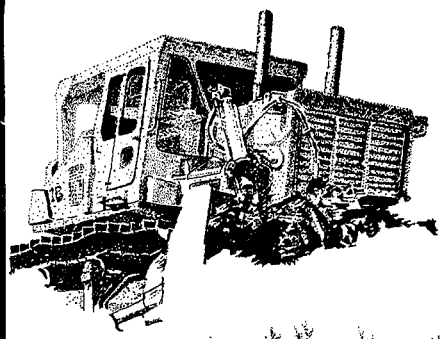
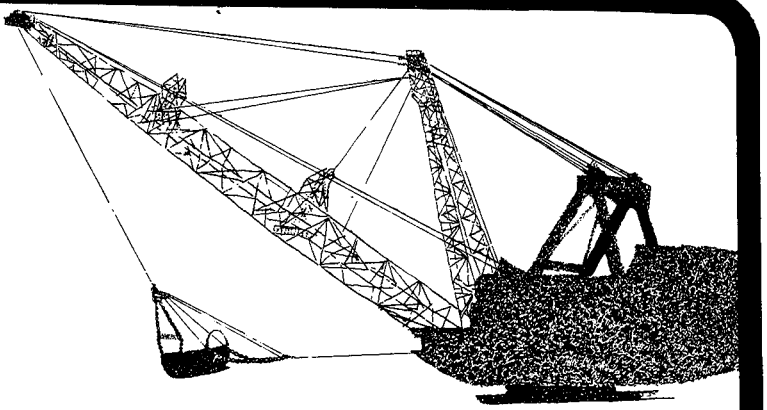
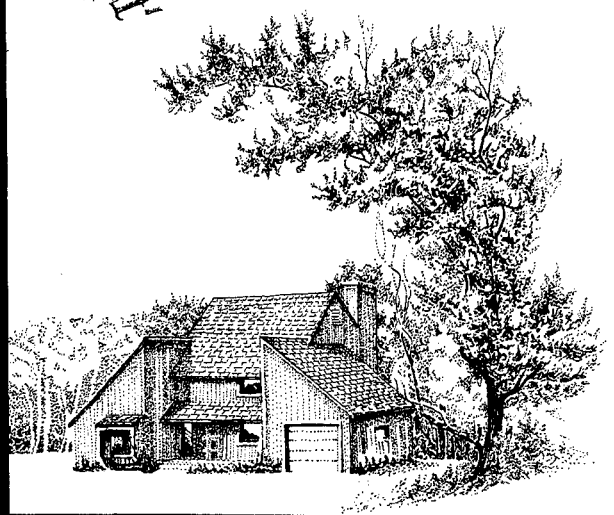
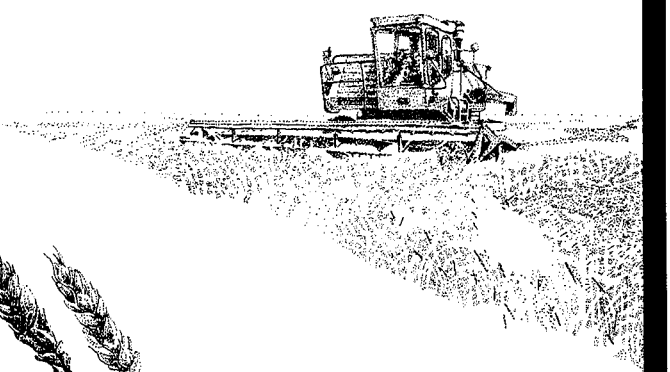
ANNUAL REPORTS FOR 1988, 1989, 1990

EMERY DEEP MINE ACT/015/015







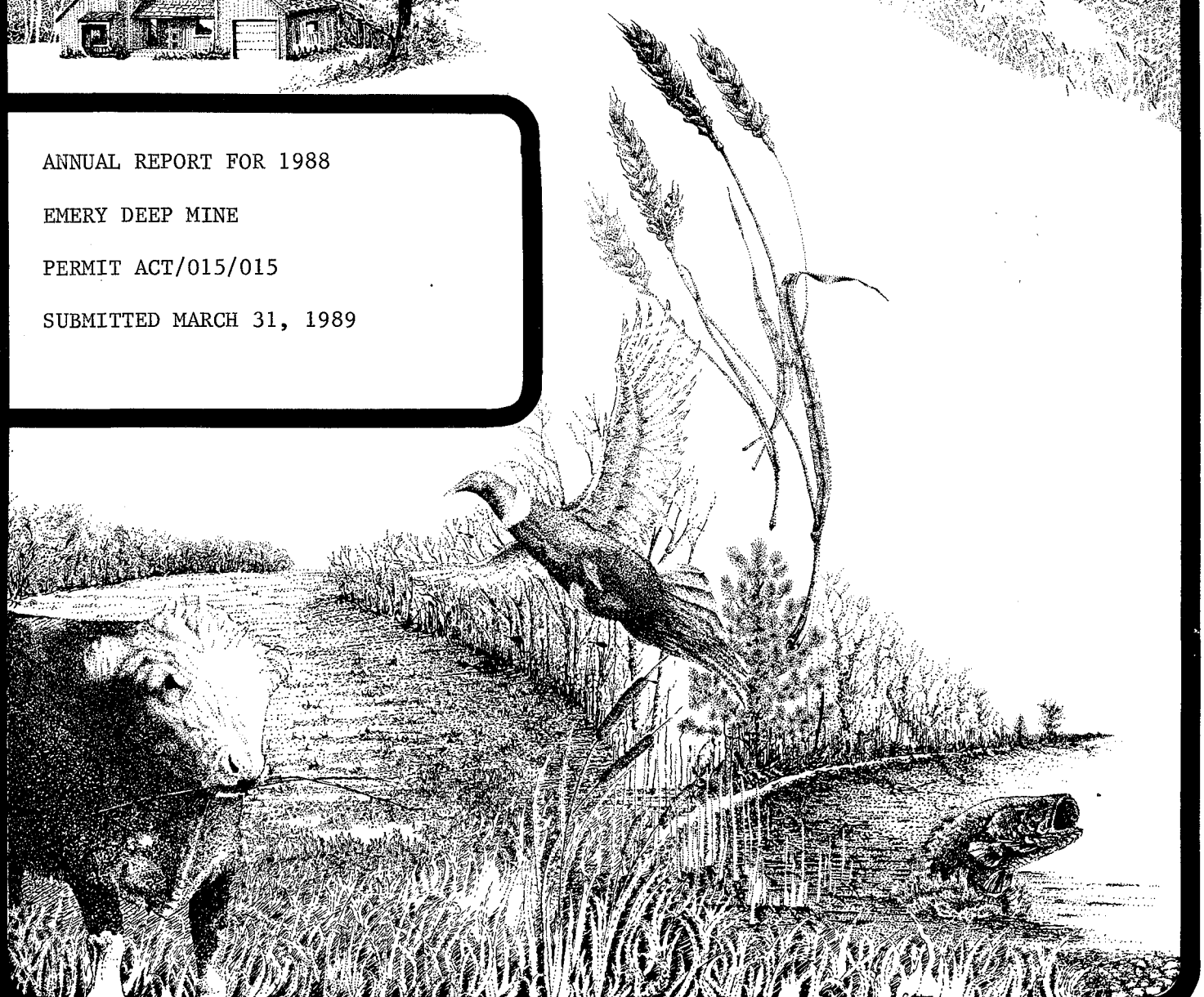


ANNUAL REPORT FOR 1988

EMERY DEEP MINE

PERMIT ACT/015/015

SUBMITTED MARCH 31, 1989



COAL MINING AND RECLAMATION OPERATIONS FOR 1988
(Authority UMC 784)

(Must be submitted to the Division by March 31, 1989)

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
3 Triad Centter, Suite 350
355 West North Temple
Salt Lake City, Utah 84180-1203

(801) 538-5340

Operator: CONSOLIDATION COAL COMPANY

Mine Name: EMERY DEEP MINE

Mailing Address: 12755 OLIVE BLVD., ST. LOUIS, MO 63141

Company Representative: THOMAS H. PLATE

Permit Number: ACT/015/015

Date of Most Recent Permanent Program Permit: JANUARY 10, 1986

Quantity of Coal Mined (tonnage) 1988: 548,132

Attach Updated Mine Sequence Map.

All monitoring activities during the report period must be submitted with this report (including, but not limited to):

A. Summarized Water Monitoring Data

B. Precipitation or Other Climatological Data

C. Subsidence Monitoring Report

D. Vegetation Data (test plots) or Revegetation Success Monitoring (includes interim and final)

E. Permit Stipulation Status

djh
AT57

(COAL)

CERTIFICATE OF LIABILITY INSURANCE
Issued to: State of Utah
Department of Natural Resources
Division of Oil, Gas, and Mining

THIS IS TO CERTIFY, That the Hartford Accident & Indemnity Company
(Name of Insurance Company)
of Hartford Plaza, Hartford, Connecticut 06115
(Home Office Address of Company)
has issued to Consolidation Coal Company
(Name of Permit Applicant)
Consol Plaza, 1800 Washington Rd., Pittsburgh Policy No. 10 CLR P12452E
(Address of Permit Applicant)
effective from January 1, 19, 86 and continuing until cancelled, nonrenewed, or changed as provided herein, which policy provides personal injury and property damage insurance covering the obligations imposed upon such permit applicant with regard to Permit No. ACT/015/015 according to provisions of the coal mining and reclamation program of Utah, (Utah Code Annotated 40-10-1 et seq.), specifically Section UMC/SMC 806.14.

Underwriting Agent: Marsh and McLennan, Incorporated

Company Name: Hartford Accident & Indemnity Co. Phone: 405/767-3897

Address: 123 William Street, New York, NY 10038

The above-named insurance company agrees to notify the Division in writing of any substantive change in the above coverage, including cancellation, failure to renew, or other material change. No change shall be effective until at least thirty (30) days after such notice is received by the Division.

The undersigned affirms that the above information is true and complete to the best of his or her knowledge and belief, and that he or she is an authorized representative of the above-named insurance company.

12-18-85 Frank Prentice Hapgood Frank Prentice Hapgood - Claims Attorney
(Date, Signature, and Title of Authorized Representative of Insurance Company)

Signed and sworn to before me by Frank Prentice Hapgood this the 23rd day of December, 1985.

(Notary)

My Commission Expires: 8-16-89

1988 N.P.D.E.S. REPORT SUMMARY

Permit No. UT0022616 - Emery Deep Mine

Outfall 001 - Sedimentation Pond for Deep Mine Pump Discharges

The attached sheets summarize the effluent quality by month and quarter for 1988.

Outfall 002 - Mine Yard Area

No discharges occured during 1988.

Permit No. UT0022624 - Emery Surface Mine

Outfall FAC A

This outfall has not been constructed, thus no discharge occured during 1988.

Permit No. UT0024040 - Emery Mine Preparation Plant

Outfalls 001 and 002

No discharges occured during 1988.

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE FIRST QUARTER 1988
REPORT PREPARED ON 03/09/89 AT 14:15:25

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001		FIRST QUARTER 1988				
FLOW INSPECTIONS	0.64	0.64	0.64	CFS	N/A	1
PH	7.8		8.4	STD UNITS		8
TOT SUSP SOLIDS	2	8.8	20	MG/L		8
OIL & GREASE	1.0	1.0	1.0	MG/L		3
TOTAL IRON	0.30	0.74	1.66	MG/L		8
FLOW	0.414	0.414	0.414	MGD	N/A	1
TOT DISS SOLIDS	2815	3009	3090	MG/L		8
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 5.1						
POINT 001		JANUARY 1988				
FLOW INSPECTIONS				CFS	N/A	0
PH	8.0		8.3	STD UNITS		3
TOT SUSP SOLIDS	3	4.0	5	MG/L		3
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.69	1.08	1.66	MG/L		3
FLOW				MGD	N/A	0
TOT DISS SOLIDS	2910	3020	3090	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -						
POINT 001		FEBRUARY 1988				
FLOW INSPECTIONS				CFS	N/A	0
PH	8.1		8.4	STD UNITS		3
TOT SUSP SOLIDS	2	12.0	18	MG/L		3
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.30	0.38	0.50	MG/L		3
FLOW				MGD	N/A	0
TOT DISS SOLIDS	2815	2990	3080	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -						
POINT 001		MARCH 1988				
FLOW INSPECTIONS	0.64	0.64	0.64	CFS	N/A	1
PH	7.8		8.1	STD UNITS		2
TOT SUSP SOLIDS	2	11.0	20	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.64	0.75	0.86	MG/L		2
FLOW	0.414	0.414	0.414	MGD	N/A	1
TOT DISS SOLIDS	2975	3022	3068	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 5.1						

FOR THE FIRST QUARTER 1988

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
880118				8.0	1.66	3.0		2910								LAB-CONOCO,INST Q=1.97 CFS
880125				8.3	0.89	5.0		3060								LAB-CONOCO,INST Q=2.18 CFS
880125				8.0	0.69	4.0	1.0	3090								LAB-ACZ,INST Q=2.18 CFS
880211				8.4	0.30	16.0		2815								LAB-CONOCO,INST Q=1.98 CFS
880229				8.3	0.35	18.0		3075								LAB-CONOCO,INST Q=0.26 CFS
880229				8.1	0.50	2.0	1.0	3080								LAB-ACZ,INST Q=0.26 CFS
880314				7.8	0.64	2.0	1.0	3068								LAB-ACZ,INST Q=1.20 CFS
880331		0.64	0.414	8.1	0.86	20.0		2975								LAB-CONOCO,INST Q=1.13 CFS

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE SECOND QUARTER 1988
REPORT PREPARED ON 03/09/89 AT 14:15:53

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001		SECOND QUARTER 1988				
FLOW INSPECTIONS	0.00	1.11	2.77	CFS	N/A	49
PH	7.9		8.2	STD UNITS		9
TOT SUSP SOLIDS	1	6.6	16	MG/L		9
OIL & GREASE	1.0	1.0	1.0	MG/L		3
TOTAL IRON	0.20	0.41	0.80	MG/L		9
FLOW	0.006	0.860	1.790	MGD	N/A	41
TOT DISS SOLIDS	2908	3020	3090	MG/L		9
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD EXCEEDED - 12.7						
POINT 001		APRIL 1988				
FLOW INSPECTIONS	0.00	1.22	2.77	CFS	N/A	28
PH	7.9		8.0	STD UNITS		3
TOT SUSP SOLIDS	2	7.3	11	MG/L		3
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.34	0.54	0.80	MG/L		3
FLOW	0.006	0.919	1.790	MGD	N/A	24
TOT DISS SOLIDS	3048	3065	3090	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD EXCEEDED - 19.7						
POINT 001		MAY 1988				
FLOW INSPECTIONS	1.19	1.19	1.19	CFS	N/A	2
PH	8.1		8.2	STD UNITS		3
TOT SUSP SOLIDS	2	5.3	10	MG/L		3
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.44	0.80	MG/L		3
FLOW	0.769	0.769	0.769	MGD	N/A	2
TOT DISS SOLIDS	2908	2986	3062	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 9.5						
POINT 001		JUNE 1988				
FLOW INSPECTIONS	0.00	0.95	2.27	CFS	N/A	19
PH	8.0		8.1	STD UNITS		3
TOT SUSP SOLIDS	1	7.0	16	MG/L		3
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.24	0.26	MG/L		3
FLOW	0.006	0.778	1.467	MGD	N/A	15
TOT DISS SOLIDS	2965	3009	3038	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 8.8						

FOR THE SECOND QUARTER 1988

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
880401		0.18	0.116													
880402		0.12	0.078													
880403		2.62	1.693													
880404		2.77	1.790													
880405		0.46	0.297													
880406		0.01	0.006													
880407		0.55	0.355													
880408		2.70	1.745	8.0	0.49	9.0		3048								
880409		2.71	1.751													LAB-CONOCO,INST Q=2.48CFS
880410		1.19	0.769													
880411		0.00														
880412		0.00														
880413		1.42	0.918													
880414		2.41	1.558													
880415		1.88	1.215													
880416		1.71	1.105													
880417		1.67	1.079													
880418		0.05	0.032													
880419		0.00														
880420		0.67	0.433													
880421		2.25	1.454													
880422		2.07	1.338	8.0	0.80	11.0		3090								
880422				7.9	0.34	2.0	1.0	3058								LAB-CONOCO,INST Q=2.31CFS
880423		0.16	0.103													LAB-ACZ,INST Q=2.31CFS
880424		0.00														
880425		1.00	0.646													
880426		2.41	1.558													
880427		2.55	1.648													
880428		0.55	0.355													
880511		1.19	0.769	8.2	0.80	4.0		2988								
880520	1020	1.19	0.769	8.2	0.20	10.0		2908								LAB-CONOCO,INST Q=2.35CFS
880520	1020			8.1	0.31	2.0	1.0	3062								LAB-CONOCO,INST Q=0.09CFS
880606		1.23	0.795	8.0	0.20	1.0		3038								LAB-ACZ,INST Q=0.09CFS
880607		1.02	0.659													LAB-CONOCO,INST Q=0.17CFS
880608		0.34	0.220													
880609		0.01	0.006													
880610		0.00														
880611		0.12	0.078													
880612		2.14	1.383													
880613		1.72	1.112													
880614		0.03	0.019													
880615		0.00														
880616		1.46	0.944													
880617		2.27	1.467													
880618		0.85	0.549													
880619		0.00														
880620		0.00														
880621		1.38	0.892													

FOR THE SECOND QUARTER 1988

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
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E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
880622		2.26	1.461													
880623		2.27	1.467													
880630		0.95	0.614	8.1	0.25	16.0		2965								LAB-CONOCO,INST Q=0.97CFS
880630				8.1	0.26	4.0	1.0	3024								LAB-ACZ,INST Q=0.97CFS

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE THIRD QUARTER 1988
REPORT PREPARED ON 03/09/89 AT 14:16:13

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001		THIRD QUARTER 1988				
FLOW INSPECTIONS	0.00	1.15	2.38	CFS	N/A	75
PH	7.7		8.4	STD UNITS		9
TOT SUSP SOLIDS	1	5.8	14	MG/L		9
OIL & GREASE	1.0	1.7	3.0	MG/L		3
TOTAL IRON	0.20	0.33	0.73	MG/L		9
FLOW	0.006	0.823	1.538	MGD	N/A	68
TOT DISS SOLIDS	2778	2964	3140	MG/L		9
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD EXCEEDED - 14.5						
POINT 001		JULY 1988				
FLOW INSPECTIONS	0.00	1.00	2.35	CFS	N/A	14
PH	7.9		8.1	STD UNITS		3
TOT SUSP SOLIDS	1	3.3	8	MG/L		3
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.23	0.28	MG/L		3
FLOW	0.026	0.756	1.519	MGD	N/A	12
TOT DISS SOLIDS	2920	2953	3006	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD EXCEEDED - 12.1						
POINT 001		AUGUST 1988				
FLOW INSPECTIONS	0.00	1.13	2.38	CFS	N/A	31
PH	7.7		8.1	STD UNITS		3
TOT SUSP SOLIDS	2	4.0	8	MG/L		3
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.29	0.52	0.73	MG/L		3
FLOW	0.006	0.874	1.538	MGD	N/A	26
TOT DISS SOLIDS	3000	3075	3140	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD EXCEEDED - 19.6						
POINT 001		SEPTEMBER 1988				
FLOW INSPECTIONS	0.01	1.25	2.36	CFS	N/A	30
PH	7.8		8.4	STD UNITS		3
TOT SUSP SOLIDS	6	10.0	14	MG/L		3
OIL & GREASE	3.0	3.0	3.0	MG/L		1
TOTAL IRON	0.20	0.25	0.29	MG/L		3
FLOW	0.006	0.806	1.525	MGD	N/A	30
TOT DISS SOLIDS	2778	2865	3030	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD EXCEEDED - 13.0						

FOR THE THIRD QUARTER 1988

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
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E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
880705		0.00														
880706																
880707																
880708		1.10	0.711	8.0	0.20	1.0		2920								LAB-CONOCC,INST Q=2.35CFS
880709																
880710																
880711																
880712																
880713																
880714																
880715																
880716																
880717																
880718																
880719		1.10	0.711	7.9	0.20	1.0		2933								LAB-CONOCC,INST Q=2.31CFS
880720		0.28	0.181													
880721		2.28	1.474													
880722		2.32	1.499													
880723		1.42	0.918													
880724		0.04	0.026													
880725		0.00														
880726		0.23	0.149													
880727		1.31	0.847													
880728		2.35	1.519	8.1	0.28	8.0	1.0	3006								LAB-ACZ,INST Q=0.90CFS
880729		1.49	0.963													
880730		0.11	0.071													
880801		0.01	0.006													
880802		0.34	0.220													
880803		0.54	0.349													
880804		1.15	0.743													
880805		0.97	0.627													
880806		0.08	0.052													
880807		0.02	0.013													
880808		0.00														
880809		0.00														
880810		0.00														
880811		0.00														
880812		0.00														
880813		0.27	0.175													
880814		2.29	1.480													
880815		2.36	1.525	8.0	0.55	8.0		3140								LAB-CONOCC
880815				7.7	0.73	2.0	1.0	3084								LAB-ACZ
880816		2.38	1.538													
880817		2.38	1.538	8.1	0.29	2.0		3000								LAB-CONOCC,INST Q=0.85CFS
880818		2.34	1.512													
880819		2.37	1.532													
880820		2.38	1.538													
880821		2.37	1.532													

FOR THE THIRD QUARTER 1988

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
880822		2.36	1.525													
880823		2.36	1.525													
880824		1.89	1.222													
880825		0.14	0.090													
880826		0.05	0.032													
880827		1.50	0.969													
880828		2.35	1.519													
880829		2.06	1.331													
880830		0.17	0.110													
880831		0.03	0.019													
880901		0.52	0.336													
880902		2.35	1.519													
880903		2.36	1.525													
880904		2.36	1.525													
880905		0.49	0.317													
880906		0.04	0.026													
880907		1.80	1.163													
880908		1.40	0.905	8.3	0.25	14.0		2788								LAB-CONOCC,INST Q=2.18 CFS
880908				7.8	0.29	6.0	3.0	3030								LAB-ACZ,INST Q=2.18 CFS
880909		2.26	1.461													
880910		2.35	1.519													
880911		2.20	1.422													
880912		0.25	0.162													
880913		0.01	0.006													
880914		0.02	0.013													
880915		2.03	1.312													
880916		2.31	1.493													
880917		2.12	1.370													
880918		0.18	0.116													
880919		0.01	0.006													
880920		0.02	0.013													
880921		2.07	1.338	8.4	0.20	10.0		2778								LAB-CONOCC
880922		2.08	1.344													
880923		0.17	0.110													
880924		1.32	0.853													
880925		2.34	1.512													
880926		1.55	1.002													
880927		0.11	0.071													
880928		0.04	0.026													
880929		0.34	0.220													
880930		2.29	1.480													

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE FOURTH QUARTER 1988
REPORT PREPARED ON 03/09/89 AT 14:16:42

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001		FOURTH QUARTER 1988				
FLOW INSPECTIONS	0.00	1.00	2.71	CFS	N/A	62
PH	7.7		8.4	STD UNITS		7
TOT SUSP SOLIDS	4	8.3	18	MG/L		7
OIL & GREASE	1.0	1.0	1.0	MG/L		3
TOTAL IRON	0.07	0.26	0.46	MG/L		7
FLOW	0.013	0.759	1.751	MGD	N/A	53
TOT DISS SOLIDS	2483	2846	3005	MG/L		7
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 9.4						
POINT 001		OCTOBER 1988				
FLOW INSPECTIONS	0.00	1.21	2.71	CFS	N/A	31
PH	7.8		8.4	STD UNITS		2
TOT SUSP SOLIDS	4	6.0	8	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.07	0.15	0.24	MG/L		2
FLOW	0.013	0.810	1.751	MGD	N/A	30
TOT DISS SOLIDS	2650	2818	2986	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 9.6						
POINT 001		NOVEMBER 1988				
FLOW INSPECTIONS	0.00	0.80	2.24	CFS	N/A	29
PH	7.9		8.2	STD UNITS		3
TOT SUSP SOLIDS	4	6.7	8	MG/L		3
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.16	0.27	0.38	MG/L		3
FLOW	0.019	0.715	1.448	MGD	N/A	21
TOT DISS SOLIDS	2894	2954	3005	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD EXCEEDED - 12.0						
POINT 001		DECEMBER 1988				
FLOW INSPECTIONS	0.70	0.70	0.70	CFS	N/A	2
PH	7.7		8.4	STD UNITS		2
TOT SUSP SOLIDS	8	13.0	18	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.23	0.34	0.46	MG/L		2
FLOW	0.452	0.452	0.452	MGD	N/A	2
TOT DISS SOLIDS	2483	2713	2942	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 5.1						

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
881001		2.35	1.519													
881002		2.13	1.377													
881003		0.20	0.129													
881004		0.06	0.039													
881005		0.00														
881006		1.46	0.944													
881007		0.58	0.375													
881008		2.71	1.751													
881009		2.32	1.499													
881010		0.25	0.162													
881011		1.07	0.692													
881012		1.46	0.944													
881013		1.05	0.679	8.4	0.07	8.0		2650								LAB-CONOCO INST Q=2.18 CFS
881014		2.00	1.293													
881015		2.31	1.493													
881016		0.86	0.556													
881017		0.05	0.032													
881018		0.02	0.013													
881019		1.45	0.937	7.8	0.24	4.0	1.0	2986								LAB-ACZ INST Q=2.10 CFS
881020		2.32	1.499													
881021		0.78	0.504													
881022		0.30	0.194													
881023		0.75	0.485													
881024		2.31	1.493													
881025		2.17	1.402													
881026		0.20	0.129													
881027		0.04	0.026													
881028		0.02	0.013													
881029		1.64	1.060													
881030		2.43	1.571													
881031		2.32	1.499													
881101		0.32	0.207													
881102		0.08	0.052													
881103		0.03	0.019													
881104		0.13	0.084													
881105		2.07	1.338													
881106		2.22	1.435													
881107		1.75	1.131													
881108		0.46	0.297													
881109		1.24	0.801													
881110		0.71	0.459													
881111		2.24	1.448	8.2	0.16	8.0		3005								. INST Q=2.18 CFS
881112		2.22	1.435													
881113		0.35	0.226													
881114		0.89	0.575													
881115		1.93	1.247													
881116		1.03	0.666													
881117		2.24	1.448													

FOR THE FOURTH QUARTER 1988

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
881118		2.21	1.428	7.9	0.38	4.0		2962								LAB-ACZ INST Q=2.18 CFS
881119		1.05	0.679													
881120		0.03	0.019													
881121		0.00														
881122		0.00														
881123		0.00														
881124		0.00														
881125		0.00														
881126		0.00														
881127		0.00														
881128		0.00														
881129		0.04	0.026	7.9	0.28	8.0	1.0	2894								LAB-ACZ INST Q=1.98 CFS
881205		0.70	0.452	8.4	0.23	8.0		2483								LAB-CONOCO INST Q=2.39 CFS
881219		0.70	0.452	7.7	0.46	18.0	1.0	2942								LAB-ACZ INST Q=2.39 CFS

EMERY MINE - MONITORING WELL DATA

The following monitoring wells were sampled in 1988.

Emery Deep Mine Wells

Well Name	Water Bearing Unit(s)
Bryant	Upper Ferron S.S.
Emria 2	Bluegate Shale Upper Ferron S.S. Middle Ferron S.S. Lower Ferron S.S.
Kemmer	Lower Ferron S.S.
Lewis	Upper Ferron S.S.
TP	Upper Ferron S.S.
T1	Bluegate Shale
USGS 1-2	Upper Ferron S.S.
ZZ	Lower Ferron S.S.

Refuse Disposal Area Wells

RDA1	Quitchupah Alluvium
RDA2	Quitchupah Alluvium
RDA3	Quitchupah Alluvium
RDA4	Quitchupah Alluvium
RDA5	Quitchupah Alluvium
RDA6	Quitchupah Alluvium

Surface Mine Wells

SM1-1	Christiansen Alluvium
SM1-2	Christiansen Alluvium
SM1-3	Christiansen Alluvium
SM1-4	Christiansen Alluvium

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=BRYANT WATER BEARING UNIT=U

	RAW DATA			
	22MAR88	30JUN88	19OCT88	19DEC88
WATER DEPTH	290.4	314.3	287.4	288.3
WATER LEVEL ELEV	5730.4	5706.5	5733.4	5732.5
SP COND - LAB	2000	1980	1980	
PH - LAB	10.4	10.6	10.8	
TDS	1296.0	1306.0	1302.0	
ACIDITY,TOT	0.00	0.00	0.00	
ALKALINITY(CACO3)				
TOTAL	108.00	149.00	144.00	
NONCARBONATE	0.00	0.00	76.00	
ANIONS				
HCO3	0.00	2.44	0.00	
CO3	64.80	88.20	40.80	
CL	98.00	90.00	91.00	
SO4	759.00	737.00	718.00	
NO3(N)	0.29	0.06	0.01	
CATIONS				
NA	471.00	461.00	491.00	
K	4.00	4.00	4.00	
CA	6.00	4.00	1.00	
MG	9.00	7.00	3.00	
FE,TOT	14.80	0.54	1.72	
MN	0.02	0.01	0.01	
TRACE IONS				
AS				
B				
BA				
CD				
CR				
CU				
HG				
MO				
NI				
PB				
SE				
SR	0.610	0.270	0.140	
ZN				
OTHER IONS				
AL				
F	0.60	0.60	0.60	
FE,DISS	0.09	0.02	0.02	
S	1.60	0.40	0.40	
NH3(N)				
NO2(N)	0.01	0.01	0.01	
P-ORTHO	0.01	0.02	0.01	
P,TOT				
SIO2	0.10	0.90	0.10	
CALCULATED DATA				
HARDNESS	52	39	15	
NC HARDNESS				
SAR	28	32	56	
IONIC RATIOS(%)				
NA+K	95	96	99	
CA	1	1	0	
MG	3	3	1	
HCO3+CO3	10	14	7	
CL	13	12	14	
SO4	76	74	79	
TDS(SUM)	1412.9	1395.2	1349.5	
TDS(SUM)/SP COND	0.71	0.70	0.68	
TDS(CALC)	1412.9	1394.0	1349.5	
TDS/TDS(CALC)	0.92	0.94	0.96	
TOTAL CATIONS	21.63	20.93	21.76	
TOTAL ANIONS	20.78	20.90	20.43	
CAT-AN BALANCE	2.00	0.10	3.20	

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=BRYANT WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	295.1	287.4	314.3	4.0	12.9
WATER LEVEL ELEV	5725.7	5706.5	5733.4	4.0	12.9
SP COND - LAB	1987	1980	2000	3	12
PH - LAB	10.6	10.4	10.8	3.0	0.2
TDS	1301.3	1296.0	1306.0	3.0	5.0
ACIDITY,TOT	0.00	0.00	0.00	3.00	0.00
ALKALINITY(CACO3)					
TOTAL	133.67	108.00	149.00	3.00	22.37
NONCARBONATE	25.33	0.00	76.00	3.00	43.88
ANIONS					
HCO3	0.81	0.00	2.44	3.00	1.41
CO3	64.60	40.80	88.20	3.00	23.70
CL	93.00	90.00	98.00	3.00	4.36
SO4	738.00	718.00	759.00	3.00	20.52
NO3(N)	0.12	0.01	0.29	3.00	0.15
CATIONS					
NA	474.33	461.00	491.00	3.00	15.28
K	4.00	4.00	4.00	3.00	0.00
CA	3.67	1.00	6.00	3.00	2.52
MG	6.33	3.00	9.00	3.00	3.06
FE,TOT	5.69	0.54	14.80	3.00	7.91
MN	0.01	0.01	0.02	3.00	0.01
TRACE IONS					
AS				0.000	
B				0.000	
BA				0.000	
CD				0.000	
CR				0.000	
CU				0.000	
HG				0.0000	
MO				0.000	
NI				0.000	
PB				0.000	
SE				0.000	
SR	0.340	0.140	0.610	3.000	0.243
ZN				0.000	
OTHER IONS					
AL				0.00	
F	0.60	0.60	0.60	3.00	0.00
FE,DISS	0.04	0.02	0.09	3.00	0.04
S	0.80	0.40	1.60	3.00	0.69
NH3(N)				0.00	
NO2(N)	0.01	0.01	0.01	3.00	0.00
P-ORTHO	0.01	0.01	0.02	3.00	0.01
P,TOT				0.00	
SIO2	0.37	0.10	0.90	3.00	0.46
CALCULATED DATA					
HARDNESS	35	15	52	3	19
NC HARDNESS				0	
SAR	39	28	56	3	15
IONIC RATIOS(%)					
NA+K	97	95	99	3	2
CA	1	0	1	3	1
MG	2	1	3	3	1
HCO3+CO3	11	7	14	3	4
CL	13	12	14	3	1
SO4	76	74	79	3	3
TDS(SUM)	1385.9	1349.5	1412.9	3.0	32.7
TDS(SUM)/SP COND	0.70	0.68	0.71	3.00	0.01
TDS(CALC)	1385.5	1349.5	1412.9	3.0	32.5
TDS/TDS(CALC)	0.94	0.92	0.96	3.00	0.02
TOTAL CATIONS	21.44	20.93	21.76	3.00	0.45
TOTAL ANIONS	20.70	20.43	20.90	3.00	0.24
CAT-AN BALANCE	1.77	0.10	3.20	3.00	1.56

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=EMRIA2 WATER BEARING UNIT=BGUML

