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August 18, 1980

Science Applications, Inc.

Mr. Gerald W. Stewart
Environmental Improvement Division
P.O. Box 968
Croom Building
Santa Fe, New Mexico 87503

Dear Mr. Stewart:

Attached is the complete set of laboratory chemical analysis from the Commercial Laboratory (CORE) of the samples taken of the UNC Church Rock Operations. The radiometric data was received on Friday August 15, and is attached. The other chemical analysis was already provided to you in the Seepage Study report of August 4, 1980. It is provided again for completeness. The well location numbers are as provided on the Well Location Map of the Seepage Study report.

Mr. Tom Hill of UNC asked that I provide you this data directly.

Sincerely,

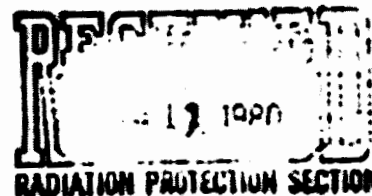
SCIENCE APPLICATIONS, INC.

Donald G. Silva
Donald G. Silva

DGS:jl

cc: Tom Hill

attachment



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PER ADOCK 04009707
C PDR

NATURAL RESOURCES DIVISION 200 Lomas N.W., Suite 600, Albuquerque, N.M. 87102, (505) 247-0381

Other Offices in Colorado Springs CO, Las Vegas NV, Los Angeles CA, Washington DC, Seattle WA, Sunnyvale CA, San Leandro CA

CORE LABORATORIES INC.
3428 Stanford Dr. N.E.
Albuquerque, New Mexico 87107
Phone: 505-344-0274

ANALYTICAL REPORT

From Science Applications, Inc.
 Address 200 Lomas Blvd., NE, Suite 600, Albuquerque, N. M. 87102
 Work authorized by Stuart Faith Date Received June 23, 1980
 Analyzed by GDC Date August 12, 1980 Job No. RA-053

<u>Sample Identification</u>	<u>Ra-226 (pCi/Liter)</u>	<u>Ra-228 (pCi/Liter)</u>	<u>Tb-230 (pCi/Liter)</u>	<u>Pb-210 (pCi/Liter)</u>
110 D	0.8 ± 0.2	1.4 ± 2.9	2.7 ± 3.8	0.49 ± 3.58
104 D	1.9 ± 0.3	2.5 ± 3.4	0.5 ± 2.0	0.73 ± 5.85
116 D	1.4 ± 0.2	2.9 ± 3.8	0.0 ± 1.1	0.0 ± 3.55
115 D	1.1 ± 0.2	3.4 ± 4.4	1.1 ± 5.4	1.72 ± 6.25
118 D	0.8 ± 0.2	0.5 ± 9.0	*	0.0 ± 2.84
7 D	1.9 ± 0.3	3.2 ± 3.4	1.5 ± 1.8	0.30 ± 4.35
GU-4	0.9 ± 0.2	0.4 ± 3.2	0.1 ± 1.8	1.18 ± 5.01
105 A	0.5 ± 0.2	1.1 ± 5.8	0.0 ± 1.0	0.57 ± 9.89
102 A	0.4 ± 0.1	2.7 ± 5.3	0.7 ± 1.1	1.00 ± 4.70
3 D	1.2 ± 0.2	7.8 ± 6.1	0.9 ± 1.4	1.22 ± 3.72
4 D	1.9 ± 0.3	7.8 ± 8.5	0.1 ± 1.7	0.0 ± 4.06
101 A	0.4 ± 0.2	4.3 ± 10.2	0.0 ± 1.1	0.0 ± 2.73
KMEID	0.4 ± 0.1	1.4 ± 10.9	0.0 ± 1.3	1.86 ± 5.45
5 D	1.5 ± 0.2	4.5 ± 14.6	0.4 ± 1.0	0.0 ± 3.04
117 D	0.8 ± 0.2	2.7 ± 3.2	0.0 ± 1.7	0.0 ± 4.28

* Sample lost due to broken glassware.

