MULTILABORATORY ANALYTICAL
QUALITY CONTROL FOR THE
HYDROCHEMICAL AND STREAM
SEDIMENT RECONNAISSANCE

A.P. D'Silva
W.J. Haas, Jr.
M.A. Floyd

MASTER

AMES LABORATORY, DOE
IOWA STATE UNIVERSITY
AMES, IOWA

Quality Control Report for April 1978

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FOR THE
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V. A. Fassel
Program Director

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Ames Laboratory, DOE
Iowa State University
Ames, Iowa 50011

HIGHLIGHTS

The quality control program has been extended to include LLL. At the request of LLL, Ames Laboratory dispatched a set of water reference materials to be analyzed by LLL during January - April. However, no results have been reported by LLL on these quality control samples.

MULTILABORATORY QUALITY CONTROL REPORT
FOR THE
HYDROGEOCHEMICAL AND STREAM SEDIMENT RECONNAISSANCE

Report for April 1978

SUMMARY

For the month of April 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	3F
Water B2 - 9.98 ppb U		2F
Sediment R1 - 5 ppm U		38F, 36DNC
Sediment S1 - 10 ppm U		26F, 31DNC

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 ORGDP control charts for sediment R1 analyzed by delayed neutron counting shows negative bias. The ORGDP control charts for sediment batch S1 analyzed by fluorometric and delayed neutron counting techniques also 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
April 1978

Chart No.	Lab	Batch and Method of Analysis	Status
1	LASL	A2-0.98 ppb U,F	OK
2	ORGDP	A2-0.98 ppb U,F	OK
3	ORGDP	B2-9.98 ppb U,F	OK
4	ORGDP	R1-5 ppm U,F	OK
5	ORGDP	S1-10 ppm U,F	-0.47 $\pm$ 0.43 bias
6	ORGDP	R1-5 ppm U,DNC	-0.09 $\pm$ 0.06 bias
7	ORGDP	S1-10 ppm U,DNC	-0.20 $\pm$ 0.10 bias

Table 2

Interlaboratory Comparison of Means
and Standard Deviations

Figure	Labs in Comparison	Batch
1	LASL, ORGDP	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 - 40	40	0.88 +/- 0.06	0.19	22.2%
CURRENT	41 - 46	6	0.90 +/- 0.11	0.11	12.2%
STD +/- 95% CONF LIMITS			0.98 +/- 0.04		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.08 +/- 0.12					

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= 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

(CHART CONTINUATION)

CHART 1 LASL

WATER BATCH A2

0.98 PPB URANIUM

FLUOROMETRIC

41	4-14-78	1.0				*		
42	4-14-78	1.0				*		
43	4-21-78	1.0				*		
44	4-21-78	0.8			*			
45	4-28-78	0.8			*			
46	4-28-78	0.8			*			

CHART 2 ORGDP
WATER BATCH A2

0.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 9	8	0.924 +/- 0.141	0.168	18.%
CURRENT	9 - 11	3	0.973 +/- 0.542	0.218	22.%
STD +/-	95% CONF LIMITS		0.980 +/- 0.040		

BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.007 +/- 0.544
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- 11 OMITTING OUTLIERS

N= 11 S= 0.173 LOWER= 0.418 XBAR= 0.937 UPPER= 1.456

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	0.91
7	3-27-78	1.10
8	3-27-78	1.04
9	4-24-78	0.78
10	4-24-78	1.21
11	4-24-78	0.93

TOPO EXTRACTION-FLUOROMETRIC

CHART 2A ORGDP
WATER BATCH A2

0.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 8	8	0.924 +/- 0.141	0.168	18.1%
CURRENT	9 - 11	3	0.973 +/- 0.542	0.218	22.1%
STD +/- 95% CONF LIMITS			0.980 +/- 0.040		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.007 +/- 0.544					

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- 11 OMITTING OUTLIERS

TOPO EXTRACTION-FLUOROMETRIC

CHART 3. ORGDP

WATER BATCH B2

9.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 10	9	9.302 +/- 0.615	0.800	9.0%
CURRENT	11 - 12	2	6.945 +/- 4.384	0.488	7.0%
STD +/- 95% CONF LIMITS			9.980 +/- 0.220		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -3.035 +/- 4.389					