	RAW DATA				
	21MAR88	22MAR88	09JUN88	20OCT88	23DEC88
WATER DEPTH		26.7	30.8	32.7	33.5
WATER LEVEL ELEV		6055.6	6051.5	6049.6	6048.8
SP COND - LAB	3950		4880	4180	
PH - LAB	7.1		7.8	7.7	
TDS	5242.0		5730.0	5324.0	
ACIDITY,TOT	0.00		0.00	0.00	
ALKALINITY(CACO3)					
TOTAL	423.00		457.00	418.00	
NONCARBONATE	0.00		0.00	0.00	
ANIONS					
HCO3	516.06		557.54	509.96	
CO3	0.00		0.00	0.00	
CL	43.00		49.00	43.00	
SO4	3297.00		3614.00	3101.00	
NO3(N)	1.71		1.47	1.50	
CATIONS					
NA	299.00		345.00	314.00	
K	17.00		18.00	18.00	
CA	439.00		455.00	425.00	
MG	513.00		528.00	549.00	
FE,TOT	1.30		0.44	0.21	
MN	1.48		1.11	0.88	
TRACE IONS					
AS					
B					
BA					
CD					
CR					
CU					
HG					
MO					
NI					
PB					
SE					
SR	5.150		5.250	5.700	
ZN					
OTHER IONS					
AL					
F	0.40		0.40	0.50	
FE,DISS	0.02		0.02	0.02	
S	0.20		0.20	0.20	
NH3(N)					
NO2(N)	0.03		0.02	0.02	
P-ORTHO	0.04		0.03	0.03	
P,TOT					
SIO2	6.30		7.10	6.40	
CALCULATED DATA					
HARDNESS	3201		3302	3313	
NC HARDNESS					
SAR	2		3	2	
IONIC RATIOS(%)					
NA+K	17		19	18	
CA	28		28	26	
MG	54		53	56	
HCO3+CO3	11		11	11	
CL	2		2	2	
SO4	88		88	87	
TDS(SUM)	5134.0		5576.7	4969.3	
TDS(SUM)/SP COND	1.30		1.14	1.19	
TDS(CALC)	4871.7		5293.3	4710.1	
TDS/TDS(CALC)	1.08		1.08	1.13	
TOTAL CATIONS	77.60		81.65	80.52	
TOTAL ANIONS	78.46		85.89	74.27	
CAT-AN BALANCE	-0.60		-2.50	4.00	

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=EMRIA2 WATER BEARING UNIT=BGUML

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	30.9	26.7	33.5	4.0	3.0
WATER LEVEL ELEV	6051.4	6048.8	6055.6	4.0	3.0
SP COND - LAB	4337	3950	4880	3	484
PH - LAB	7.5	7.1	7.8	3.0	0.4
TDS	5432.0	5242.0	5730.0	3.0	261.3
ACIDITY,TOT	0.00	0.00	0.00	3.00	0.00
ALKALINITY(CACO3)					
TOTAL	432.67	418.00	457.00	3.00	21.22
NONCARBONATE	0.00	0.00	0.00	3.00	0.00
ANIONS					
HCO3	527.85	509.96	557.54	3.00	25.89
CO3	0.00	0.00	0.00	3.00	0.00
CL	45.00	43.00	49.00	3.00	3.46
SO4	3337.33	3101.00	3614.00	3.00	258.87
NO3(N)	1.56	1.47	1.71	3.00	0.13
CATIONS					
NA	319.33	299.00	345.00	3.00	23.46
K	17.67	17.00	18.00	3.00	0.58
CA	439.67	425.00	455.00	3.00	15.01
MG	530.00	513.00	549.00	3.00	18.08
FE,TOT	0.65	0.21	1.30	3.00	0.57
MN	1.16	0.88	1.48	3.00	0.30
TRACE IONS					
AS				0.000	
B				0.000	
BA				0.000	
CD				0.000	
CR				0.000	
CU				0.000	
HG				0.0000	
MO				0.000	
NI				0.000	
PB				0.000	
SE				0.000	
SR	5.367	5.150	5.700	3.000	0.293
ZN				0.000	
OTHER IONS					
AL				0.00	
F	0.43	0.40	0.50	3.00	0.06
FE,DISS	0.02	0.02	0.02	3.00	0.00
S	0.20	0.20	0.20	3.00	0.00
NH3(N)				0.00	
NO2(N)	0.02	0.02	0.03	3.00	0.01
P-ORTHO	0.03	0.03	0.04	3.00	0.01
P,TOT				0.00	
SIO2	6.60	6.30	7.10	3.00	0.44
CALCULATED DATA					
HARDNESS	3272	3201	3313	3	62
NC HARDNESS				0	
SAR	2	2	3	3	0
IONIC RATIOS(%)					
NA+K	18	17	19	3	1
CA	27	26	28	3	1
MG	55	53	56	3	1
HCO3+CO3	11	11	11	3	0
CL	2	2	2	3	0
SO4	87	87	88	3	0
TDS(SUM)	5226.6	4969.3	5576.7	3.0	314.1
TDS(SUM)/SP COND	1.21	1.14	1.30	3.00	0.08
TDS(CALC)	4958.3	4710.1	5293.3	3.0	301.1
TDS/TDS(CALC)	1.10	1.08	1.13	3.00	0.03
TOTAL CATIONS	79.92	77.60	81.65	3.00	2.09
TOTAL ANIONS	79.54	74.27	85.89	3.00	5.89
CAT-AN BALANCE	0.30	-2.50	4.00	3.00	3.34

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=KEMMER WATER BEARING UNIT=L

	RAW DATA			
	22MAR88	09JUN88	20OCT88	27DEC88
WATER DEPTH	-26.0	-26.0	-26.0	-25.0
WATER LEVEL ELEV	6310.7	6310.7	6310.7	6309.7
SP COND - LAB	1010	1020	1130	
PH - LAB	9.3	9.3	9.2	
TDS	628.0	632.0	778.0	
ACIDITY,TOT	0.00	0.00	0.00	
ALKALINITY(CACO3)				
TOTAL	254.00	264.00	244.00	
NONCARBONATE	0.00	0.00	0.00	
ANIONS				
HCO3	208.62	244.00	219.60	
CO3	49.80	38.40	38.40	
CL	23.00	20.00	28.00	
SO4	247.00	282.00	350.00	
NO3(N)	0.06	0.03	0.08	
CATIONS				
NA	244.00	266.00	268.00	
K	3.00	4.00	4.00	
CA	5.00	10.00	10.00	
MG	8.00	10.00	21.00	
FE,TOT	5.05	1.89	1.76	
MN	0.01	0.01	0.01	
TRACE IONS				
AS				
B				
BA				
CD				
CR				
CU				
HG				
MO				
NI				
PB				
SE				
SR	0.840	0.900	0.610	
ZN				
OTHER IONS				
AL				
F	0.50	0.60	0.80	
FE,DISS	0.05	0.09	0.24	
S	0.20	0.30	0.50	
NH3(N)				
NO2(N)	0.01	0.01	0.01	
P-ORTHO	0.02	0.01	0.05	
P,TOT				
SIO2	7.40	8.70	11.90	
CALCULATED DATA				
HARDNESS	45	66	111	
NC HARDNESS				
SAR	16	14	11	
IONIC RATIOS(%)				
NA+K	92	90	84	
CA	2	4	4	
MG	6	6	12	
HCO3+CO3	47	45	38	
CL	6	5	6	
SO4	47	50	56	
TDS(SUM)	796.4	883.8	952.0	
TDS(SUM)/SP COND	0.79	0.87	0.84	
TDS(CALC)	690.4	759.8	840.4	
TDS/TDS(CALC)	0.91	0.83	0.93	
TOTAL CATIONS	11.60	13.00	14.00	
TOTAL ANIONS	10.90	11.75	13.01	
CAT-AN BALANCE	3.10	5.00	3.70	

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=KEMMER WATER BEARING UNIT=L

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	-25.8	-26.0	-25.0	4.0	0.5
WATER LEVEL ELEV	6310.4	6309.7	6310.7	4.0	0.5
SP COND - LAB	1053	1010	1130	3	67
PH - LAB	9.3	9.2	9.3	3.0	0.1
TDS	679.3	628.0	778.0	3.0	85.5
ACIDITY,TOT	0.00	0.00	0.00	3.00	0.00
ALKALINITY(CACO3)					
TOTAL	254.00	244.00	264.00	3.00	10.00
NONCARBONATE	0.00	0.00	0.00	3.00	0.00
ANIONS					
HCO3	224.07	208.62	244.00	3.00	18.11
CO3	42.20	38.40	49.80	3.00	6.58
CL	23.67	20.00	28.00	3.00	4.04
SO4	293.00	247.00	350.00	3.00	52.37
NO3(N)	0.06	0.03	0.08	3.00	0.03
CATIONS					
NA	259.33	244.00	268.00	3.00	13.32
K	3.67	3.00	4.00	3.00	0.58
CA	8.33	5.00	10.00	3.00	2.89
MG	13.00	8.00	21.00	3.00	7.00
FE,TOT	2.90	1.76	5.05	3.00	1.86
MN	0.01	0.01	0.01	3.00	0.00
TRACE IONS					
AS				0.000	
B				0.000	
BA				0.000	
CD				0.000	
CR				0.000	
CU				0.000	
HG				0.0000	
MO				0.000	
NI				0.000	
PB				0.000	
SE				0.000	
SR	0.783	0.610	0.900	3.000	0.153
ZN				0.000	
OTHER IONS					
AL				0.00	
F	0.63	0.50	0.80	3.00	0.15
FE,DISS	0.13	0.05	0.24	3.00	0.10
S	0.33	0.20	0.50	3.00	0.15
NH3(N)				0.00	
NO2(N)	0.01	0.01	0.01	3.00	0.00
P-ORTHO	0.03	0.01	0.05	3.00	0.02
P,TOT				0.00	
SIO2	9.33	7.40	11.90	3.00	2.32
CALCULATED DATA					
HARDNESS	74	45	111	3	34
NC HARDNESS				0	
SAR	14	11	16	3	2
IONIC RATIOS(%)					
NA+K	89	84	92	3	4
CA	3	2	4	3	1
MG	8	6	12	3	4
HCO3+CO3	43	38	47	3	5
CL	6	5	6	3	1
SO4	51	47	56	3	5
TDS(SUM)	877.4	796.4	952.0	3.0	78.0
TDS(SUM)/SP COND	0.83	0.79	0.87	3.00	0.04
TDS(CALC)	763.5	690.4	840.4	3.0	75.1
TDS/TDS(CALC)	0.89	0.83	0.93	3.00	0.05
TOTAL CATIONS	12.86	11.60	14.00	3.00	1.20
TOTAL ANIONS	11.89	10.90	13.01	3.00	1.06
CAT-AN BALANCE	3.93	3.10	5.00	3.00	0.97

FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=LEWIS WATER BEARING UNIT=U

	RAW DATA		
	30JUN88	25OCT88	29DEC88
WATER DEPTH			
WATER LEVEL ELEV			
SP COND - LAB	1310		
PH - LAB	8.9		
TDS	914.0		
ACIDITY,TOT	0.00		
ALKALINITY(CACO3)			
TOTAL	314.00		
NONCARBONATE	0.00		
ANIONS			
HCO3	353.80		
CO3	14.40		
CL	30.00		
SO4	366.00		
NO3(N)	0.02		
CATIONS			
NA	328.00		
K	2.00		
CA	2.00		
MG	2.00		
FE,TOT	0.02		
MN	0.01		
TRACE IONS			
AS			
B			
BA			
CD			
CR			
CU			
HG			
MO			
NI			
PB			
SE			
SR	0.540		
ZN			
OTHER IONS			
AL			
F	0.90		
FE,DISS	0.02		
S	0.30		
NH3(N)			
NO2(N)	0.01		
P-ORTHO	0.01		
P,TOT			
SIO2	9.50		
CALCULATED DATA			
HARDNESS	13		
NC HARDNESS			
SAR	39		
IONIC RATIOS(%)			
NA+K	98		
CA	1		
MG	1		
HCO3+CO3	43		
CL	6		
SO4	52		
TDS(SUM)	1108.7		
TDS(SUM)/SP COND	0.85		
TDS(CALC)	928.8		
TDS/TDS(CALC)	0.98		
TOTAL CATIONS	14.58		
TOTAL ANIONS	14.80		
CAT-AN BALANCE	-0.70		

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=LEWIS WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH				0.0	
WATER LEVEL ELEV				0.0	
SP COND - LAB	1310	1310	1310	1	
PH - LAB	8.8	8.8	8.8	1.0	
TDS	914.0	914.0	914.0	1.0	
ACIDITY,TOT	0.00	0.00	0.00	1.00	
ALKALINITY(CACO3)					
TOTAL	314.00	314.00	314.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	353.80	353.80	353.80	1.00	
CO3	14.40	14.40	14.40	1.00	
CL	30.00	30.00	30.00	1.00	
SO4	366.00	366.00	366.00	1.00	
NO3(N)	0.02	0.02	0.02	1.00	
CATIONS					
NA	328.00	328.00	328.00	1.00	
K	2.00	2.00	2.00	1.00	
CA	2.00	2.00	2.00	1.00	
MG	2.00	2.00	2.00	1.00	
FE,TOT	0.02	0.02	0.02	1.00	
MN	0.01	0.01	0.01	1.00	
TRACE IONS					
AS				0.000	
B				0.000	
BA				0.000	
CD				0.000	
CR				0.000	
CU				0.000	
HG				0.0000	
MO				0.000	
NI				0.000	
PB				0.000	
SE				0.000	
SR	0.540	0.540	0.540	1.000	
ZN				0.000	
OTHER IONS					
AL				0.00	
F	0.90	0.90	0.90	1.00	
FE,DISS	0.02	0.02	0.02	1.00	
S	0.30	0.30	0.30	1.00	
NH3(N)				0.00	
NO2(N)	0.01	0.01	0.01	1.00	
P-ORTHO	0.01	0.01	0.01	1.00	
P,TOT				0.00	
SIO2	9.50	9.50	9.50	1.00	
CALCULATED DATA					
HARDNESS	13	13	13	1	
NC HARDNESS				0	
SAR	39	39	39	1	
IONIC RATIOS(%)					
NA+K	98	98	98	1	
CA	1	1	1	1	
MG	1	1	1	1	
HCO3+CO3	43	43	43	1	
CL	6	6	6	1	
SO4	52	52	52	1	
TDS(SUM)	1108.7	1108.7	1108.7	1.0	
TDS(SUM)/SP COND	0.85	0.85	0.85	1.00	
TDS(CALC)	928.8	928.8	928.8	1.0	
TDS/TDS(CALC)	0.98	0.98	0.98	1.00	
TOTAL CATIONS	14.58	14.58	14.58	1.00	
TOTAL ANIONS	14.80	14.80	14.80	1.00	
CAT-AN BALANCE	-0.70	-0.70	-0.70	1.00	

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=TP WATER BEARING UNIT=U

	RAW DATA			
	25MAR88	09JUN88	25OCT88	29DEC88
WATER DEPTH	332.2	332.1		
WATER LEVEL ELEV	5669.7	5669.8		
SP COND - LAB		1780	1570	
PH - LAB		10.3	10.3	
TDS		1046.0	1018.0	
ACIDITY,TOT		0.00	0.00	
ALKALINITY(CACO3)				
TOTAL		487.00	470.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		122.00	85.40	
CO3		232.20	240.00	
CL		48.00	47.00	
SO4		405.00	247.00	
NO3(N)		0.03	0.01	
CATIONS				
NA		463.00	358.00	
K		2.00	1.00	
CA		2.00	2.00	
MG		2.00	1.00	
FE,TOT		31.00	1.56	
MN		0.01	0.01	
TRACE IONS				
AS				
B				
BA				
CD				
CR				
CU				
HG				
MO				
NI				
PB				
SE				
SR		0.070	0.160	
ZN				
OTHER IONS				
AL				
F		0.90	1.00	
FE,DISS		0.04	0.04	
S		3.60	6.50	
NH3(N)				
NO2(N)		0.01	0.01	
P-ORTHO		0.02	0.03	
P,TOT				
SIO2		4.20	4.50	
CALCULATED DATA				
HARDNESS		13	9	
NC HARDNESS				
SAR		55	52	
IONIC RATIOS(%)				
NA+K		99	99	
CA		0	1	
MG		1	1	
HCO3+CO3		50	59	
CL		7	8	
SO4		43	32	
TDS(SUM)		1281.4	987.0	
TDS(SUM)/SP COND		0.72	0.63	
TDS(CALC)		1219.4	943.6	
TDS/TDS(CALC)		0.86	1.08	
TOTAL CATIONS		20.46	15.78	
TOTAL ANIONS		19.58	15.92	
CAT-AN BALANCE		2.20	-0.40	

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=TP WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	332.1	332.1	332.2	2.0	0.1
WATER LEVEL ELEV	5669.7	5669.7	5669.8	2.0	0.1
SP COND - LAB	1675	1570	1780	2	148
PH - LAB	10.3	10.3	10.3	2.0	0.0
TDS	1032.0	1018.0	1046.0	2.0	19.8
ACIDITY,TOT	0.00	0.00	0.00	2.00	0.00
ALKALINITY(CACO3)					
TOTAL	478.50	470.00	487.00	2.00	12.02
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	103.70	85.40	122.00	2.00	25.88
CO3	236.10	232.20	240.00	2.00	5.52
CL	47.50	47.00	48.00	2.00	0.71
SO4	326.00	247.00	405.00	2.00	111.72
NO3(N)	0.02	0.01	0.03	2.00	0.01
CATIONS					
NA	410.50	358.00	463.00	2.00	74.25
K	1.50	1.00	2.00	2.00	0.71
CA	2.00	2.00	2.00	2.00	0.00
MG	1.50	1.00	2.00	2.00	0.71
FE,TOT	16.28	1.56	31.00	2.00	20.82
MN	0.01	0.01	0.01	2.00	0.00
TRACE IONS					
AS				0.000	
B				0.000	
BA				0.000	
CD				0.000	
CR				0.000	
CU				0.000	
HG				0.0000	
MO				0.000	
NI				0.000	
PB				0.000	
SE				0.000	
SR	0.115	0.070	0.160	2.000	0.064
ZN				0.000	
OTHER IONS					
AL				0.00	
F	0.95	0.90	1.00	2.00	0.07
FE,DISS	0.04	0.04	0.04	2.00	0.00
S	5.05	3.60	6.50	2.00	2.05
NH3(N)				0.00	
NO2(N)	0.01	0.01	0.01	2.00	0.00
P-ORTHO	0.02	0.02	0.03	2.00	0.01
P,TOT				0.00	
SIO2	4.35	4.20	4.50	2.00	0.21
CALCULATED DATA					
HARDNESS	11	9	13	2	3
NC HARDNESS				0	
SAR	53	52	55	2	3
IONIC RATIOS(%)					
NA+K	99	99	99	2	0
CA	1	0	1	2	0
MG	1	1	1	2	0
HCO3+CO3	55	50	59	2	7
CL	8	7	8	2	1
SO4	38	32	43	2	8
TDS(SUM)	1134.2	987.0	1281.4	2.0	208.2
TDS(SUM)/SP COND	0.67	0.63	0.72	2.00	0.06
TDS(CALC)	1081.5	943.6	1219.4	2.0	195.0
TDS/TDS(CALC)	0.97	0.86	1.08	2.00	0.16
TOTAL CATIONS	18.12	15.78	20.46	2.00	3.31
TOTAL ANIONS	17.75	15.92	19.58	2.00	2.58
CAT-AN BALANCE	0.90	-0.40	2.20	2.00	1.84

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=T1 WATER BEARING UNIT=BG

	RAW DATA			
	25MAR88	09JUN88	21OCT88	29DEC88
WATER DEPTH	10.2	11.2	11.2	10.9
WATER LEVEL ELEV	5990.7	5989.7	5989.7	5990.0
SP COND - LAB		17200	11300	
PH - LAB		8.2	8.3	
TDS		17918.0	14300.0	
ACIDITY,TOT		0.00	0.00	
ALKALINITY(CACO3)				
TOTAL		387.00	352.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		472.14	429.44	
CO3		0.00	0.00	
CL		137.00	72.00	
SO4		12220	10496	
NO3(N)		0.02	0.06	
CATIONS				
NA		5200.00	4290.00	
K		28.00	23.00	
CA		392.00	287.00	
MG		316.00	240.00	
FE,TOT		0.74	0.86	
MN		0.40	0.46	
TRACE IONS				
AS				
B				
BA				
CD				
CR				
CU				
HG				
MO				
NI				
PB				
SE				
SR		4.800	5.000	
ZN				
OTHER IONS				
AL				
F		0.80	0.90	
FE,DISS		0.02	0.02	
S		0.20	0.40	
NH3(N)				
NO2(N)		0.01	0.01	
P-ORTHO		0.06	0.03	
P,TOT				
SIO2		5.70	6.80	
CALCULATED DATA				
HARDNESS		2276	1702	
NC HARDNESS				
SAR		47	45	
IONIC RATIOS(%)				
NA+K		83	85	
CA		7	6	
MG		10	9	
HCO3+CO3		3	3	
CL		1	1	
SO4		96	96	
TDS(SUM)		18772.1	15845.7	
TDS(SUM)/SP COND		1.09	1.40	
TDS(CALC)		18532.1	15627.4	
TDS/TDS(CALC)		0.97	0.92	
TOTAL CATIONS		272.49	221.28	
TOTAL ANIONS		266.07	227.65	
CAT-AN BALANCE		1.20	-1.40	

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=T1 WATER BEARING UNIT=BG

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	10.9	10.2	11.2	4.0	0.5
WATER LEVEL ELEV	5990.0	5989.7	5990.7	4.0	0.5
SP COND - LAB	14250	11300	17200	2	4172
PH - LAB	8.2	8.2	8.3	2.0	0.1
TDS	16109.0	14300.0	17918.0	2.0	2558.3
ACIDITY,TOT	0.00	0.00	0.00	2.00	0.00
ALKALINITY(CACO3)					
TOTAL	369.50	352.00	387.00	2.00	24.75
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	450.79	429.44	472.14	2.00	30.19
CO3	0.00	0.00	0.00	2.00	0.00
CL	104.50	72.00	137.00	2.00	45.96
SO4	11358	10496	12220	2.00	1219.05
NO3(N)	0.04	0.02	0.06	2.00	0.03
CATIONS					
NA	4745.00	4290.00	5200.00	2.00	643.47
K	25.50	23.00	28.00	2.00	3.54
CA	339.50	287.00	392.00	2.00	74.25
MG	278.00	240.00	316.00	2.00	53.74
FE,TOT	0.80	0.74	0.86	2.00	0.08
MN	0.43	0.40	0.46	2.00	0.04
TRACE IONS					
AS				0.000	
B				0.000	
BA				0.000	
CD				0.000	
CR				0.000	
CU				0.000	
HG				0.0000	
MO				0.000	
NI				0.000	
PB				0.000	
SE				0.000	
SR	4.900	4.800	5.000	2.000	0.141
ZN				0.000	
OTHER IONS					
AL				0.00	
F	0.85	0.80	0.90	2.00	0.07
FE,DISS	0.02	0.02	0.02	2.00	0.00
S	0.30	0.20	0.40	2.00	0.14
NH3(N)				0.00	
NO2(N)	0.01	0.01	0.01	2.00	0.00
P-ORTHO	0.04	0.03	0.06	2.00	0.02
P,TOT				0.00	
SIO2	6.25	5.70	6.80	2.00	0.78
CALCULATED DATA					
HARDNESS	1989	1702	2276	2	406
NC HARDNESS				0	
SAR	46	45	47	2	2
IONIC RATIOS(%)					
NA+K	84	83	85	2	1
CA	7	6	7	2	0
MG	9	9	10	2	0
HCO3+CO3	3	3	3	2	0
CL	1	1	1	2	0
SO4	96	96	96	2	0
TDS(SUM)	17308.9	15845.7	18772.1	2.0	2069.3
TDS(SUM)/SP COND	1.25	1.09	1.40	2.00	0.22
TDS(CALC)	17079.8	15627.4	18532.1	2.0	2053.9
TDS/TDS(CALC)	0.94	0.92	0.97	2.00	0.04
TOTAL CATIONS	246.89	221.28	272.49	2.00	36.21
TOTAL ANIONS	246.86	227.65	266.07	2.00	27.17
CAT-AN BALANCE	-0.10	-1.40	1.20	2.00	1.84

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=USGS1-2 WATER BEARING UNIT=U

	RAW DATA			
	22MAR88	09JUN88	20OCT88	29DEC88
WATER DEPTH	88.2	89.0	89.9	92.1
WATER LEVEL ELEV	5957.5	5956.7	5955.8	5953.6
SP COND - LAB		2250	2800	
PH - LAB		8.0	7.5	
TDS		1760.0	2820.0	
ACIDITY,TOT		0.00	0.00	
ALKALINITY(CACO3)				
TOTAL		434.00	418.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		529.48	509.96	
CO3		0.00	0.00	
CL		37.00	46.00	
SO4		973.00	1611.00	
NO3(N)		0.02	0.06	
CATIONS				
NA		370.00	456.00	
K		5.00	6.00	
CA		116.00	211.00	
MG		88.00	178.00	
FE,TOT		0.47	2.13	
MN		0.09	0.18	
TRACE IONS				
AS				
B				
BA				
CD				
CR				
CU				
HG				
MO				
NI				
PB				
SE				
SR		4.600	7.400	
ZN				
OTHER IONS				
AL				
F		1.00	1.00	
FE,DISS		0.12	0.02	
S		3.90	13.80	
NH3(N)				
NO2(N)		0.01	0.01	
P-ORTHO		0.02	0.01	
P,TOT				
SIO2		17.00	18.50	
CALCULATED DATA				
HARDNESS		651	1257	
NC HARDNESS				
SAR		6	6	
IONIC RATIOS(%)				
NA+K		55	44	
CA		20	23	
MG		25	32	
HCO3+CO3		29	19	
CL		3	3	
SO4		68	78	
TDS(SUM)		2136.7	3037.7	
TDS(SUM)/SP COND		0.95	1.08	
TDS(CALC)		1867.6	2778.5	
TDS/TDS(CALC)		0.94	1.01	
TOTAL CATIONS		29.26	45.17	
TOTAL ANIONS		30.04	43.26	
CAT-AN BALANCE		-1.30	2.20	

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=USGS1-2 WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	89.8	88.2	92.1	4.0	1.7
WATER LEVEL ELEV	5955.9	5953.6	5957.5	4.0	1.7
SP COND - LAB	2525	2250	2800	2	389
PH - LAB	7.8	7.5	8.0	2.0	0.4
TDS	2290.0	1760.0	2820.0	2.0	749.5
ACIDITY,TOT	0.00	0.00	0.00	2.00	0.00
ALKALINITY(CACO3)					
TOTAL	426.00	418.00	434.00	2.00	11.31
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	519.72	509.96	529.48	2.00	13.80
CO3	0.00	0.00	0.00	2.00	0.00
CL	41.50	37.00	46.00	2.00	6.36
SO4	1292.00	973.00	1611.00	2.00	451.13
NO3(N)	0.04	0.02	0.06	2.00	0.03
CATIONS					
NA	413.00	370.00	456.00	2.00	60.81
K	5.50	5.00	6.00	2.00	0.71
CA	163.50	116.00	211.00	2.00	67.18
MG	133.00	88.00	178.00	2.00	63.64
FE,TOT	1.30	0.47	2.13	2.00	1.17
MN	0.13	0.09	0.18	2.00	0.06
TRACE IONS					
AS				0.000	
B				0.000	
BA				0.000	
CD				0.000	
CR				0.000	
CU				0.000	
HG				0.0000	
MO				0.000	
NI				0.000	
PB				0.000	
SE				0.000	
SR	6.000	4.600	7.400	2.000	1.980
ZN				0.000	
OTHER IONS					
AL				0.00	
F	1.00	1.00	1.00	2.00	0.00
FE,DISS	0.07	0.02	0.12	2.00	0.07
S	8.85	3.90	13.80	2.00	7.00
NH3(N)				0.00	
NO2(N)	0.01	0.01	0.01	2.00	0.00
P-ORTHO	0.01	0.01	0.02	2.00	0.01
P,TOT				0.00	
SIO2	17.75	17.00	18.50	2.00	1.06
CALCULATED DATA					
HARDNESS	954	651	1257	2	429
NC HARDNESS				0	
SAR	6	6	6	2	0
IONIC RATIOS(%)					
NA+K	50	44	55	2	8
CA	22	20	23	2	2
MG	29	25	32	2	5
HCO3+CO3	24	19	29	2	7
CL	3	3	3	2	0
SO4	73	68	78	2	7
TDS(SUM)	2587.2	2136.7	3037.7	2.0	637.1
TDS(SUM)/SP COND	1.02	0.95	1.08	2.00	0.10
TDS(CALC)	2323.1	1867.6	2778.5	2.0	644.1
TDS/TDS(CALC)	0.98	0.94	1.01	2.00	0.05
TOTAL CATIONS	37.21	29.26	45.17	2.00	11.25
TOTAL ANIONS	36.65	30.04	43.26	2.00	9.35
CAT-AN BALANCE	0.45	-1.30	2.20	2.00	2.47

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=ZZ WATER BEARING UNIT=L

	RAW DATA			
	22MAR88	09JUN88	21OCT88	29DEC88
WATER DEPTH	144.6	145.0	145.0	145.3
WATER LEVEL ELEV	5921.1	5920.7	5920.7	5920.4
SP COND - LAB		1150	1180	
PH - LAB		9.4	9.5	
TDS		734.0	752.0	
ACIDITY,TOT		0.00	0.00	
ALKALINITY(CACO3)				
TOTAL		600.00	550.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		503.86	412.36	
CO3		112.20	127.20	
CL		16.00	17.00	
SO4		54.00	86.00	
NO3(N)		0.02	0.04	
CATIONS				
NA		306.00	265.00	
K		3.00	3.00	
CA		4.00	2.00	
MG		6.00	11.00	
FE,TOT		0.28	0.04	
MN		0.01	0.01	
TRACE IONS				
AS				
B				
BA				
CD				
CR				
CU				
HG				
MO				
NI				
PB				
SE				
SR		0.390	0.290	
ZN				
OTHER IONS				
AL				
F		2.20	2.40	
FE,DISS		0.02	0.02	
S		1.90	13.40	
NH3(N)				
NO2(N)		0.01	0.01	
P-ORTHO		0.01	0.02	
P,TOT				
SIO2		5.40	4.50	
CALCULATED DATA				
HARDNESS		35	50	
NC HARDNESS				
SAR		23	16	
IONIC RATIOS(%)				
NA+K		95	92	
CA		1	1	
MG		4	7	
HCO3+CO3		88	83	
CL		3	4	
SO4		8	13	
TDS(SUM)		1012.7	930.5	
TDS(SUM)/SP COND		0.88	0.79	
TDS(CALC)		756.6	720.9	
TDS/TDS(CALC)		0.97	1.04	
TOTAL CATIONS		14.08	12.61	
TOTAL ANIONS		13.69	13.40	
CAT-AN BALANCE		1.40	-3.00	

FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
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NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=ZZ WATER BEARING UNIT=L

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	145.0	144.6	145.3	4.0	0.3
WATER LEVEL ELEV	5920.7	5920.4	5921.1	4.0	0.3
SP COND - LAB	1165	1150	1180	2	21
PH - LAB	9.4	9.4	9.5	2.0	0.1
TDS	743.0	734.0	752.0	2.0	12.7
ACIDITY,TOT	0.00	0.00	0.00	2.00	0.00
ALKALINITY(CACO3)					
TOTAL	575.00	550.00	600.00	2.00	35.36
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	458.11	412.36	503.86	2.00	64.70
CO3	119.70	112.20	127.20	2.00	10.61
CL	16.50	16.00	17.00	2.00	0.71
SO4	70.00	54.00	86.00	2.00	22.63
NO3(N)	0.03	0.02	0.04	2.00	0.01
CATIONS					
NA	285.50	265.00	306.00	2.00	28.99
K	3.00	3.00	3.00	2.00	0.00
CA	3.00	2.00	4.00	2.00	1.41
MG	8.50	6.00	11.00	2.00	3.54
FE,TOT	0.16	0.04	0.28	2.00	0.17
MN	0.01	0.01	0.01	2.00	0.00
TRACE IONS					
AS				0.000	
B				0.000	
BA				0.000	
CD				0.000	
CR				0.000	
CU				0.000	
HG				0.0000	
MO				0.000	
NI				0.000	
PB				0.000	
SE				0.000	
SR	0.340	0.290	0.390	2.000	0.071
ZN				0.000	
OTHER IONS					
AL				0.00	
F	2.30	2.20	2.40	2.00	0.14
FE,DISS	0.02	0.02	0.02	2.00	0.00
S	7.65	1.90	13.40	2.00	8.13
NH3(N)				0.00	
NO2(N)	0.01	0.01	0.01	2.00	0.00
P-ORTHO	0.01	0.01	0.02	2.00	0.01
P,TOT				0.00	
SIO2	4.95	4.50	5.40	2.00	0.64
CALCULATED DATA					
HARDNESS	43	35	50	2	11
NC HARDNESS				0	
SAR	19	16	23	2	4
IONIC RATIOS(%)					
NA+K	94	92	95	2	2
CA	1	1	1	2	0
MG	5	4	7	2	3
HCO3+CO3	86	83	88	2	4
CL	3	3	4	2	0
SO4	11	8	13	2	4
TDS(SUM)	971.6	930.5	1012.7	2.0	58.1
TDS(SUM)/SP COND	0.83	0.79	0.88	2.00	0.07
TDS(CALC)	738.8	720.9	756.6	2.0	25.2
TDS/TDS(CALC)	1.01	0.97	1.04	2.00	0.05
TOTAL CATIONS	13.35	12.61	14.08	2.00	1.04
TOTAL ANIONS	13.55	13.40	13.69	2.00	0.21
CAT-AN BALANCE	-0.80	-3.00	1.40	2.00	3.11

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
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NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA1 WATER BEARING UNIT=QAL

	RAW DATA			
	17FEB88	08JUN88	26SEP88	19DEC88
WATER DEPTH	12.3	12.8	13.8	13.2
WATER LEVEL ELEV	5945.5	5945.0	5944.0	5944.6
SP COND - LAB	3390	4150	3810	4440
PH - LAB	7.2	7.5	7.7	7.1
TDS	3734.0	4234.0	3848.0	3834.0
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	521.00	463.00	430.00	456.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	635.62	564.86	524.60	556.32
CO3	0.00	0.00	0.00	0.00
CL	121.00	133.00	113.00	117.00
SO4	2181.00	2461.00	2179.00	2272.00
NO3(N)	0.23	2.21	0.18	0.54
CATIONS				
NA	512.00	612.00	514.00	505.00
K	15.00	14.00	13.00	12.00
CA	476.00	392.00	435.00	413.00
MG	195.00	196.00	182.00	190.00
FE,TOT				
MN	0.08	0.42	0.57	0.40
TRACE IONS				
AS	0.001	0.001	0.001	0.001
B	0.610	0.660	0.580	0.610
BA	0.010	0.030	0.010	0.010
CD	0.005	0.005	0.005	0.005
CR	0.010	0.010	0.010	
CU	0.010	0.010	0.010	0.010
HG	0.0002	0.0002	0.0001	0.0001
MO	0.050	0.050	0.050	0.050
NI	0.020	0.020	0.030	0.020
PB	0.020	0.020	0.020	0.020
SE	0.001	0.004	0.001	0.002
SR	4.100	4.750	3.950	4.100
ZN	0.050	0.040	0.020	0.020
OTHER IONS				
AL	0.06	0.05	0.05	0.05
F	0.50	0.50	0.50	0.40
FE,DISS	0.02	0.13	0.12	0.03
S				
NH3(N)	0.32	0.13	0.38	0.04
NO2(N)	0.01	0.03	0.02	0.01
P-ORTHO	0.03	0.03	0.01	0.01
P,TOT				
SIO2				
CALCULATED DATA				
HARDNESS	1990	1784	1834	1812
NC HARDNESS				
SAR	5	6	5	5
IONIC RATIOS(%)				
NA+K	36	43	38	38
CA	38	31	37	35
MG	26	26	25	27
HCO3+CO3	18	14	15	15
CL	6	6	6	6
SO4	77	80	79	79
TDS(SUM)	4137.2	4377.0	3962.7	4067.4
TDS(SUM)/SP COND	1.22	1.05	1.04	0.92
TDS(CALC)	3814.2	4089.8	3696.1	3784.7
TDS/TDS(CALC)	0.98	1.04	1.04	1.01
TOTAL CATIONS	62.45	62.68	59.39	58.53
TOTAL ANIONS	59.29	64.44	57.20	59.78
CAT-AN BALANCE	2.60	-1.40	1.90	-1.10