These analyses, opinions or interpretations are based on observations and materials supplied by the client to whom, and for whose exclusive and confidential use, they were made. The interpretations or opinions reported represent the best judgment of Core Laboratories, Inc. (all errors and omissions excepted). But Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representation, as to the production, proper operation, or performance of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

<u>Sample Identification</u>	<u>Ra-226 (pCi/Liter)</u>	<u>Ra-228 (pCi/Liter)</u>	<u>Th-230 (pCi/Liter)</u>	<u>Pb-210 (pCi/Liter)</u>
103 A	0.9 ± 0.2	1.9 ± 3.7	0.0 ± 1.1	0.0 ± 2.48
114 A	1.3 ± 0.2	1.9 ± 6.0	1.4 ± 1.5	0.0 ± 3.54
111 D	1.1 ± 0.2	2.1 ± 6.0	1.1 ± 1.7	0.0 ± 3.83
10 D	1.1 ± 0.2	4.8 ± 3.1	8.4 ± 3.4	1.34 ± 3.80
9 D	2.0 ± 0.3	6.2 ± 3.6	4.3 ± 5.2	1.15 ± 3.71
106 D	1.3 ± 0.2	4.1 ± 5.5	2.9 ± 2.1	7.12 ± 3.04
387-10	148.4 ± 6.1	**	25800.0 ± 217.0	**

** Samples incomplete due to interferences in samples.

Client: Science Applications, Inc.
 Address: 200 Lomas Blvd., NE
 Suite 600
 Albuquerque, N. M. 87102
 Authorized By: Stuart Faith

Date Received: June 23, 1980
 Analyzed By: DMH
 Date: July 25, 1980
 Job Number: WA-539

	Sample Identification			(Mg/L)	Sample Identification		
	TWQ 110 D	TWQ 104 D	TWQ 116 D		TWQ 115 D	TWQ 118 D	TWQ 7 D
(Mg/L)				(Mg/L)			
TDS	3590	2595	3245	TDS	4220	3485	3875
SO ₄	1929	1292	1776	SO ₄	3273	2132	2122
Cl	31.8	43.7	33.7	Cl	53.6	30.8	36.7
F	0.23	0.34	0.33	F	0.72	1.00	0.25
Al	0.2	0.1	0.2	Al	0.6	0.1	0.2
As	0.04	<0.01	0.09	As	0.01	0.01	0.01
Ba	<0.1	0.1	0.1	Ba	<0.1	0.1	0.1
B	0.34	0.15	0.23	B	0.35	0.15	0.10
Cd	0.01	0.01	0.22	Cd	0.02	0.01	0.01
Cr	<0.01	<0.01	0.01	Cr	<0.01	<0.01	<0.01
Co	0.25	0.06	0.17	Co	2.20	0.16	0.11
Cu	0.01	0.01	0.02	Cu	0.01	0.01	0.01
Fe	29.00	0.03	0.02	Fe	53.00	0.79	<0.01
Pb	0.06	0.03	0.01	Pb	<0.01	0.01	0.04
Mn	12.00	0.39	2.90	Mn	17.00	4.50	1.90
Hg(Total)	<0.001	<0.001	<0.001	Hg(Total)	<0.001	<0.001	<0.001
Mo	0.04	0.01	0.03	Mo	0.04	0.14	0.31
Ni	0.12	0.08	0.13	Ni	1.00	0.09	0.05
Se	0.03	0.02	0.06	Se	0.24	0.02	0.03
Ag	0.01	<0.01	0.01	Ag	0.01	0.01	<0.01
V	<0.01	<0.01	<0.01	V	0.01	<0.01	<0.01
Zn	0.12	0.19	0.26	Zn	1.50	0.06	0.24
U ₃ O ₈	0.059	0.036	0.005	U ₃ O ₈	<0.001	0.002	0.060

NOTE: Radiochemistry results will follow shortly.