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- 12 OMITTING OUTLIERS

TOPD EXTRACTION-FLUOROMETRIC

CHART 3A ORGDP

WATER BATCH 32

9.98 PPB URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 10	9	9.302 +/- 0.615	0.800	9.0%
CURRENT	11 - 12	2	6.945 +/- 4.384	0.488	7.0%
STD +/- 95% CONF LIMITS			9.980 +/- 0.220		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -3.035 +/- 4.389					

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- 12 OMITTING OUTLIERS

CHART 4 ORGDP
 TOPO EXTRACTION-FLUOROMETRIC SEDIMENT BATCH R1 APPROX 5 PPM URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 177	177	3.557+/- 0.067	0.452	13.1%
CURRENT	178 - 214	37	3.483+/- 0.133	0.400	11.5%

STD +/- 95% CONF LIMITS

NONE

BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.074 +/- 0.149
 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- 214 OMITTING OUTLIERS

N= 214 S= 0.443 LOWER= 2.215 XBAR= 3.544 UPPER= 4.873

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

TOPD 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	2.99
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 4 ORGDP

TOPD 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
178	4-05-78	3.29
179	4-05-78	3.35
180	4-05-78	3.86
181	4-05-78	2.86
182	4-05-78	3.22
183	4-05-78	2.95
184	4-05-78	2.88
185	4-05-78	4.02
186	4-05-78	3.37
187	4-13-78	3.55
188	4-13-78	3.51
189	4-13-78	3.35
190	4-13-78	4.32

(CHART CONTINUATION)
CHART 4 ORGDP

TOPO EXTRACTION-FLUOROMETRIC

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

191	4-13-78	2.85
192	4-13-78	3.17
193	4-13-78	2.96
194	4-13-78	3.48
195	4-13-78	3.13
196	4-13-78	3.64
197	4-13-78	3.82
198	4-13-78	3.89
199	4-13-78	3.32
200	4-13-78	3.78
201	4-13-78	3.27
202	4-13-78	3.19
203	4-13-78	3.63
204	4-13-78	3.93
205	4-13-78	3.31
206	4-19-78	3.41
207	4-19-78	4.07
208	4-19-78	3.52
209	4-19-78	3.20
210	4-19-78	3.04
211	4-19-78	3.47
212	4-24-78	4.17
213	4-28-78	4.04
214	4-28-78	4.06

TOPD 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 - 175	175	9.214 +/- 0.153	1.028	11.1%
CURRENT	176 - 201	26	8.746 +/- 0.402	0.995	11.1%
STD +/- 95% CONF LIMITS			NONE		
BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.469 +/- 0.430					
COMMENT:					

OUTLIER PTS
LEVEL SHIFT AFTER PT
VARIATION CHANGE AFTER PT
CHART OF INDIVIDUALS
XBAR AND 3 SIGMA LIMITS BASED ON POINTS 1- 201 OMITTING OUTLIERS

N= 201 S= 1.033 LOWER= 6.055 XBAR= 9.154 UPPER= 12.253

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

TOPD 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

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 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	9.37
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
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
176	4-05-78	9.37
177	4-05-78	7.80
178	4-05-78	9.38
179	4-05-78	7.61
180	4-05-78	9.11
181	4-05-78	10.73
182	4-05-78	7.04
183	4-05-78	8.90
184	4-13-78	8.50
185	4-13-78	9.53
186	4-13-78	8.68
187	4-13-78	7.67
188	4-13-78	6.79
189	4-13-78	9.25
190	4-13-78	7.86

(CHART CONTINUATION)
 CHART 5 ORGDP
 SEDIMENT BATCH S1

TOPO EXTRACTION-FLUOROMETRIC

APPROX 10 PPM URANIUM

191	4-13-78	9.25
192	4-13-78	10.27
193	4-13-78	8.41
194	4-19-78	8.77
195	4-19-78	9.02
196	4-19-78	8.07
197	4-19-78	8.38
198	4-19-78	8.52
199	4-19-78	10.53
200	4-19-78	8.11
201	4-19-78	9.76