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA1 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	13.0	12.3	13.8	4.0	0.6
WATER LEVEL ELEV	5944.8	5944.0	5945.5	4.0	0.6
SP COND - LAB	3948	3390	4440	4	452
PH - LAB	7.4	7.1	7.7	4.0	0.3
TDS	3912.5	3734.0	4234.0	4.0	220.3
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	467.50	430.00	521.00	4.00	38.39
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	570.35	524.60	635.62	4.00	46.83
CO3	0.00	0.00	0.00	4.00	0.00
CL	121.00	113.00	133.00	4.00	8.64
SO4	2273.25	2179.00	2461.00	4.00	132.47
NO3(N)	0.79	0.18	2.21	4.00	0.96
CATIONS					
NA	535.75	505.00	612.00	4.00	50.98
K	13.50	12.00	15.00	4.00	1.29
CA	429.00	392.00	476.00	4.00	35.92
MG	190.75	182.00	196.00	4.00	6.40
FE,TOT				0.00	
MN	0.37	0.08	0.57	4.00	0.21
TRACE IONS					
AS	0.001	0.001	0.001	4.000	0.000
B	0.615	0.580	0.660	4.000	0.033
BA	0.015	0.010	0.030	4.000	0.010
CD	0.005	0.005	0.005	4.000	0.000
CR	0.010	0.010	0.010	3.000	0.000
CU	0.010	0.010	0.010	4.000	0.000
HG	0.0001	0.0001	0.0002	4.0000	0.0001
MO	0.050	0.050	0.050	4.000	0.000
NI	0.022	0.020	0.030	4.000	0.005
PB	0.020	0.020	0.020	4.000	0.000
SE	0.002	0.001	0.004	4.000	0.001
SR	4.225	3.950	4.750	4.000	0.357
ZN	0.032	0.020	0.050	4.000	0.015
OTHER IONS					
AL	0.05	0.05	0.06	4.00	0.01
F	0.47	0.40	0.50	4.00	0.05
FE,DISS	0.07	0.02	0.13	4.00	0.06
S				0.00	
NH3(N)	0.22	0.04	0.38	4.00	0.16
NO2(N)	0.02	0.01	0.03	4.00	0.01
P-ORTHO	0.02	0.01	0.03	4.00	0.01
P,TOT				0.00	
SIO2				0.00	
CALCULATED DATA					
HARDNESS	1855	1784	1990	4	92
NC HARDNESS				0	
SAR	5	5	6	4	1
IONIC RATIOS(%)					
NA+K	39	36	43	4	3
CA	35	31	38	4	3
MG	26	25	27	4	1
HCO3+CO3	16	14	18	4	1
CL	6	6	6	4	0
SO4	79	77	80	4	1
TDS(SUM)	4136.1	3962.7	4377.0	4.0	175.9
TDS(SUM)/SP COND	1.06	0.92	1.22	4.00	0.12
TDS(CALC)	3846.2	3696.1	4089.8	4.0	170.0
TDS/TDS(CALC)	1.02	0.98	1.04	4.00	0.03
TOTAL CATIONS	60.76	58.53	62.68	4.00	2.11
TOTAL ANIONS	60.18	57.20	64.44	4.00	3.05
CAT-AN BALANCE	0.50	-1.40	2.60	4.00	2.04

FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA2 WATER BEARING UNIT=QAL

	RAW DATA			
	17FEB88	08JUN88	26SEP88	19DEC88
WATER DEPTH	12.3	13.0	15.8	13.1
WATER LEVEL ELEV	5942.2	5941.5	5938.7	5941.4
SP COND - LAB	3890	4760	4490	4890
PH - LAB	7.5	7.6	7.7	7.5
TDS	4532.0	4548.0	4612.0	4518.0
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	300.00	431.00	402.00	610.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	366.00	525.82	490.44	744.20
CO3	0.00	0.00	0.00	0.00
CL	151.00	143.00	126.00	168.00
SO4	2852.00	2708.00	2663.00	2688.00
NO3(N)	0.17	0.11	0.13	0.02
CATIONS				
NA	634.00	781.00	668.00	649.00
K	12.00	12.00	12.00	10.00
CA	574.00	560.00	496.00	448.00
MG	236.00	216.00	207.00	194.00
FE,TOT				
MN	0.01	0.05	0.55	0.52
TRACE IONS				
AS	0.001	0.001	0.001	0.001
B	0.710	0.720	0.610	0.710
BA	0.020	0.040	0.010	0.010
CD	0.005	0.005	0.005	0.005
CR	0.010	0.010	0.010	
CU	0.010	0.010	0.010	0.010
HG	0.0002	0.0002	0.0001	0.0001
MO	0.050	0.050	0.050	0.050
NI	0.020	0.020	0.020	0.020
PB	0.020	0.020	0.020	0.020
SE	0.001	0.001	0.001	0.001
SR	4.350	5.150	4.600	4.600
ZN	0.100	0.060	0.010	0.010
OTHER IONS				
AL	0.05	0.05	0.06	0.05
F	0.60	0.60	0.60	0.50
FE,DISS	0.02	0.12	0.22	0.06
S				
NH3(N)	0.17	0.12	0.50	0.06
NO2(N)	0.01	0.01	0.02	0.01
P-ORTHO	0.03	0.02	0.01	0.01
P,TOT				
SIO2				
CALCULATED DATA				
HARDNESS	2403	2286	2089	1915
NC HARDNESS				
SAR	6	7	6	7
IONIC RATIOS(%)				
NA+K	37	43	41	43
CA	38	35	35	33
MG	26	22	24	24
HCO3+CO3	9	12	12	17
CL	6	6	5	7
SO4	85	82	83	77
TDS(SUM)	4826.7	4947.6	4664.7	4903.1
TDS(SUM)/SP COND	1.24	1.04	1.04	1.00
TDS(CALC)	4640.7	4680.3	4415.4	4524.9
TDS/TDS(CALC)	0.98	0.97	1.04	1.00
TOTAL CATIONS	75.94	80.00	71.17	66.82
TOTAL ANIONS	69.68	69.07	67.08	72.93
CAT-AN BALANCE	4.30	7.30	3.00	-4.40

FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA2 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	13.6	12.3	15.8	4.0	1.5
WATER LEVEL ELEV	5940.9	5938.7	5942.2	4.0	1.5
SP COND - LAB	4508	3890	4890	4	444
PH - LAB	7.6	7.5	7.7	4.0	0.1
TDS	4552.5	4518.0	4612.0	4.0	41.5
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	435.75	300.00	610.00	4.00	129.04
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	531.61	366.00	744.20	4.00	157.43
CO3	0.00	0.00	0.00	4.00	0.00
CL	147.00	126.00	168.00	4.00	17.45
SO4	2727.75	2663.00	2952.00	4.00	84.85
NO3(N)	0.11	0.02	0.17	4.00	0.06
CATIONS					
NA	683.00	634.00	781.00	4.00	66.80
K	11.50	10.00	12.00	4.00	1.00
CA	519.50	448.00	574.00	4.00	58.52
MG	213.25	194.00	236.00	4.00	17.65
FE,TOT				0.00	
MN	0.28	0.01	0.55	4.00	0.29
TRACE IONS					
AS	0.001	0.001	0.001	4.000	0.000
B	0.687	0.610	0.720	4.000	0.052
BA	0.020	0.010	0.040	4.000	0.014
CD	0.005	0.005	0.005	4.000	0.000
CR	0.010	0.010	0.010	3.000	0.000
CU	0.010	0.010	0.010	4.000	0.000
HG	0.0001	0.0001	0.0002	4.0000	0.0001
MO	0.050	0.050	0.050	4.000	0.000
NI	0.020	0.020	0.020	4.000	0.000
PB	0.020	0.020	0.020	4.000	0.000
SE	0.001	0.001	0.001	4.000	0.000
SR	4.675	4.350	5.150	4.000	0.338
ZN	0.045	0.010	0.100	4.000	0.044
OTHER IONS					
AL	0.05	0.05	0.06	4.00	0.01
F	0.57	0.50	0.60	4.00	0.05
FE,DISS	0.10	0.02	0.22	4.00	0.09
S				0.00	
NH3(N)	0.21	0.06	0.50	4.00	0.20
NO2(N)	0.01	0.01	0.02	4.00	0.00
P-ORTHO	0.02	0.01	0.03	4.00	0.01
P,TOT				0.00	
SIO2				0.00	
CALCULATED DATA					
HARDNESS	2173	1915	2403	4	215
NC HARDNESS				0	
SAR	6	6	7	4	1
IONIC RATIOS(%)					
NA+K	41	37	43	4	3
CA	35	33	38	4	2
MG	24	22	26	4	1
HCO3+CO3	12	9	17	4	3
CL	6	5	7	4	1
SO4	82	77	85	4	4
TDS(SUM)	4835.5	4664.7	4947.6	4.0	124.4
TDS(SUM)/SP COND	1.08	1.00	1.24	4.00	0.11
TDS(CALC)	4565.3	4415.4	4680.3	4.0	119.7
TDS/TDS(CALC)	1.00	0.97	1.04	4.00	0.03
TOTAL CATIONS	73.48	66.82	80.00	4.00	5.72
TOTAL ANIONS	69.69	67.08	72.93	4.00	2.43
CAT-AN BALANCE	2.55	-4.40	7.30	4.00	4.97

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA3 WATER BEARING UNIT=QAL

	RAW DATA			
	17FEB88	08JUN88	23SEP88	19DEC88
WATER DEPTH	19.9	21.3	19.9	21.7
WATER LEVEL ELEV	5925.5	5924.1	5925.5	5923.7
SP COND - LAB	3700	8990	5950	8960
PH - LAB	7.7	7.7	7.8	7.4
TDS	4322.0	9134.0	6336.0	9158.0
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	483.00	645.00	550.00	564.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	589.26	786.90	671.00	688.08
CO3	0.00	0.00	0.00	0.00
CL	132.00	431.00	228.00	424.00
SO4	2529.00	5363.00	3562.00	5499.00
NO3(N)	0.11	0.11	0.12	0.02
CATIONS				
NA	545.00	1770.00	1015.00	1676.00
K	10.00	10.00	8.00	8.00
CA	356.00	439.00	382.00	346.00
MG	279.00	580.00	429.00	570.00
FE,TOT				
MN	0.40	0.62	0.53	0.52
TRACE IONS				
AS	0.001	0.001	0.001	0.001
B	1.190	1.900	1.400	1.740
BA	0.010	0.060	0.010	0.010
CD	0.005	0.005	0.005	0.005
CR	0.010	0.010	0.010	
CU	0.010	0.010	0.010	0.010
HG	0.0002	0.0002	0.0001	0.0001
MO	0.050	0.050	0.050	0.050
NI	0.020	0.020	0.020	0.020
PB	0.020	0.020	0.020	0.020
SE	0.001	0.001	0.001	0.001
SR	4.500	5.850	4.600	5.400
ZN	0.010	0.140	0.010	0.010
OTHER IONS				
AL	0.09	0.85	0.10	0.06
F	0.60	0.60	0.60	0.60
FE,DISS	0.02	4.50	0.28	0.16
S				
NH3(N)	0.32	0.23	0.95	0.22
NO2(N)	0.02	0.01	0.02	0.01
P-ORTHO	0.10	0.03	0.01	0.01
P,TOT				
SIO2				
CALCULATED DATA				
HARDNESS	2034	3476	2714	3202
NC HARDNESS				
SAR	5	13	9	13
IONIC RATIOS(%)				
NA+K	37	53	45	53
CA	27	15	19	13
MG	35	32	36	34
HCO3+CO3	15	9	12	8
CL	6	9	7	9
SO4	80	82	81	83
TDS(SUM)	4442.8	9388.7	6298.1	9214.3
TDS(SUM)/SP COND	1.20	1.04	1.06	1.03
TDS(CALC)	4143.2	8988.7	5957.1	8864.5
TDS/TDS(CALC)	1.04	1.02	1.06	1.03
TOTAL CATIONS	64.69	147.05	98.74	137.29
TOTAL ANIONS	66.08	136.76	91.63	137.76
CAT-AN BALANCE	-1.10	3.60	3.70	-0.20

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=ROA3 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	20.7	19.9	21.7	4.0	0.9
WATER LEVEL ELEV	5924.7	5923.7	5925.5	4.0	0.9
SP COND - LAB	6900	3700	8990	4	2566
PH - LAB	7.6	7.4	7.8	4.0	0.2
TDS	7237.5	4322.0	9158.0	4.0	2352.2
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	560.50	483.00	645.00	4.00	66.51
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	683.81	589.26	786.90	4.00	81.14
CO3	0.00	0.00	0.00	4.00	0.00
CL	303.75	132.00	431.00	4.00	148.20
SO4	4238.25	2529.00	5499.00	4.00	1441.46
NO3(N)	0.09	0.02	0.12	4.00	0.05
CATIONS					
NA	1251.50	545.00	1770.00	4.00	578.54
K	9.00	8.00	10.00	4.00	1.15
CA	380.75	346.00	439.00	4.00	41.69
MG	464.50	279.00	580.00	4.00	141.59
FE,TOT				0.00	
MN	0.52	0.40	0.62	4.00	0.09
TRACE IONS					
AS	0.001	0.001	0.001	4.000	0.000
B	1.557	1.190	1.900	4.000	0.322
BA	0.022	0.010	0.060	4.000	0.025
CD	0.005	0.005	0.005	4.000	0.000
CR	0.010	0.010	0.010	3.000	0.000
CU	0.010	0.010	0.010	4.000	0.000
HG	0.0001	0.0001	0.0002	4.0000	0.0001
MO	0.050	0.050	0.050	4.000	0.000
NI	0.020	0.020	0.020	4.000	0.000
PB	0.020	0.020	0.020	4.000	0.000
SE	0.001	0.001	0.001	4.000	0.000
SR	5.087	4.500	5.850	4.000	0.649
ZN	0.042	0.010	0.140	4.000	0.065
OTHER IONS					
AL	0.27	0.06	0.85	4.00	0.38
F	0.60	0.60	0.60	4.00	0.00
FE,DISS	1.24	0.02	4.50	4.00	2.18
S				0.00	
NH3(N)	0.43	0.22	0.95	4.00	0.35
NO2(N)	0.01	0.01	0.02	4.00	0.01
P-ORTHO	0.04	0.01	0.10	4.00	0.04
P,TOT				0.00	
SIO2				0.00	
CALCULATED DATA					
HARDNESS	2857	2034	3476	4	632
NC HARDNESS				0	
SAR	10	5	13	4	4
IONIC RATIOS(%)					
NA+K	47	37	53	4	8
CA	19	13	27	4	7
MG	34	32	36	4	1
HCO3+CO3	11	8	15	4	3
CL	8	6	9	4	2
SO4	81	80	83	4	1
TDS(SUM)	7336.0	4442.8	9388.7	4.0	2393.7
TDS(SUM)/SP COND	1.08	1.03	1.20	4.00	0.08
TDS(CALC)	6988.4	4143.2	8988.7	4.0	2357.9
TDS/TDS(CALC)	1.04	1.02	1.06	4.00	0.02
TOTAL CATIONS	111.94	64.69	147.05	4.00	37.78
TOTAL ANIONS	108.06	66.08	137.76	4.00	35.30
CAT-AN BALANCE	1.50	-1.10	3.70	4.00	2.51

EMERY MINE GROUNDWATER MONITORING REPORT
FOR ALL DATA FROM 880101 THROUGH 881231

14:06 THURSDAY, MARCH 9, 1989

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA4 WATER BEARING UNIT=QAL

	RAW DATA			
	17FEB88	03JUN88	23SEP88	19DEC88
WATER DEPTH	20.1	20.6	19.6	20.9
WATER LEVEL ELEV	5923.0	5922.5	5923.5	5922.2
SP COND - LAB	6660	6820	7170	7300
PH - LAB	7.5	7.8	8.0	7.7
TDS	8432.0	7324.0	8098.0	7394.0
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	583.00	539.00	530.00	87.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	711.26	657.58	646.60	106.14
CO3	0.00	0.00	0.00	0.00
CL	314.00	227.00	247.00	230.00
SO4	5026.00	4474.00	4976.00	4503.00
NO3(N)	0.81	0.37	0.21	0.52
CATIONS				
NA	1460.00	1195.00	1360.00	1055.00
K	10.00	7.00	7.00	5.00
CA	485.00	435.00	399.00	399.00
MG	490.00	448.00	514.00	406.00
FE,TOT				
MN	0.24	0.27	0.40	0.19
TRACE IONS				
AS	0.001	0.001	0.001	0.001
B	1.810	1.610	1.510	1.390
BA	0.010	0.030	0.010	0.010
CD	0.005	0.005	0.005	0.005
CR	0.010	0.010	0.010	
CU	0.010	0.010	0.010	0.010
HG	0.0002	0.0002	0.0001	0.0001
MO	0.050	0.050	0.050	0.050
NI	0.020	0.020	0.020	0.020
PB	0.020	0.020	0.020	0.020
SE	0.001	0.001	0.001	0.001
SR	6.700	6.650	5.400	6.200
ZN	0.010	0.110	0.040	0.010
OTHER IONS				
AL	0.05	0.63	0.05	0.05
F	1.00	1.00	0.90	0.80
FE,DISS	0.02	1.18	0.14	0.10
S				
NH3(N)	0.16	0.14	0.64	0.05
NO2(N)	0.01	0.08	0.02	0.02
P-ORTHO	0.05	0.03	0.01	0.01
P,TOT				
SIO2				
CALCULATED DATA				
HARDNESS	3222	2924	3105	2662
NC HARDNESS				
SAR	11	10	11	9
IONIC RATIOS(%)				
NA+K	50	47	49	46
CA	19	20	16	20
MG	31	33	35	34
HCO3+CO3	9	10	9	2
CL	7	6	6	6
SO4	84	84	86	92
TDS(SUM)	8500.3	7449.4	8152.9	6707.3
TDS(SUM)/SP COND	1.28	1.09	1.14	0.92
TDS(CALC)	8138.7	7115.1	7824.3	6653.3
TDS/TDS(CALC)	1.04	1.03	1.03	1.11
TOTAL CATIONS	128.28	110.77	121.55	99.34
TOTAL ANIONS	125.27	110.45	121.23	102.06
CAT-AN BALANCE	1.20	0.10	0.10	-1.40

FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
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NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA4 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	20.3	19.6	20.9	4.0	0.6
WATER LEVEL ELEV	5922.8	5922.2	5923.5	4.0	0.6
SP COND - LAB	6988	6660	7300	4	298
PH - LAB	7.7	7.5	8.0	4.0	0.2
TDS	7812.0	7324.0	8432.0	4.0	541.3
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	434.75	87.00	583.00	4.00	232.99
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	530.39	106.14	711.26	4.00	284.24
CO3	0.00	0.00	0.00	4.00	0.00
CL	254.50	227.00	314.00	4.00	40.63
SO4	4744.75	4474.00	5026.00	4.00	296.83
NO3(N)	0.60	0.21	0.87	4.00	0.30
CATIONS					
NA	1267.50	1055.00	1460.00	4.00	178.91
K	7.25	5.00	10.00	4.00	2.06
CA	429.50	399.00	485.00	4.00	40.71
MG	464.50	406.00	514.00	4.00	47.59
FE,TOT				0.00	
MN	0.27	0.19	0.40	4.00	0.09
TRACE IONS					
AS	0.001	0.001	0.001	4.000	0.000
B	1.580	1.390	1.810	4.000	0.178
BA	0.015	0.010	0.030	4.000	0.010
CD	0.005	0.005	0.005	4.000	0.000
CR	0.010	0.010	0.010	3.000	0.000
CU	0.010	0.010	0.010	4.000	0.000
HG	0.0001	0.0001	0.0002	4.0000	0.0001
MO	0.050	0.050	0.050	4.000	0.000
NI	0.020	0.020	0.020	4.000	0.000
PB	0.020	0.020	0.020	4.000	0.000
SE	0.001	0.001	0.001	4.000	0.000
SR	6.237	5.400	6.700	4.000	0.602
ZN	0.042	0.010	0.110	4.000	0.047
OTHER IONS					
AL	0.19	0.05	0.63	4.00	0.29
F	0.92	0.80	1.00	4.00	0.10
FE,DISS	0.36	0.02	1.18	4.00	0.55
S				0.00	
NH3(N)	0.25	0.05	0.64	4.00	0.27
NO2(N)	0.03	0.01	0.08	4.00	0.03
P-ORTHO	0.02	0.01	0.05	4.00	0.02
P,TOT				0.00	
SIO2				0.00	
CALCULATED DATA					
HARDNESS	2978	2662	3222	4	244
NC HARDNESS				0	
SAR	10	9	11	4	1
IONIC RATIOS(%)					
NA+K	48	46	50	4	2
CA	19	16	20	4	2
MG	33	31	35	4	1
HCO3+CO3	7	2	10	4	4
CL	6	6	7	4	1
SO4	86	84	92	4	4
TDS(SUM)	7702.5	6707.3	8500.3	4.0	794.5
TDS(SUM)/SP COND	1.11	0.92	1.28	4.00	0.15
TDS(CALC)	7432.9	6653.3	8138.7	4.0	673.3
TDS/TDS(CALC)	1.05	1.03	1.11	4.00	0.04
TOTAL CATIONS	114.99	99.34	128.28	4.00	12.68
TOTAL ANIONS	114.75	102.06	125.27	4.00	10.52
CAT-AN BALANCE	-0.00	-1.40	1.20	4.00	1.07

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=ROA5 WATER BEARING UNIT=QAL

	RAW DATA			
	17FEB88	08JUN88	23SEP88	19DEC88
WATER DEPTH	17.8	18.6	16.3	19.1
WATER LEVEL ELEV	5923.4	5922.6	5924.9	5922.1
SP COND - LAB	18500	20500	17700	20700
PH - LAB	7.5	7.9	8.1	7.9
TDS	29976.0	29642.0	28674.0	28102.0
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	542.00	559.00	552.00	520.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	661.24	681.98	673.44	634.40
CO3	0.00	0.00	0.00	0.00
CL	1600.00	1540.00	1540.00	1330.00
SO4	18283	18119	19057	16011
NO3(N)	0.18	0.20	1.14	0.02
CATIONS				
NA	6500.00	6960.00	6545.00	6370.00
K	13.00	7.00	7.00	6.00
CA	702.00	492.00	378.00	362.00
MG	1670.00	1640.00	1530.00	1640.00
FE,TOT				
MN	0.85	0.88	1.00	0.74
TRACE IONS				
AS	0.001	0.001	0.001	0.005
B	3.350	3.400	3.550	3.300
BA	0.010	0.090	0.020	0.010
CD	0.005	0.005	0.005	0.005
CR	0.010	0.010	0.010	
CU	0.010	0.010	0.010	0.010
HG	0.0002	0.0002	0.0001	0.0001
MO	0.050	0.050	0.050	0.050
NI	0.030	0.020	0.020	0.020
PB	0.020	0.020	0.020	0.020
SE	0.003	0.001	0.025	0.001
SR	9.100	10.100	8.400	8.800
ZN	0.020	0.140	0.030	0.010
OTHER IONS				
AL	0.05	1.31	0.09	0.05
F	1.80	1.80	1.90	1.90
FE,DISS	0.02	2.05	0.17	0.08
S				
NH3(N)	0.29	0.60	1.81	0.04
NO2(N)	0.02	0.06	0.05	0.01
P-ORTHO	0.23	0.09	0.03	0.01
P,TOT				
SIO2				
CALCULATED DATA				
HARDNESS	8602	7954	7218	7629
NC HARDNESS				
SAR	31	34	34	32
IONIC RATIOS(%)				
NA+K	62	66	66	64
CA	8	5	4	4
MG	30	29	29	31
HCO3+CO3	2	3	2	3
CL	10	10	10	10
SO4	87	87	88	87
TDS(SUM)	29435.6	29449.9	29738.4	26359.6
TDS(SUM)/SP COND	1.59	1.44	1.68	1.27
TDS(CALC)	29099.5	29103.2	29396.1	26037.1
TDS/TDS(CALC)	1.03	1.02	0.98	1.08
TOTAL CATIONS	455.52	462.50	429.65	430.25
TOTAL ANIONS	436.74	431.97	451.44	381.37
CAT-AN BALANCE	2.10	3.40	-2.50	6.00

FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA5 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	18.0	16.3	19.1	4.0	1.2
WATER LEVEL ELEV	5923.2	5922.1	5924.9	4.0	1.2
SP COND - LAB	19350	17700	20700	4	1482
PH - LAB	7.8	7.5	8.1	4.0	0.3
TDS	29098.5	28102.0	29976.0	4.0	863.8
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	543.25	520.00	559.00	4.00	17.00
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	662.76	634.40	681.98	4.00	20.74
CO3	0.00	0.00	0.00	4.00	0.00
CL	1502.50	1330.00	1600.00	4.00	118.43
SO4	17867.5	16011	19057	4.00	1303.51
NO3(N)	0.38	0.02	1.14	4.00	0.51
CATIONS					
NA	6593.75	6370.00	6960.00	4.00	255.19
K	8.25	6.00	13.00	4.00	3.20
CA	483.50	362.00	702.00	4.00	156.75
MG	1620.00	1530.00	1670.00	4.00	61.64
FE,TOT				0.00	
MN	0.87	0.74	1.00	4.00	0.11
TRACE IONS					
AS	0.002	0.001	0.005	4.000	0.002
B	3.400	3.300	3.550	4.000	0.108
BA	0.032	0.010	0.090	4.000	0.039
CD	0.005	0.005	0.005	4.000	0.000
CR	0.010	0.010	0.010	3.000	0.000
CU	0.010	0.010	0.010	4.000	0.000
HG	0.0001	0.0001	0.0002	4.0000	0.0001
MO	0.050	0.050	0.050	4.000	0.000
NI	0.022	0.020	0.030	4.000	0.005
PB	0.020	0.020	0.020	4.000	0.000
SE	0.007	0.001	0.025	4.000	0.012
SR	9.100	8.400	10.100	4.000	0.726
ZN	0.050	0.010	0.140	4.000	0.061
OTHER IONS					
AL	0.37	0.05	1.31	4.00	0.62
F	1.85	1.80	1.90	4.00	0.06
FE,DISS	0.58	0.02	2.05	4.00	0.98
S				0.00	
NH3(N)	0.68	0.04	1.81	4.00	0.78
NO2(N)	0.03	0.01	0.06	4.00	0.02
P-ORTHO	0.09	0.01	0.23	4.00	0.10
P,TOT				0.00	
SIO2				0.00	
CALCULATED DATA					
HARDNESS	7851	7218	8602	4	584
NC HARDNESS				0	
SAR	32	31	34	4	2
IONIC RATIOS(%)					
NA+K	65	62	66	4	2
CA	5	4	8	4	2
MG	30	29	31	4	1
HCO3+CO3	3	2	3	4	0
CL	10	10	10	4	0
SO4	87	87	88	4	0
TDS(SUM)	28745.9	26359.6	29738.4	4.0	1597.0
TDS(SUM)/SP COND	1.50	1.27	1.68	4.00	0.18
TDS(CALC)	28409.0	26037.1	29396.1	4.0	1587.4
TDS/TDS(CALC)	1.03	0.98	1.08	4.00	0.04
TOTAL CATIONS	444.48	429.65	462.50	4.00	17.02
TOTAL ANIONS	425.38	381.37	451.44	4.00	30.49
CAT-AN BALANCE	2.25	-2.50	6.00	4.00	3.56

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA6 WATER BEARING UNIT=QAL

	RAW DATA			
	17FEB88	08JUN88	23SEP88	19DEC88
WATER DEPTH	10.4	13.9	15.9	14.3
WATER LEVEL ELEV	5930.0	5926.5	5924.5	5926.1
SP COND - LAB	18600	17300	14000	19100
PH - LAB	7.4	8.1	8.0	7.6
TDS	29786.0	29840.0	19018.0	25346.0
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	650.00	671.00	464.00	494.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	793.00	818.62	566.08	602.68
CO3	0.00	0.00	0.00	0.00
CL	1340.00	1270.00	678.00	923.00
SO4	17989	18036	11228	15682
NO3(N)	128.41	10.05	49.00	110.50
CATIONS				
NA	6700.00	6840.00	4225.00	5760.00
K	42.00	23.00	14.00	15.00
CA	783.00	535.00	420.00	435.00
MG	1670.00	1580.00	965.00	1340.00
FE,TOT				
MN	0.20	0.18	0.13	0.12
TRACE IONS				
AS	0.001	0.009	0.011	0.006
B	1.710	1.470	1.900	1.670
BA	0.010	0.050	0.010	0.010
CD	0.005	0.005	0.005	0.010
CR	0.010	0.010	0.010	
CU	0.010	0.010	0.010	0.030
HG	0.0002	0.0002	0.0001	0.0001
MO	0.050	0.050	0.050	0.050
NI	0.020	0.020	0.030	0.030
PB	0.020	0.020	0.020	0.020
SE	0.022	0.310	0.001	0.050
SR	14.800	17.800	14.800	13.500
ZN	0.050	0.070	0.010	0.010
OTHER IONS				
AL	0.06	0.13	0.05	0.05
F	1.00	0.40	1.00	1.00
FE,DISS	0.02	0.25	0.15	0.02
S				
NH3(N)	0.09	0.12	1.65	0.04
NO2(N)	0.59	0.55	0.20	0.46
P-ORTHO	0.11	0.09	0.01	0.02
P,TOT				
SIO2				
CALCULATED DATA				
HARDNESS	8805	7816	5007	6582
NC HARDNESS				
SAR	31	34	26	31
IONIC RATIOS(%)				
NA+K	62	66	65	66
CA	8	6	7	6
MG	29	29	28	29
HCO3+CO3	3	3	4	3
CL	9	8	7	7
SO4	88	88	89	90
TDS(SUM)	29449.1	29115.8	18148.6	24871.6
TDS(SUM)/SP COND	1.58	1.68	1.30	1.30
TDS(CALC)	29046.0	28699.7	17860.9	24565.2
TDS/TDS(CALC)	1.03	1.04	1.06	1.03
TOTAL CATIONS	468.98	454.81	284.49	382.88
TOTAL ANIONS	434.60	425.53	265.74	370.40
CAT-AN BALANCE	3.80	3.30	3.40	1.70

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
#####

MONITORING AREA=REFUSE DISPOSAL WELL=RDA6 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	13.6	10.4	15.9	4.0	2.3
WATER LEVEL ELEV	5926.8	5924.5	5930.0	4.0	2.3
SP COND - LAB	17250	14000	19100	4	2296
PH - LAB	7.8	7.4	8.1	4.0	0.3
TDS	25997.5	19018.0	29840.0	4.0	5107.4
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	569.75	464.00	671.00	4.00	105.85
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	695.09	566.08	818.62	4.00	129.14
CO3	0.00	0.00	0.00	4.00	0.00
CL	1052.75	678.00	1340.00	4.00	309.29
SO4	15733.8	11228	18036	4.00	3198.49
NO3(N)	74.49	10.05	128.41	4.00	54.79
CATIONS					
NA	5881.25	4225.00	6840.00	4.00	1203.80
K	23.50	14.00	42.00	4.00	12.97
CA	543.25	420.00	783.00	4.00	167.79
MG	1388.75	965.00	1670.00	4.00	314.97
FE,TOT				0.00	
MN	0.16	0.12	0.20	4.00	0.04
TRACE IONS					
AS	0.007	0.001	0.011	4.000	0.004
B	1.687	1.470	1.900	4.000	0.176
BA	0.020	0.010	0.050	4.000	0.020
CD	0.006	0.005	0.010	4.000	0.002
CR	0.010	0.010	0.010	3.000	0.000
CU	0.015	0.010	0.030	4.000	0.010
HG	0.0001	0.0001	0.0002	4.0000	0.0001
MO	0.050	0.050	0.050	4.000	0.000
NI	0.025	0.020	0.030	4.000	0.006
PB	0.020	0.020	0.020	4.000	0.000
SE	0.096	0.001	0.310	4.000	0.144
SR	15.225	13.500	17.800	4.000	1.823
ZN	0.035	0.010	0.070	4.000	0.030
OTHER IONS					
AL	0.07	0.05	0.13	4.00	0.04
F	0.85	0.40	1.00	4.00	0.30
FE,DISS	0.11	0.02	0.25	4.00	0.11
S				0.00	
NH3(N)	0.47	0.04	1.65	4.00	0.78
NO2(N)	0.45	0.20	0.59	4.00	0.18
P-ORTHO	0.06	0.01	0.11	4.00	0.05
P,TOT				0.00	
SIO2				0.00	
CALCULATED DATA					
HARDNESS	7053	5007	8805	4	1639
NC HARDNESS				0	
SAR	30	26	34	4	3
IONIC RATIOS(%)					
NA+K	65	62	66	4	1
CA	7	6	8	4	1
MG	29	28	29	4	1
HCO3+CO3	3	3	4	4	0
CL	8	7	9	4	1
SO4	89	88	90	4	1
TDS(SUM)	25396.3	18148.6	29449.1	4.0	5261.9
TDS(SUM)/SP COND	1.47	1.30	1.68	4.00	0.20
TDS(CALC)	25042.9	17860.9	29046.0	4.0	5202.8
TDS/TDS(CALC)	1.04	1.03	1.06	4.00	0.02
TOTAL CATIONS	397.79	284.49	468.98	4.00	84.41
TOTAL ANIONS	374.07	265.74	434.60	4.00	77.59
CAT-AN BALANCE	3.05	1.70	3.80	4.00	0.93

FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-1 WATER BEARING UNIT=CAL

	RAW DATA			
	21MAR88	10JUN88	22SEP88	29DEC88
WATER DEPTH	7.7	2.4	16.7	8.5
WATER LEVEL ELEV	6062.6	6067.9	6053.6	6061.8
SP COND - LAB		20400	5350	
PH - LAB		7.7	7.8	
TDS	15660.0	24860.0	6040.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	231.00	983.00	542.00	
NONCARBONATE	0.00	0.00	0.00	
ANIONS				
HCO3	281.82	1199.26	661.24	
CO3	0.00	0.00	0.00	
CL	763.00	830.00	123.00	
SO4	9952.00	14863	3552.00	
NO3(N)	145.85	32.38	0.64	
CATIONS				
NA	4100.00	5120.00	655.00	
K	61.00	24.00	20.00	
CA	465.00	418.00	461.00	
MG	509.00	1665.00	508.00	
FE,TOT		58.80	24.00	
MN	0.52	2.40	2.48	
TRACE IONS				
AS	0.001		0.001	
B	0.370	0.960	0.790	
BA	0.140		0.020	
CD	0.005		0.005	
CR	0.010		0.010	
CU	0.010		0.010	
HG	0.0002		0.0001	
MO	0.050		0.050	
NI	0.020		0.020	
PB	0.020		0.020	
SE	0.197		0.001	
SR		9.200	4.400	
ZN	0.100		0.010	
OTHER IONS				
AL	0.11		0.05	
F	0.40	0.40	0.50	
FE,DISS	0.11		1.04	
S	0.50			
NH3(N)	3.04		5.60	
NO2(N)	0.15	0.82	0.07	
P-ORTHO	0.46	0.10	0.02	
P,TOT				
SIO2		14.20	17.40	
CALCULATED DATA				
HARDNESS	3249	7872	3235	
NC HARDNESS				
SAR	31	25	5	
IONIC RATIOS(%)				
NA+K	73	59	31	
CA	9	5	25	
MG	17	36	45	
HCO3+CO3	2	6	12	
CL	9	7	4	
SO4	89	88	84	
TDS(SUM)	16279.5	24229.2	6003.3	
TDS(SUM)/SP COND		1.19	1.12	
TDS(CALC)	16136.2	23619.6	5667.2	
TDS/TDS(CALC)	0.97	1.05	1.07	
TOTAL CATIONS	245.01	383.35	93.92	
TOTAL ANIONS	243.79	354.91	88.34	
CAT-AN BALANCE	0.20	3.90	3.10	

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 29, 1990
FOR ALL DATA FROM 880101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=SURFACE MINE(I) WELL=SMI-1 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	8.8	2.4	16.7	4.0	5.9
WATER LEVEL ELEV	6061.5	6053.6	6067.9	4.0	5.9
SP COND - LAB	12875	5350	20400	2	10642
PH - LAB	7.7	7.7	7.8	2.0	0.1
TDS	15520.0	6040.0	24860.0	3.0	9410.8
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	585.33	231.00	983.00	3.00	377.87
NONCARBONATE	0.00	0.00	0.00	3.00	0.00
ANIONS					
HCO3	714.11	281.82	1199.26	3.00	461.00
CO3	0.00	0.00	0.00	3.00	0.00
CL	572.00	123.00	830.00	3.00	390.29
SO4	9455.67	3552.00	14863	3.00	5671.81
NO3(N)	59.62	0.64	145.85	3.00	76.34
CATIONS					
NA	3291.67	655.00	5120.00	3.00	2339.68
K	35.00	20.00	61.00	3.00	22.61
CA	448.00	418.00	465.00	3.00	26.06
MG	894.00	508.00	1665.00	3.00	667.71
FE,TOT	41.40	24.00	58.80	2.00	24.61
MN	1.80	0.52	2.48	3.00	1.11
TRACE IONS					
AS	0.001	0.001	0.001	2.000	0.000
B	0.707	0.370	0.960	3.000	0.304
BA	0.080	0.020	0.140	2.000	0.085
CD	0.005	0.005	0.005	2.000	0.000
CR	0.010	0.010	0.010	2.000	0.000
CU	0.010	0.010	0.010	2.000	0.000
HG	0.0001	0.0001	0.0002	2.0000	0.0001
MO	0.050	0.050	0.050	2.000	0.000
NI	0.020	0.020	0.020	2.000	0.000
PB	0.020	0.020	0.020	2.000	0.000
SE	0.099	0.001	0.197	2.000	0.139
SR	6.800	4.400	9.200	2.000	3.394
ZN	0.055	0.010	0.100	2.000	0.064
OTHER IONS					
AL	0.08	0.05	0.11	2.00	0.04
F	0.43	0.40	0.50	3.00	0.06
FE,DISS	0.57	0.11	1.04	2.00	0.66
S	0.50	0.50	0.50	1.00	
NH3(N)	4.32	3.04	5.60	2.00	1.81
NO2(N)	0.35	0.07	0.82	3.00	0.41
P-ORTHO	0.19	0.02	0.46	3.00	0.23
P,TOT				0.00	
SIO2	15.80	14.20	17.40	2.00	2.26
CALCULATED DATA					
HARDNESS	4785	3235	7872	3	2673
NC HARDNESS				0	
SAR	20	5	31	3	14
IONIC RATIOS(%)					
NA+K	54	31	73	3	22
CA	13	5	25	3	10
MG	33	17	45	3	14
HCO3+CO3	7	2	12	3	5
CL	7	4	9	3	3
SO4	87	84	89	3	3
TDS(SUM)	15504.0	6003.3	24229.2	3.0	9137.7
TDS(SUM)/SP COND	1.15	1.12	1.19	2.00	0.05
TDS(CALC)	15141.0	5667.2	23619.6	3.0	9017.5
TDS/TDS(CALC)	1.03	0.97	1.07	3.00	0.05
TOTAL CATIONS	240.76	93.92	383.35	3.00	144.76
TOTAL ANIONS	229.02	88.34	354.91	3.00	133.90
CAT-AN BALANCE	2.40	0.20	3.90	3.00	1.95

FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-2 WATER BEARING UNIT=CAL

	RAW DATA			
	21MAR88	10JUN88	22SEP88	29DEC88
WATER DEPTH	4.4	1.1	2.3	
WATER LEVEL ELEV	6043.8	6047.1	6045.9	
SP COND - LAB		4090	7450	
PH - LAB		7.8	7.4	
TDS	14582.0	2240.0	9374.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	719.00	443.00	718.00	
NONCARBONATE	0.00	0.00	0.00	
ANIONS				
HCO3	877.18	540.46	875.96	
CO3	0.00	0.00	0.00	
CL	297.00	68.00	138.00	
SO4	9384.00	2188.00	5756.00	
NO3(N)	21.94	3.88	6.37	
CATIONS				
NA	2470.00	802.00	985.00	
K	27.00	13.00	18.00	
CA	505.00	113.00	460.00	
MG	1060.00	182.00	920.00	
FE,TOT		56.00	129.00	
MN	4.85	1.35	3.16	
TRACE IONS				
AS	0.001		0.004	
B	0.570	0.390	0.610	
BA	0.120		0.040	
CD	0.005		0.005	
CR	0.010		0.010	
CU	0.010		0.010	
HG	0.0002		0.0001	
MO	0.050		0.050	
NI	0.020		0.020	
PB	0.020		0.020	
SE	0.010		0.001	
SR		1.500	6.300	
ZN	0.050		0.050	
OTHER IONS				
AL	0.05		0.05	
F	0.60	0.60	0.50	
FE,DISS	0.14		0.16	
S	7.80			
NH3(N)	1.96		3.81	
NO2(N)	0.06	0.05	0.83	
P-ORTHO	0.14	0.03	0.45	
P,TOT				
SIO2		13.00	14.30	
CALCULATED DATA				
HARDNESS	5609	1029	4922	
NC HARDNESS				
SAR	14	11	6	
IONIC RATIOS(%)				
NA+K	49	63	31	
CA	11	10	16	
MG	40	27	53	
HCO3+CO3	7	16	10	
CL	4	3	3	
SO4	90	81	87	
TDS(SUM)	14648.5	3981.7	9179.1	
TDS(SUM)/SP COND		0.97	1.23	
TDS(CALC)	14202.6	3707.0	8733.8	
TDS/TDS(CALC)	1.03	0.60	1.07	
TOTAL CATIONS	220.71	57.88	142.06	
TOTAL ANIONS	219.74	56.64	138.63	
CAT-AN BALANCE	0.20	1.10	1.20	

FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-2 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	2.6	1.1	4.4	3.0	1.7
WATER LEVEL ELEV	6045.6	6043.8	6047.1	3.0	1.7
SP COND - LAB	5770	4090	7450	2	2376
PH - LAB	7.6	7.4	7.8	2.0	0.3
TDS	8732.0	2240.0	14582.0	3.0	6196.0
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	626.67	443.00	719.00	3.00	159.06
NONCARBONATE	0.00	0.00	0.00	3.00	0.00
ANIONS					
HCO3	764.53	540.46	877.18	3.00	194.05
CO3	0.00	0.00	0.00	3.00	0.00
CL	167.67	68.00	297.00	3.00	117.35
SO4	5776.00	2188.00	9384.00	3.00	3598.04
NO3(N)	10.73	3.88	21.94	3.00	9.79
CATIONS					
NA	1419.00	802.00	2470.00	3.00	914.78
K	19.33	13.00	27.00	3.00	7.09
CA	359.33	113.00	505.00	3.00	214.51
MG	720.67	182.00	1060.00	3.00	471.72
FE,TOT	92.50	56.00	129.00	2.00	51.62
MN	3.12	1.35	4.85	3.00	1.75
TRACE IONS					
AS	0.002	0.001	0.004	2.000	0.002
B	0.523	0.390	0.610	3.000	0.117
BA	0.080	0.040	0.120	2.000	0.057
CD	0.005	0.005	0.005	2.000	0.000
CR	0.010	0.010	0.010	2.000	0.000
CU	0.010	0.010	0.010	2.000	0.000
HG	0.0001	0.0001	0.0002	2.0000	0.0001
MO	0.050	0.050	0.050	2.000	0.000
NI	0.020	0.020	0.020	2.000	0.000
PB	0.020	0.020	0.020	2.000	0.000
SE	0.005	0.001	0.010	2.000	0.006
SR	3.900	1.500	6.300	2.000	3.394
ZN	0.050	0.050	0.050	2.000	0.000
OTHER IONS					
AL	0.05	0.05	0.05	2.00	0.00
F	0.57	0.50	0.60	3.00	0.06
FE,DISS	0.15	0.14	0.16	2.00	0.01
S	7.80	7.80	7.80	1.00	
NH3(N)	2.88	1.96	3.81	2.00	1.31
NO2(N)	0.31	0.05	0.83	3.00	0.45
P-ORTHO	0.21	0.03	0.45	3.00	0.22
P,TOT				0.00	
SIO2	13.65	13.00	14.30	2.00	0.92
CALCULATED DATA					
HARDNESS	3853	1029	5609	3	2470
NC HARDNESS				0	
SAR	10	6	14	3	4
IONIC RATIOS(%)					
NA+K	48	31	63	3	16
CA	13	10	16	3	3
MG	40	27	53	3	13
HCO3+CO3	11	7	16	3	5
CL	3	3	4	3	1
SO4	86	81	90	3	4
TDS(SUM)	9269.8	3981.7	14648.5	3.0	5334.0
TDS(SUM)/SP COND	1.10	0.97	1.23	2.00	0.18
TDS(CALC)	8881.1	3707.0	14202.6	3.0	5249.4
TDS/TDS(CALC)	0.90	0.60	1.07	3.00	0.26
TOTAL CATIONS	140.22	57.88	220.71	3.00	81.43
TOTAL ANIONS	138.34	56.64	219.74	3.00	81.55
CAT-AN BALANCE	0.83	0.20	1.20	3.00	0.55

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=SURFACE MINE(1) WELL=SMI-3 WATER BEARING UNIT=CAL

	RAW DATA			
	21MAR88	10JUN88	22SEP88	29DEC88
WATER DEPTH	7.5	6.8	7.8	8.1
WATER LEVEL ELEV	6048.5	6049.2	6048.2	6047.9
SP COND - LAB		42600	22800	
PH - LAB		7.9	7.9	
TDS	58270.0	60618.0	56802.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	710.00	723.00	698.00	
NONCARBONATE	0.00	0.00	0.00	
ANIONS				
HCO3	866.20	882.06	851.56	
CO3	0.00	0.00	0.00	
CL	1315.00	1300.00	1000.00	
SO4	38748	29767	40872	
NO3(N)	171.96	125.86	135.82	
CATIONS				
NA	14230	15150	16125	
K	104.00	76.00	75.00	
CA	703.00	512.00	440.00	
MG	2500.00	2550.00	2495.00	
FE,TOT		15.60	39.00	
MN	1.72	3.50	3.56	
TRACE IONS				
AS	0.005		0.001	
B	0.740	0.790	0.820	
BA	0.080		0.020	
CD	0.005		0.005	
CR	0.010		0.010	
CU	0.010		0.010	
HG	0.0002		0.0001	
MO	0.050		0.050	
NI	0.020		0.030	
PB	0.020		0.020	
SE	0.174		0.001	
SR		10.700	10.400	
ZN	0.090		0.040	
OTHER IONS				
AL	0.22		0.05	
F	0.90	0.80	0.80	
FE,DISS	0.18		0.46	
S	0.20			
NH3(N)	1.65		1.67	
NO2(N)	0.04	0.14	0.18	
P-ORTHO	0.27	0.20	0.13	
P,TOT				
SIO2		7.20	7.10	
CALCULATED DATA				
HARDNESS	12008	11735	11329	
NC HARDNESS				
SAR	56	61	66	
IONIC RATIOS(%)				
NA+K	72	74	76	
CA	4	3	2	
MG	24	23	22	
HCO3+CO3	2	2	2	
CL	4	5	3	
SO4	94	92	95	
TDS(SUM)	58642.1	50390.9	62007.5	
TDS(SUM)/SP COND		1.18	2.72	
TDS(CALC)	58201.8	49942.6	61574.6	
TDS/TDS(CALC)	1.00	1.21	0.92	
TOTAL CATIONS	862.46	896.97	930.70	
TOTAL ANIONS	870.36	679.92	902.88	
CAT-AN BALANCE	-0.50	13.80	1.50	

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-3 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	7.5	6.8	8.1	4.0	0.6
WATER LEVEL ELEV	6048.4	6047.9	6049.2	4.0	0.6
SP COND - LAB	32700	22800	42600	2	14001
PH - LAB	7.9	7.9	7.9	2.0	0.0
TDS	58563.3	56802.0	60618.0	3.0	1924.8
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	710.33	698.00	723.00	3.00	12.50
NONCARBONATE	0.00	0.00	0.00	3.00	0.00
ANIONS					
HCO3	866.61	851.56	882.06	3.00	15.25
CO3	0.00	0.00	0.00	3.00	0.00
CL	1205.00	1000.00	1315.00	3.00	177.69
SO4	36462.3	29767	40872	3.00	5894.78
NO3(N)	144.55	125.86	171.96	3.00	24.26
CATIONS					
NA	15168.3	14230	16125	3.00	947.63
K	85.00	75.00	104.00	3.00	16.46
CA	551.67	440.00	703.00	3.00	135.91
MG	2515.00	2495.00	2550.00	3.00	30.41
FE,TOT	27.30	15.60	39.00	2.00	16.55
MN	2.93	1.72	3.56	3.00	1.05
TRACE IONS					
AS	0.003	0.001	0.005	2.000	0.003
B	0.783	0.740	0.820	3.000	0.040
BA	0.050	0.020	0.080	2.000	0.042
CD	0.005	0.005	0.005	2.000	0.000
CR	0.010	0.010	0.010	2.000	0.000
CU	0.010	0.010	0.010	2.000	0.000
HG	0.0001	0.0001	0.0002	2.0000	0.0001
MO	0.050	0.050	0.050	2.000	0.000
NI	0.025	0.020	0.030	2.000	0.007
PB	0.020	0.020	0.020	2.000	0.000
SE	0.087	0.001	0.174	2.000	0.122
SR	10.550	10.400	10.700	2.000	0.212
ZN	0.065	0.040	0.090	2.000	0.035
OTHER IONS					
AL	0.13	0.05	0.22	2.00	0.12
F	0.83	0.80	0.90	3.00	0.06
FE,DISS	0.32	0.18	0.46	2.00	0.20
S	0.20	0.20	0.20	1.00	
NH3(N)	1.66	1.65	1.67	2.00	0.01
NO2(N)	0.12	0.04	0.18	3.00	0.07
P-ORTHO	0.20	0.13	0.27	3.00	0.07
P,TOT				0.00	
SIO2	7.15	7.10	7.20	2.00	0.07
CALCULATED DATA					
HARDNESS	11691	11329	12008	3	342
NC HARDNESS				0	
SAR	61	56	66	3	5
IONIC RATIOS(%)					
NA+K	74	72	76	3	2
CA	3	2	4	3	1
MG	23	22	24	3	1
HCO3+CO3	2	2	2	3	0
CL	4	3	5	3	1
SO4	94	92	95	3	1
TDS(SUM)	57013.5	50390.9	62007.5	3.0	5977.0
TDS(SUM)/SP COND	1.95	1.18	2.72	2.00	1.09
TDS(CALC)	56573.0	49942.6	61574.6	3.0	5984.6
TDS/TDS(CALC)	1.05	0.92	1.21	3.00	0.15
TOTAL CATIONS	896.71	862.46	930.70	3.00	34.12
TOTAL ANIONS	817.72	679.92	902.88	3.00	120.44
CAT-AN BALANCE	4.93	-0.50	13.80	3.00	7.74

FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(I) WELL=SMI-4 WATER BEARING UNIT=CAL

	RAW DATA			
	21MAR88	10JUN88	22SEP88	29DEC88
WATER DEPTH	10.6	10.4	11.9	10.7
WATER LEVEL ELEV	5928.6	5928.8	5927.3	5928.5
SP COND - LAB		2890	3050	
PH - LAB		8.0	7.9	
TDS	2372.0	2656.0	2782.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	367.00	364.00	348.00	
NONCARBONATE	0.00	0.00	0.00	
ANIONS				
HCO3	447.74	444.08	424.56	
CO3	0.00	0.00	0.00	
CL	87.00	47.00	48.00	
SO4	1362.00	1581.00	1690.00	
NO3(N)	3.18	1.10	2.65	
CATIONS				
NA	368.00	383.00	385.00	
K	25.00	6.00	8.00	
CA	158.00	214.00	233.00	
MG	138.00	164.00	173.00	
FE,TOT		72.80	78.80	
MN	0.01	1.35	0.02	
TRACE IONS				
AS	0.001		0.001	
B	0.470	0.360	0.540	
BA	0.090		0.020	
CD	0.005		0.005	
CR	0.010		0.010	
CU	0.020		0.010	
HG	0.0002		0.0001	
MO	0.050		0.050	
NI	0.020		0.020	
PB	0.020		0.020	
SE	0.018		0.001	
SR		2.600	2.860	
ZN	0.330		0.020	
OTHER IONS				
AL	0.05		0.05	
F	0.70	0.70	0.70	
FE,DISS	0.02		0.45	
S	0.20			
NH3(N)	0.10		0.39	
NO2(N)	0.09	0.01	0.02	
P-ORTHO	0.04	0.03	0.05	
P,TOT				
SIO2		15.60	19.00	
CALCULATED DATA				
HARDNESS	961	1207	1292	
NC HARDNESS				
SAR	5	5	5	
IONIC RATIOS(%)				
NA+K	46	41	40	
CA	22	26	27	
MG	32	33	33	
HCO3+CO3	19	18	16	
CL	6	3	3	
SO4	74	79	81	
TDS(SUM)	2590.7	2931.0	2985.1	
TDS(SUM)/SP COND		1.01	0.98	
TDS(CALC)	2363.1	2705.3	2769.3	
TDS/TDS(CALC)	1.00	0.98	1.00	
TOTAL CATIONS	35.88	43.64	42.83	
TOTAL ANIONS	38.42	41.64	43.73	
CAT-AN BALANCE	-3.40	2.30	-1.00	

EMERY MINE GROUNDWATER MONITORING REPORT 14:06 THURSDAY, MARCH 9, 1989
FOR ALL DATA FROM 880101 THROUGH 881231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-4 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	10.9	10.4	11.9	4.0	0.7
WATER LEVEL ELEV	5928.3	5927.3	5928.8	4.0	0.7
SP COND - LAB	2970	2890	3050	2	113
PH - LAB	7.9	7.9	8.0	2.0	0.1
TDS	2603.3	2372.0	2782.0	3.0	210.0
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	359.67	348.00	367.00	3.00	10.21
NONCARBONATE	0.00	0.00	0.00	3.00	0.00
ANIONS					
HCO3	438.79	424.56	447.74	3.00	12.46
CO3	0.00	0.00	0.00	3.00	0.00
CL	60.67	47.00	87.00	3.00	22.81
SO4	1544.33	1362.00	1690.00	3.00	167.05
NO3(N)	2.31	1.10	3.18	3.00	1.08
CATIONS					
NA	378.67	368.00	385.00	3.00	9.29
K	13.00	6.00	25.00	3.00	10.44
CA	201.67	158.00	233.00	3.00	38.99
MG	158.33	138.00	173.00	3.00	18.18
FE,TOT	75.80	72.80	78.80	2.00	4.24
MN	0.46	0.01	1.35	3.00	0.77
TRACE IONS					
AS	0.001	0.001	0.001	2.000	0.000
B	0.457	0.360	0.540	3.000	0.091
BA	0.055	0.020	0.090	2.000	0.049
CD	0.005	0.005	0.005	2.000	0.000
CR	0.010	0.010	0.010	2.000	0.000
CU	0.015	0.010	0.020	2.000	0.007
HG	0.0001	0.0001	0.0002	2.0000	0.0001
MO	0.050	0.050	0.050	2.000	0.000
NI	0.020	0.020	0.020	2.000	0.000
PB	0.020	0.020	0.020	2.000	0.000
SE	0.009	0.001	0.018	2.000	0.012
SR	2.730	2.600	2.860	2.000	0.184
ZN	0.175	0.020	0.330	2.000	0.219
OTHER IONS					
AL	0.05	0.05	0.05	2.00	0.00
F	0.70	0.70	0.70	3.00	0.00
FE,DISS	0.23	0.02	0.45	2.00	0.30
S	0.20	0.20	0.20	1.00	
NH3(N)	0.24	0.10	0.39	2.00	0.21
NO2(N)	0.04	0.01	0.09	3.00	0.04
P-ORTHO	0.04	0.03	0.05	3.00	0.01
P,TOT				0.00	
SIO2	17.30	15.60	19.00	2.00	2.40
CALCULATED DATA					
HARDNESS	1153	961	1292	3	172
NC HARDNESS				0	
SAR	5	5	5	3	0
IONIC RATIOS(%)					
NA+K	42	40	46	3	4
CA	25	22	27	3	3
MG	33	32	33	3	1
HCO3+CO3	18	16	19	3	2
CL	4	3	6	3	2
SO4	78	74	81	3	3
TDS(SUM)	2835.6	2590.7	2985.1	3.0	213.8
TDS(SUM)/SP COND	1.00	0.98	1.01	2.00	0.03
TDS(CALC)	2612.5	2363.1	2769.3	3.0	218.4
TDS/TDS(CALC)	1.00	0.98	1.00	3.00	0.01
TOTAL CATIONS	40.78	35.88	43.64	3.00	4.26
TOTAL ANIONS	41.26	38.42	43.73	3.00	2.67
CAT-AN BALANCE	-0.70	-3.40	2.30	3.00	2.86

EMERY MINE SURFACE WATER MONITORING REPORT 14:00 THURSDAY, MARCH [illegible] 1989
FOR ALL DATA FROM 880101 THROUGH 881231

*****

SITE=S01

	RAW DATA 06JUN88	28JUL88	15SEP88
FLOW(CFS)	2.72	0.45	1.08
SP COND - LAB	977	1950	1760
PH - LAB	8.2	7.9	7.9
TSS	682.0	122.0	18.0
TDS	684.0	1594.0	1412.0
OIL & GREASE	1.0		1.0
ACIDITY,TOT			
ALKALINITY(CACO3)			
TOTAL	214.00	280.00	269.00
NONCARBONATE	0.00	0.00	0.00
ANIONS			
HCO3	261.08	341.60	328.18
CO3	0.00	0.00	0.00
CL	15.00	48.00	47.00
SO4	311.00	888.00	776.00
NO3(N)	0.76	0.70	0.51
CATIONS			
NA	89.00	231.00	227.00
K	3.00	6.00	4.00
CA	86.00	163.00	139.00
MG	43.00	91.00	91.00
FE,DISS			
MN	0.01	0.04	0.01
OTHER IONS			
B	0.06	0.31	0.30
SR	0.86	1.95	1.66
F	0.30	0.50	0.40
FE,TOT	0.09	2.98	0.19
P-ORTHO	0.01	0.01	0.01
SIO2	6.90	10.70	10.00
CALCULATED DATA			
HARDNESS	391	781	721
NC HARDNESS			
SAR	2	4	4
IONIC RATIOS(%)			
NA+K	34	40	41
CA	36	31	28
MG	30	29	31
HCO3+CO3	38	22	24
CL	4	5	6
SO4	58	73	71
TDS(SUM)	816.2	1783.8	1623.6
TDS(SUM)/SP COND	0.84	0.91	0.92
TDS(CALC)	683.5	1610.2	1456.8
TDS/TDS(CALC)	1.00	0.99	0.97
TOTAL CATIONS	11.78	25.93	24.41
TOTAL ANIONS	11.25	25.52	22.92
CAT-AN BALANCE	2.30	0.80	3.10

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SITE=S01

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	1.42	0.45	2.72	3.00	1.17
SP COND - LAB	1562	977	1950	3	516
PH - LAB	8.0	7.9	8.2	3.0	0.2
TSS	274.0	18.0	682.0	3.0	357.1
TDS	1230.0	684.0	1594.0	3.0	481.5
OIL & GREASE	1.0	1.0	1.0	2.0	0.0
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	254.33	214.00	280.00	3.00	35.36
NONCARBONATE	0.00	0.00	0.00	3.00	0.00
ANIONS					
HCO3	310.29	261.08	341.60	3.00	43.14
CO3	0.00	0.00	0.00	3.00	0.00
CL	36.67	15.00	48.00	3.00	18.77
SO4	658.33	311.00	888.00	3.00	305.97
NO3(N)	0.66	0.51	0.76	3.00	0.13
CATIONS					
NA	182.33	89.00	231.00	3.00	80.85
K	4.33	3.00	6.00	3.00	1.53
CA	129.33	86.00	163.00	3.00	39.40
MG	75.00	43.00	91.00	3.00	27.71
FE,DISS				0.00	
MN	0.02	0.01	0.04	3.00	0.02
OTHER IONS					
B	0.22	0.06	0.31	3.00	0.14
SR	1.49	0.86	1.95	3.00	0.56
F	0.40	0.30	0.50	3.00	0.10
FE,TOT	1.09	0.09	2.98	3.00	1.64
P-ORTHO	0.01	0.01	0.01	3.00	0.00
SIO2	9.20	6.90	10.70	3.00	2.02
CALCULATED DATA					
HARDNESS	631	391	781	3	210
NC HARDNESS				0	
SAR	3	2	4	3	1
IONIC RATIOS(%)					
NA+K	38	34	41	3	4
CA	32	28	36	3	4
MG	30	29	31	3	1
HCO3+CO3	28	22	38	3	9
CL	5	4	6	3	1
SO4	67	58	73	3	8
TDS(SUM)	1407.9	816.2	1783.8	3.0	518.6
TDS(SUM)/SP COND	0.89	0.84	0.92	3.00	0.05
TDS(CALC)	1250.2	683.5	1610.2	3.0	496.7
TDS/TDS(CALC)	0.99	0.97	1.00	3.00	0.02
TOTAL CATIONS	20.71	11.78	25.93	3.00	7.77
TOTAL ANIONS	19.90	11.25	25.52	3.00	7.60
CAT-AN BALANCE	2.07	0.80	3.10	3.00	1.17

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SITE=S01A

	- RAW D 21DEC88
FLOW(CFS)	
SP COND - LAB	1370
PH - LAB	7.8
TSS	202.0
TDS	986.0
OIL & GREASE	1.0
ACIDITY,TOT	
ALKALINITY(CACO3)	
TOTAL	272.00
NONCARBONATE	0.00
ANIONS	
HCO3	331.84
CO3	0.00
CL	53.00
SO4	492.00
NO3(N)	0.12
CATIONS	
NA	139.00
K	4.00
CA	100.00
MG	66.00
FE,DISS	
MN	0.11
OTHER IONS	
B	0.29
SR	1.14
F	0.40
FE,TOT	4.80
P-ORTHO	0.01
SIO2	10.70
CALCULATED DATA	
HARDNESS	521
NC HARDNESS	
SAR	3
IONIC RATIOS(%)	
NA+K	37
CA	30
MG	33
HCO3+CO3	32
CL	9
SO4	60
TDS(SUM)	1202.3
TDS(SUM)/SP COND	0.88
TDS(CALC)	1033.6
TDS/TDS(CALC)	0.95
TOTAL CATIONS	16.74
TOTAL ANIONS	17.21
CAT-AN BALANCE	-1.40

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SITE=S01A

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)				0.00	
SP COND - LAB	1370	1370	1370	1	
PH - LAB	7.8	7.8	7.8	1.0	
TSS	202.0	202.0	202.0	1.0	
TDS	986.0	986.0	986.0	1.0	
OIL & GREASE	1.0	1.0	1.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	272.00	272.00	272.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	331.84	331.84	331.84	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	53.00	53.00	53.00	1.00	
SO4	492.00	492.00	492.00	1.00	
NO3(N)	0.12	0.12	0.12	1.00	
CATIONS					
NA	139.00	139.00	139.00	1.00	
K	4.00	4.00	4.00	1.00	
CA	100.00	100.00	100.00	1.00	
MG	66.00	66.00	66.00	1.00	
FE,DISS				0.00	
MN	0.11	0.11	0.11	1.00	
OTHER IONS					
B	0.29	0.29	0.29	1.00	
SR	1.14	1.14	1.14	1.00	
F	0.40	0.40	0.40	1.00	
FE,TOT	4.80	4.80	4.80	1.00	
P-ORTHO	0.01	0.01	0.01	1.00	
SIO2	10.70	10.70	10.70	1.00	
CALCULATED DATA					
HARDNESS	521	521	521	1	
NC HARDNESS				0	
SAR	3	3	3	1	
IONIC RATIOS(%)					
NA+K	37	37	37	1	
CA	30	30	30	1	
MG	33	33	33	1	
HCO3+CO3	32	32	32	1	
CL	9	9	9	1	
SO4	60	60	60	1	
TDS(SUM)	1202.3	1202.3	1202.3	1.0	
TDS(SUM)/SP COND	0.88	0.88	0.88	1.00	
TDS(CALC)	1033.6	1033.6	1033.6	1.0	
TDS/TDS(CALC)	0.95	0.95	0.95	1.00	
TOTAL CATIONS	16.74	16.74	16.74	1.00	
TOTAL ANIONS	17.21	17.21	17.21	1.00	
CAT-AN BALANCE	-1.40	-1.40	-1.40	1.00	

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SITE=S02

	RAW DATA			
	07JUN88	28JUL88	14SEP88	27DEC88
FLOW(CFS)	2.83	0.33	0.29	
SP COND - LAB	2760	6990	5130	2920
PH - LAB	8.2	8.2	7.9	7.7
TSS	154.0	6.0	80.0	108.0
TDS	2388.0	7162.0	5282.0	2558.0
OIL & GREASE				
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	322.00	392.00	315.00	324.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	392.84	478.24	383.08	395.28
CO3	0.00	0.00	0.00	0.00
CL	44.00	123.00	81.00	46.00
SO4	1416.00	4515.00	3276.00	1597.00
NO3(N)	5.00	33.56	28.04	10.93
CATIONS				
NA	395.00	1220.00	870.00	379.00
K	8.00	21.00	10.00	5.00
CA	152.00	415.00	286.00	199.00
MG	161.00	448.00	320.00	178.00
FE,DISS				
MN	0.10	0.02	0.05	0.37
OTHER IONS				
B	0.21	0.71	0.54	0.22
SR	1.52	4.45	2.80	1.70
F	0.40	0.50	0.40	0.40
FE,TOT	0.18	0.28	1.05	2.32
P-ORTHO	0.03	0.02	0.01	0.01
SIO2	9.00	8.30	7.50	8.10
CALCULATED DATA				
HARDNESS	1040	2874	2027	1227
NC HARDNESS				
SAR	5	10	8	5
IONIC RATIOS(%)				
NA+K	45	48	48	40
CA	20	19	18	24
MG	35	33	33	36
HCO3+CO3	17	7	8	16
CL	3	3	3	3
SO4	79	89	89	81
TDS(SUM)	2583.8	7263.8	5263.8	2821.7
TDS(SUM)/SP COND	0.94	1.04	1.03	0.97
TDS(CALC)	2384.1	7020.8	5069.1	2620.8
TDS/TDS(CALC)	1.00	1.02	1.04	0.98
TOTAL CATIONS	38.23	111.18	78.73	41.28
TOTAL ANIONS	37.54	107.75	78.81	41.83
CAT-AN BALANCE	0.90	1.60	0.00	-0.70

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SITE=S02

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	1.15	0.29	2.83	3.00	1.46
SP COND - LAB	4450	2760	6990	4	2009
PH - LAB	8.0	7.7	8.2	4.0	0.2
TSS	87.0	6.0	154.0	4.0	62.0
TDS	4347.5	2388.0	7162.0	4.0	2297.6
OIL & GREASE				0.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	338.25	315.00	392.00	4.00	36.04
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	412.36	383.08	478.24	4.00	44.24
CO3	0.00	0.00	0.00	4.00	0.00
CL	73.50	44.00	123.00	4.00	37.12
SO4	2701.00	1416.00	4515.00	4.00	1470.97
NO3(N)	19.38	5.00	33.56	4.00	13.59
CATIONS					
NA	716.00	379.00	1220.00	4.00	405.93
K	11.00	5.00	21.00	4.00	6.98
CA	263.00	152.00	415.00	4.00	115.54
MG	276.75	161.00	448.00	4.00	134.59
FE,DISS				0.00	
MN	0.13	0.02	0.37	4.00	0.16
OTHER IONS					
B	0.42	0.21	0.71	4.00	0.25
SR	2.62	1.52	4.45	4.00	1.35
F	0.42	0.40	0.50	4.00	0.05
FE,TOT	0.96	0.18	2.32	4.00	0.99
P-ORTHO	0.02	0.01	0.03	4.00	0.01
SIO2	8.22	7.50	9.00	4.00	0.62
CALCULATED DATA					
HARDNESS	1792	1040	2874	4	839
NC HARDNESS				0	
SAR	7	5	10	4	2
IONIC RATIOS(%)					
NA+K	46	40	48	4	4
CA	20	18	24	4	3
MG	34	33	36	4	1
HCO3+CO3	12	7	17	4	5
CL	3	3	3	4	0
SO4	85	79	89	4	5
TDS(SUM)	4483.3	2583.8	7263.8	4.0	2214.3
TDS(SUM)/SP COND	0.99	0.94	1.04	4.00	0.05
TDS(CALC)	4273.7	2384.1	7020.8	4.0	2197.1
TDS/TDS(CALC)	1.01	0.98	1.04	4.00	0.03
TOTAL CATIONS	67.36	38.23	111.18	4.00	34.54
TOTAL ANIONS	66.48	37.54	107.75	4.00	33.17
CAT-AN BALANCE	0.45	-0.70	1.60	4.00	1.01

