

40-8714

Cleveland-Cliffs

Helping develop earth's resources to meet the world's needs.

Western Division

RETURN ORIGINAL TO PDR, HQ.

818 Taughenbaugh Boulevard
Rifle, Colorado 81650-2730
Phone: 303-625-2445

February 11, 1988

✓ Mr. Edward F. Hawkins, Chief
Licensing Branch 1
Uranium Recovery Field Office
Region IV
U.S. NUCLEAR REGULATORY COMMISSION
P.O. Box 25325
Denver, Colorado 80225

Ms. Susan Hogg
Land Quality Division
WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY
Herschler Building - Third Floor
122 West 25th Street
Cheyenne, Wyoming 82002

Dear Mr. Hawkins and Ms. Hogg:

SUBJECT: COLLINS DRAW (SUA-1352) PROCESS EQUIPMENT REMOVAL AND GROUNDWATER
SAMPLES

I wish to inform you that Cleveland-Cliffs has sold and removed the process equipment from the Collins Draw plant in Campbell County, Wyoming. The equipment was sold to B.G.S. Mining of Albuquerque, New Mexico. The equipment was all tested for levels of contamination and classified as either restricted or unrestricted before it left the site; the analyses were done by Sheryl Garling, a radiation safety officer from Energy Labs in Casper. Mrs. Garling was present at the site when equipment was loaded and left the site and she kept all necessary documentation. The equipment was truck transported to New Mexico; the restricted went to Homestake's plant near Grants (SUA-1471) and the unrestricted to B.G.S.'s properties in Albuquerque. The equipment was loaded and transported during two periods:

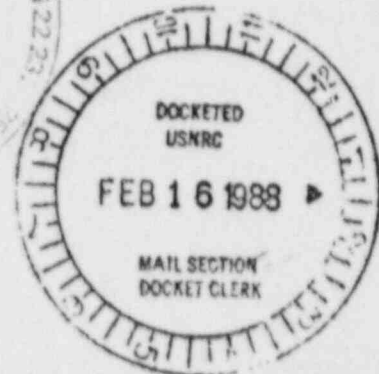
1. On site loading six trucks January 23-25, 1988. Trucks left site January 24 and 25.
2. On site loading six trucks February 3-4, 1988. Trucks left site February 3 and 4.

All of the trucks were moved in compliance with DOT regulations and safely reached their destinations without incident. Energy Labs is now assembling the final records and documentation for Cleveland-Cliffs.

8803090260 880211
PDR ADDCK 04008714
C PDR

DESIGNATED ORIGINAL

Certified By Mary C. Hood



FEE NOT REQUIRED

Info only

88-0501

Mr. Edward F. Hawkins
Ms. Susan Hogg

-2-

February 11, 1988

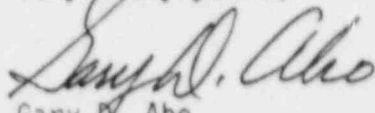
Unfortunately, B.G.S. was unable to remove one restricted 8'-diameter x 10' high surge tank from the plant building since it contains about 1,500 gallons of wash-down water which is now frozen. When it thaws this spring, the water will be properly disposed of and B.G.S. will then pick up the tank. The only other item is a piece of our fiberglass restoration tower (8' x 8' x 3' high) which is frozen to the ground outside and which will be moved by B.G.S. after the thaw.

Naturally, Cleveland-Cliffs is continuing its groundwater monitoring program at Collins Draw. I have enclosed the analyses for samples collected by Energy Labs on January 5 and 6, 1988. We are now scheduling sampling again for March 3 and 4 and we invite both the NRC and DEQ to join us in sampling at that time.

Following the analyses of the March samples, I would like to meet in Cheyenne with the DEQ to discuss the results to that date, some of our lab's observations, and to perhaps discuss ways to insure uniform sampling and lab procedure. I am suggesting March 15 as a meeting date and I would plan to have Roger Garling, Manager of Energy Labs, join me. The NRC is certainly welcome to have representatives at the meeting.

Please let me know if you plan to have anyone present on March 3 and 4 and whether you are available for a March 15 meeting in Cheyenne.