(Mg/L)	Sample Identification			(Mg/L)	Sample Identification		
	TWQ 119	TWQ 120	TWQ 121		TWQ 123	TWQ 124	TWQ 126
TDS	4102	18830	6994	TDS	4284	19940	4051
SO ₄	2614	8002	4549	SO ₄	2639	8323	2820
Cl	46.7	248.0	84.3	Cl	34.7	32.8	51.6
F	0.48	0.04	2.40	F	0.04	0.87	1.20
Al	5.1	760.0	150.0	Al	1.3	1010.0	1.2
As	0.01	0.63	0.26	As	0.01	0.39	0.03
Ba	<0.01	<0.01	<0.01	Ba	<0.01	<0.01	<0.01
B	0.18	0.40	0.18	B	0.20	0.31	0.22
Ca	520.0	450.0	530.0	Ca	480.0	430.0	440.0
Cd	<0.01	0.04	<0.01	Cd	<0.01	0.06	<0.01
Cr	<0.01	0.77	0.05	Cr	<0.01	0.80	<0.01
Co	0.73	4.70	2.02	Co	0.24	5.40	0.29
Cu	0.01	0.61	0.03	Cu	0.01	1.03	<0.01
Fe	2.30	1210.00	4.10	Fe	0.28	800.00	0.26
Pb	0.03	0.09	0.13	Pb	0.04	0.05	0.11
Hg	310.0	820.0	650.0	Hg	370.0	910.0	440.0
Mn	8.0	87.0	28.0	Mn	2.8	96.0	3.4
Hg(Total)	<0.001	<0.001	0.001	Hg(Total)	<0.001	<0.001	<0.001
Mo	0.02	0.03	0.04	Mo	0.20	0.31	0.10
Ni	0.23	2.90	1.40	Ni	0.27	3.70	0.31
Se	0.05	0.05	1.30	Se	0.09	0.24	0.01
Ag	<0.01	0.01	0.01	Ag	<0.01	0.01	<0.01
V	0.04	11.00	0.06	V	0.02	19.00	0.06
Zn	0.63	15.00	5.00	Zn	0.68	15.00	0.79
U ₃ O ₈	0.045	4.700	0.795	U ₃ O ₈	0.068	8.500	<0.001

NOTE: Radiochemistry results will follow shortly.

Sample Identification

(Mg/L)	<u>TWQ</u> <u>127</u>	<u>CH-3</u>	<u>Gallup</u> <u>#3</u>	
TDS	4837	3217	29490	TDS
SO ₄	2754	2076	7962	SO ₄
Cl	44.7	39.7	78.4	Cl
F	0.45	1.10	0.16	F
Al	1.0	19.0	1620.0	Al
As	0.05	0.02	3.80	As
Ba	<0.01	<0.01	<0.01	Ba
B	0.18	0.16	0.44	B
Ca	520.0	260.0	430.0	Ca
Cd	<0.01	<0.01	0.08	Cd
Cr	<0.01	<0.01	1.10	Cr
Co	0.38	0.47	5.20	Co
Cu	<0.01	<0.01	1.70	Cu
Fe	0.41	0.43	1900.00	Fe
Pb	0.71	0.09	0.09	Pb
Hg	420.0	270.0	850.0	Hg
Mn	3.2	2.3	110.0	Mn
Hg(Total)	<0.001	<0.001	<0.001	Hg(Total)
Mo	0.42	0.41	2.70	Mo
Ni	0.18	0.22	3.50	Ni
Se	0.07	<0.01	0.10	Se
Ag	<0.01	<0.01	0.02	Ag
V	0.12	0.04	71.00	V
Zn	0.92	1.60	15.00	Zn
U ₃ O ₈	0.025	0.010	11.500	U ₃ O ₈

NOTE: Radiochemistry results will follow shortly.

Client: Science Applications, Inc.
Address: 200 Lomas Blvd., NW
 Suite 600
 Albuquerque, N. M. 87102
Authorized By: Stuart Faith

Date Received: July 14, 1980
Analyzed By: DMH
Date: July 24, 1980
Job Number: WA-556