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SITE=S03

	RAW DATA				
	22JAN88	06JUN88	28JUL88	15SEP88	27DEC88
FLOW(CFS)	12.00	7.84	0.89	4.41	1.11
SP COND - LAB	1470	2520	2880	2910	2060
PH - LAB	8.2	8.3	8.1	7.8	7.9
TSS	86.0	256.0	64.0	52.0	40.0
TDS	1098.0	2002.0	2467.0	2332.0	1554.0
OIL & GREASE					
ACIDITY,TOT					
ALKALINITY(CACO3)					
TOTAL	304.00	337.00	302.00	315.00	314.00
NONCARBONATE	0.00	0.00	0.00	0.00	0.00
ANIONS					
HCO3	370.88	411.14	368.44	384.30	383.08
CO3	0.00	0.00	0.00	0.00	0.00
CL	32.00	52.00	52.00	163.00	50.00
SO4	578.00	1048.00	1505.00	1418.00	873.00
NO3(N)	1.96	2.07	6.51	1.94	1.03
CATIONS					
NA	174.00	410.00	369.00	521.00	297.00
K	3.00	6.00	8.00	6.00	4.00
CA	116.00	128.00	192.00	118.00	118.00
MG	75.00	101.00	168.00	110.00	72.00
FE,DISS					
MN	0.06	0.03	0.04	0.03	0.05
OTHER IONS					
B	0.18	0.39	0.38	0.53	0.32
SR	1.28	2.64	2.40	3.28	2.28
F	0.40	0.60	0.60	0.70	0.40
FE,TOT	2.19	0.31	1.25	1.02	1.05
P-ORTHO	0.01	0.02	0.01	0.01	0.01
SIO2	9.20	11.90	11.20	11.50	10.20
CALCULATED DATA					
HARDNESS	598	734	1169	746	590
NC HARDNESS					
SAR	3	7	5	8	5
IONIC RATIOS(%)					
NA+K	39	55	41	60	52
CA	30	20	24	16	24
MG	31	25	35	24	24
HCO3+CO3	32	22	16	16	24
CL	5	5	4	11	5
SO4	63	73	81	73	70
TDS(SUM)	1362.9	2171.5	2682.5	2736.0	1810.2
TDS(SUM)/SP COND	0.93	0.86	0.93	0.94	0.88
TDS(CALC)	1174.4	1962.5	2495.2	2540.7	1615.4
TDS/TDS(CALC)	0.93	1.02	0.99	0.92	0.96
TOTAL CATIONS	19.68	32.70	39.70	37.79	24.87
TOTAL ANIONS	19.18	30.21	39.34	40.60	25.96
CAT-AN BALANCE	1.30	4.00	0.50	-3.60	-2.10

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SITE=S03

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	5.25	0.89	12.00	5.00	4.72
SP COND - LAB	2368	1470	2910	5	608
PH - LAB	8.1	7.8	8.3	5.0	0.2
TSS	99.6	40.0	256.0	5.0	89.1
TDS	1890.6	1098.0	2467.0	5.0	565.9
OIL & GREASE				0.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	314.40	302.00	337.00	5.00	13.90
NONCARBONATE	0.00	0.00	0.00	5.00	0.00
ANIONS					
HCO3	383.57	368.44	411.14	5.00	16.96
CO3	0.00	0.00	0.00	5.00	0.00
CL	69.80	32.00	163.00	5.00	52.77
SO4	1084.40	578.00	1505.00	5.00	384.27
NO3(N)	2.70	1.03	6.51	5.00	2.17
CATIONS					
NA	354.20	174.00	521.00	5.00	129.32
K	5.40	3.00	8.00	5.00	1.95
CA	134.40	116.00	192.00	5.00	32.54
MG	105.20	72.00	168.00	5.00	38.73
FE,DISS				0.00	
MN	0.04	0.03	0.06	5.00	0.01
OTHER IONS					
B	0.36	0.18	0.53	5.00	0.13
SR	2.38	1.28	3.28	5.00	0.72
F	0.54	0.40	0.70	5.00	0.13
FE,TOT	1.16	0.31	2.19	5.00	0.68
P-ORTHO	0.01	0.01	0.02	5.00	0.00
SIO2	10.80	9.20	11.90	5.00	1.09
CALCULATED DATA					
HARDNESS	767	590	1169	5	236
NC HARDNESS				0	
SAR	6	3	8	5	2
IONIC RATIOS(%)					
NA+K	50	39	60	5	9
CA	23	16	30	5	5
MG	28	24	35	5	5
HCO3+CO3	22	16	32	5	7
CL	6	4	11	5	3
SO4	72	63	81	5	6
TDS(SUM)	2152.6	1362.9	2736.0	5.0	583.6
TDS(SUM)/SP COND	0.91	0.86	0.94	5.00	0.04
TDS(CALC)	1957.6	1174.4	2540.7	5.0	583.0
TDS/TDS(CALC)	0.96	0.92	1.02	5.00	0.04
TOTAL CATIONS	30.95	19.68	39.70	5.00	8.52
TOTAL ANIONS	31.06	19.18	40.60	5.00	9.05
CAT-AN BALANCE	0.02	-3.60	4.00	5.00	2.97

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SITE=S04

	RAW DATA				
	22JAN88	07JUN88	28JUL88	15SEP88	27DEC88
FLOW(CFS)	8.00	4.98	0.45	3.88	
SP COND - LAB	1300	2400	2150	2860	2040
PH - LAB	7.8	8.3	7.8	7.9	7.9
TSS	122.0	394.0	104.0	28.0	120.0
TDS	962.0	1808.0	1764.0	2232.0	1532.0
OIL & GREASE	1.0	1.0	1.0	1.0	
ACIDITY,TOT					
ALKALINITY(CACO3)					
TOTAL	294.00	288.00	296.00	323.00	320.00
NONCARBONATE	0.00	0.00	0.00	0.00	0.00
ANIONS					
HCO3	358.68	351.36	361.12	394.06	390.40
CO3	0.00	0.00	0.00	0.00	0.00
CL	33.00	56.00	47.00	63.00	50.00
SO4	473.00	1068.00	988.00	1346.00	860.00
NO3(N)	0.66	0.47	0.90	0.32	0.50
CATIONS					
NA	146.00	389.00	251.00	541.00	303.00
K	3.00	6.00	6.00	6.00	4.00
CA	103.00	107.00	160.00	116.00	104.00
MG	64.00	75.00	99.00	98.00	70.00
FE,DISS					
MN	0.04	0.01	0.05	0.03	0.06
OTHER IONS					
B	0.19	0.33	0.28	0.56	0.32
SR	1.22	2.68	2.45	3.60	2.36
F	0.40	0.60	0.50	0.70	0.70
FE,TOT	2.40	0.14	2.06	0.97	2.49
P-ORTHO	0.01	0.02	0.01	0.01	0.01
SIO2	9.50	7.90	10.30	12.00	10.20
CALCULATED DATA					
HARDNESS	520	575	806	692	547
NC HARDNESS					
SAR	3	7	4	9	6
IONIC RATIOS(%)					
NA+K	38	60	41	63	55
CA	31	19	29	15	21
MG	31	22	30	21	24
HCO3+CO3	35	19	21	18	25
CL	6	5	5	5	5
SO4	59	75	74	77	70
TDS(SUM)	1193.9	2061.8	1926.2	2578.6	1795.7
TDS(SUM)/SP COND	0.92	0.86	0.90	0.90	0.88
TDS(CALC)	1011.6	1883.2	1742.7	2378.3	1597.3
TDS/TDS(CALC)	0.95	0.96	1.01	0.94	0.96
TOTAL CATIONS	16.92	28.59	27.28	37.57	24.32
TOTAL ANIONS	16.73	29.64	27.91	36.32	25.79
CAT-AN BALANCE	0.60	-1.80	-1.10	1.70	-2.90

EMERY MINE SURFAC[illegible]ER MONITORING REPORT 14:49 THURSDAY, MARCH [illegible]989 PC
FOR ALL DATA FRO[illegible]0101 THROUGH 881231

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SITE=S04

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	4.33	0.45	8.00	4.00	3.12
SP COND - LAB	2150	1300	2860	5	570
PH - LAB	7.9	7.8	8.3	5.0	0.2
TSS	153.6	28.0	394.0	5.0	139.8
TDS	1659.6	962.0	2232.0	5.0	464.6
OIL & GREASE	1.0	1.0	1.0	4.0	0.0
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	304.20	288.00	323.00	5.00	16.10
NONCARBONATE	0.00	0.00	0.00	5.00	0.00
ANIONS					
HCO3	371.12	351.36	394.06	5.00	19.64
CO3	0.00	0.00	0.00	5.00	0.00
CL	49.80	33.00	63.00	5.00	11.21
SO4	947.00	473.00	1346.00	5.00	319.28
NO3(N)	0.57	0.32	0.90	5.00	0.22
CATIONS					
NA	326.00	146.00	541.00	5.00	148.95
K	5.00	3.00	6.00	5.00	1.41
CA	118.00	103.00	160.00	5.00	24.03
MG	81.20	64.00	99.00	5.00	16.27
FE,DISS				0.00	
MN	0.04	0.01	0.06	5.00	0.02
OTHER IONS					
B	0.34	0.19	0.56	5.00	0.14
SR	2.46	1.22	3.60	5.00	0.85
F	0.58	0.40	0.70	5.00	0.13
FE,TOT	1.61	0.14	2.49	5.00	1.02
P-ORTHO	0.01	0.01	0.02	5.00	0.00
SIO2	9.98	7.90	12.00	5.00	1.48
CALCULATED DATA					
HARDNESS	628	520	806	5	119
NC HARDNESS				0	
SAR	6	3	9	5	2
IONIC RATIOS(%)					
NA+K	51	38	63	5	11
CA	23	15	31	5	7
MG	26	21	31	5	5
HCO3+CO3	24	18	35	5	7
CL	5	5	6	5	0
SO4	71	59	77	5	7
TDS(SUM)	1911.3	1193.9	2578.6	5.0	499.1
TDS(SUM)/SP COND	0.89	0.86	0.92	5.00	0.02
TDS(CALC)	1722.6	1011.6	2378.3	5.0	494.3
TDS/TDS(CALC)	0.96	0.94	1.01	5.00	0.03
TOTAL CATIONS	26.94	16.92	37.57	5.00	7.47
TOTAL ANIONS	27.28	16.73	36.32	5.00	7.09
CAT-AN BALANCE	-0.70	-2.90	1.70	5.00	1.85

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SITE=S05

	RAW DATA			
	22JAN88	06JUN88	28JUL88	15SEP88
FLOW(CFS)		3.07	0.45	0.81
SP COND - LAB	1480	2470	3540	3340
PH - LAB	8.2	8.4	8.2	7.8
TSS	108.0	84.0	4.0	2.0
TDS	1138.0	2122.0	3266.0	3190.0
OIL & GREASE				
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	281.00	332.00	322.00	273.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	342.82	390.40	392.84	333.06
CO3	0.00	7.20	0.00	0.00
CL	21.00	39.00	59.00	58.00
SO4	632.00	1212.00	2002.00	1935.00
NO3(N)	4.11	4.84	12.13	13.85
CATIONS				
NA	166.00	344.00	479.00	489.00
K	2.00	7.00	9.00	5.00
CA	113.00	139.00	207.00	182.00
MG	86.00	148.00	225.00	215.00
FE,DISS				
MN	0.15	0.07	0.02	0.01
OTHER IONS				
B	0.11	0.25	0.43	0.40
SR	1.04	1.56	2.85	2.40
F	0.40	0.50	0.60	0.60
FE,TOT	4.80	0.25	0.13	0.04
P-ORTHO	0.01	0.03	0.01	0.01
SIO2	8.20	11.80	12.60	12.80
CALCULATED DATA				
HARDNESS	635	954	1440	1337
NC HARDNESS				
SAR	3	5	6	6
IONIC RATIOS(%)				
NA+K	36	44	42	44
CA	28	20	21	19
MG	35	36	37	37
HCO3+CO3	29	20	13	12
CL	3	3	3	3
SO4	68	77	84	85
TDS(SUM)	1380.6	2304.3	3399.8	3244.8
TDS(SUM)/SP COND	0.93	0.93	0.96	0.97
TDS(CALC)	1206.4	2105.9	3200.1	3075.5
TDS/TDS(CALC)	0.94	1.01	1.02	1.04
TOTAL CATIONS	20.16	34.27	49.91	48.17
TOTAL ANIONS	19.69	33.35	50.69	48.41
CAT-AN BALANCE	1.20	1.40	-0.80	-0.20

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SITE=S05

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	1.44	0.45	3.07	3.00	1.42
SP COND - LAB	2708	1480	3540	4	941
PH - LAB	8.1	7.8	8.4	4.0	0.3
TSS	49.5	2.0	108.0	4.0	54.6
TDS	2429.0	1138.0	3266.0	4.0	1006.7
OIL & GREASE				0.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	302.00	273.00	332.00	4.00	29.34
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	364.78	333.06	392.84	4.00	31.26
CO3	1.80	0.00	7.20	4.00	3.60
CL	44.25	21.00	59.00	4.00	18.03
SO4	1445.25	632.00	2002.00	4.00	649.51
NO3(N)	8.73	4.11	13.85	4.00	4.97
CATIONS					
NA	369.50	166.00	489.00	4.00	150.92
K	5.75	2.00	9.00	4.00	2.99
CA	160.25	113.00	207.00	4.00	42.20
MG	168.50	86.00	225.00	4.00	64.76
FE,DISS				0.00	
MN	0.06	0.01	0.15	4.00	0.06
OTHER IONS					
B	0.30	0.11	0.43	4.00	0.15
SR	1.96	1.04	2.85	4.00	0.81
F	0.52	0.40	0.60	4.00	0.10
FE,TOT	1.30	0.04	4.80	4.00	2.33
P-ORTHO	0.01	0.01	0.03	4.00	0.01
SIO2	11.35	8.20	12.80	4.00	2.14
CALCULATED DATA					
HARDNESS	1092	635	1440	4	369
NC HARDNESS				0	
SAR	5	3	6	4	1
IONIC RATIOS(%)					
NA+K	42	36	44	4	4
CA	22	19	28	4	4
MG	36	35	37	4	1
HCO3+CO3	18	12	29	4	8
CL	3	3	3	4	0
SO4	78	68	85	4	8
TDS(SUM)	2582.4	1380.6	3399.8	4.0	936.1
TDS(SUM)/SP COND	0.95	0.93	0.97	4.00	0.02
TDS(CALC)	2397.0	1206.4	3200.1	4.0	932.3
TDS/TDS(CALC)	1.00	0.94	1.04	4.00	0.04
TOTAL CATIONS	38.13	20.16	49.91	4.00	13.87
TOTAL ANIONS	38.03	19.69	50.69	4.00	14.45
CAT-AN BALANCE	0.40	-0.80	1.40	4.00	1.07

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SITE=S08

	RAW DATA 06JUN88	28JUL88	14SEP88	27DEC88
FLOW(CFS)	1.36	0.04	0.00	0.00
SP COND - LAB	1770	5180		
PH - LAB	8.5	7.9		
TSS	144.0	50.0		
TDS	1322.0	4430.0		
OIL & GREASE		1.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	306.00	302.00		
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	348.92	368.44		
CO3	12.00	0.00		
CL	61.00	180.00		
SO4	700.00	2731.00		
NO3(N)	0.07	3.17		
CATIONS				
NA	249.00	936.00		
K	6.00	14.00		
CA	101.00	151.00		
MG	90.00	204.00		
FE,DISS				
MN	0.01	0.04		
OTHER IONS				
B	0.17	0.36		
SR	1.10	2.30		
F	0.30	0.50		
FE,TOT	0.16	1.00		
P-ORTHO	0.01	0.06		
SIO2	7.60	12.30		
CALCULATED DATA				
HARDNESS	622	1214		
NC HARDNESS				
SAR	4	12		
IONIC RATIOS(%)				
NA+K	47	63		
CA	22	12		
MG	32	26		
HCO3+CO3	27	9		
CL	8	7		
SO4	65	84		
TDS(SUM)	1576.2	4602.3		
TDS(SUM)/SP COND	0.89	0.89		
TDS(CALC)	1398.9	4415.1		
TDS/TDS(CALC)	0.95	1.00		
TOTAL CATIONS	23.43	65.43		
TOTAL ANIONS	22.44	68.27	0.00	0.00
CAT-AN BALANCE	2.20	-2.10		

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SITE=S08

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.35	0.00	1.36	4.00	0.67
SP COND - LAB	3475	1770	5180	2	2411
PH - LAB	8.2	7.9	8.5	2.0	0.4
TSS	97.0	50.0	144.0	2.0	66.5
TDS	2876.0	1322.0	4430.0	2.0	2197.7
OIL & GREASE	1.0	1.0	1.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	304.00	302.00	306.00	2.00	2.83
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	358.68	348.92	368.44	2.00	13.80
CO3	6.00	0.00	12.00	2.00	8.49
CL	120.50	61.00	180.00	2.00	84.15
SO4	1715.50	700.00	2731.00	2.00	1436.13
NO3(N)	1.62	0.07	3.17	2.00	2.19
CATIONS					
NA	592.50	249.00	936.00	2.00	485.78
K	10.00	6.00	14.00	2.00	5.66
CA	126.00	101.00	151.00	2.00	35.36
MG	147.00	90.00	204.00	2.00	80.61
FE,DISS				0.00	
MN	0.02	0.01	0.04	2.00	0.02
OTHER IONS					
B	0.26	0.17	0.36	2.00	0.13
SR	1.70	1.10	2.30	2.00	0.85
F	0.40	0.30	0.50	2.00	0.14
FE,TOT	0.58	0.16	1.00	2.00	0.59
P-ORTHO	0.03	0.01	0.06	2.00	0.04
SIO2	9.95	7.60	12.30	2.00	3.32
CALCULATED DATA					
HARDNESS	918	622	1214	2	419
NC HARDNESS				0	
SAR	8	4	12	2	5
IONIC RATIOS(%)					
NA+K	55	47	63	2	11
CA	17	12	22	2	7
MG	29	26	32	2	4
HCO3+CO3	18	9	27	2	13
CL	8	7	8	2	0
SO4	74	65	84	2	13
TDS(SUM)	3089.3	1576.2	4602.3	2.0	2139.8
TDS(SUM)/SP COND	0.89	0.89	0.89	2.00	0.00
TDS(CALC)	2907.0	1398.9	4415.1	2.0	2132.8
TDS/TDS(CALC)	0.97	0.95	1.00	2.00	0.04
TOTAL CATIONS	44.43	23.43	65.43	2.00	29.69
TOTAL ANIONS	22.68	0.00	68.27	4.00	32.18
CAT-AN BALANCE	0.05	-2.10	2.20	2.00	3.04

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SITE=S09

	RAW DATA			
	06JUN88	28JUL88	14SEP88	27DEC88
FLOW(CFS)	0.32	0.00	0.08	
SP COND - LAB	1550		1410	893
PH - LAB	8.0		7.8	7.7
TSS	22.0		2.0	32.0
TDS	1238.0		1086.0	584.0
OIL & GREASE				
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL	161.00		152.00	218.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	196.42		185.44	265.96
CO3	0.00		0.00	0.00
CL	92.00		78.00	50.00
SO4	669.00		582.00	214.00
NO3(N)	0.02		0.02	0.12
CATIONS				
NA	82.00		70.00	29.00
K	5.00		3.00	3.00
CA	159.00		139.00	90.00
MG	110.00		100.00	48.00
FE,DISS				
MN	0.01		0.01	0.01
OTHER IONS				
B	0.11		0.08	0.02
SR	1.20		0.90	0.54
F	0.30		0.20	0.30
FE,TOT	0.07		0.06	0.69
P-ORTHO	0.01		0.01	0.01
SIO2	15.70		16.00	17.90
CALCULATED DATA				
HARDNESS	849		758	422
NC HARDNESS				
SAR	1		1	1
IONIC RATIOS(%)				
NA+K	18		17	14
CA	38		38	46
MG	44		45	40
HCO3+CO3	16		18	43
CL	13		13	14
SO4	71		70	44
TDS(SUM)	1329.6		1173.8	719.0
TDS(SUM)/SP COND	0.86		0.83	0.81
TDS(CALC)	1229.8		1079.6	583.8
TDS/TDS(CALC)	1.01		1.01	1.00
TOTAL CATIONS	20.68		18.29	9.80
TOTAL ANIONS	19.76	0.00	17.37	10.25
CAT-AN BALANCE	2.30		2.60	-2.20

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SITE=S09

	STATISTICS MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.13	0.00	0.32	3.00	0.17
SP COND - LAB	1284	893	1550	3	346
PH - LAB	7.8	7.7	8.0	3.0	0.2
TSS	18.7	2.0	32.0	3.0	15.3
TDS	969.3	584.0	1238.0	3.0	342.3
OIL & GREASE				0.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	177.00	152.00	218.00	3.00	35.79
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	215.94	185.44	265.96	3.00	43.67
CO3	0.00	0.00	0.00	3.00	0.00
CL	73.33	50.00	92.00	3.00	21.39
SO4	488.33	214.00	669.00	3.00	241.53
NO3(N)	0.05	0.02	0.12	3.00	0.06
CATIONS					
NA	60.33	29.00	82.00	3.00	27.79
K	3.67	3.00	5.00	3.00	1.15
CA	129.33	90.00	159.00	3.00	35.50
MG	86.00	48.00	110.00	3.00	33.29
FE,DISS				0.00	
MN	0.01	0.01	0.01	3.00	0.00
OTHER IONS					
B	0.07	0.02	0.11	3.00	0.05
SR	0.88	0.54	1.20	3.00	0.33
F	0.27	0.20	0.30	3.00	0.06
FE,TOT	0.27	0.06	0.69	3.00	0.36
P-ORTHO	0.01	0.01	0.01	3.00	0.00
SIO2	16.53	15.70	17.90	3.00	1.19
CALCULATED DATA					
HARDNESS	676	422	849	3	225
NC HARDNESS				0	
SAR	1	1	1	3	0
IONIC RATIOS(%)					
NA+K	16	14	18	3	2
CA	41	38	46	3	4
MG	43	40	45	3	2
HCO3+CO3	25	16	43	3	15
CL	13	13	14	3	1
SO4	61	44	71	3	15
TDS(SUM)	1074.2	719.0	1329.6	3.0	317.3
TDS(SUM)/SP COND	0.83	0.81	0.86	3.00	0.03
TDS(CALC)	964.4	583.8	1229.8	3.0	338.0
TDS/TDS(CALC)	1.00	1.00	1.01	3.00	0.00
TOTAL CATIONS	16.26	9.80	20.68	3.00	5.72
TOTAL ANIONS	11.85	0.00	19.76	4.00	8.87
CAT-AN BALANCE	0.90	-2.20	2.60	3.00	2.69

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SITE=S10

	RAW DATA				
	22JAN88	06JUN88	28JUL88	14SEP88	27DEC88
FLOW(CFS)	2.00	0.70	0.17	0.50	
SP COND - LAB	2320	4060	4700	4500	1810
PH - LAB	8.0	8.3	8.3	7.9	7.9
TSS	24.0	10.0	6.0	18.0	174.0
TDS	1966.0	3938.0	4602.0	4552.0	1430.0
OIL & GREASE					
ACIDITY,TOT					
ALKALINITY(CACO3)					
TOTAL	300.00	208.00	196.00	229.00	256.00
NONCARBONATE	0.00	0.00	0.00	0.00	0.00
ANIONS					
HCO3	366.00	253.76	239.12	279.38	312.32
CO3	0.00	0.00	0.00	0.00	0.00
CL	142.00	241.00	319.00	350.00	69.00
SO4	1080.00	2247.00	2610.00	2669.00	790.00
NO3(N)	0.38	0.16	0.11	1.44	1.54
CATIONS					
NA	213.00	440.00	541.00	568.00	175.00
K	5.00	11.00	15.00	11.00	4.00
CA	165.00	269.00	277.00	251.00	134.00
MG	158.00	331.00	390.00	383.00	116.00
FE,DISS					
MN	0.06	0.02	0.04	0.01	0.08
OTHER IONS					
B	0.28	0.61	0.79	0.77	0.20
SR	1.86	3.54	4.15	3.80	1.42
F	0.40	0.40	0.40	0.40	0.40
FE,TOT	1.22	0.05	0.08	0.09	3.55
P-ORTHO	0.01	0.01	0.01	0.01	0.01
SIO2	16.30	9.40	2.50	10.20	9.90
CALCULATED DATA					
HARDNESS	1060	2030	2292	2198	811
NC HARDNESS					
SAR	3	4	5	5	3
IONIC RATIOS(%)					
NA+K	31	32	34	36	32
CA	27	22	20	18	28
MG	42	45	46	46	40
HCO3+CO3	18	7	6	7	22
CL	12	12	13	14	8
SO4	69	81	81	79	70
TDS(SUM)	2147.6	3803.4	4395.0	4524.3	1616.0
TDS(SUM)/SP COND	0.93	0.94	0.94	1.01	0.89
TDS(CALC)	1961.6	3674.4	4273.5	4382.3	1457.3
TDS/TDS(CALC)	1.00	1.07	1.08	1.04	0.98
TOTAL CATIONS	30.67	60.07	69.83	69.02	24.07
TOTAL ANIONS	32.54	57.77	67.29	70.15	23.65
CAT-AN BALANCE	-3.00	2.00	1.80	-0.80	0.90

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SITE=S10

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.84	0.17	2.00	4.00	0.80
SP COND - LAB	3478	1810	4700	5	1323
PH - LAB	8.1	7.9	8.3	5.0	0.2
TSS	46.4	6.0	174.0	5.0	71.7
TDS	3297.6	1430.0	4602.0	5.0	1495.5
OIL & GREASE				0.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	237.80	196.00	300.00	5.00	41.57
NONCARBONATE	0.00	0.00	0.00	5.00	0.00
ANIONS					
HCO3	290.12	239.12	366.00	5.00	50.72
CO3	0.00	0.00	0.00	5.00	0.00
CL	224.20	69.00	350.00	5.00	118.26
SO4	1879.20	790.00	2669.00	5.00	882.92
NO3(N)	0.73	0.11	1.54	5.00	0.71
CATIONS					
NA	387.40	175.00	568.00	5.00	183.37
K	9.20	4.00	15.00	5.00	4.60
CA	219.20	134.00	277.00	5.00	65.25
MG	275.60	116.00	390.00	5.00	129.42
FE,DISS				0.00	
MN	0.04	0.01	0.08	5.00	0.03
OTHER IONS					
B	0.53	0.20	0.79	5.00	0.28
SR	2.95	1.42	4.15	5.00	1.23
F	0.40	0.40	0.40	5.00	0.00
FE,TOT	1.00	0.05	3.55	5.00	1.51
P-ORTHO	0.01	0.01	0.01	5.00	0.00
SIO2	9.66	2.50	16.30	5.00	4.89
CALCULATED DATA					
HARDNESS	1678	811	2292	5	690
NC HARDNESS				0	
SAR	4	3	5	5	1
IONIC RATIOS(%)					
NA+K	33	31	36	5	2
CA	23	18	28	5	4
MG	44	40	46	5	3
HCO3+CO3	12	6	22	5	8
CL	12	8	14	5	2
SO4	76	69	81	5	6
TDS(SUM)	3297.3	1616.0	4524.3	5.0	1333.7
TDS(SUM)/SP COND	0.94	0.89	1.01	5.00	0.04
TDS(CALC)	3149.8	1457.3	4382.3	5.0	1354.0
TDS/TDS(CALC)	1.03	0.98	1.08	5.00	0.04
TOTAL CATIONS	50.73	24.07	69.83	5.00	21.79
TOTAL ANIONS	50.28	23.65	70.15	5.00	21.00
CAT-AN BALANCE	0.18	-3.00	2.00	5.00	2.09

WATER LEVEL DATA FOR THE EMERY MINE
FOR THE PERIOD FROM 880101 TO 881231

---------- WELL=AA AQUIFER=BG ----------

DATE	READING	WLELEV
22MAR88	59.5	5910.2
30JUN88	60.0	5909.7
19OCT88	59.5	5910.2
19DEC88	57.0	5912.7

---------- WELL=AA AQUIFER=L ----------

DATE	READING	WLELEV
22MAR88	87.3	5881.3
30JUN88	86.5	5882.1
19OCT88	88.0	5880.6
19DEC88	86.4	5882.2

---------- WELL=AA AQUIFER=M ----------

DATE	READING	WLELEV
22MAR88	86.0	5883.2
30JUN88	83.5	5885.7
19OCT88	85.0	5884.2
19DEC88	84.0	5885.2

---------- WELL=AA AQUIFER=U ----------

DATE	READING	WLELEV
22MAR88	109.0	5860.8
30JUN88	108.0	5861.8
19OCT88	112.5	5857.3
19DEC88	109.0	5860.8

---------- WELL=BRYANT AQUIFER=U ----------

DATE	READING	WLELEV
22MAR88	294.1	5730.4
30JUN88	318.0	5706.5
19OCT88	291.1	5733.4
19DEC88	292.0	5732.5

WATER LEVEL DATA FOR THE EMERY MINE
FOR THE PERIOD FROM 880101 TO 881231

WELL=EMRIA1 AQUIFER=UM

DATE	READING	WLELEV
22MAR88	149.5	6006.2
29JUN88	143.6	6012.1
11OCT88	139.5	6016.2
23DEC88	140.3	6015.4

WELL=EMRIA2 AQUIFER=BGUML

DATE	READING	WLELEV
22MAR88	27.8	6055.6
09JUN88	31.9	6051.5
20OCT88	33.8	6049.6
23DEC88	34.6	6048.8

WELL=EMRIA3 AQUIFER=BGU

DATE	READING	WLELEV
10JUN88	47.5	6044.3
21OCT88	62.7	6029.1
23DEC88	47.3	6044.5

WELL=FC346WW AQUIFER=UM

DATE	READING	WLELEV
22MAR88	88.0	6035.2
09JUN88	76.3	6046.9
11OCT88	76.3	6046.9
23DEC88	77.2	6046.0

WELL=H AQUIFER=BG

DATE	READING	WLELEV
22MAR88	35.1	6196.5
30JUN88	33.6	6198.0
25OCT88	33.9	6197.7
23DEC88	.	.

WELL=H AQUIFER=L

DATE	READING	WLELEV
22MAR88	40.4	6190.0
30JUN88	44.0	6186.4
25OCT88	43.9	6186.5

---------- WELL=H AQUIFER=M ----------

DATE	READING	WLELEV
22MAR88	94.6	6135.8
30JUN88	183.1	6047.3
25OCT88	220.0	6010.4
23DEC88	.	.

---------- WELL=H AQUIFER=U ----------

DATE	READING	WLELEV
22MAR88	58.0	6172.4
30JUN88	57.3	6173.1
20OCT88	57.7	6172.7
23DEC88	56.9	6173.5

---------- WELL=I AQUIFER=BG ----------

DATE	READING	WLELEV
22MAR88	40.1	6069.5
30JUN88	36.0	6073.6
25OCT88	26.0	6083.6
23DEC88	38.0	6071.6

---------- WELL=I AQUIFER=L ----------

DATE	READING	WLELEV
22MAR88	13.5	6095.2
30JUN88	14.6	6094.1
25OCT88	13.8	6094.9
23DEC88	13.8	6094.9

---------- WELL=I AQUIFER=M ----------

DATE	READING	WLELEV
22MAR88	223.3	5885.6
30JUN88	223.3	5885.6
25OCT88	223.8	5885.1
23DEC88	223.5	5885.4

WELL=12 AQUIFER=U

DATE	READING	WLELEV
22MAR88	397.9	5702.1
09JUN88	397.0	5703.0
25OCT88	.	.
23DEC88	.	.

WELL=KEMMER AQUIFER=L

DATE	READING	WLELEV
22MAR88	-24.0	6310.7
09JUN88	-24.0	6310.7
20OCT88	-24.0	6310.7
27DEC88	-23.0	6309.7

WELL=LEWIS AQUIFER=U

DATE	READING	WLELEV
25OCT88	.	.
29DEC88	.	.

WELL=MUDDY1 AQUIFER=U

DATE	READING	WLELEV
22MAR88	127.5	5940.7
09JUN88	127.7	5940.5
21OCT88	128.6	5939.6
29DEC88	128.4	5939.8

WELL=MUDDY2 AQUIFER=U

DATE	READING	WLELEV
22MAR88	93.6	5953.2
09JUN88	91.1	5955.7
21OCT88	87.7	5959.1
29DEC88	76.5	5970.3

WELL=RDA1 AQUIFER=UAL

DATE	READING	WLELEV
17FEB88	13.0	5945.5
08JUN88	13.5	5945.0
26SEP88	14.5	5944.0
19DEC88	13.9	5944.6

WATER LEVEL DATA FOR THE EMERY MINE
FOR THE PERIOD FROM 880101 TO 881231

---------- WELL=RDA2 AQUIFER=QAL ----------

DATE	READING	WLELEV
17FEB88	13.5	5942.2
08JUN88	14.2	5941.5
26SEP88	17.0	5938.7
19DEC88	14.3	5941.4

---------- WELL=RDA3 AQUIFER=QAL ----------

DATE	READING	WLELEV
17FEB88	21.0	5925.5
08JUN88	22.4	5924.1
23SEP88	21.0	5925.5
19DEC88	22.8	5923.7

---------- WELL=RDA4 AQUIFER=QAL ----------

DATE	READING	WLELEV
17FEB88	21.0	5923.0
08JUN88	21.5	5922.5
23SEP88	20.5	5923.5
19DEC88	21.8	5922.2

---------- WELL=RDA5 AQUIFER=QAL ----------

DATE	READING	WLELEV
17FEB88	19.0	5923.4
08JUN88	19.8	5922.6
23SEP88	17.5	5924.9
19DEC88	20.3	5922.1

---------- WELL=RDA6 AQUIFER=QAL ----------

DATE	READING	WLELEV
17FEB88	12.0	5930.0
08JUN88	15.5	5926.5
23SEP88	17.5	5924.5
19DEC88	15.9	5926.1

WATER LEVEL DATA FOR THE EMERY MINE
FOR THE PERIOD FROM 880101 TO 881231

WELL=R1 AQUIFER=L

DATE	READING	WLELEV
22MAR88	-258.4	6292.6
30JUN88	-263.0	6297.2
25OCT88	-267.7	6301.9
29DEC88	-226.1	6260.3

WELL=R2 AQUIFER=BG

DATE	READING	WLELEV
22MAR88	64.3	5967.4
30JUN88	117.3	5914.4
25OCT88	74.0	5957.7
29DEC88	76.8	5954.9

WELL=R2 AQUIFER=M

DATE	READING	WLELEV
22MAR88	-69.2	6100.3
25OCT88	.	.
29DEC88	.	.