DELAYED NEUTRON COUNTING

CHART 6 ORGDP

SEDIMENT BATCH R1

APPROX 5 PPM URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 168	165	5.241+/- 0.023	0.149	3.0%
CURRENT	169 - 204	36	5.150+/- 0.061	0.180	3.0%

STD +/- 95% CONF LIMITS

NONE

BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.092 +/- 0.065
COMMENT:

OUTLIER PTS 72.82, 143

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- 204 OMITTING OUTLIERS

N= 201 S= 0.158 LOWER= 4.750 XBAR= 5.225 UPPER= 5.700

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 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 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	5.31
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	6.09
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

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
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
169	4-03-78	5.15
170	4-03-78	5.43
171	4-03-78	5.01
172	4-03-78	5.12
173	4-03-78	4.87
174	4-03-78	5.16
175	4-03-78	5.21
176	4-03-78	5.05
177	4-03-78	4.95
178	4-03-78	5.11
179	4-03-78	5.10
180	4-03-78	5.29
181	4-04-78	5.13
182	4-05-78	5.29
183	4-05-78	5.15
184	4-05-78	5.17
185	4-05-78	5.25
186	4-05-78	5.11
187	4-05-78	5.27
188	4-05-78	4.95
189	4-05-78	5.00
190	4-05-78	5.12

(CHART CONTINUATION)
 CHART 6 ORGDP
 SEDIMENT BATCH R1

DELAYED NEUTRON COUNTING

APPROX 5 PPM URANIUM

191	4-05-78	5.14
192	4-05-78	5.31
193	4-25-78	5.11
194	4-25-78	5.47
195	4-25-78	5.03
196	4-25-78	5.17
197	4-25-78	5.21
198	4-25-78	4.98
199	4-25-78	4.95
200	4-26-78	5.01
201	4-26-78	5.00
202	4-26-78	5.17
203	4-26-78	5.09
204	4-26-78	5.86

DELAYED NEUTRON COUNTING

CHART 7 ORGDP

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

	POINTS OMITTING OUTLIERS	N	XBAR +/- 95% CONFIDENCE LIMITS	STD DEV	COEFFICIENT OF VARIATION
PRIOR	1 - 172	171	10.75+/- 0.04	0.26	2.4%
CURRENT	173 - 203	31	10.56+/- 0.09	0.24	2.4%

STD +/- 95% CONF LIMITS

NONE

BIAS: CURRENT XBAR - STD (OR PRIOR XBAR) +/- 95% CONF LIMITS -0.20 +/- 0.10

COMMENT:

OUTLIER PTS 115

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- 203 OMITTING OUTLIERS

LOWER= 9.92

UPPER= 11.52

N= 202 S= 0.27

XBAR= 10.72

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 7 DRGDP

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 7 ORGDP

DELAYED NEUTRON COUNTING

SEDIMENT BATCH S1

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 7 ORGDP

DELAYED NEUTRON COUNTING

SEDIMENT BATCH 51

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
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
173	4-03-78	10.9
174	4-03-78	10.0
175	4-03-78	10.4
176	4-03-78	10.6
177	4-03-78	10.5
178	4-03-78	10.9
179	4-03-78	10.2
180	4-03-78	10.9
181	4-03-78	10.4
182	4-04-78	10.6
183	4-04-78	10.8
184	4-04-78	10.6
185	4-04-78	10.6
186	4-05-78	10.5
187	4-05-78	10.8
188	4-05-78	10.7
189	4-05-78	10.7
190	4-05-78	10.4

(CHART CONTINUATION)

CHART 7 ORGDP

DELAYED NEUTRON COUNTING

SEDIMENT BATCH S1

APPROX 10 PPM URANIUM

191	4-05-78	10.8				*		
192	4-25-78	10.7				*		
193	4-25-78	10.5			*			
194	4-25-78	10.7				*		
195	4-25-78	10.7				*		
196	4-25-78	10.4			*			
197	4-25-78	10.6				*		
198	4-25-78	10.4			*			
199	4-26-78	10.0	*					
200	4-26-78	10.2		*				
201	4-26-78	10.5			*			
202	4-26-78	10.5			*			
203	4-26-78	10.8				*		