<u>Sample Identification</u>				<u>Sample Identification</u>			
(Mg/L)	<u>TWQ</u> <u>3 D</u>	<u>TWQ</u> <u>4 D</u>	<u>TWQ</u> <u>5 D</u>	(Mg/L)	<u>TWQ</u> <u>114 D</u>	<u>TWQ</u> <u>115 D</u>	<u>TWQ</u> <u>118 D</u>
TDS	2590	4421	5567	TDS	3931	4569	3586
SO ₄	1533	2945	4417	SO ₄	2495	2667	2134
Cl	24.8	46.7	34.7	Cl	18.9	55.9	47.6
F	0.28	1.50	1.40	F	0.90	0.37	1.00
Al	<0.1	8.3	85.0	Al	0.03	20.3	<0.1
As	<0.01	0.01	0.06	As	0.01	0.02	<0.01
Ba	<0.01	<0.01	<0.01	Ba	<0.01	<0.01	<0.01
B	0.25	0.19	0.20	B	0.18	0.26	0.20
Ca	530.0	570.0	520.0	Ca	590.0	510.0	540.0
Cd	<0.01	0.01	0.01	Cd	0.01	0.01	<0.01
Cr	<0.01	<0.01	0.01	Cr	<0.01	<0.01	<0.01
Co	0.14	1.10	2.80	Co	0.23	1.30	0.27
Cu	<0.01	<0.01	<0.01	Cu	<0.01	<0.01	<0.01
Fe	0.33	20.00	27.10	Fe	8.60	7.50	1.90
Pb	0.04	0.13	0.20	Pb	0.03	0.07	0.01
Mg	130.0	450.0	610.0	Mg	250.0	300.0	220.0
Mn	1.9	15.0	26.0	Mn	7.1	9.9	4.6
Hg(Total)	<0.001	<0.001	<0.001	Hg(Total)	<0.001	<0.001	<0.001
Mo	0.04	0.01	0.01	Mo	0.02	0.01	0.27
Ni	0.03	0.46	1.20	Ni	0.09	0.56	0.12
Se	0.04	0.17	0.01	Se	0.08	0.06	0.26
Ag	<0.01	<0.01	<0.01	Ag	<0.01	<0.01	<0.01
V	0.06	0.04	0.02	V	0.03	0.09	0.03
Zn	0.07	1.70	5.00	Zn	0.08	1.90	0.02
U ₃ O ₈	0.210	0.026	0.025	U ₃ O ₈	0.054	<0.001	0.026

NOTE: Radiochemistry results will follow shortly.

(Mg/L)	Sample Identification			(Mg/L)	Sample Identification		
	CU-4	TWQ 105 A	TWQ 102 A		TWQ 3 D	TWQ 4 D	TWQ 101 A
TDS	4170	3780	1725	TDS	7185	4660	3240
SO ₄	1755	1844	531	SO ₄	4975	2966	1619
Cl	68.5	58.6	59.6	Cl	49.6	159.0	49.6
F	0.32	0.45	0.49	F	1.50	1.40	0.27
Al	0.1	0.2	0.2	Al	240.0	1.9	0.2
As	0.03	0.02	0.01	As	0.14	0.03	0.03
Ba	0.1	0.2	0.1	Ba	0.1	0.2	0.1
B	0.10	0.10	0.19	B	0.17	0.09	0.15
Cd	< 0.01	< 0.01	< 0.01	Cd	0.09	0.02	0.01
Cr	< 0.01	< 0.01	< 0.01	Cr	0.07	< 0.01	< 0.01
Co	0.10	0.10	0.04	Co	2.10	0.80	0.09
Cu	0.02	0.01	< 0.01	Cu	0.03	0.01	0.01
Fe	0.05	0.03	< 0.01	Fe	90.00	33.00	0.03
Pb	0.06	0.02	0.01	Pb	0.11	0.05	0.07
Mn	1.50	0.88	1.40	Mn	25.00	14.00	1.50
Hg(Total)	< 0.001	0.002	< 0.001	Hg(Total)	< 0.001	< 0.001	< 0.001
Mo	0.02	0.02	0.01	Mo	0.03	0.02	< 0.01
Ni	0.03	0.04	0.01	Ni	1.60	0.43	0.02
Se	0.62	0.05	0.02	Se	0.09	0.05	0.05
Ag	0.01	0.01	0.01	Ag	0.01	0.01	0.01
V	< 0.01	0.01	< 0.01	V	< 0.01	< 0.01	< 0.01
Zn	0.11	0.09	0.01	Zn	6.70	1.40	0.05
U ₃ O ₈	0.115	0.079	0.150	U ₃ O ₈	0.012	0.003	0.058

NOTE: Radiochemistry results will follow shortly.