WELL=R2 AQUIFER=U

DATE	READING	WLELEV
22MAR88	198.0	5833.7
25OCT88	.	.
29DEC88	.	.

WELL=SM1-1 AQUIFER=CAL

DATE	READING	WLELEV
21MAR88	9.0	6062.6
10JUN88	3.7	6067.9
22SEP88	18.0	6053.6
29DEC88	9.8	6061.8

WELL=SM1-2 AQUIFER=CAL

DATE	READING	WLELEV
21MAR88	8.0	6043.8
10JUN88	4.7	6047.1
22SEP88	5.9	6045.9
29DEC88	.	.

WATER LEVEL DATA FOR THE EMERY MINE
FOR THE PERIOD FROM 880101 TO 881231

WELL=SM1-3 AQUIFER=CAL

DATE	READING	WLELEV
21MAR88	8.0	6048.5
10JUN88	7.3	6049.2
22SEP88	8.3	6048.2
29DEC88	8.6	6047.9

WELL=SM1-4 AQUIFER=CAL

DATE	READING	WLELEV
21MAR88	13.0	5928.6
10JUN88	12.8	5928.8
22SEP88	14.3	5927.3
29DEC88	13.1	5928.5

WELL=TP AQUIFER=U

DATE	READING	WLELEV
25MAR88	333.0	5669.7
09JUN88	332.9	5669.8
25OCT88	.	.
29DEC88	.	.

WELL=T1 AQUIFER=UG

DATE	READING	WLELEV
25MAR88	12.5	5990.7
09JUN88	13.5	5989.7
21OCT88	13.5	5989.7
29DEC88	13.2	5990.0

WELL=T1 AQUIFER=U

DATE	READING	WLELEV
21OCT88	.	.
29DEC88	.	.

WELL=T2 AQUIFER=UG

DATE	READING	WLELEV
22MAR88	12.9	5990.1
09JUN88	13.3	5989.7
21OCT88	13.5	5989.5
29DEC88	13.0	5990.0

WELL=T2 AQUIFER=U

DATE	READING	WLELEV
22MAR88	325.7	5672.0
09JUN88	322.7	5675.0
21OCT88	353.3	5644.4
29DEC88	.	.

WELL=USGS1-2 AQUIFER=U

DATE	READING	WLELEV
22MAR88	88.8	5957.5
09JUN88	89.6	5956.7
20OCT88	90.5	5955.8
29DEC88	92.7	5953.6

WELL=USGS3-1 AQUIFER=BG

DATE	READING	WLELEV
22MAR88	18.2	6028.7
09JUN88	18.3	6028.6
21OCT88	20.5	6026.4
29DEC88	18.7	6028.2

WELL=USGS4-1 AQUIFER=BG

DATE	READING	WLELEV
22MAR88	8.0	6039.5
09JUN88	18.3	6029.2
21OCT88	18.8	6028.7
29DEC88	20.6	6026.9

WELL=WW1 AQUIFER=L

DATE	READING	WLELEV
30JUN88	66.2	5853.8
21OCT88	67.9	5852.1
29DEC88	.	.

WELL=ZZ AQUIFER=L

DATE	READING	WLELEV
22MAR88	147.6	5921.1
09JUN88	148.0	5920.7
21OCT88	148.0	5920.7
29DEC88	148.3	5920.4

SUBSIDENCE MONITORING - 1988

Mining Activities - During 1988 the First Federal Mains were advanced 2300 feet, 4-East Mains 2,000 feet and the 3rd Federal panel developed and roomed out, and 4th Federal panel developed.

Subsidence Surveys Table Sm-1 summarizes the survey data obtained for stations surveyed in 1988 and includes initial baseline survey data, survey elevations from the latest 1988 survey and the most recent previous check survey. Table includes baseline data for the new stations established in 1988.

TABLE SM-1 SUBSIDENCE MONITORING STATIONS - SURVEY 1988

STATION	LOCATION	DATE	BASELINE NORTHING	SURVEY DATA EASTING	ELEVATION	PRIOR DATE	CHECK SURVEY ELEVATION	DATE	CHECK SURVEY ELEVATION
SMK-3	2-East	6/81	197,304.72	2,071,450.90	6,083.56	7/87	6,078.26	12/88	6,078.32
83-1	3-East	6/83	197,431.73	2,072,907.02	6,062.29	7/87	6,061.97	12/88	6,062.03
E	3-East	5/81	197,803.76	2,072,023.67	6,079.67	7/87	6,079.26	12/88	6,079.40
W	2-Right	1/81	194,616.64	2,065,467.15	5,957.05	7/87	5,954.96	11/88	5,955.01
85-1	5-Right	12/85	194,958.12	2,063,444.68	5,974.25	7/87	5,973.19	7/87	5,973.19
85-2	5-Right	12/85	195,463.95	2,063,363.96	5,978.85	7/87	5,978.01	7/87	5,978.01
83-3	3-Right	5/84	194,594.74	2,064,492.11	5,962.25			-	*
83-4	3-Right	5/84	194,929.82	2,064,644.95	5,966.22			-	*
83-5	4-Right	5/84	194,627.68	2,063,887.44	5,969.53	7/87	5,968.36	7/87	5,968.36
83-6	4-Right	5/84	194,965.20	2,064,059.57	5,971.07			-	*
87-1	2-Fed	5/87	195,498.41	2,066,141.87	5,995.61	-	-	-	-
88-3	5-Fed	10/88	197,031.84	2,064,091.02	6,010.55	N/A	N/A	N/A	N/A
88-4	4-Fed	10/88	196,346.15	2,064,618.22	5,985.47	N/A	N/A	N/A	N/A
88-6	3-Fed	10/88	195,517.06	2,065,670.10	5,970.89	N/A	N/A	N/A	N/A
88-7	4-East	10/88	197,096.86	2,075,534.68	6,053.99	N/A	N/A	N/A	N/A
Q	1-Left	6/81	191,929.15	2,066,753.80	5,931.20	5/88	5,929.69	11/88	5,929.69
N	2-Right	12/82	193,874.72	2,065,955.61	5,948.67	5/88	5,946.44	11/88	5,946.55

*Stations 83-3, 4, & 6 were destroyed during resloping of the Lewis Field during 4th Quarter 1986. Station 83-5 was located intact.

Emery Mine Revegetation Demonstration Sites
Third Annual Monitoring Report - 1988

Consolidation Coal Company
Emery Mine
UDOGM Permit #ACT/015/015

Prepared By:

Richard Denning
David Larson
Consolidation Coal Company
January 10, 1989

Three Emery Mine revegetation demonstration sites, referred to as the Demonstration Site, the Borehole Site and the Flume Site were surveyed during September 13-14, 1988 by Richard Denning and David Larson, both members of the Consolidation Coal Company environmental staff. Additionally, the Demonstration Site was surveyed by Lynn Kunzler, James Leatherwood and Brent Stettler all personnel of the Utah Division of Oil, Gas and Mining on September 13, 1988 in an effort to determine successful revegetation techniques for Mancos shale soils. The sites, established in 1984, were partially reconstructed in 1987. Due to the site rework which utilized new revegetation techniques, vegetation monitoring will be conducted thru 1991 to allow sufficient time to evaluate the success of these techniques.

METHODS

The 1988 survey field methods used for the seeded plots are those specified by Utah, Division of Oil, Gas and Mining (UDOGM) guidelines. Sample adequacy for the seeded plots was calculated by Bio-Resources Inc. in 1985 and similar sample sets were used for the 1988 survey. Seeded plots were sampled by counting the number of stems in a 1/2 meter^2 plot. Each 1/2m^2 plot was checked using five quadrats. The number of 1/2m^2 plots varied from 2 thru 7 due to the size of the revegetation treatment site. Vegetation density and frequency are reported on attached tables and calculated as follows:

> Density equals the total number of stems per species in a treatment plot divided by the number of 1/2m^2 plots sampled.
>
> Frequency, expressed as a percent, equals the number of Daubenmire quadrats containing the species divided by the total number of quadrats samples.

Typed versions of the field sheets for the seeded plots are provided in this report. Note that data entry code DRKR stands for "dry crispies", which matured earlier and were not identifiable at the time of monitoring although the vast majority of these dried stems appeared to be halogeton or kochia.

Field observations of reconstructed plots containing transplants and containerized seedlings (A1 and B1) and those involving new revegetation techniques (A2) are discussed later.

DISCUSSION

The following summary tables are included in this report:

TABLE 1 - Species Codes
TABLE 2 - Flume Site Densities and Frequencies
TABLE 3 - Borehole Access Site Densities and Frequencies
TABLE 4 - Main Demonstration Site Densities
TABLE 5 - Main Demonstration Site Frequencies
TABLE 6 - Mature Transplants, 1987 & 1988 Observations
TABLE 7 - Containerized Seedlings, 1987 & 1988 Observations

DEMONSTRATION SITE - 1987 RECONSTRUCTED PLOTS

The mature transplants in Plot A1 as listed in Table 6 continue to show a 50% survival rate after their second growing season. The plants, due primarily to a dry summer, are not as healthy this year and exhibit smaller crown widths.

The field observations for the containerized transplants in Plot B1 are shown in Table 7 and summarized below. The survey shows a decrease in the overall survival rate from 66% in 1987 to 41% in 1988. Fourwing saltbush and black greasewood exhibited the best second year survival.

Species	1987			1988		
ATCA	22/22	-	100%	18/26	-	69%
ATCO	18/24	-	75%	8/25	-	32%
ATGA	26/26	-	100%	13/21	-	62%
CHNA	0/24	-	0%	0/24	-	0%
SAVE	13/23	-	56%	10/23	-	43%

Five water harvesting furrows created in 1987 on Plot A2 and seeded with fourwing saltbush, blackgreasewood, winterfat and rubber rabbitbrush show a significant decrease in survival of the seeded species. Stem counts and densities as calculated in the 1987 report are given below. Non furrowed ground in Plot A2 shows a similar decrease in the survival of seeded species, which indicates that the dry summer caused the loss more than did siltation in the furrows.

Species	1987		1988	
	Stem Count	Stems/$\frac{1}{2}m^2$	Stem Count	Stems/$\frac{1}{2}m^2$
ATCA	123	2.7	17	0.4
SAVE	36	0.8	15	0.3

Plots B2 and C2 were rototilled and seeded with Plot B2 additionally receiving mulch and fertilizer in April 1987. Both plots were again reseeded in September 1987. The 1988 vegetation survey shows little survival of the seeded species.

DEMONSTRATION SITE - ORIGINAL 1984 PLOTS

An overview of this area shows that satisfactory vegetative cover has developed in two spots. One of these spots is in Plot C1 and the other in Plots D2 and D2A. Reclamation techniques between these plots differ significantly. Plot C1 was mulched and irrigated. Plots D2 and D2A were mulched and received shrub transplants but were not irrigated. Additionally, Plot D2A received topsoil. Plot C1 received a different seed mixture than Plots D2 and D2A. The only thing in common besides the mulch application is that these two spots of vegetation occur in shallow depressions. The depressions could function as water harvesting features without causing significant siltation.

Flume Site

Species densities and frequencies are listed for 1987 and 1988 field surveys in Table 2. A noticeable increase in kochia and russian thistle were observed.

Borehole Site

Observations of twenty mat saltbush (ATCO2) specimens transplanted in April 1987 showed that two remain healthy and one is barely alive while 17 have died. This represents a loss of one plant since the 1987 survey was made.

Species densities and frequencies are listed for 1987 and 1988 field surveys in Table 3.

EMERY REVEGETATION DEMONSTRATION SITE

REVISED PLOT LAYOUT (1987)

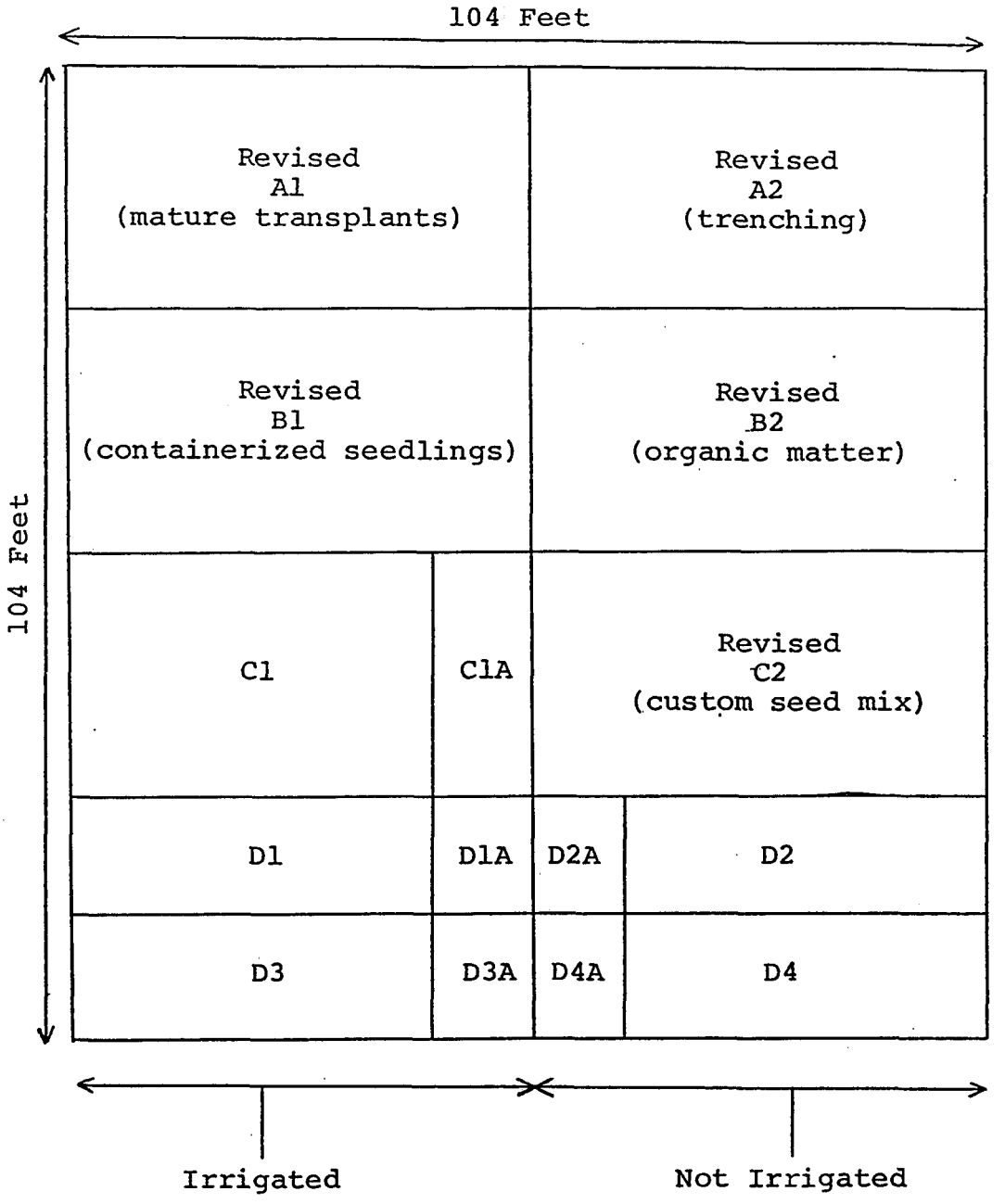

TABLE 1. EMERY REVEGETATION DEMONSTRATION SITE: SPECIES CODES

Species Codes	Species	Common Name
GRASSES		
AGCR	Agropyron cristatum	crested wheatgrass
AGSM	Agropyron smithii	western wheatgrass
AGTR	Agropyron trachycaulum	slender wheatgrass
AGSP	Agropyron ssp.	wheatgrass
ARPU	Aristida purpurea	poverty grass
BOGR	Bouteloua gracilis	blue grama
BRTE	Bromus tectorum	cheatgrass brome
HIJA	Hilaria jamesii	galleta
HOVU	Hordeum vulgare	
MUPU	Muhlenbergia pungens	muhly
ORHY	Oryzopsis hymenoides	indian ricegrass
SPAI	Sporobolus airoides	alkali sacaton
SPCON	Sporobolus contracta	spike dropseed
SPCR	Sporobolus cryptandrus	sand dropseed
SPGI	Sporobolus gigantus	giant dropseed
SPSP	Sporobolus ssp.	dropseed
TRAE	Triticum aestivum	wheat
SHRUBS		
ARCAC	Artamesia cana cana	silver sagebrush
ARNO	Artamesia nova	black sagebrush
ATAN	Atriplex (annual)	
ATCA	Atriplex canescens	fourwing saltbush
ATCO	Atriplex confertifolia	shadscale saltbush
ATCU	Atriplex cuneata	castle valley clover
ATCO2	Atriplex corrugata	mat saltbush
ATGA	Atriplex gardneri	gardner saltbush
ATPA	Atriplex patula	orache
ATSP	Atriplex spp.	saltbush
CELA	Ceratoides lanata	winterfat
CHLI	Chrysothamnus linifolius	
CHNA	Chrysothamnus nauseosus	rubber rabbitbrush
EPVI	Ephedra viridus	green mormon tea
GUSA	Gutierrezia sarothrae	broom snakeweed
SAVE	Sarcobatus vermiculatus	black greasewood
TARA	Tamarix ramosissima	tamarisk
FORBS		
AMAC	Ambrosia acanthicarpa	ragweed
ASSP	Astragalus spp.	milkvetch
CRSP	Crypthantha spp.	cryptantha
DESP	Descurainia spp.	tansy mustard
EUSP	Euphorbia spp.	spurge
HAGL	Halogeton glomeratus	common halogeton
KOSC	Kochia scoparia	fireweed summercypress
LEER	Leucelene ericoides	
MEOF	Melilotus officinalis	yellow sweetclover
SAIB	Salsola iberica	
SAKA	Salsola kali	russian thistle
SPPA	Sphaeralcea parvifolia	
STEX	Stephanomenia exigua	
SUTO	Suaeda torreyana	
TRDU	Tragopogon dubius	yellow salsify
UNKNOWN		
DRKR	"Dry Crispies"	

EMERY MINE
TABLE 2

Flume Site Densities and Frequencies

Species	*Average Stems/1/2 m² 1987	*Average Stems/1/2 m² 1988	Frequency (%) 1987	Frequency (%) 1988
Grasses				
AGSM	1.0	--	17	--
SPSP	--	1.3	--	30
Shrubs				
ATCA	0.3	--	7	--
CHLI	0.2	--	3	--
CHNR	0.2	--	3	--
CHNA	--	0.5	--	10
SAVE	0.2	--	3	--
GUSA	--	0.5	--	3
Forbs				
SAKA	1.0	16.5	13	67
DRKR**	46.0	--	97	--
KOSC	--	20.0	--	80
DESP	--	0.2	--	3

* Six 1/2 m² sample plots

** DRKR = dry crispies (considered KOSC by observer)

EMERY MINE
TABLE 3

1987 Borehole Access Site
Densities and Frequencies

	*Average Stems/1/2 m²		Frequency (%)	
Species	1987	1988	1987	1988
Grasses				
AGSM	4.4	7.7	14	14
Shrubs				
ATAN	0.7	4.1	11	29
ATCA	0.2	--	3	--
ATCO	--	0.4	--	6
ATSP	--	3.7	--	49
Forbs				
HAGL	53.0	51.3	57	91
SAKA	0.3	--	6	--
Unknown	0.7	--	6	--
DRKR**	41.0	25.4	57	54
SUTO	--	0.1	--	3

* Seven 1/2 m² sample plots

** DRKR = dry crispies (considered HAGL by observer)

Consolidat[illegible]al Company
Eme[illegible]ne
1988 Vegetation Survey
TABLE 4
Demonstration Site Densities
Average Stems/1/2 m²

	Irrigated						Not Irrigated (Reconstructed in 1987)						
	No Topsoil			Topsoil					No Topsoil				
Plot #	C1	D1	D3*	C1A	D1A	D3A*	D2A	D4A*	A2	B2*	C2	D2	D4*
**N =	5	5	3	2	2	2	2	2	5	5	5	5	5
SPECIES													
Grasses													
HIJA	1.6	0.4		1.5									
SPSP	4.8												
Shrubs													
ATCA					0.5	1.0	1.0					0.4	
ATGA					1.0								
CELA				0.5		0.5							
SAVE		0.6								0.2	1.0		
Forbs													
DESP			14.0		13.5	27.5	12.5	1.5					
HAGL		9.0	7.7	1.5	2.5	1.0		17.5	1.8	3.4	0.4	15.8	38.2
KOSC	26.8	8.0	8.7	31.0	36.5	28.0	60.5	16.5	11.8	26.2	21.8	10.6	2.0
SUTO		0.8	0.3				0.5		0.4	0.2			
DRKR***	40.8	8.8			31.5		32.0	12.5	29.4	26.8	12.4	29.2	13.2

* These plots not mulched
** N=number of 1/2m² sample plots
*** DRKR=dry crispies (considered halogeton or kochia by observers)

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Em[illegible]ine
1988 Vegetation Survey
TABLE 5
Demonstration Site Densities
% Occurrence in Observed Subplots

	Irrigated						Reconstructed in 1987 Not Irrigated						
	No Topsoil			Topsoil					No Topsoil				
Plot #	C1	D1	D3*	C1A	D1A	D3A*	D2A	D4A*	A2	B2*	C2	D2	D4*
**N =	5	5	3	2	2	2	2	2	5	5	5	5	5
SPECIES													
Grasses													
HIJA	12	4		20									
SPSP	32												
Shrubs													
ATCA					10	20	20					8	
ATGA					20								
CELA				10		10							
SAVE		12								4	20		
Forbs													
DESP			33		50	100	40	10					
HAGL		44	33	30	30	20		70	20	12	8	44	76
KOSC	76	40	53	100	90	100	100	70	32	88	52	16	24
SUTO		12	7				10		8	4			
DRKR***	84	24			80		700	70	88	60	24	68	36

* These plots not mulched
** N=number of 1/2m² sample plots (there are 5 subplots per N)
*** DRKR=dry crispies (considered halogeton or kochia by observers)

Emery Mine [illegible]tation Site
T[illegible] 6
Revised Plot A1
Mature Transplant Plot

	1987 Field Observations			1988 Field Observations		
Species	Condition	Crown Width	Notes	Condition	Crown Width	Notes
ARNO - Black sagebrush	alive	20", 9" alive	11 seed shoots approx. 4"	alive	10"	barely alive
CHNA - Rubber rabbitbrush	dead	28"	2 small SAVE under canopy	dead	---	---
ATCA - Forwing saltbush	dead	47"	2 small ATC under canopy	dead	---	---
ATCO - Shadscale	dead	12"	2 small ATCA under canopy	dead	---	---
CHNA - Rubber rabbitbrush	dead	13"	---	dead	---	---
SAVE - Black greasewood	healthy	28"	---	alive	30"	---
SAVE - Black greasewood	healthy	52"	---	alive	24"	---
ATCO - Shadscale	alive	24"	20% of stem alive	alive	12"	barely alive
SAVE - Black greasewood	healthy	27"	---	alive	20"	---
ATCO - Shadscale	healthy	18"	---	alive	10"	barely alive
ARCAC - Silver Sagebrush	alive	24"	---	alive	20"	---
ATCA - Fourwing saltbush	dead	24"	---	---	---	no observation
ATCO - Shadescale .	dead	11"	---	---	---	no observation
SAVE - Black greasewood	dead	24"	---	dead	---	---
ATCA - Fourwing saltbush	---	---	no observation	alive	8"	---

Emery Mine Revegetation Site
TABLE 7
Revised Plot B1
Containerized Seedlings
Transplanted in April 1987
1987 & 1988 Field Observations

N

									ROW #
	ATCA	ATCO	ATGA	CHNA	SAVE	ATCA	ATCO	ATGA	
1987	alive 15" c.w.*	dead 7" c.w.	alive 14" c.w.	dead 4" c.w.	dead 7" c.w.	alive-m.s.** 6" c.w.	alive 5" c.w.	alive-m.s. 10" c.w.	1
1988	alive 12" c.w.		alive 4" c.w.			alive-m.s. 12" c.w.	barely alive 8" c.w.	alive 4" c.w.	
	CHNA	ATCO	ATCA	ATGA	SAVE	CHNA	ATGA/ATCO***	ATCO	
1987	dead 6" c.w.	alive 8" c.w.	alive 8" c.w.	alive 12" c.w.	barely alive 2" c.w.	dead 10" c.w.	alive-m.s. 13" c.w.	alive 7" c.w.	2
1988		dead 6" c.w.	dead	alive 10" c.w.	barely alive 2" c.w.		alive 12" c.w.	barely alive 7" c.w.	
	SAVE	CHNA	ATGA	ATCO	ATCA	SAVE	CHNA	ATGA/ATCA	
1987	alive 8" c.w.	dead 2" c.w.	alive-m.s. 10" c.w.	alive 5" c.w.	alive 9" c.w.	barely alive 3" c.w.	dead 3" c.w.	alive-m.s. 13" c.w.	3
1988	alive 4" c.w.		alive 8" c.w.	barely alive 5" c.w.	alive 7" c.w.	barely alive 3" c.w.		alive-m.s. 12" c.w.	
	ATCA	SAVE	CHNA	ATCO	ATCA	ATGA	SAVE	CHNA	
1987	alive 11" c.w.	barely alive 12" c.w.	dead 2" c.w.	alive 8" c.w.	alive 14" c.w.	alive-m.s. 12" c.w.	alive 8" c.w.	dead 2" c.w.	4
1988	barely alive 6" c.w.	alive 6" c.w.		alive 5" c.w.	alive 15" c.w.	barely alive 10" c.w.	barely alive 2" c.w.		
	ATCA	ATGA	SAVE	CHNA	ATCO	ATGA/ATCA	ATCA	SAVE	
1987	alive 12" c.w.	alive 10" c.w.	alive 10" c.w.	dead 4" c.w.	alive 5" c.w.	alive-m.s. 16" c.w.	alive 10" c.w.	dead ? 8" c.w.	5
1988	alive 12" c.w.	dead	alive 8" c.w.		dead	alive-m.s. 16" c.w.	dead	alive 6" c.w.	
	ATGA/ATCA	ATCO	ATCA	SAVE	CHNA	ATCO	ATGA	ATCA	
1987	alive-m.s. 15" c.w.	alive 10" c.w.	alive 16" c.w.	dead 3" c.w.	dead 4" c.w.	alive 6" c.w.	alive-m.s. 11" c.w.	barely alive 10" c.w.	6
1988	alive 10" c.w.	dead	barely alive 10" c.w.			alive 6" c.w.	dead	dead	

* c.w. - crown width
** m.s. - made seed
*** 1987 ID/1988 ID

Emery Mine [illegible]etation Site
Revised Plo[illegible]1 (continued)

N

									ROW #
	CHNA	ATGA	ATCO	ATCA	SAVE	CHNA	ATGA/ATCA	ATCO	
1987	dead 2" c.w.	alive-m.s. 18" c.w.	dead 4" c.w.	alive 14" c.w.	alive 9" c.w.	dead 4" c.w.	alive-m.s. 18" c.w.	barely alive 7" c.w.	7
1988		barely alive 10" c.w.		dead	alive 9" c.w.		alive-m.s. 20" c.w.	barely alive 7" c.w.	
	SAVE	CHNA	ATGA	ATCO	ATCA	SAVE	CHNA	ATGA	
1987	dead 5" c.w.	dead 2" c.w.	alive-m.s. 14" c.w.	dead 8" c.w.	barely alive 14" c.w.	dead 6" c.w.	dead 6" c.w.	alive-m.s. 14" c.w.	8
1988			barely alive 8" c.w.		barely alive 10" c.w.			alive-m.s. 8" c.w.	
	ATCA	SAVE	CHNA	ATGA	ATCO	ATCA	SAVE	CHNA	
1987	alive 10" c.w.	dead 4" c.w.	dead 6" c.w.	alive-m.s. 10" c.w.	barely alive 12" c.w.	alive 14" c.w.	dead 7" c.w.	dead 5" c.w.	9
1988	barely alive 2" c.w.			alive 8" c.w.	dead	alive 10" c.w.			
		ATCO	SAVE	CHNA	ATGA	ATCO	ATCA	SAVE	
1987	----	alive 5" c.w.	alive 5" c.w.	dead 2" c.w.	alive-m.s. 12" c.w.	barely alive 10" c.w.	alive 12" c.w.	dead 9" c.w.	10
1988	----	barely alive 3" c.w.	alive 2" c.w.		barely alive 4" c.w.	dead	barely alive 3" c.w.		
	ATGA	ATCO	ATCA	SAVE	CHNA	ATGA	ATCO	ATCA	
1987	alive 6" c.w.	barely alive 4" c.w.	alive 11" c.w.	alive 11" c.w.	dead 10" c.w.	alive 11" c.w.	dead 10" c.w.	alive 12" c.w.	11
1988	alive 6" c.w.	dead	dead	dead		alive 4" c.w.		barely alive 2" c.w.	
		ATGA	ATCO	ATCA	SAVE	CHNA	ATGA	ATCO	
1987	----	alive 10" c.w.	dead 6" c.w.	alive 11" c.w.	alive 11" c.w.	dead 6" c.w.	alive 8" c.w.	barely alive 11" c.w.	12
1988	----	dead		dead	dead		dead	dead	

Emery Mine Re[illegible]tation Site
Revised Plot[illegible] (continued)

N

									ROW #
		CHNA	ATGA	ATCO	ATCA	SAVE	CHNA	ATGA	
1987	----	dead 3" c.w.	alive 15" c.w.	barely alive 7" c.w.	alive 8" c.w.	alive 6" c.w.	dead	alive 16" c.w.	13
1988	----		dead	dead	dead	dead		dead	
	ATCA	SAVE	CHNA	ATGA	ATCO	ATCO	SAVE	CHNA	
1987	alive 8" c.w.	alive 8" c.w.	dead 4" c.w.	alive 11" c.w.	dead 8" c.w.	alive 6" c.w.	dead 5" c.w.	dead 4" c.w.	14
1988	barely alive 4" c.w.	dead		dead		dead			
				CHNA	ATGA	ATCO	ATCA	SAVE	
1987	----	----	----	dead 4" c.w.	alive 16" c.w.	barely alive 6" c.w.	barely alive 15" c.w.	barely alive 11" c.w.	15
1988	----	----	----		dead	dead	barely alive 8" c.w.	barely alive 10" c.w.	
				SAVE	CHNA	ATGA	ATCO	ATCA	
1987	----	----	----	dead 7" c.w.	dead 2" c.w.	barely alive 6" c.w.	barely alive 7" c.w.	alive 6" c.w.	16
1988	----	----	----			barely alive 6" c.w.	dead	dead	

---- no planting

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON

Location: FLUMESITE
(combined mulched & unmulched)

Notes: All willow & poplar transplants are dead

Sample No. 1	Density				
Species	1	2	3	4	5
KOSC	8	6	10	10	8
SAKA	4	4	5	2	3

Sample No. 4	Density				
Species	1	2	3	4	5
KOSC	5	4	8	1	1
SAKA	3	2	5	5	4
DESP			1		
CHNO				1	

Sample No. 2	Density				
Species	1	2	3	4	5
KOSC	3	5	4	6	4
SAKA	6	10	9	12	12

Sample No. 5	Density				
Species	1	2	3	4	5
KOSC	3	6	5	12	4
GUSA		3			
CHNA				1	1

Sample No. 3	Density				
Species	1	2	3	4	5
KOSC	1		1		
SAKA	1	4	3	3	2

Sample No. 6	Density				
Species	1	2	3	4	5
SPSP	1		3		4
KOSC	3			2	
BAREGROUND		X			
ADDITIONAL SPECIES LIST					
ATCA ATCO EPVI HAGL					
SAVE SUTO ATCO					

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON

Location: BOREHOLE SITE (combined mulched & unmulched)

Notes: 6 sites @30 paces alg transect line; mat saltbush trnspl-17dead,3live

Sample No. 1	Density				
Species	1	2	3	4	5
HAGL		1	1		
AGSM	6	8	10	14	16
DRKR *		8			
ATCO	1	2			
ATSP	2		2		2
*DRKR - appear to be dead HAGL					

Sample No. 5	Density				
Species	1	2	3	4	5
HAGL	20	10	10	10	15
ATSP		1	1	2	1
DRKR	10	5	5	5	5

Sample No. 2	Density				
Species	1	2	3	4	5
HAGL	25	20	20	15	15
ATSP			1		
Sample No. 3					
HAGL	15	25	20	25	15
DRKR				5	10
ATAN	1	6	4	1	

Sample No. 6	Density				
Species	1	2	3	4	5
HAGL	5	5	5	10	5
ATSP	2	1			2
DRKR	15	10	15	10	10

Sample No. 4	Density				
Species	1	2	3	4	5
ATAN	2	1			
HAGL	7	5	5	5	10
ATSP		1	1		
SUTO		1			
DRKR	20	10	10	10	5

Sample No. 7	Density				
Species	1	2	3	4	5
HAGL	5	10	10	5	5
ATAN	2	4	5	3	
ATSP		2	2	2	1
DRKR					10

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON

Location: DEMONSTRATION SITE PLOT C2	Notes: Recnsrt in 1987 combining old plots C2 & C2A

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
KOSC	12	25	10		1
BAREGROUND				X	

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
SAVE			1	1	
KOSC	2		12	7	15
HAGL	1				1
DRKR	15	20			

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X			
KOSC			8	5	
DRKR			2	12	10

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
SAVE					1
KOSC	2				
BAREGROUND		X	X	X	

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
KOSC		8	2		
BAREGROUND	X				X
SAVE			1	1	
DRKR				3	