Very truly yours,



Gary D. Aho
Manager-Western Division

GDA:ms
Enclosure
xc w/encl: Gary Konwinski
Roger Shaffer

COLLINS DRAW - JANUARY, 11th ANALYSIS

RED RIFLE 2/3/88

Cleveland Cliffs Iron Company

Invoice #801-335

Page Two

88-0118	Well #260	88-0126	Well #240 ✓
88-0119	Well #231	88-0133	Well #190
88-0120	Well #232	88-0134	Well #234
88-0121	Well #277	88-0135	Well #283
88-0122	Well #276	88-0136	Well #285
88-0123	Well #233	88-0137	Well #237
88-0124	Well #238 ✓	88-0138	Well #239 ✓
88-0125	Well #230 ✓	88-0139	Well #241 ✓

5 ✓ EXCURSION MONITOR WELLS
220, 238, 239, 240, 241 (Selenium only)

11 B WELL FIELD STABILITY WELLS

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: Collins Draw

Sample I.D.:	Well #190	Well #190	Well #190	
Sample Date:	09-08-87	11-12-87	01-06-88	Det. Limit
Report Date:	09-29-87	12-28-87	01-27-88	% Range
Sample Number:	#1	57-14699	88-0133	

MAJOR IONS mg/l:

Ca	7.0	12.7	9.3	0.05
Mg	5.0	5.6	3.0	0.01
Na	99	140	111	0.05
K	211	408	312	0.10
CO3	150	17.3	20.7	0.10
HCO3	449	697	662	0.10
SO4	372	564	397	0.50
Cl	53.0	48.7	44.9	0.10
NH4 (N)	127	121	104	0.05
TDS @ 180 C	952	1482	1320	1.0
pH (units)	8.57	8.73	8.83	1-14

TRACE METALS mg/l:

As	0.085	0.118	0.125	0.001
Mo	<0.10	<0.10	<0.10	0.10
Se	1.420	0.077	0.179	0.001
V	<0.10	0.40	0.50	0.10

RADIOMETRIC pCi/l:

U (mg/l)	13.823	11.066	10.094	0.0003
Ra226	65.0	630.6	432.6	0.20
Ra Prec. +/-	6.1	7.9	5.2	

Q.A. DATA:

Anion eqq:	19.54	25.12	21.08	
Cation eqq:	21.59	25.29	20.96	
A/C Balance:	0.905	0.955	1.006	0.95-1.05
NYDEQ A/C Bal.%	4.98	2.23	-0.29	-5 - +5
Calc TDS mg/l:		1545	1343	
TDS A/C Bal:		0.959	0.983	0.90-1.10

Q.A. MANAGER: *A.C. Harding*
ENERGY LABORATORIES, INC.

09-29-87 Data Provided by WAMCO Lab.

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 190
Water Level to Casing: 73.29 '
Casing Height: 3.04 '
Water Level: 70.25 '
T.D./Casing I.D.: 485'/5"
Casing Volume: 423 Gal
Date Sampled: 01-06-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Corrected Cond
01-06-88	10:30	171850		8.65	10.5	
	10:45	172300		8.95	11.5	1500
	10:55	172600		8.90	12.0	1310
	11:05	172865				1350

Total Time Pumped: 35 min
Total Gal. Pumped: 1015 Gal
Casing Displacement: 2.40
Time Sampled: 11:05
Sampler: Energy Laboratories, Inc./RAG/SMD

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: Collins Draw

Sample I.D.:	Well #231	Well #231	Well #231	
Sample Date:	09-08-87	11-12-87	01-05-88	Det. Limit
Report Date:	09-29-87	12-28-87	01-27-88	& Range
Sample Number:	#2	87-14700	88-0119	

MAJOR IONS mg/l:

Ca	9.0	12.8	14.2	0.05
Mg	6.0	1.5	1.7	0.01
Na	93	84.0	86.4	0.05
K	163	223	181	0.10
CO ₃	0	3.5	0	0.10
HCO ₃	299	327	315	0.10
SO ₄	452	411	360	0.50
Cl	30.0	21.2	23.5	0.10
NH ₄ (N)	74.0	58.0	55.2	0.05
TDS @ 180 C	835	812	838	1.0
pH (units)	7.24	8.37	7.94	1-14

TRACE METALS mg/l:

As	0.008	0.008	0.028	0.001
Mo	<0.10	<0.10	<0.10	0.10
Se	0.039	0.063	0.040	0.001
V	<0.10	<0.10	<0.10	0.10

RADIOMETRIC pCi/l:

U (mg/l)	9.752	2.567	3.281	0.0003
Ra226	146.0	106.7	145.2	0.20
Ra Prec. +/-	9.0	3.3	3.4	

Q.A. DATA:

Anion meq	14.45	14.64	13.33	
Cation meq	15.15	14.28	13.19	
A/C Balance:	0.954	1.025	1.011	0.95-1.05
UNDEQ A/C Bal. %	2.36	-1.24	-0.53	-5 - +5
Calc TDS mg/l:		921	883	
TDS A/C Bal:		0.990	1.003	0.90-1.10

Q.A. MANAGER: *P.A. Leasing*
ENERGY LABORATORIES, INC.