(Mg/L)	Sample Identification			(Mg/L)	Sample Identification		
	<u>10E1D</u>	<u>5 D</u>	<u>117 D</u>		<u>103 A</u>	<u>114 A</u>	<u>111 D</u>
TDS	5503	3617	3175	TDS	2503	3487	2929
SO ₄	3443	2355	1990	SO ₄	1096	2237	1847
Cl	90.3	19.9	18.9	Cl	19.9	14.9	18.9
F	0.77	0.78	0.26	F	0.48	0.40	0.25
Al	0.4	0.6	0.1	Al	1.3	0.2	0.2
As	0.02	0.03	0.01	As	0.02	0.03	0.03
Ba	<0.1	<0.1	<0.1	Ba	<0.1	<0.1	<0.1
B	0.12	0.11	0.26	B	0.11	0.18	0.28
Cd	0.01	0.01	0.01	Cd	0.01	0.01	<0.01
Cr	<0.01	<0.01	<0.01	Cr	<0.01	<0.01	<0.01
Co	0.07	0.65	0.09	Co	0.10	0.11	0.09
Cu	0.01	0.01	0.01	Cu	0.01	0.01	0.01
Fe	0.04	27.00	0.03	Fe	0.52	1.70	0.04
Pb	0.04	0.05	0.06	Pb	0.06	0.05	0.07
Mn	0.09	11.00	5.80	Mn	4.80	5.70	1.10
Hg(Total)	<0.001	<0.001	<0.001	Hg(Total)	<0.001	<0.001	<0.001
Mo	0.01	0.01	0.01	Mo	0.01	0.01	0.01
Ni	0.02	0.36	0.02	Ni	0.01	0.03	0.01
Se	0.05	0.06	0.12	Se	0.03	0.04	0.03
Ag	0.01	0.01	0.01	Ag	<0.01	0.01	0.01
V	<0.01	<0.01	0.01	V	<0.01	0.02	0.01
Zn	0.03	0.98	0.03	Zn	0.10	0.09	0.06
U ₃ O ₈	0.027	0.025	0.007	U ₃ O ₈	0.007	0.007	0.016

NOTE: Radiochemistry results will follow shortly.

(Mg/L)	Sample Identification			(Mg/L)	North Platte 387-10
	TWQ 10 D	TWQ 9 D	TWQ 106 D		
TDS	4637	5151	3508	TDS	148100
SO ₄	3826	4890	3425	SO ₄	144900
Cl	119.0	109.0	0.2	Cl	104.0
F	2.50	1.60	1.30	F	0.96
Al	72.0	41.0	30.0	Al	7400.0
As	<0.01	0.05	0.03	As	0.10
Ba	<0.1	<0.1	<0.1	Ba	0.7
B	0.19	0.18	0.21	B	3.70
Cd	0.02	0.01	0.01	Cd	0.23
Cr	0.04	0.01	<0.01	Cr	5.50
Co	0.84	0.93	2.40	Co	5.30
Cu	0.03	0.01	0.01	Cu	12.0
Fe	29.00	41.00	46.00	Fe	12000.00
Pb	0.11	0.04	0.14	Pb	15.90
Mn	23.00	21.00	31.00	Mn	380.00
Hg(Total)	<0.001	<0.001	<0.001	Hg(Total)	<0.001
Mo	0.02	0.01	0.01	Mo	18.70
Ni	0.86	1.00	0.80	Ni	3.50
Se	0.05	0.06	0.04	Se	0.10
Ag	0.01	0.01	0.01	Ag	0.07
V	0.01	<0.01	<0.01	V	180.00
Zn	2.00	2.10	2.20	Zn	49.00
U ₃ O ₈	0.605	0.031	0.003	U ₃ O ₈	54.500

NOTE: Radiochemistry results will follow shortly.