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
ATCA					
SUTO					
ATSP					
DESP					

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON
Location: DEMONSTRATION SITE PLOT B2		Notes: Recnsrt in 1987 combining old plots B2 & B2A

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
KOSC	12	10	14	10	
DRKR			6		12

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X				
KOSC		3	2	8	15
SUTO			1		

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
KOSC	2	8	4	4	7
HAGL			7	2	8
DRKR	10	3		3	

Sample No. 5	CENTER 6X6 from SE Density				
Species	1	2	3	4	5
KOSC	4	5	6	4	5
SAVE					1
DRKR	10	12	10	5	10

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
KOSC		3	1	1	3
DRKR	12	10	15	12	4

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
ATSP					

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON

Location: DEMONSTRATION SITE PLOT A2	Notes: Recnsrt in 1987 combining old plots A2 & A2A;area is beside trenches

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
KOSC	7		5	10	4
DRKR	4	10	6	3	6

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
KOSC	7	5	11	10	
SUTO		1			
DRKR				4	12

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
MAGL	3	2	1	1	2
DRKR	5	4	10	8	6

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
DRKR	5	6	8	6	10

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
SUTO				1	
DRKR	8	6	10	8	2

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
SPSP					
SAVE					
ATGA					
DESP					

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON

Location: DEMONSTRATION SITE PLOT C1

Notes:

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
KOSC	5	4	2	3	5
SPSP		2			
DRKR	5	5	12	5	5
COVER	40%				

Sample No. 4	NE 1/4 Density				
Species	1	2	3	4	5
KOSC	12	10	8	10	6
HIJA				1	
DRKR	20	12	10	8	5

Sample No. 2	SE 1/4 Density				
Species	1	2	3	4	5
KOSC	3				
SPSP			1	1	1
DRKR	12	12	10	10	12

Sample No. 5	CENTER 6X6 from NE Density				
Species	1	2	3	4	5
KOSC	10	12	15	5	
HIJA	2	5			
SPSP			4	4	4
DRKR		5			
COVER				90%	

Sample No. 3	NW 1/4 Density				
Species	1	2	3	4	5
SPSP	3				
KOSC	2		10	5	12
DRKR	12	12	12	10	10

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
SAVE					
SUTO					

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON
Location: DEMONSTRATION SITE PLOT C1A		Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
KOSC	6	6	12	6	12						

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
KOSC	6	6	6	8	2						
HAGL			1	2							
HIJA	1				2						
CELA	1										

	Density					Sample No.	Density				
	1	2	3	4	5	Species	1	2	3	4	5

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON

Location: DEMONSTRATION SITE PLOT D1

Notes:

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X		X	X
SAVE			1		

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
KOSC		4			1
HAGL			7	8	3
SAVE	1				
DRKR					4
COVER	100%				

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
KOSC	6		5		2
HAGL	1				
SUTO		1		2	1
DRKR	8	15	8	5	

Sample No. 5	CENTER 6X6 from SW Density				
Species	1	2	3	4	5
KOSC	9	8	3	1	
HAGL	2	2	1	8	9
HIJA	2				
DRKR					4

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
BAREGROUND					X
KOSC		1			
SAVE	1				
HAGL			1	3	
COVER	100%				

Sample No.	Density				
Species	1	2	3	4	5

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON
Location: DEMONSTRATION SITE PLOT D3		Notes:

Sample No. 1	Density				
Species	1	2	3	4	5
KOSC	3	6	5		
BAREGROUND				X	X

Sample No.	Density				
Species	1	2	3	4	5

Sample No. 2	Density				
Species	1	2	3	4	5
BAREGROUND	X				
KOSC		2	1		
DRKR		3	2	6	2

Sample No.	Density				
Species	1	2	3	4	5

Sample No. 3	Density				
Species	1	2	3	4	5
HAGL	4	5	7	5	2
DESP	10	10	6	6	10
SUTO				1	
KOSC			2	4	3
DRKR	5	3	5		4

Sample No.	Density				
Species	1	2	3	4	5

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON

Location: DEMONSTRATION SITE PLOT D1A

Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
KOSC	10	10	12	6	6						
ATGA	1	1									
DESP	3	4	8	8	4						
DRKR	10	8	10	10	5						

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
ATCA	1										
KOSC	6	6		10	7						
HAGL		1	3	1							
DRKR			5	5	10						

Sample No.	Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON

Location: DEMONSTATION SITE PLOT D3A

Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
KOSC	12	6	6	1	1						
DESP	5	3	4	5	5						

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
KOSC	3	3	6	12	6						
HAGL			1		1						
DRKR	4	5	4	5	5						
ATCA	1	1									
CELA	1										
DESP	8	5	5	10	5						

Sample No.	Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON
Location: DEMONSTRATION SITE PLOT D2A		Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
KOSC	12	15	10	15	25						
DESP		10									
DRKR		12	15	10							

Sample No. 2	Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
AUTO	1										
KOSC	12	8	10	8	6						
DESP		5	5		5						
ATCA				1	1						
DRKR	5	10	8		4						
COVER				100%							

Sample No.	Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D. LARSON

Location: DEMONSTRATION SITE PLOT D4A

Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
KOSC	3	5	11	3	3						
HAGL				4	5						
DRKR			5	5							

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
HAGL	6	5	3	7	5						
KOSC			2		6						
DESP					3						
DRKR	2	2	4	5	2						

Sample No.	Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5

Sheet No. EMERY MINE	Date: 9-13-88	Name: R. DENNING; D. LARSON
Location: DEMONSTRATION SITE PLOT D2		Notes:

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
KOSC		20	30		
DRKR		8	4	10	12
HAGL	10	10			

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
DRKR	15	8	12	3	
KOSC				1	
ATCA	1	1			
HAGL	10	2	7	15	
BAREGROUND					X

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
HAGL	2	5	6	9	3
DRKR	6	10	8	4	15

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
DRKR	12	8	5	6	
KOSC			2		
BAREGROUND					X

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
DESP					
TRAE					
AGSP					
SPSP					

Sheet No. EMERY MINE	Date: 9-14-88	Name: R. DENNING; D.LARSON

Location: DEMONSTRATION SITE PLOT D4

Notes:

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
KOSC				1	1
HAGL	11	6	14	6	9

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
HAGL	11	12	8	16	17
DRKR		6	4	8	6

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
KOSC		3	3	1	1
HAGL	7	4		1	

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X		X
HAGL				1	

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
HAGL	25	12	12	12	7
DRKR	3	4	10	10	15

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
AGSP					
DESP					
SAVE					

015/015 #6

Consolidation Coal Company
Mid-Continent Region
12755 Olive Boulevard
St. Louis, Missouri 63141
(314) 275-2300

March 27, 1990

Mr. Lowell Braxton, Assoc. Director, Mining
Mineral Resource Dev. and Reclamation Program
Division of Oil, Gas, and Mining
3 Triad Center, Suite 350
355 West North Temple
Salt Lake City, Utah 84180-1203

RE: Annual Report for 1989
Emery Deep Mine Permit ACT/015/015

Dear Mr. Braxton:

As required by the Division, please find attached the 1989 Annual Report for the Emery Deep Mine.

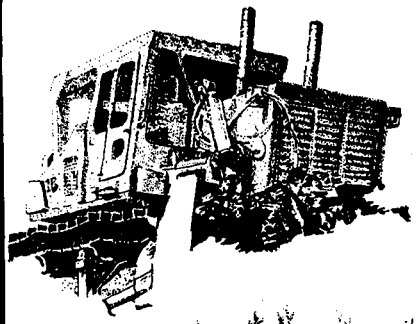
Should you require any additional information on the above-referenced report, please feel free to contact me.

Sincerely,

Thomas H. Plate
Senior Engineer

/vms

Attachment



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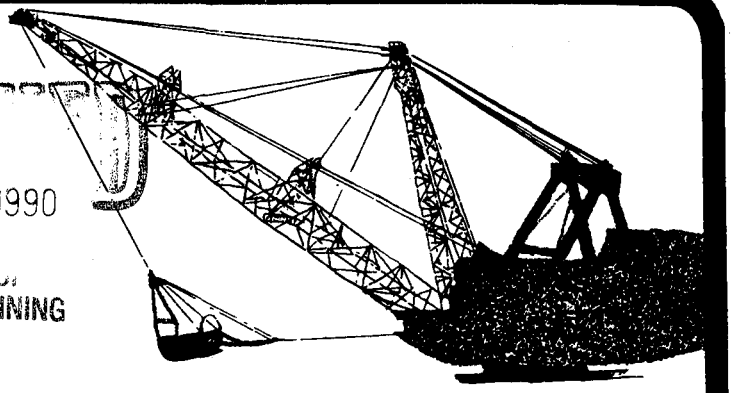
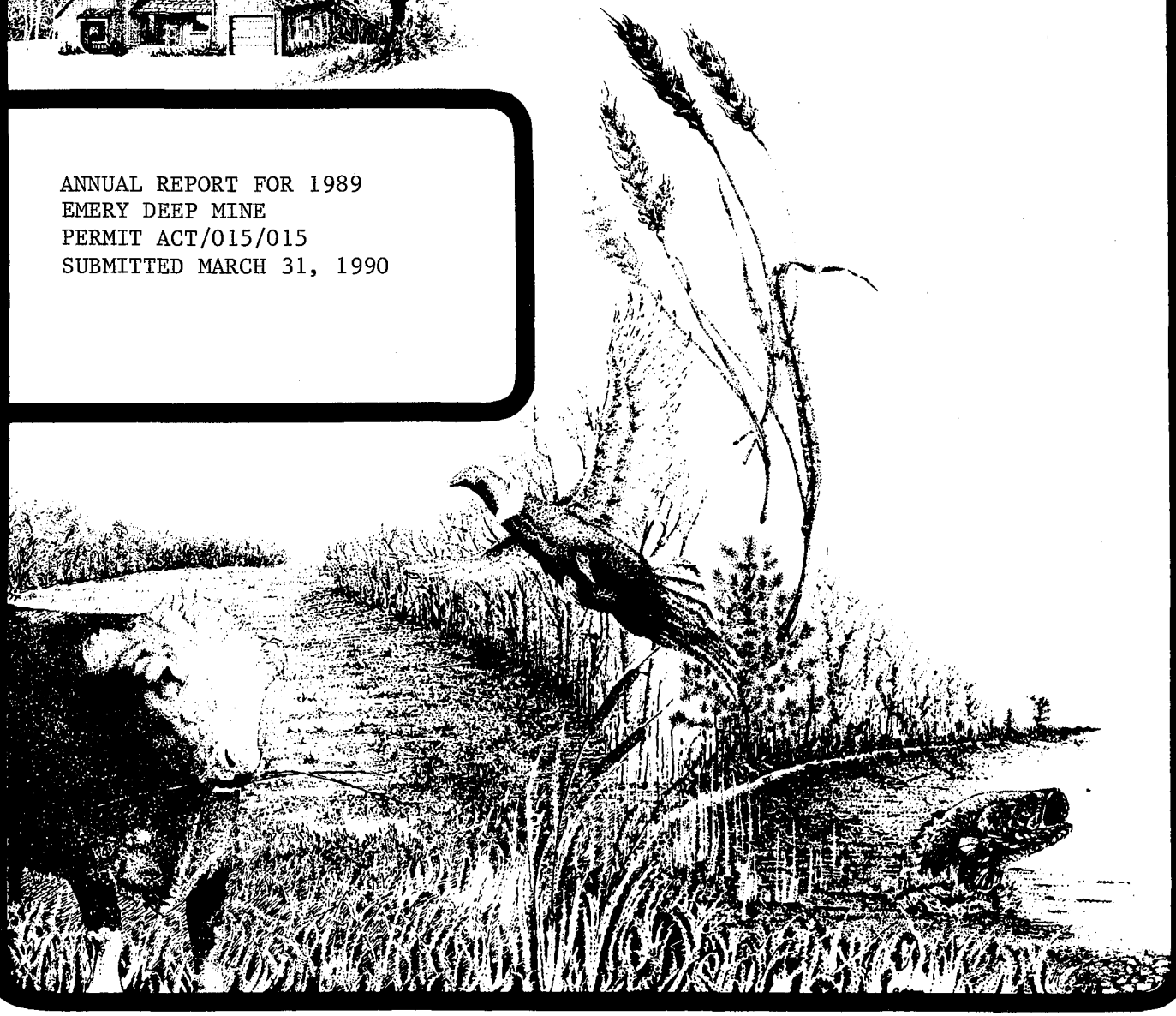
DIVISION OF
OIL, GAS & MINING



ANNUAL REPORT FOR 1989
EMERY DEEP MINE
PERMIT ACT/015/015
SUBMITTED MARCH 31, 1990



COAL MINING AND RECLAMATION OPERATIONS FOR 1989
(Authority UMC 784)

(Must be submitted to the Division by March 31, 1990)

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
3 Triad Centter, Suite 350
355 West North Temple
Salt Lake City, Utah 84180-1203

(801) 538-5340

Operator: Consolidation Coal Company

Mine Name: Emery Deep Mine

Mailing Address: 12755 Olive Blvd., St. Louis, MO 63141

Company Representative: Thomas H. Plate

Permit Number: ACT/015/015

Date of Most Recent Permanent Program Permit: January 10, 1986

Quantity of Coal Mined (tonnage) 1989: 585,513

Attach Updated Mine Sequence Map.

All monitoring activities during the report period must be submitted with this report (including, but not limited to):

A. Summarized Water Monitoring Data

B. Precipitation or Other Climatological Data

C. Subsidence Monitoring Report

D. Vegetation Data (test plots) or Revegetation Success Monitoring (includes interim and final)

E. Permit Stipulation Status

djh
AT57/2

(COAL)

CERTIFICATE OF LIABILITY INSURANCE
Issued to: State of Utah
Department of Natural Resources
Division of Oil, Gas, and Mining

THIS IS TO CERTIFY, That the Hartford Accident & Indemnity Company
(Name of Insurance Company)
of Hartford Plaza, Hartford, Connecticut 06115
(Home Office Address of Company)
has issued to Consolidation Coal Company
(Name of Permit Applicant)
Consol Plaza, 1800 Washington Rd., Pittsburgh Policy No. 10 CLR P12452E
(Address of Permit Applicant)
effective from January 1, 19, 86 and continuing until cancelled, nonrenewed, or changed as provided herein, which policy provides personal injury and property damage insurance covering the obligations imposed upon such permit applicant with regard to Permit No. ACT/015/015 according to provisions of the coal mining and reclamation program of Utah, (Utah Code Annotated 40-10-1 et seq.), specifically Section UMC/SMC 806.14.

Underwriting Agent: Marsh and McLennan, Incorporated

Company Name: Hartford Accident & Indemnity Co. Phone: 405/767-3897

Address: 123 William Street, New York, NY 10038

The above-named insurance company agrees to notify the Division in writing of any substantive change in the above coverage, including cancellation, failure to renew, or other material change. No change shall be effective until at least thirty (30) days after such notice is received by the Division.

The undersigned affirms that the above information is true and complete to the best of his or her knowledge and belief, and that he or she is an authorized representative of the above-named insurance company.

12-18-85 Frank Prentice Hapgood Frank Prentice Hapgood - Claims Attorney
(Date, Signature, and Title of Authorized Representative of Insurance Company)

Signed and sworn to before me by Frank Prentice Hapgood this the 23rd day of December, 1985.

(Notary)

My Commission Expires: 8-16-89

1989 N.P.D.E.S. REPORT SUMMARY

Permit No. UT0022616 - Emery Deep Mine

Outfall 001- Sedimentation Pond for Deep Mine Pumps #1 and #2

The attached sheets summarize the effluent quality by month and quarter for 1989.

Outfall 002- Mine Yard Area

No discharges occured during 1989.

Outfall 003- Sedimentation Pond for Deep Mine Pump #3

The attached sheets summarize the effluent quality by month and quarter for 1989.

Permit No. UT0022664 - Emery Surface Mine

Outfall FAC A

This outfall had not been constructed and the NPDES permit was not renewed in 1989.

Permit No. UT0024040 - Emery Mine Preparation Plant

Outfalls 001 and 002

No discharges occured during 1989.

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE FIRST QUARTER 1989
REPORT PREPARED ON 03/27/90 AT 10:49:30

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001		FIRST QUARTER 1989				
FLOW INSPECTIONS	1.04	1.07	1.13	CFS	N/A	6
PH	7.5		8.3	STD UNITS		6
TOT SUSP SOLIDS	4	8.5	14	MG/L		6
OIL & GREASE	1.0	1.0	1.0	MG/L		3
TOTAL IRON	0.35	0.64	1.18	MG/L		6
FLOW	0.672	0.692	0.730	MGD	N/A	6
TOT DISS SOLIDS	2788	2940	3056	MG/L		6
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		8.5				
POINT 001		JANUARY 1989				
FLOW INSPECTIONS	1.13	1.13	1.13	CFS	N/A	2
PH	7.5		8.3	STD UNITS		2
TOT SUSP SOLIDS	11	12.5	14	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.35	0.46	0.57	MG/L		2
FLOW	0.730	0.730	0.730	MGD	N/A	2
TOT DISS SOLIDS	3028	3042	3056	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		9.3				
POINT 001		FEBRUARY 1989				
FLOW INSPECTIONS	1.04	1.04	1.04	CFS	N/A	2
PH	7.7		8.1	STD UNITS		2
TOT SUSP SOLIDS	4	6.0	8	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.41	0.79	1.18	MG/L		2
FLOW	0.672	0.672	0.672	MGD	N/A	2
TOT DISS SOLIDS	2900	2943	2986	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		8.2				
POINT 001		MARCH 1989				
FLOW INSPECTIONS	1.04	1.04	1.04	CFS	N/A	2
PH	7.6		8.0	STD UNITS		2
TOT SUSP SOLIDS	6	7.0	8	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.60	0.66	0.73	MG/L		2
FLOW	0.672	0.672	0.672	MGD	N/A	2
TOT DISS SOLIDS	2788	2834	2880	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		7.9				

DATA BY NPDES DISCHARGE POINT FOR THE EMERY DEEP MINE
FOR THE FIRST QUARTER 1989

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
890117		1.13	0.730	8.3	0.35	11.0		3028								LAB-CONOCC INST Q=2.31 CFS
890118		1.13	0.730	7.5	0.57	14.0	1.0	3056								LAB-ACZ INST Q=2.39 CFS
890220		1.04	0.672	8.1	0.41	8.0		2900								LAB-CONOCC INST Q=2.52 CFS
890227		1.04	0.672	7.7	1.18	4.0	1.0	2986								LAB-ACZ INST Q=2.18 CFS
890310		1.04	0.672	7.6	0.73	8.0	1.0	2880								LAB-ACZ INST Q=5.14 CFS
890313		1.04	0.672	8.0	0.60	6.0		2788								LAB-CONOCO INST Q=1.41 CFS

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE SECOND QUARTER 1989
REPORT PREPARED ON 03/27/90 AT 10:49:49

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001		SECOND QUARTER 1989				
FLOW INSPECTIONS	0.00	0.99	2.41	CFS	N/A	36
PH	7.6		8.3	STD UNITS		7
TOT SUSP SOLIDS	2	3.6	7	MG/L		7
OIL & GREASE	1.0	2.0	5.0	MG/L		4
TOTAL IRON	0.20	0.28	0.41	MG/L		7
FLOW	0.013	0.768	1.558	MGD	N/A	30
TOT DISS SOLIDS	2926	3041	3248	MG/L		7
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 9.3						
POINT 001		APRIL 1989				
FLOW INSPECTIONS	0.00	1.02	2.41	CFS	N/A	28
PH	7.6		8.3	STD UNITS		3
TOT SUSP SOLIDS	2	3.7	6	MG/L		3
OIL & GREASE	1.0	3.0	5.0	MG/L		2
TOTAL IRON	0.20	0.28	0.36	MG/L		3
FLOW	0.013	0.836	1.558	MGD	N/A	22
TOT DISS SOLIDS	2934	2989	3028	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD EXCEEDED - 11.9						
POINT 001		MAY 1989				
FLOW INSPECTIONS	0.05	0.94	2.41	CFS	N/A	6
PH	7.9		8.1	STD UNITS		2
TOT SUSP SOLIDS	2	2.5	3	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.22	0.25	MG/L		2
FLOW	0.032	0.610	1.558	MGD	N/A	6
TOT DISS SOLIDS	2926	2939	2952	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 7.9						
POINT 001		JUNE 1989				
FLOW INSPECTIONS	0.76	0.76	0.76	CFS	N/A	2
PH	7.8		7.8	STD UNITS		2
TOT SUSP SOLIDS	2	4.5	7	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.23	0.32	0.41	MG/L		2
FLOW	0.491	0.491	0.491	MGD	N/A	2
TOT DISS SOLIDS	3192	3220	3248	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 6.6						

FOR THE SECOND QUARTER 1989

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
890403		1.98	1.280	8.3	0.20	6.0		2934								LAB-CONOCC INST Q=2.39 CFS
890404		0.12	0.078	7.7	0.28	3.0	5.0	3028								LAB-UT DOH INST Q=18 GPM
890405		0.00														
890406		0.00														
890407		0.00														
890408		0.54	0.349													
890409		2.35	1.519													
890410		2.37	1.532													
890411		1.44	0.931													
890412		0.04	0.026													
890413		0.00														
890414		0.46	0.297													
890415		2.10	1.357													
890416		2.37	1.532													
890417		2.36	1.525	7.6	0.36	2.0	1.0	3004								LAB-ACZ INST Q=2.39 CFS
890418		0.53	0.343													
890419		0.02	0.013													
890420		0.00														
890421		0.00														
890422		0.51	0.330													
890423		2.37	1.532													
890424		2.25	1.454													
890425		0.21	0.136													
890426		1.20	0.776													
890427		1.89	1.222													
890428		0.13	0.084													
890429		0.80	0.517													
890430		2.41	1.558													
890501		2.41	1.558													
890502		1.12	0.724													
890503		0.08	0.052													
890504		0.05	0.032													
890508		1.00	0.646	8.1	0.20	3.0		2952								LAB-CONOCC INST Q=2.39 CFS
890519		1.00	0.646	7.9	0.25	2.0	1.0	2926								LAB-ACZ INST Q=2.39 CFS
890627		0.76	0.491	7.8	0.23	7.0		3192								LAB-CONOCC
890630		0.76	0.491	7.8	0.41	2.0	1.0	3248								LAB-ACZ

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE THIRD QUARTER 1989
REPORT PREPARED ON 03/27/90 AT 10:50:04

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001		THIRD QUARTER 1989				
FLOW INSPECTIONS	0.00	0.52	1.74	CFS	N/A	50
PH	7.7		8.6	STD UNITS		6
TOT SUSP SOLIDS	3	5.8	10	MG/L		6
OIL & GREASE	1.0	1.0	1.0	MG/L		3
TOTAL IRON	0.20	0.36	0.70	MG/L		6
FLOW	0.013	0.345	1.125	MGD	N/A	49
TOT DISS SOLIDS	3150	3268	3326	MG/L		6
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		3.9				
POINT 001		JULY 1989				
FLOW INSPECTIONS	0.00	0.60	1.74	CFS	N/A	25
PH	7.7		7.9	STD UNITS		2
TOT SUSP SOLIDS	3	4.5	6	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.26	0.33	MG/L		2
FLOW	0.026	0.404	1.125	MGD	N/A	24
TOT DISS SOLIDS	3262	3287	3312	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		4.2				
POINT 001		AUGUST 1989				
FLOW INSPECTIONS	0.02	0.51	0.63	CFS	N/A	9
PH	8.1		8.2	STD UNITS		2
TOT SUSP SOLIDS	3	4.5	6	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.25	0.31	MG/L		2
FLOW	0.013	0.330	0.407	MGD	N/A	9
TOT DISS SOLIDS	3258	3278	3298	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		5.6				
POINT 001		SEPTEMBER 1989				
FLOW INSPECTIONS	0.07	0.41	0.84	CFS	N/A	16
PH	7.9		8.6	STD UNITS		2
TOT SUSP SOLIDS	7	8.5	10	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.43	0.56	0.70	MG/L		2
FLOW	0.045	0.265	0.543	MGD	N/A	16
TOT DISS SOLIDS	3150	3238	3326	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		2.1				

POINT 003 DISCHARGES AT THE EMERY DEEP MINE FOR THE THIRD QUARTER 1989
REPORT PREPARED ON 03/27/90 AT 10:50:04

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 003		THIRD QUARTER 1989				
FLOW INSPECTIONS	0.24	0.32	0.38	CFS	N/A	6
PH	8.3		9.0	STD UNITS		6
TOT SUSP SOLIDS	10	13.3	18	MG/L		6
OIL & GREASE	1.0	1.0	1.0	MG/L		3
TOTAL IRON	0.13	0.24	0.39	MG/L		6
FLOW	0.155	0.209	0.246	MGD	N/A	6
TOT DISS SOLIDS	1278	1446	1682	MG/L		6
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		1.3				
POINT 003		JULY 1989				
FLOW INSPECTIONS	0.35	0.35	0.35	CFS	N/A	2
PH	8.3		8.4	STD UNITS		2
TOT SUSP SOLIDS	10	14.0	18	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.19	0.21	0.23	MG/L		2
FLOW	0.226	0.226	0.226	MGD	N/A	2
TOT DISS SOLIDS	1328	1346	1364	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		1.3				
POINT 003		AUGUST 1989				
FLOW INSPECTIONS	0.24	0.24	0.24	CFS	N/A	2
PH	8.5		8.9	STD UNITS		2
TOT SUSP SOLIDS	11	14.5	18	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.13	0.22	0.32	MG/L		2
FLOW	0.155	0.155	0.155	MGD	N/A	2
TOT DISS SOLIDS	1278	1386	1494	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		0.9				
POINT 003		SEPTEMBER 1989				
FLOW INSPECTIONS	0.38	0.38	0.38	CFS	N/A	2
PH	8.4		9.0	STD UNITS		2
TOT SUSP SOLIDS	11	11.5	12	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.21	0.30	0.39	MG/L		2
FLOW	0.246	0.246	0.246	MGD	N/A	2
TOT DISS SOLIDS	1532	1607	1682	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		1.6				

DATA BY NPDES DISCHARGE POINT FOR THE EMERY DEEP MINE 10:52 TUESDAY, MARCH 27, 1990 1
FOR THE THIRD QUARTER 1989

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
890706		0.36	0.233	7.7	0.33	6.0	1.0	3312								LAB-ACZ INST Q=1.41 CFS
890707		1.15	0.743													
890708		0.66	0.427													
890709		0.62	0.401													
890710		0.67	0.433													
890711		0.77	0.498													
890712		0.78	0.504													
890713		0.00														
890714		0.43	0.278													
890715		0.28	0.181													
890716		0.53	0.343													
890717		1.74	1.125													
890718		0.92	0.595													
890719		0.55	0.355													
890720		0.05	0.032													
890721		0.04	0.026													
890722		0.55	0.355													
890723		0.56	0.362													
890724		0.55	0.355													
890725		0.56	0.362													
890726		0.57	0.368													
890727		0.38	0.246													
890728		0.59	0.381													
890729		1.10	0.711													
890730																
890731		0.58	0.375	7.9	0.20	3.0		3262								LAB-CONOCC INST Q=2.18 CFS
890801																
890802																
890803																
890804																
890805																
890806																
890807																
890808																
890809																
890810																
890811																
890812		0.63	0.407	8.1	0.20	3.0		3258								LAB-CONOCC INST Q=1.03 CFS
890813		0.62	0.401													
890814		0.62	0.401													
890815		0.62	0.401													
890816		0.63	0.407													
890817		0.02	0.013													
890818		0.58	0.375													
890819																
890820																
890821																
890822																

FOR THE THIRD QUARTER 1989

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
890823																
890824																
890825																
890826																
890827																
890828																
890829																
890830		0.63	0.407	8.2	0.31	6.0	1.0	3298								LAB-ACZ
890831		0.25	0.162													
890901		0.32	0.207													
890902		0.07	0.045													
890903		0.59	0.381													
890904		0.41	0.265													
890905		0.36	0.233													
890906		0.30	0.194	7.9	0.70	7.0		3150								LAB-CONSOL INST Q=0.84 CFS
890907		0.70	0.452													
890908		0.26	0.168													
890909		0.32	0.207													
890910		0.19	0.123													
890911		0.18	0.116	8.6	0.43	10.0	1.0	3326								LAB-ACZ INST Q=0.28 CFS
890912		0.84	0.543													
890913		0.26	0.168													
890914		0.36	0.233													
890915		0.68	0.439													
890916		0.72	0.465													

POINT=003

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
890728		0.35	0.226	8.4	0.19	18.0	1.0	1364								LAB-ACZ INST Q=0.49 CFS
890731		0.35	0.226	8.3	0.23	10.0		1328								LAB-CONOCO INST Q=0.09 CFS
890801		0.24	0.155	8.5	0.13	11.0		1278								LAB-CONOCO INST Q=0.76 CFS
890830		0.24	0.155	8.9	0.32	18.0	1.0	1494								LAB-ACZ
890906	1100	0.38	0.246	8.4	0.39	11.0		1532								LAB-CONSOL INST Q=0.37 CFS
890911	1315	0.38	0.246	9.0	0.21	12.0	1.0	1682								LAB-ACZ INST Q=0.37 CFS

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE FOURTH QUARTER 1989
REPORT PREPARED ON 03/27/90 AT 10:50:22

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001		FOURTH QUARTER 1989				
FLOW INSPECTIONS	0.42	0.56	0.59	CFS	N/A	7
PH	7.4		8.3	STD UNITS		7
TOT SUSP SOLIDS	2	6.0	13	MG/L		7
OIL & GREASE	1.0	2.0	5.0	MG/L		4
TOTAL IRON	0.14	0.47	0.78	MG/L		7
FLOW	0.271	0.359	0.381	MGD	N/A	7
TOT DISS SOLIDS	3310	3422	3518	MG/L		7
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		5.1				
POINT 001		OCTOBER 1989				
FLOW INSPECTIONS	0.42	0.50	0.58	CFS	N/A	2
PH	7.8		8.3	STD UNITS		2
TOT SUSP SOLIDS	2	3.5	5	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.42	0.65	MG/L		2
FLOW	0.271	0.323	0.375	MGD	N/A	2
TOT DISS SOLIDS	3376	3377	3378	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		4.6				
POINT 001		NOVEMBER 1989				
FLOW INSPECTIONS	0.56	0.56	0.56	CFS	N/A	2
PH	7.9		8.1	STD UNITS		2
TOT SUSP SOLIDS	2	3.0	4	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.46	0.62	0.78	MG/L		2
FLOW	0.362	0.362	0.362	MGD	N/A	2
TOT DISS SOLIDS	3310	3414	3518	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		5.2				
POINT 001		DECEMBER 1989				
FLOW INSPECTIONS	0.59	0.59	0.59	CFS	N/A	3
PH	7.4		7.9	STD UNITS		3
TOT SUSP SOLIDS	4	9.7	13	MG/L		3
OIL & GREASE	1.0	3.0	5.0	MG/L		2
TOTAL IRON	0.14	0.39	0.59	MG/L		3
FLOW	0.381	0.381	0.381	MGD	N/A	3
TOT DISS SOLIDS	3408	3457	3496	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		5.5				

POINT 003 DISCHARGES AT THE EMERY DEEP MINE FOR THE FOURTH QUARTER 1989
REPORT PREPARED ON 03/27/90 AT 10:50:22

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 003		FOURTH QUARTER 1989				
FLOW INSPECTIONS	0.23	0.33	0.50	CFS	N/A	8
PH	8.1		8.7	STD UNITS		8
TOT SUSP SOLIDS	5	13.1	18	MG/L		8
OIL & GREASE	1.0	2.3	5.0	MG/L		4
TOTAL IRON	0.14	0.26	0.41	MG/L		8
FLOW	0.149	0.216	0.323	MGD	N/A	8
TOT DISS SOLIDS	1322	1658	2122	MG/L		8
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		1.5				
POINT 003		OCTOBER 1989				
FLOW INSPECTIONS	0.23	0.38	0.50	CFS	N/A	3
PH	8.1		8.3	STD UNITS		3
TOT SUSP SOLIDS	10	13.0	15	MG/L		3
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.14	0.22	0.36	MG/L		3
FLOW	0.149	0.246	0.323	MGD	N/A	3
TOT DISS SOLIDS	1908	2026	2122	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		2.1				
POINT 003		NOVEMBER 1989				
FLOW INSPECTIONS	0.24	0.24	0.24	CFS	N/A	2
PH	8.6		8.7	STD UNITS		2
TOT SUSP SOLIDS	8	12.5	17	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.25	0.26	0.28	MG/L		2
FLOW	0.155	0.155	0.155	MGD	N/A	2
TOT DISS SOLIDS	1322	1395	1468	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		0.9				
POINT 003		DECEMBER 1989				
FLOW INSPECTIONS	0.35	0.35	0.35	CFS	N/A	3
PH	8.5		8.6	STD UNITS		3
TOT SUSP SOLIDS	5	13.7	18	MG/L		3
OIL & GREASE	2.0	3.5	5.0	MG/L		2
TOTAL IRON	0.23	0.30	0.41	MG/L		3
FLOW	0.226	0.226	0.226	MGD	N/A	3
TOT DISS SOLIDS	1432	1465	1522	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		1.4				

FOR THE FOURTH QUARTER 1989

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
891004		0.58	0.375	8.3	0.20	5.0		3378								LAB-CONSOL INST Q=1.33 CFS
891031	945	0.42	0.271	7.8	0.65	2.0	1.0	3376								LAB-ACZ INST Q=0.90 CFS
891121	1200	0.56	0.362	8.1	0.78	4.0	1.0	3518								LAB-ACZ INST Q=0.12 CFS
891128		0.56	0.362	7.9	0.46	2.0		3310								LAB-CONSOL INST Q=1.98 CFS
891204		0.59	0.381	7.9	0.45	13.0		3466								LAB-CONSOL INST Q=0.76 CFS
891205		0.59	0.381	7.4	0.59	4.0	5.0	3496								LAB-UTAH DEH INST Q=0.7 CFS
891213	1330	0.59	0.381	7.9	0.14	12.0	1.0	3408								LAB-ACZ

POINT=003

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
891004		0.41	0.265	8.1	0.36	14.0		1908								LAB-CONSOL INST Q=0.90 CFS
891012	1350	0.23	0.149	8.1	0.14	15.0		2048								UTAH DEPT OF HEALTH SAMPLE
891031	945	0.50	0.323	8.3	0.15	10.0	1.0	2122								LAB-ACZ INST Q=2.18 CFS
891121	1130	0.24	0.155	8.7	0.28	8.0	1.0	1468								LAB-ACZ INST Q=0.26 CFS
891128		0.24	0.155	8.6	0.25	17.0		1322								LAB-CONSOL INST Q=0.54 CFS
891204		0.35	0.226	8.6	0.23	5.0		1440								LAB-CONSOL INST Q=0.20 CFS
891205		0.35	0.226	8.5	0.41	18.0	5.0	1432								LAB-UTAH DEH INST Q=0.14 CFS
891213	1305	0.35	0.226	8.5	0.25	18.0	2.0	1522								LAB-ACZ

EMERY MINE - MONITORING WELL DATA

The following wells were sampled in 1989.