09-29-87 Data Provided by WAMCO Lab.

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 231
Water Level to Casing: 73.75 '
Casing Height: 1.52 '
Water Level: 72.23 '
T.D./Casing I.D.: 485'/5"
Casing Volume: 421 Gal
Date Sampled: 01-05-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-05-88	12:16	167583				
	12:23	167880		7.05	12.0	1000
	12:38	168390		6.74	12.2	995
	13:05	169230		6.62	13.0	900
	13:16	169570				

Total Time Pumped: 60 min
Total Gal. Pumped: 1987 gal
Casing Displacement: 4.72
Time Sampled: 13:16
Sampler: Energy Laboratories, Inc./SAG/RAG

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: Collins Draw

Sample I.D.:	Well #232	Well #232	Well #232	
Sample Date:	09-08-87	11-12-87	01-05-88	Det. Limit
Report Date:	09-29-87	12-28-87	01-27-88	& Range
Sample Number:	#3	87-14701	98-0.20	

MAJOR IONS mg/l:

Ca	30.0	38.8	47.2	0.05
Mg	5.0	3.4	5.4	0.01
Na	105	122.0	124	0.05
K	181	336	285	0.10
CO3	0	0	0	0.10
HCO3	348	606	546	0.10
SO4	640	630	582	0.50
Cl	27.0	17.5	26.7	0.10
NH4 (N)	35.0	28.0	101	0.05
TDS @ 180 C	983	1410	1444	1.0
pH (units)	7.07	7.87	7.69	1-14

TRACE METALS mg/l:

As	0.012	0.007	0.100	0.001
Mo	<0.10	<0.10	<0.10	0.10
Se	0.025	0.062	0.020	0.001
V	<0.10	<0.10	<0.10	0.10

RADIOMETRIC pCi/l:

U (eq/l)	12.805	16.157	22.712	0.0003
Ra226	6.4	160.7	276.1	0.20
Ra Prec. +/-	5.0	3.5	4.5	

Q.A. DATA:

Anion eqq:	19.54	23.69	21.83	
Cation eqq:	21.59	23.31	22.72	
A/C Balance:	0.905	1.016	0.961	0.95-1.05
WYDED A/C Bal. %	4.98	-0.81	2.00	-5 - +5
Calc TDS mg/l:		1457	1467	
TDS A/C Bal:		0.968	0.984	0.90-1.10

Q.A. MANAGER: *Al. Kurling*
ENERGY LABORATORIES, INC.

09-29-87 Data Provided by WAMCO Lab.

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 232
Water Level to Casing: 73.33 '
Casing Height: 2.02 '
Water Level: 71.31 '
T.D./Casing I.D.: 485'/5"
Casing Volume: 422 Gal
Date Sampled: 01-05-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-05-88	14:27	169730				
	14:47	169990		7.00	11.9	1625
	15:20	170160				
	15:35	170370		7.00	11.5	1700
	15:58	170704		7.00	11.5	1500
		Sampled				
	16:11	170875				

Total Time Pumped: 104 min
Total Gal. Pumped: 1095 gal
Casing Displacement: 2.59
Time Sampled: 16:11
Sampler: Energy Laboratories, Inc./SAB/RAG

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: **Collins Draw**

Sample I.D.:	Well #233	Well #233	Well #233	
Sample Date:	09-08-97	11-12-87	01-05-88	Det. Limit
Report Date:	09-29-97	12-28-87	01-27-88	± Range
Sample Number:	#4	87-14702	88-0123	

MAJOR IONS mg/l:

Ca	19.0	49.4	72.6	0.05
Mg	4.0	7.5	5.4	0.01
Na	102	128.0	130	0.05
K	172	306	323	0.10
CO3	0	0	0	0.10
HCO3	653	627	564	0.10
SO4	386	666	720	0.50
Cl	35.0	31.2	30.2	0.10
NH4 (N)	94.0	108	115	0.05
TDS ± 130 C	956	1483	1636	1.0
pH (units)	7.23	7.92	7.66	1-14

TRACE METALS mg/l:

As	0.420	0.010	0.247	0.001
Bo	<0.10	<0.10	<0.10	0.10
Se	0.045	0.119	0.026	0.001
V	<0.10	<0.10	<0.10	0.10

RADIOMETRIC pCi/l:

U (mg/l)	36.465	11.288	13.122	0.0003
Ra226	37.0	492.4	725.3	0.20
Ra Prec. +/-	4.6	6.3	6.7	

Q.A. DATA:

Anion meq:	16.83	25.03	25.10	
Cation meq:	19.76	24.24	26.22	
A/C Balance:	0.852	1.033	0.957	0.95-1.05
HYDEQ A/C Bal.%	8.01	-1.60	2.13	-5 - +5
Calc TDS mg/l:		1502	1691	
TDS A/C Bal:		0.991	0.967	0.90-1.10

Q.A. MANAGER: *L.A. Harding*
ENERGY LABORATORIES, INC.

