9.64
13	4-02-76	8.15
14	4-06-76	8.37
15	4-14-76	9.47
16	4-14-76	8.98
17	4-22-76	10.20
18	4-28-76	9.36
19	5-10-76	9.61
20	5-10-76	9.36
21	5-10-76	9.14
22	5-10-76	8.45
23	5-24-76	8.58
24	6-02-76	9.66
25	6-07-76	10.34
26	6-28-76	9.21
27	6-28-76	9.32
28	6-28-76	9.10
29	6-28-76	9.03
30	7-06-76	7.15
31	7-06-76	8.90
32	7-14-76	8.82
33	7-14-76	9.21
34	7-14-76	8.84
35	7-14-76	9.34
36	7-22-76	8.66
37	7-22-76	9.14
38	7-26-76	9.48
39	7-28-76	10.04
40	8-18-76	8.88

(CHART CONTINUATION)

CHART 5 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 5 ORGDP

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

TOPD EXTRACTION-FLUOROMETRIC

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	8.27
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 5 ORGDP

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

TOPO EXTRACTION-FLUOROMETRIC

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	9.27
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
167	3-20-78	9.74
168	3-20-78	9.46
169	3-20-78	10.55
170	3-20-78	10.26
171	3-20-78	7.79
172	3-20-78	9.07
173	3-20-78	9.12
174	3-20-78	8.44
175	3-27-78	7.31

DELAYED NEUTRON COUNTING

CHART 6 CRGDP

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

	POINTS		XBAR +/-			
	OMITTING		95% CONFIDENCE			COEFFICIENT OF
	OUTLIERS	N	LIMITS		STD DEV	VARIATION
PRIOR	1 - 160	157	5.249+/-	0.023	0.145	3.%
CURRENT	161 - 168	8	5.092+/-	0.128	0.153	3.%
STD +/- 95% CONF LIMITS			NONE			
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.157 +/- 0.130						

COMMENT:

OUTLIER PTS 72.82.143

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- 168 OMITTING OUTLIERS

N= 165 S= 0.149 LOWER= 4.795 XBAR= 5.241 UPPER= 5.688

PT	DATE	RESULT
1	2-27-76	5.21
2	2-27-76	5.03
3	3-08-76	5.21
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 6 ORGDP

DELAYED NEUTRON COUNTING

SEDIMENT BATCH R1

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 6 ORGP

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	5.31
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 6 ORGDP

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

DELAYED NEUTRON COUNTING

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
161	3-27-78	5.11
162	3-27-78	4.80
163	3-27-78	5.25
164	3-27-78	5.06
165	3-27-78	5.31
166	3-27-78	5.08
167	3-27-78	5.11
168	3-27-78	5.02

CHART 7 CRGDP
 DELAYED NEUTRON COUNTING SEDIMENT BATCH S1 APPROX 10 PPM URANIUM

POINTS	XBAR +/-				
OMITTING	95% CONFIDENCE				COEFFICIENT OF
OUTLIERS	LIMITS			STD DEV	VARIATION
PRIOR 1 - 164 163	10.76+/-	0.04	0.26	2.%	
CURRENT 165 - 172 8	10.55+/-	0.26	0.31	3.%	
STD +/- 95% CONF LIMITS	NONE				
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS	-0.21 +/-	0.26			

COMMENT:

OUTLIER PTS 115
 LEVEL SHIFT AFTER PT
 VARIATION CHANGE AFTER PT
 CHART OF INDIVIDUALS
 XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 172 OMITTING OUTLIERS

LOWER= 9.97 UPPER= 11.54

N= 171 S= 0.26

XBAR= 10.75

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	10.8
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 7 ORGOP
SEDIMENT BATCH S1

DELAYED NEUTRON COUNTING

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 7 ORGDP

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

DELAYED NEUTRON COUNTING

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 7 ORGDP

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

DELAYED NEUTRON COUNTING

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
165	3-27-78	10.7
166	3-27-78	10.8
167	3-27-78	10.6
168	3-27-78	10.1
169	3-27-78	10.8
170	3-27-78	10.3
171	3-27-78	10.2
172	3-27-78	10.9

FIGURE 1
 INTERLABORATORY COMPARISONS OF MEANS & STANDARD DEVIATIONS MARCH 1978
 WATER BATCH A2 0.98 PPB URANIUM

METHOD: F-FLUOROMETRIC, ONC-DELAYED NEUTRON COUNTING
 LABORATORIES: LASL, CRGDP

*SIGNIFICANTLY DIFFERENT FROM STD VALUE

LAB-METHOD	STANDARD DEVIATION	LINES: STD DEV NOT DIFF
LASL-F	0.08	
CRGDP-F	0.11	