09-29-97 Data Provided by WAMCO Lab.

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 233
Water Level to Casing: 71.88 '
Casing Height: 1.92 '
Water Level: 69.96 '
T.D./Casing I.D.: 485'/5"
Casing Volume: 423 Gal
Date Sampled: 01-05-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-05-88	16:15	170875				
	16:28	171120		6.70	10.0	1600
	16:50	171352		7.00	12.0	1560
	17:20	171590		7.00	12.0	1805
	17:48	171850		7.00	12.6	1800

Total Time Pumped: 23 min
Total Gal. Pumped: 975 gal
Casing Displacement: 2.30
Time Sampled: 17:48
Sampler: Energy Laboratories, Inc./SAG/RAG

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: **Collins Draw**

Sample I.D.:	Well #234	Well #234	Well #234	
Sample Date:	09-08-87	11-12-87	01-06-88	Det. Limit
Report Date:	09-29-87	12-28-87	01-27-88	% Range
Sample Number:	#5	87-14703	88-0134	

MAJOR IONS mg/l:

Ca	15.0	21.8	24.7	0.05
Mg	6.0	4.4	4.1	0.01
Na	106	109.0	95.6	0.05
K	179	280	226	0.10
CO3	0	0	0	0.10
HCO3	409	503	466	0.10
SO4	466	528	445	0.50
Cl	40.0	33.4	31.2	0.10
NH4 (N)	93.0	102.0	93.0	0.05
TDS @ 180 C	932	1220	1112	1.0
pH (units)	7.14	8.19	7.92	1-14

TRACE METALS mg/l:

As	0.088	0.008	0.136	0.001
Mo	<0.10	<0.10	<0.10	0.10
Se	0.023	0.308	0.396	0.001
V	<0.10	<0.10	<0.10	0.10

RADIOMETRIC pCi/l:

U (ag/l)	14.840	12.394	3.832	0.0003
Ra226	52.0	127.8	140.1	0.20
Ra Prec. +/-	5.4	3.2	2.9	

Q.A. DATA:

Anion meq:	17.00	20.19	17.79	
Cation meq:	17.73	20.67	18.22	
A/C Balance:	0.959	0.977	0.976	0.95-1.05
WYDEQ A/C Bal.%	2.10	1.17	1.17	-5 - +5
Calc TDS mg/l:		1228	1164	
TDS A/C Bal:		0.993	0.955	0.90-1.10

Q.A. MANAGER: *Al. Hastings*
ENERGY LABORATORIES, INC.

09-29-87 Data Provided by WAMCO Lab.

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 234
Water Level to Casing: 71.79 '
Casing Height: 1.80 '
Water Level: 69.99 '
T.D./Casing I.D.: 485'/5"
Casing Volume: 423 Gal
Date Sampled: 01-06-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-06-88	10:30	139172		7.75	10.5	1200
	10:45	139640		8.18	12.5	1200
	10:55	139880		8.13	12.9	1310
	11:05	140090				

Total Time Pumped: 35 min
Total Gal. Pumped: 978 Gal
Casing Displacement: 2.31
Time Sampled: 11:05
Sampler: Energy Laboratories, Inc./RAG/SMD

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: **Collins Draw**

Sample I.D.:	Well #237	Well #237	Well #237	
Sample Date:	09-08-87	11-12-87	01-06-88	Det. Limit
Report Date:	09-29-87	12-23-87	01-27-88	& Range
Sample Number:	#6	87-14704	88-0137	

MAJOR IONS mg/l:

Ca	50.0	51.3	56.7	0.05
Mg	3.0	7.2	6.7	0.01
Na	118	118	111	0.05
K	623	275	257	0.10
CO3	0	0	0	0.10
HCO3	744	740	651	0.10
SO4	500	508	445	0.50
Cl	7.0	30.3	30.3	0.10
NH4 (M)	107	105	90.6	0.05
TDS @ 180 C	1145	1213	1324	1.0
pH (units)	8.06	8.24	8.07	1-14

TRACE METALS mg/l:

As	0.229	0.027	0.028	0.001
Mo	<0.10	<0.10	<0.10	0.10
Se	1.420	0.461	0.253	0.001
V	0.15	<0.10	<0.10	0.10

RADIOMETRIC pCi/l:

U (mg/l)	2.883	15.271	12.366	0.0003
Ra226	123.0	182.0	193.6	0.20
Ra Prec. +/-	8.3	3.9	3.4	

Q.A. DATA:

Anion meq:	21.36	23.58	20.80	
Cation meq:	22.80	22.83	21.38	
A/C Balance:	0.937	1.033	0.977	0.95-1.05
HYDEQ A/C Bal.X	3.25	-1.62	1.38	-5 - +5
Calc TDS mg/l:		1360	1335	
TDS A/C Bal:		0.969	0.992	0.90-1.10

Q.A. MANAGER: *S.A. Harding*
ENERGY LABORATORIES, INC.

09-29-87 Data Provided by WAMCO Lab.

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 237
Water Level to Casing: 73.75 '
Casing Height: 1.71 '
Water Level: 72.04 '
T.D./Casing I.D.: 485'/5"
Casing Volume: 421 Gal
Date Sampled: 01-06-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-06-88	12:10	140766		6.13	11.0	1290
	12:15	140970		6.03	11.1	1350
	12:25	141200		6.05	13.5	1420
	12:40	141420		6.09	13.3	1405
	12:55	141780				

Total Time Pumped: 45 min
Total Gal. Pumped: 1014 gal
Casing Displacement: 2.41
Time Sampled: 12:55
Sampler: Energy Laboratories, Inc./RAG"/M0

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: Collins Draw

Sample I.D.:	Well #239	Well #241	Well #239	Well #230	Well #240	
Sample Date:	01-06-88	01-06-88	01-06-88	01-06-88	01-06-88	Det. Limit
Report Date:	01-27-88	01-27-88	01-27-88	01-27-88	01-27-88	1 Range
Sample Number:	88-0138	88-0139	88-0124	88-0125	88-0126	

TRACE METALS mg/l:

Se	<0.001	0.044	<0.001	<0.001	<0.001	0.001
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Q.A. MANAGER: *RA Keating*
ENERGY LABORATORIES, INC.

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 230 (SM)
Water Level to Casing: 76.29 '
Casing Height: 2.93 '
Water Level: 73.46 '
T.D./Casing I.D.: 270'/5"
Casing Volume: 200 Gal
Date Sampled: 01-05-88
Pump Depth: 200'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	R. s.	pH	Temp	Uncorrected Cond
01-05-88	13:40	159727				
	14:17	Meter not		7.80	11.5	600
	14:46	rotating due		7.53	11.5	675
	15:32	slow flow		7.45	11.0	695
	15:32	Sampled				

Total Time Pumped: 113 min
Total Gal. Pumped: 326 Gal
Casing Displacement: 1.63
Time Sampled: 15:33
Sampler: Energy Laboratories, Inc./SAB/RAG

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 238 (A)
Water Level to Casing: 89.75 '
Casing Height: 3.42 '
Water Level: 86.33 '
T.D./Casing I.D.: 485'/5"
Casing Volume: 407 Gal
Date Sampled: 01-05-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-05-88	17:10	138100				
	17:17	138340		7.60	11.0	355
	17:31	138655		7.60	11.0	350
	17:49	139112		7.60	11.0	355

Total Time Pumped: 39 min
Total Gal. Pumped: 1012 Gal
Casing Displacement: 2.49
Time Sampled: 17:49
Sampler: Energy Laboratories, Inc./SAG/RAG

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 239 (M)
Water Level to Casing: 30.83 '
Casing Height: 2.71 '
Water Level: 28.12 '
T.D./Casing I.D.: 485'/5"
Casing Volume: 460 Gal
Date Sampled: 01-06-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH*	Temp	Uncorrected Cond
01-06-88	15:10	142368		-	10.0	302
	15:20	142580		-	11.7	296
	15:45	142780		-	11.5	327
	16:10	143000		-	11.8	340
	16:30	143288		-		

*Meter failure - stability determined by specific conductance.

Total Time Pumped: 80 min
Total Gal. Pumped: 920 gal
Casing Displacement: 2.0
Time Sampled: 16:30
Sampler: Energy Laboratories, Inc./RAG

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 240 (M)
Water Level to Casing: 79.83 '
Casing Height: 3.50 '
Water Level: 76.33 '
I.D./Casing I.D.: 485'/5"
Casing Volume: 417 Gal
Date Sampled: 01-05-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-05-88	11:00	135586				
	11:27	135838		7.60	10.5	160
	11:55	136075		7.65	12.0	340
	12:16	136271		7.62	12.0	355
	12:10	136430		7.53	12.1	360
		Sampled				
	12:47	136495				

Total Time Pumped: 107 min
Total Gal. Pumped: 908.5 Gal
Casing Displacement: 2.18
Time Sampled: 12:47
Sampler: Energy Laboratories/SAG/RAG

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 241 (M)
Water Level to Casing: 57.58 '
Casing Height: 2.00 '
Water Level: 55.58 '
I.D./Casing I.D.: 485'/5"
Casing Volume: 438 Gal
Date Sampled: 01-06-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-06-88	13:05	141784				
	13:35	141965		5.89	11.5	367
	14:00	142040		6.03	13.2	376
	14:30	142210		6.05	12.9	330
	14:50	142330		6.35	12.9	374
	15:00	142370			13.1	368

Total Time Pumped: 155 min
Total Gal. Pumped: 586 gal
Casing Displacement: 1.34
Time Sampled: 15:00
Sampler: Energy Laboratories, Inc./RAG/SAG

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: **Collins Draw**

Sample I.D.:	Well #260	Well #260	Well #260	
Sample Date:	09-08-87	11-12-87	01-05-88	Det. Limit
Report Date:	09-29-87	12-28-87	01-27-88	& Range
Sample Number:	#7	87-14705	88-0118	

MAJOR IONS mg/l:

Ca	29.0	35.4	32.5	0.05
Mg	4.0	3.7	3.4	0.01
Na	100	108	107	0.05
K	189	249	276	0.10
CO3	0	0	0	0.10
HCO3	323	498	342	0.10
SO4	490	492	349	0.50
Cl	37.0	28.7	27.6	0.10
NH4 (N)	92.6	78.0	70.8	0.05
TDS @ 180 C	922	1126	999	1.0
pH (units)	7.00	8.06	7.63	1-14

TRACE METALS mg/l:

As	0.007	0.005	0.012	0.001
Mo	<0.10	<0.10	<0.10	0.10
Se	0.050	0.176	0.032	0.001
V	<0.10	<0.10	<0.10	0.10

RADIOMETRIC pCi/l:

U (mg/l)	7.293	5.312	4.795	0.0003
Ra226	59.0	157.4	170.7	0.20
Ra Prec. +/-	3.7	7.6	3.6	

Q.A. DATA:

Anion meq:	17.03	19.22	13.65	
Cation meq:	16.59	19.73	13.64	
A/C Balance:	1.027	1.026	1.001	0.95-1.05
WYDEQ A/C Bal.%	-1.31	-1.29	-0.04	-5 - +5
Calc TDS mg/l:		1166	967	
TDS A/C Bal:		0.966	1.024	0.90-1.10

Q.A. MANAGER: *A. Karling*
ENERGY LABORATORIES, INC.

09-29-87 Data Provided by WAMCO Lab.

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 260
Water Level to Casing: 76.54 '
Casing Height: 3.58 '
Water Level: 72.96 '
T.D./Casing I.D.: 465'/4.33'
Casing Volume: 315 Gal
Date Sampled: 01-05-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-05-88	11:00	166458				
	11:25	166900		6.89	12.0	800
	11:53	167385		6.75	13.3	1100
	12:03	167540		6.80	13.5	1125

Total Time Pumped: 63 min
Total Gal. Pumped: 1082 Gal
Casing Displacement: 3.43
Time Sampled: 12:03
Sampler: Energy Laboratories, Inc./SAB/RAG

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: **Collins Draw**

Sample I.D.:	Well #274	Well #276	Well #276	
Sample Date:	09-08-87	11-12-87	01-05-88	Det. Limit
Report Date:	09-29-87	12-28-87	01-27-88	% Range
Sample Number:	#8	87-14706	88-0122	

MAJOR IONS mg/l:

Ca	21.0	17.7	22.2	0.05
Mg	9.0	4.1	3.2	0.01
Na	103	119	104	0.05
K	169	249	229	0.10
CO3	0	0	0	0.10
HCO3	427	515	468	0.10
SO4	426	480	403	0.50
Cl	33.0	28.7	24.9	0.10
NH4 (N)	96.0	86.0	80.2	0.05
TDS @ 190 C	1018	1188	1092	1.0
pH (units)	7.69	8.03	7.79	1-14

TRACE METALS mg/l:

As	0.350	0.025	0.325	0.001
Mo	<0.10	<0.10	<0.10	0.10
Se	0.434	0.164	0.093	0.001
V	<0.10	<0.10	<0.10	0.10

RADIOMETRIC pCi/l:

U (mg/l)	28.833	9.733	10.851	0.0003
Ra226	52.0	124.7	206.1	0.20
Ra Prec. +/-	5.4	3.2	3.7	

Q.A. DATA:

Anion eq:	17.46	19.25	16.93	
Cation eq:	16.93	18.93	17.50	
A/C Balance:	1.031	1.017	0.967	0.95-1.05
WYDED A/C Bal. %	-1.54	-0.84	1.66	-5 - +5
Calc TDS mg/l:		1156	1116	
TDS A/C Bal:		1.028	0.978	0.90-1.10

Q.A. MANAGER: *M. Karling*
ENERGY LABORATORIES, INC.

09-29-87 Data Provided by WAMCO Lab.

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 276
Water Level to Casing: 73.79 '
Casing Height: 2.54 '
Water Level: 71.25 '
T.D./Casing I.D.: 485'/4.23"
Casing Volume: 317 Gal
Date Sampled: 01-05-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-05-88	13:04	135500				
	13:17	136740		6.70	11.0	1800
	13:35	136900		6.75	11.0	1950
	14:16	137220		6.72	12.2	2005
	14:26	137817				

Total Time Pumped: 82 min
Total Gal. Pumped: 1317.5 Gal
Casing Displacement: 4.16
Time Sampled: 14:26
Sampler: Energy Laboratories, Inc./SAG/RAG

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: **Collins Draw**

Sample I.D.:	Well #277	Well #277	Well #277	
Sample Date:	09-08-87	11-12-87	01-05-88	Det. Limit
Report Date:	09-29-87	12-28-87	01-27-88	& Range
Sample Number:	#9	87-14707	88-0122	

MAJOR IONS mg/l:

Ca	15.0	91.0	123	0.05
Mg	3.0	11.3	14.4	0.01
Na	98	140	154	0.05
K	165	391	328	0.10
CO3	0	0	0	0.10
HCO3	342	531	615	0.10
SO4	426	726	840	0.50
Cl	32.0	36.3	35.6	0.10
NH4 (N)	92.0	103.0	103	0.05
TDS @ 180 C	915	1442	1834	1.0
pH (units)	7.00	7.49	7.59	1-14

TRACE METALS mg/l:

As	0.114	0.292	0.203	0.001
Mo	<0.10	<0.10	<0.10	0.10
Se	0.028	0.054	0.023	0.001
V	<0.10	<0.10	<0.10	0.10

RADIOMETRIC pCi/l:

U (eq/l)	18.156	13.280	9.337	0.0003
Ra226	38.0	739.1	1193	0.20
Ra Prec. +/-	4.6	7.8	8.9	

Q.A. DATA:

Anion eq:	16.05	25.67	28.53	
Cation eq:	15.37	26.40	29.81	
A/C Balance:	1.044	0.972	0.959	0.95-1.05
HYDED A/C Bal. %	-2.16	1.40	2.11	-5 - +5
Calc TDS eq/l:		1586	1915	
TDS A/C Bal:		0.909	0.958	0.90-1.10

Q.A. MANAGER: *A.L. Hastings*
ENERGY LABORATORIES, INC.

09-29-87 Data Provided by WAMCO Lab.

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 277
Water Level to Casing: 73.58 '
Casing Height: 3.50 '
Water Level: 70.08 '
T.D./Casing I.D.: 485'/4.23"
Casing Volume: 317 Gal
Date Sampled: 01-05-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-05-88	15:35	137317				
	16:00	137605		7.40	12.0	1295
	16:28	137820		7.00	11.9	1390
	16:50	138017		7.00	12.5	1375
	17:06	138100				

Total Time Pumped: 91 min
Total Gal. Pumped: 793 Gal
Casing Displacement: 2.47
Time Sampled: 17:06
Sampler: Energy Laboratories, Inc./SAG/RAG

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: **Collins Draw**

Sample I.D.:	Well #283	Well #283	Well #283	
Sample Date:	09-08-87	11-12-87	01-06-88	Det. Limit
Report Date:	09-29-87	12-28-87	01-27-88	& Range
Sample Number:	#10	87-14708	88-0135	

MAJOR IONS mg/l:

Ca	6.0	12.2	17.1	0.05
Mg	4.0	3.7	4.3	0.01
Na	115	140	167	0.05
K	168	256	333	0.10
CO3	0	6.9	0	0.10
HCO3	500	593	639	0.10
SO4	350	426	600	0.50
Cl	43.0	35.9	37.7	0.10
NH4 (N)	92.0	97.0	103	0.05
TDS @ 180 C	886	1036	1530	1.0
pH (units)	8.04	8.40	8.24	1-14

TRACE METALS mg/l:

As	0.082	0.085	0.054	0.001
Mo	<0.10	<0.10	<0.10	0.10
Se	1.050	0.062	0.102	0.001
V	0.35	<0.10	0.20	0.10

RADIOMETRIC pCi/l:

U (eq/l)	14.077	13.943	8.632	0.0003
Ra226	94.0	340.2	605.1	0.20
Ra Prec. +/-	7.3	5.4	6.1	

Q.A. DATA:

Anion meq:	16.50	19.84	24.04	
Cation meq:	16.89	20.50	24.37	
A/C Balance:	0.969	0.968	0.986	0.95-1.05
HYDEQ A/C Bal.%	0.57	1.64	0.68	-5 - +5
Calc TDS eq/l:		1177	1591	
TDS A/C Bal:		0.923	0.962	0.90-1.10

Q.A. MANAGER: *P.A. Harding*
ENERGY LABORATORIES, INC.

09-29-87 Data Provided by WAMCO Lab.

CLEVELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 283
Water Level to Casing: 74.83 '
Casing Height: 3.04 '
Water Level: 71.79 '
I.D./Casing I.D.: 485'/4.33"
Casing Volume: 316 Gal
Date Sampled: 01-06-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-06-88	11:15	172912		7.45	11.5	1400
	11:25	173230		8.19	12.0	1500
	11:40	173730		7.62	12.4	1510
	11:55	174220		7.26	12.5	1580
	12:15	174920		6.73	12.9	1560
	12:20	Sampled				

Total Time Pumped: 65 min
Total Gal. Pumped: 2008 gal
Casing Displacement: 6.35
Time Sampled: 12:20
Sampler: Energy Laboratories, Inc./RAG/SMD

WATER ANALYSIS REPORT - CLEVELAND CLIFFS

Project: Collins Draw

Sample I.D.:	Well #235	Well #285	Well #295	
Sample Date:	09-08-87	11-12-87	01-06-88	Det. Limit
Report Date:	09-29-87	12-22-87	01-27-88	& Range
Sample Number:	#11	87-14709	88-0136	

MAJOR IONS mg/l:

Ca	36.0	84.2	95.2	0.05
Mg	5.0	8.9	9.4	0.01
Na	102	127	138	0.05
K	176	269	285	0.10
CO3	0	0	0	0.10
HCO3	451	597	617	0.10
SO4	444	648	684	0.50
Cl	96.0	32.4	32.0	0.10
NH4 (N)	105	109.0	99.0	0.05
TDS @ 180 C	1006	1378	1562	1.0
pH (units)	7.25	7.71	7.59	1-14

TRACE METALS mg/l:

As	0.500	0.234	0.206	0.001
Mo	<0.10	<0.10	<0.10	0.10
Se	0.032	0.006	0.023	0.001
V	<0.10	<0.10	<0.10	0.10

RADIOMETRIC pCi/l:

U (ug/l)	21.201	12.616	7.571	0.0003
Ra226	109	1094	1112	0.20
Ra Prec. +/-	7.8	9.8	8.2	

Q.A. DATA:

Anion meq:	19.35	24.20	26.11	
Cation meq:	18.66	25.17	25.92	
A/C Balance:	1.037	0.961	1.007	0.95-1.05
WYDED A/C Bal. %	-1.82	1.96	-0.37	-5 - +5
Calc TDS ug/l:		1468	1689	
TDS A/C Bal:		0.939	0.925	0.90-1.10

Q.A. MANAGER: *AD. Kauling*
ENERGY LABORATORIES, INC.

09-29-87 Data Provided by WAMCO Lab.

CLE ELAND CLIFFS - DOWNHOLE SAMPLING REPORT

Project: Collins Draw

Well No: 285
Water Level to Casing: 73.85 '
Casing Height: 2.67 '
Water Level: 71.18 '
I.D./Casing I.D.: 485'/4.33"
Casing Volume: 312 Gal
Date Sampled: 01-06-88
Pump Depth: 400'
Pump Type: Downhole Submersible Pump

Date	Time	Meter	Rate	pH	Temp	Uncorrected Cond
01-06-88	11:15	140075		7.18	10.2	1480
	11:25	140240		7.15	12.2	1400
	11:40	140470		6.65	12.1	1570
	11:55	140670		6.29	13.3	1590
	12:05	140756				

Total Time Pumped: 50 min
Total Gal. Pumped: 691 gal
Casing Displacement: 2.21
Time Sampled: 12:05
Sampler: Energy Laboratories, Inc./RAG/SMD