Well Name	Water Bearing Unit(s)
Emery Deep Mine Wells	
Bryant	Upper Ferron S.S.
Emria 2	Bluegate Shale Upper Ferron S.S. Middle Ferron S.S. Lower Ferron S.S.
Kemmer	Lower Ferron S.S.
Lewis	Upper Ferron S.S.
TP	Upper Ferron S.S.
T1	Bluegate Shale
USGS 1-2	Upper Ferron S.S.
ZZ	Lower Ferron S.S.
Refuse Disposal Area Wells	
RDA1	Quitchupah Alluvium
RDA2	Quitchupah Alluvium
RDA3	Quitchupah Alluvium
RDA4	Quitchupah Alluvium
RDA5	Quitchupah Alluvium
RDA6	Quitchupah Alluvium
Surface Mine Wells	
SM1-1	Christiansen Alluvium
SM1-2	Christiansen Alluvium
SM1-3	Christiansen Alluvium
SM1-4	Christiansen Alluvium

EMERY MINE GROUNDWATER MONITORING REPORT 16:03 MONDAY, MARCH 26, 1990
FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=BRYANT WATER BEARING UNIT=U

	RAW DATA			
	30MAR89	19MAY89	11SEP89	06DEC89
WATER DEPTH	285.3	294.7	287.1	286.9
WATER LEVEL ELEV	5735.5	5726.1	5733.7	5733.9
SP COND - FIELD		1950	2110	
PH		10.7	9.9	
TEMP(CELSIUS)		13.2	15.5	
TDS		1232.0	1238.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		160.00	167.00	
NONCARBONATE		24.00	40.00	
ANIONS				
HCO3		0.00	0.00	
CO3		81.60	76.20	
CL		89.00	85.00	
SO4		617.00	677.00	
NO3(N)				
CATIONS				
NA		451.00	410.00	
K		4.00	5.00	
CA		3.00	1.00	
MG		3.00	1.00	
FE,TOT				
FE,DISS		0.02	0.18	
MN		0.01	0.01	
CALCULATED DATA				
HARDNESS		20	2	
NC HARDNESS				
SAR		44	69	
IONIC RATIOS(%)				
NA+K		98	99	
CA		1	0	
MG		1	0	
HCO3+CO3		15	13	
CL		14	13	
SO4		71	74	
TDS(SUM)		1248.6	1255.4	
TDS(SUM)/SP COND		0.64	0.59	
TDS(CALC)		1248.6	1255.4	
TDS/TDS(CALC)		0.99	0.99	
TOTAL CATIONS		20.12	18.10	
TOTAL ANIONS		18.56	19.83	
CAT-AN BALANCE		4.00	-4.60	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=BRYANT WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	288.5	285.3	294.7	4.0	4.2
WATER LEVEL ELEV	5732.3	5726.1	5735.5	4.0	4.2
SP COND - FIELD	2030	1950	2110	2	113
PH	10.3	9.9	10.7	2.0	0.6
TEMP(CELSIUS)	14.3	13.2	15.5	2.0	1.6
TDS	1235.0	1232.0	1238.0	2.0	4.2
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	163.50	160.00	167.00	2.00	4.95
NONCARBONATE	32.00	24.00	40.00	2.00	11.31
ANIONS					
HCO3	0.00	0.00	0.00	2.00	0.00
CO3	78.90	76.20	81.60	2.00	3.82
CL	87.00	85.00	89.00	2.00	2.83
SO4	647.00	617.00	677.00	2.00	42.43
NO3(N)				0.00	
CATIONS					
NA	430.50	410.00	451.00	2.00	28.99
K	4.50	4.00	5.00	2.00	0.71
CA	2.00	1.00	3.00	2.00	1.41
MG	2.00	1.00	3.00	2.00	1.41
FE,TOT				0.00	
FE,DISS	0.10	0.02	0.18	2.00	0.11
MN	0.01	0.01	0.01	2.00	0.00
CALCULATED DATA					
HARDNESS	11	2	20	2	13
NC HARDNESS				0	
SAR	57	44	69	2	18
IONIC RATIOS(%)					
NA+K	99	98	99	2	1
CA	1	0	1	2	0
MG	1	0	1	2	1
HCO3+CO3	14	13	15	2	1
CL	13	13	14	2	1
SO4	73	71	74	2	2
TDS(SUM)	1252.0	1248.6	1255.4	2.0	4.8
TDS(SUM)/SP COND	0.62	0.59	0.64	2.00	0.03
TDS(CALC)	1252.0	1248.6	1255.4	2.0	4.8
TDS/TDS(CALC)	0.99	0.99	0.99	2.00	0.00
TOTAL CATIONS	19.11	18.10	20.12	2.00	1.43
TOTAL ANIONS	19.19	18.56	19.83	2.00	0.90
CAT-AN BALANCE	-0.30	-4.60	4.00	2.00	6.08

EMERY MINE GROUNDWATER MONITORING REPORT
FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=EMRIA2 WATER BEARING UNIT=BGUML

	RAW DATA			
	27MAR89	19MAY89	12SEP89	05DEC89
WATER DEPTH	24.7	37.4	39.6	40.4
WATER LEVEL ELEV	6057.6	6044.9	6042.7	6041.9
SP COND - FIELD		6910		
PH		6.7	6.4	
TEMP(CELSIUS)		14.4	10.3	
TDS		8016.0	9960.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		434.00	406.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		529.48	495.32	
CO3		0.00	0.00	
CL		59.00	65.00	
SO4		5639.00	7285.00	
NO3(N)				
CATIONS				
NA		307.00	290.00	
K		44.00	20.00	
CA		455.00	462.00	
MG		999.00	1350.00	
FE,TOT				
FE,DISS		0.02	0.02	
MN		3.46	5.30	
CALCULATED DATA				
HARDNESS		5233	6690	
NC HARDNESS				
SAR		2	2	
IONIC RATIOS(%)				
NA+K		12	9	
CA		19	16	
MG		69	75	
HCO3+CO3		7	5	
CL		1	1	
SO4		92	94	
TDS(SUM)		8036.0	9972.6	
TDS(SUM)/SP COND		1.16		
TDS(CALC)		7766.8	9720.9	
TDS/TDS(CALC)		1.03	1.02	
TOTAL CATIONS		119.49	147.42	
TOTAL ANIONS		127.75	161.63	
CAT-AN BALANCE		-3.30	-4.60	

EMERY MINE GROUNDWATER MONITORING REPORT
FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=EMRIA2 WATER BEARING UNIT=BGUML

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	35.5	24.7	40.4	4.0	7.3
WATER LEVEL ELEV	6046.8	6041.9	6057.6	4.0	7.3
SP COND - FIELD	6910	6910	6910	1	-
PH	6.5	6.4	6.7	2.0	0.2
TEMP(CELSIUS)	12.3	10.3	14.4	2.0	2.9
TDS	8988.0	8016.0	9960.0	2.0	1374.6
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	420.00	406.00	434.00	2.00	19.80
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	512.40	495.32	529.48	2.00	24.15
CO3	0.00	0.00	0.00	2.00	0.00
CL	62.00	59.00	65.00	2.00	4.24
SO4	6462.00	5639.00	7285.00	2.00	1163.90
NO3(N)				0.00	
CATIONS					
NA	298.50	290.00	307.00	2.00	12.02
K	32.00	20.00	44.00	2.00	16.97
CA	458.50	455.00	462.00	2.00	4.95
MG	1174.50	999.00	1350.00	2.00	248.19
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	2.00	0.00
MN	4.38	3.46	5.30	2.00	1.30
CALCULATED DATA					
HARDNESS	5962	5233	6690	2	1030
NC HARDNESS				0	
SAR	2	2	2	2	0
IONIC RATIOS(%)					
NA+K	11	9	12	2	2
CA	17	16	19	2	2
MG	72	69	75	2	5
HCO3+CO3	6	5	7	2	1
CL	1	1	1	2	0
SO4	93	92	94	2	1
TDS(SUM)	9004.3	8036.0	9972.6	2.0	1369.4
TDS(SUM)/SP COND	1.16	1.16	1.16	1.00	
TDS(CALC)	8743.8	7766.8	9720.9	2.0	1381.7
TDS/TDS(CALC)	1.03	1.02	1.03	2.00	0.01
TOTAL CATIONS	133.46	119.49	147.42	2.00	19.75
TOTAL ANIONS	144.69	127.75	161.63	2.00	23.96
CAT-AN BALANCE	-3.95	-4.60	-3.30	2.00	0.92

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=KEMMER WATER BEARING UNIT=L

	RAW DATA			
	27MAR89	18MAY89	11SEP89	05DEC89
WATER DEPTH	-27.0	-27.0	-27.0	-23.0
WATER LEVEL ELEV	6311.7	6311.7	6311.7	6307.7
SP COND - FIELD		1010	900	
PH		9.3	9.1	
TEMP(CELSIUS)		14.9	14.7	
TDS		924.0	626.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		246.00	260.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		261.08	170.80	
CO3		19.20	72.00	
CL		26.00	19.00	
SO4		428.00	239.00	
NO3(N)				
CATIONS				
NA		285.00	215.00	
K		4.00	6.00	
CA		6.00	4.00	
MG		9.00	8.00	
FE,TOT				
FE,DISS		0.22	0.43	
MN		0.01	0.01	
CALCULATED DATA				
HARDNESS		52	43	
NC HARDNESS				
SAR		17	14	
IONIC RATIOS(%)				
NA+K		92	92	
CA		2	2	
MG		5	6	
HCO3+CO3		34	49	
CL		5	5	
SO4		61	46	
TDS(SUM)		1038.5	734.2	
TDS(SUM)/SP COND		1.03	0.82	
TDS(CALC)		905.8	647.4	
TDS/TDS(CALC)		1.02	0.97	
TOTAL CATIONS		13.55	10.38	
TOTAL ANIONS		14.56	10.71	
CAT-AN BALANCE		-3.60	-1.60	

EMERY MINE GROUNDWATER MONITORING REPORT
FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=KEMMER WATER BEARING UNIT=L

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	-26.0	-27.0	-23.0	4.0	2.0
WATER LEVEL ELEV	6310.7	6307.7	6311.7	4.0	2.0
SP COND - FIELD	955	900	1010	2	78
PH	9.2	9.1	9.3	2.0	0.1
TEMP(CELSIUS)	14.8	14.7	14.9	2.0	0.1
TDS	775.0	626.0	924.0	2.0	210.7
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	253.00	246.00	260.00	2.00	9.90
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	215.94	170.80	261.08	2.00	63.84
CO3	45.60	19.20	72.00	2.00	37.34
CL	22.50	19.00	26.00	2.00	4.95
SO4	333.50	239.00	428.00	2.00	133.64
NO3(N)				0.00	
CATIONS					
NA	250.00	215.00	285.00	2.00	49.50
K	5.00	4.00	6.00	2.00	1.41
CA	5.00	4.00	6.00	2.00	1.41
MG	8.50	8.00	9.00	2.00	0.71
FE,TOT				0.00	
FE,DISS	0.32	0.22	0.43	2.00	0.15
MN	0.01	0.01	0.01	2.00	0.00
CALCULATED DATA					
HARDNESS	48	43	52	2	6
NC HARDNESS				0	
SAR	16	14	17	2	2
IONIC RATIOS(%)					
NA+K	92	92	92	2	0
CA	2	2	2	2	0
MG	6	5	6	2	1
HCO3+CO3	41	34	49	2	10
CL	5	5	5	2	0
SO4	54	46	61	2	10
TDS(SUM)	886.4	734.2	1038.5	2.0	215.2
TDS(SUM)/SP COND	0.92	0.82	1.03	2.00	0.15
TDS(CALC)	776.6	647.4	905.8	2.0	182.7
TDS/TDS(CALC)	0.99	0.97	1.02	2.00	0.04
TOTAL CATIONS	11.96	10.38	13.55	2.00	2.24
TOTAL ANIONS	12.64	10.71	14.56	2.00	2.72
CAT-AN BALANCE	-2.60	-3.60	-1.60	2.00	1.41

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=LEWIS WATER BEARING UNIT=U

	RAW DATA				
	27MAR89	19MAY89	30JUN89	11SEP89	06DEC89
WATER DEPTH		259.1		255.8	256.1
WATER LEVEL ELEV		5759.4		5762.7	5762.4
SP COND - FIELD				1410	
PH				8.3	
TEMP(CELSIUS)				17.5	
TDS			876.0	882.0	
ACIDITY,TOT					
ALKALINITY(CACO3)					
TOTAL			306.00	308.00	
NONCARBONATE			0.00	0.00	
ANIONS					
HCO3			348.92	336.72	
CO3			12.00	19.20	
CL			29.00	26.00	
SO4			350.00	370.00	
NO3(N)					
CATIONS					
NA			370.00	330.00	
K			1.00	2.00	
CA			1.00	1.00	
MG			1.00	1.00	
FE,TOT					
FE,DISS			0.03	0.02	
MN			0.01	0.01	
CALCULATED DATA					
HARDNESS			7	2	
NC HARDNESS					
SAR			63	56	
IONIC RATIOS(%)					
NA+K			99	99	
CA			0	0	
MG			1	1	
HCO3+CO3			43	42	
CL			6	5	
SO4			51	53	
TDS(SUM)			1113.0	1085.9	
TDS(SUM)/SP COND				0.77	
TDS(CALC)			935.6	914.8	
TDS/TDS(CALC)			0.94	0.96	
TOTAL CATIONS			16.25	14.54	
TOTAL ANIONS			14.23	14.60	
CAT-AN BALANCE			6.70	-0.20	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=LEWIS WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	257.0	255.8	259.1	3.0	1.8
WATER LEVEL ELEV	5761.5	5759.4	5762.7	3.0	1.8
SP COND - FIELD	1410	1410	1410	1	.
PH	8.3	8.3	8.3	1.0	
TEMP(CELSIUS)	17.5	17.5	17.5	1.0	
TDS	879.0	876.0	882.0	2.0	4.2
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	307.00	306.00	308.00	2.00	1.41
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	342.82	336.72	348.92	2.00	8.63
CO3	15.60	12.00	19.20	2.00	5.09
CL	27.50	26.00	29.00	2.00	2.12
SO4	360.00	350.00	370.00	2.00	14.14
NO3(N)				0.00	
CATIONS					
NA	350.00	330.00	370.00	2.00	28.28
K	1.50	1.00	2.00	2.00	0.71
CA	1.00	1.00	1.00	2.00	0.00
MG	1.00	1.00	1.00	2.00	0.00
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.03	2.00	0.01
MN	0.01	0.01	0.01	2.00	0.00
CALCULATED DATA					
HARDNESS	5	2	7	2	4
NC HARDNESS				0	
SAR	59	56	63	2	5
IONIC RATIOS(%)					
NA+K	99	99	99	2	0
CA	0	0	0	2	0
MG	1	1	1	2	0
HCO3+CO3	43	42	43	2	1
CL	5	5	6	2	1
SO4	52	51	53	2	1
TDS(SUM)	1099.5	1085.9	1113.0	2.0	19.1
TDS(SUM)/SP COND	0.77	0.77	0.77	1.00	
TDS(CALC)	925.2	914.8	935.6	2.0	14.7
TDS/TDS(CALC)	0.95	0.94	0.96	2.00	0.02
TOTAL CATIONS	15.40	14.54	16.25	2.00	1.21
TOTAL ANIONS	14.41	14.23	14.60	2.00	0.26
CAT-AN BALANCE	3.25	-0.20	6.70	2.00	4.88

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=TP WATER BEARING UNIT=U

	RAW DATA			
	27MAR89	26MAY89	11SEP89	05DEC89
WATER DEPTH	334.2		342.2	364.2
WATER LEVEL ELEV	5667.7		5659.7	5637.7
SP COND - FIELD		2020	1610	
PH		10.8	9.7	
TEMP(CELSIUS)		16.8	13.2	
TDS		1048.0	994.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		368.00	580.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		39.04	170.80	
CO3		201.60	264.00	
CL		49.00	45.00	
SO4		327.00	163.00	
NO3(N)				
CATIONS				
NA		402.00	369.00	
K		3.00	2.00	
CA		1.00	1.00	
MG		1.00	1.00	
FE,TOT				
FE,DISS		0.35	0.07	
MN		0.01	0.01	
CALCULATED DATA				
HARDNESS		7	7	
NC HARDNESS				
SAR		68	62	
IONIC RATIOS(%)				
NA+K		99	99	
CA		0	0	
MG		0	1	
HCO3+CO3		47	71	
CL		9	8	
SO4		44	21	
TDS(SUM)		1024.0	1015.9	
TDS(SUM)/SP COND		0.51	0.63	
TDS(CALC)		1004.2	929.1	
TDS/TDS(CALC)		1.04	1.07	
TOTAL CATIONS		17.71	16.24	
TOTAL ANIONS		15.55	16.26	
CAT-AN BALANCE		6.50	-0.10	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=TP WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	346.9	334.2	364.2	3.0	15.5
WATER LEVEL ELEV	5655.0	5637.7	5667.7	3.0	15.5
SP COND - FIELD	1815	1610	2020	2	290
PH	10.2	9.7	10.8	2.0	0.8
TEMP(CELSIUS)	15.0	13.2	16.8	2.0	2.5
TDS	1021.0	994.0	1048.0	2.0	38.2
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	474.00	368.00	580.00	2.00	149.91
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	104.92	39.04	170.80	2.00	93.17
CO3	232.80	201.60	264.00	2.00	44.12
CL	47.00	45.00	49.00	2.00	2.83
SO4	245.00	163.00	327.00	2.00	115.97
NO3(N)				0.00	
CATIONS					
NA	385.50	369.00	402.00	2.00	23.33
K	2.50	2.00	3.00	2.00	0.71
CA	1.00	1.00	1.00	2.00	0.00
MG	1.00	1.00	1.00	2.00	0.00
FE,TOT				0.00	
FE,DISS	0.21	0.07	0.35	2.00	0.20
MN	0.01	0.01	0.01	2.00	0.00
CALCULATED DATA					
HARDNESS	7	7	7	2	0
NC HARDNESS				0	
SAR	65	62	68	2	4
IONIC RATIOS(%)					
NA+K	99	99	99	2	0
CA	0	0	0	2	0
MG	0	0	1	2	0
HCO3+CO3	59	47	71	2	17
CL	8	8	9	2	1
SO4	32	21	44	2	16
TDS(SUM)	1019.9	1015.9	1024.0	2.0	5.7
TDS(SUM)/SP COND	0.57	0.51	0.63	2.00	0.09
TDS(CALC)	966.6	929.1	1004.2	2.0	53.1
TDS/TDS(CALC)	1.06	1.04	1.07	2.00	0.02
TOTAL CATIONS	16.97	16.24	17.71	2.00	1.04
TOTAL ANIONS	15.91	15.55	16.26	2.00	0.50
CAT-AN BALANCE	3.20	-0.10	6.50	2.00	4.67

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=T1 WATER BEARING UNIT=BG

	RAW DATA			
	27MAR89	26MAY89	11SEP89	05DEC89
WATER DEPTH	15.7	10.5	10.9	10.7
WATER LEVEL ELEV	5985.2	5990.4	5990.0	5990.2
SP COND - FIELD		7110		
PH		7.9	7.2	
TEMP(CELSIUS)		16.6	13.2	
TDS		17062.0	19806.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		304.00	424.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		370.88	517.28	
CO3		0.00	0.00	
CL		140.00	190.00	
SO4		10533	13118	
NO3(N)				
CATIONS				
NA		4710.00	5405.00	
K		52.00	50.00	
CA		347.00	399.00	
MG		280.00	391.00	
FE,TOT				
FE,DISS		0.02	0.02	
MN		0.36	0.26	
CALCULATED DATA				
HARDNESS		2016	2601	
NC HARDNESS				
SAR		46	46	
IONIC RATIOS(%)				
NA+K		84	82	
CA		7	7	
MG		9	11	
HCO3+CO3		3	3	
CL		2	2	
SO4		96	95	
TDS(SUM)		16433.3	20070.6	
TDS(SUM)/SP COND		2.31		
TDS(CALC)		16244.7	19807.6	
TDS/TDS(CALC)		1.05	1.00	
TOTAL CATIONS		246.58	288.48	
TOTAL ANIONS		229.33	286.96	
CAT-AN BALANCE		3.60	0.30	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=T1 WATER BEARING UNIT=BG

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	11.9	10.5	15.7	4.0	2.5
WATER LEVEL ELEV	5988.9	5985.2	5990.4	4.0	2.5
SP COND - FIELD	7110	7110	7110	1	-
PH	7.5	7.2	7.9	2.0	0.5
TEMP(CELSIUS)	14.9	13.2	16.6	2.0	2.4
TDS	18434.0	17062.0	19806.0	2.0	1940.3
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	364.00	304.00	424.00	2.00	84.85
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	444.08	370.88	517.28	2.00	103.52
CO3	0.00	0.00	0.00	2.00	0.00
CL	165.00	140.00	190.00	2.00	35.36
SO4	11825.5	10533	13118	2.00	1827.87
NO3(N)				0.00	
CATIONS					
NA	5057.50	4710.00	5405.00	2.00	491.44
K	51.00	50.00	52.00	2.00	1.41
CA	373.00	347.00	399.00	2.00	36.77
MG	335.50	280.00	391.00	2.00	78.49
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	2.00	0.00
MN	0.31	0.26	0.36	2.00	0.07
CALCULATED DATA					
HARDNESS	2309	2016	2601	2	414
NC HARDNESS				0	
SAR	46	46	46	2	0
IONIC RATIOS(%)					
NA+K	83	82	84	2	1
CA	7	7	7	2	0
MG	10	9	11	2	1
HCO3+CO3	3	3	3	2	0
CL	2	2	2	2	0
SO4	95	95	96	2	0
TDS(SUM)	18251.9	16433.3	20070.6	2.0	2572.0
TDS(SUM)/SP COND	2.31	2.31	2.31	1.00	
TDS(CALC)	18026.2	16244.7	19807.6	2.0	2519.3
TDS/TDS(CALC)	1.03	1.00	1.05	2.00	0.04
TOTAL CATIONS	267.53	246.58	288.48	2.00	29.63
TOTAL ANIONS	258.14	229.33	286.96	2.00	40.75
CAT-AN BALANCE	1.95	0.30	3.60	2.00	2.33

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=USGS1-2 WATER BEARING UNIT=U

	RAW DATA			
	27MAR89	19MAY89	11SEP89	06DEC89
WATER DEPTH	94.5	96.2	97.8	99.8
WATER LEVEL ELEV	5951.2	5949.5	5947.9	5945.9
SP COND - FIELD		5360	4140	
PH		7.4	7.4	
TEMP(CELSIUS)		14.5	10.1	
TDS		8788.0	4274.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		456.00	458.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		556.32	558.76	
CO3		0.00	0.00	
CL		209.00	68.00	
SO4		5886.00	2696.00	
NO3(N)				
CATIONS				
NA		2030.00	521.00	
K		17.00	12.00	
CA		241.00	307.00	
MG		474.00	290.00	
FE,TOT				
FE,DISS		0.02	0.02	
MN		0.13	0.21	
CALCULATED DATA				
HARDNESS		2546	1957	
NC HARDNESS				
SAR		18	5	
IONIC RATIOS(%)				
NA+K		63	37	
CA		9	25	
MG		28	38	
HCO3+CO3		7	14	
CL		4	3	
SO4		89	84	
TDS(SUM)		9413.5	4453.0	
TDS(SUM)/SP COND		1.76	1.08	
TDS(CALC)		9130.7	4169.0	
TDS/TDS(CALC)		0.96	1.03	
TOTAL CATIONS		139.76	62.15	
TOTAL ANIONS		137.56	67.21	
CAT-AN BALANCE		0.80	-3.90	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=USGS1-2 WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	97.1	94.5	99.8	4.0	2.3
WATER LEVEL ELEV	5948.6	5945.9	5951.2	4.0	2.3
SP COND - FIELD	4750	4140	5360	2	863
PH	7.4	7.4	7.4	2.0	0.0
TEMP(CELSIUS)	12.3	10.1	14.5	2.0	3.1
TDS	6531.0	4274.0	8788.0	2.0	3191.9
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	457.00	456.00	458.00	2.00	1.41
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	557.54	556.32	558.76	2.00	1.73
CO3	0.00	0.00	0.00	2.00	0.00
CL	138.50	68.00	209.00	2.00	99.70
SO4	4291.00	2696.00	5886.00	2.00	2255.67
NO3(N)				0.00	
CATIONS					
NA	1275.50	521.00	2030.00	2.00	1067.02
K	14.50	12.00	17.00	2.00	3.54
CA	274.00	241.00	307.00	2.00	46.67
MG	382.00	290.00	474.00	2.00	130.11
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	2.00	0.00
MN	0.17	0.13	0.21	2.00	0.06
CALCULATED DATA					
HARDNESS	2252	1957	2546	2	416
NC HARDNESS				0	
SAR	11	5	18	2	9
IONIC RATIOS(%)					
NA+K	50	37	63	2	19
CA	17	9	25	2	11
MG	33	28	38	2	7
HCO3+CO3	10	7	14	2	5
CL	4	3	4	2	1
SO4	86	84	89	2	4
TDS(SUM)	6933.2	4453.0	9413.5	2.0	3507.6
TDS(SUM)/SP COND	1.42	1.08	1.76	2.00	0.48
TDS(CALC)	6649.8	4169.0	9130.7	2.0	3508.5
TDS/TDS(CALC)	0.99	0.96	1.03	2.00	0.04
TOTAL CATIONS	100.96	62.15	139.76	2.00	54.88
TOTAL ANIONS	102.39	67.21	137.56	2.00	49.75
CAT-AN BALANCE	-1.55	-3.90	0.80	2.00	3.32

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=ZZ WATER BEARING UNIT=L

	RAW DATA			
	27MAR89	18MAY89	11SEP89	06DEC89
WATER DEPTH	145.5	145.8	146.8	146.6
WATER LEVEL ELEV	5920.2	5919.9	5918.9	5919.1
SP COND - FIELD		1170	980	
PH		9.6	9.6	
TEMP(CELSIUS)		16.4	11.9	
TDS		700.0	678.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		612.00	560.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		434.32	390.40	
CO3		153.60	144.00	
CL		15.00	14.00	
SO4		19.00	16.00	
NO3(N)				
CATIONS				
NA		306.00	276.00	
K		3.00	4.00	
CA		2.00	1.00	
MG		3.00	4.00	
FE,TOT				
FE,DISS		0.07	0.02	
MN		0.01	0.01	
CALCULATED DATA				
HARDNESS		10	19	
NC HARDNESS				
SAR		32	28	
IONIC RATIOS(%)				
NA+K		97	97	
CA		1	0	
MG		2	3	
HCO3+CO3		94	94	
CL		3	3	
SO4		3	3	
TDS(SUM)		936.0	849.4	
TDS(SUM)/SP COND		0.80	0.87	
TDS(CALC)		715.2	651.0	
TDS/TDS(CALC)		0.98	1.04	
TOTAL CATIONS		13.74	12.49	
TOTAL ANIONS		13.06	11.93	
CAT-AN BALANCE		2.50	2.30	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=ZZ WATER BEARING UNIT=L

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	146.2	145.5	146.8	4.0	0.6
WATER LEVEL ELEV	5919.5	5918.9	5920.2	4.0	0.6
SP COND - FIELD	1075	980	1170	2	134
PH	9.6	9.6	9.6	2.0	0.0
TEMP(CELSIUS)	14.1	11.9	16.4	2.0	3.2
TDS	689.0	678.0	700.0	2.0	15.6
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	586.00	560.00	612.00	2.00	36.77
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	412.36	390.40	434.32	2.00	31.06
CO3	148.80	144.00	153.60	2.00	6.79
CL	14.50	14.00	15.00	2.00	0.71
SO4	17.50	16.00	19.00	2.00	2.12
NO3(N)				0.00	
CATIONS					
NA	291.00	276.00	306.00	2.00	21.21
K	3.50	3.00	4.00	2.00	0.71
CA	1.50	1.00	2.00	2.00	0.71
MG	3.50	3.00	4.00	2.00	0.71
FE,TOT				0.00	
FE,DISS	0.04	0.02	0.07	2.00	0.04
MN	0.01	0.01	0.01	2.00	0.00
CALCULATED DATA					
HARDNESS	15	10	19	2	6
NC HARDNESS				0	
SAR	30	28	32	2	3
IONIC RATIOS(%)					
NA+K	97	97	97	2	0
CA	1	0	1	2	0
MG	2	2	3	2	1
HCO3+CO3	94	94	94	2	0
CL	3	3	3	2	0
SO4	3	3	3	2	0
TDS(SUM)	892.7	849.4	936.0	2.0	61.2
TDS(SUM)/SP COND	0.83	0.80	0.87	2.00	0.05
TDS(CALC)	683.1	651.0	715.2	2.0	45.4
TDS/TDS(CALC)	1.01	0.98	1.04	2.00	0.04
TOTAL CATIONS	13.11	12.49	13.74	2.00	0.88
TOTAL ANIONS	12.49	11.93	13.06	2.00	0.80
CAT-AN BALANCE	2.40	2.30	2.50	2.00	0.14

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDAI WATER BEARING UNIT=QAL

	RAW DATA			
	21MAR89	19MAY89	11SEP89	06DEC89
WATER DEPTH	14.0	14.3	14.5	14.1
WATER LEVEL ELEV	5943.8	5943.5	5943.3	5943.7
SP COND - FIELD		4250		
PH		7.6		
TEMP(CELSIUS)		13.5		
TDS		5052.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		522.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		636.84		
CO3		0.00		
CL		198.00		
SO4		2996.00		
NO3(N)				
CATIONS				
NA		754.00		
K		12.00		
CA		404.00		
MG		228.00		
FE,TOT				
FE,DISS		0.02		
MN		0.39		
CALCULATED DATA				
HARDNESS		1945		
NC HARDNESS				
SAR		7		
IONIC RATIOS(%)				
NA+K		46		
CA		28		
MG		26		
HCO3+CO3		13		
CL		7		
SO4		80		
TDS(SUM)		5229.2		
TDS(SUM)/SP COND		1.23		
TDS(CALC)		4905.5		
TDS/TDS(CALC)		1.03		
TOTAL CATIONS		72.04		
TOTAL ANIONS		78.40		
CAT-AN BALANCE		-4.20		

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA1 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	14.2	14.0	14.5	4.0	0.2
WATER LEVEL ELEV	5943.6	5943.3	5943.8	4.0	0.2
SP COND - FIELD	4250	4250	4250	1	
PH	7.6	7.6	7.6	1.0	
TEMP(CELSIUS)	13.5	13.5	13.5	1.0	
TDS	5052.0	5052.0	5052.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	522.00	522.00	522.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	636.84	636.84	636.84	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	198.00	198.00	198.00	1.00	
SO4	2996.00	2996.00	2996.00	1.00	
NO3(N)				0.00	
CATIONS					
NA	754.00	754.00	754.00	1.00	
K	12.00	12.00	12.00	1.00	
CA	404.00	404.00	404.00	1.00	
MG	228.00	228.00	228.00	1.00	
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	1.00	
MN	0.39	0.39	0.39	1.00	
CALCULATED DATA					
HARDNESS	1945	1945	1945	1	
NC HARDNESS				0	
SAR	7	7	7	1	
IONIC RATIOS(%)					
NA+K	46	46	46	1	
CA	28	28	28	1	
MG	26	26	26	1	
HCO3+CO3	13	13	13	1	
CL	7	7	7	1	
SO4	80	80	80	1	
TDS(SUM)	5229.2	5229.2	5229.2	1.0	
TDS(SUM)/SP COND	1.23	1.23	1.23	1.00	
TDS(CALC)	4905.5	4905.5	4905.5	1.0	
TDS/TDS(CALC)	1.03	1.03	1.03	1.00	
TOTAL CATIONS	72.04	72.04	72.04	1.00	
TOTAL ANIONS	78.40	78.40	78.40	1.00	
CAT-AN BALANCE	-4.20	-4.20	-4.20	1.00	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA2 WATER BEARING UNIT=QAL

	RAW DATA			
	21MAR89	19MAY89	11SEP89	06DEC89
WATER DEPTH	13.3	13.8	13.8	14.2
WATER LEVEL ELEV	5941.2	5940.7	5940.7	5940.3
SP COND - FIELD		4620		
PH		7.3		
TEMP(CELSIUS)		13.4		
TDS		4424.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		506.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		617.32		
CO3		0.00		
CL		165.00		
SO4		2535.00		
NO3(N)				
CATIONS				
NA		588.00		
K		12.00		
CA		430.00		
MG		175.00		
FE,TOT				
FE,DISS		0.02		
MN		0.01		
CALCULATED DATA				
HARDNESS		1793		
NC HARDNESS				
SAR		6		
IONIC RATIOS(%)				
NA+K		42		
CA		35		
MG		23		
HCO3+CO3		15		
CL		7		
SO4		78		
TDS(SUM)		4522.3		
TDS(SUM)/SP COND		0.98		
TDS(CALC)		4208.6		
TDS/TDS(CALC)		1.05		
TOTAL CATIONS		61.74		
TOTAL ANIONS		67.55		
CAT-AN BALANCE		-4.50		

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA2 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	13.8	13.3	14.2	4.0	0.4
WATER LEVEL ELEV	5940.7	5940.3	5941.2	4.0	0.4
SP COND - FIELD	4620	4620	4620	1	
PH	7.3	7.3	7.3	1.0	
TEMP(CELSIUS)	13.4	13.4	13.4	1.0	
TDS	4424.0	4424.0	4424.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	506.00	506.00	506.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	617.32	617.32	617.32	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	165.00	165.00	165.00	1.00	
SO4	2535.00	2535.00	2535.00	1.00	
NO3(N)				0.00	
CATIONS					
NA	588.00	588.00	588.00	1.00	
K	12.00	12.00	12.00	1.00	
CA	430.00	430.00	430.00	1.00	
MG	175.00	175.00	175.00	1.00	
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	1.00	
MN	0.01	0.01	0.01	1.00	
CALCULATED DATA					
HARDNESS	1793	1793	1793	1	
NC HARDNESS				0	
SAR	6	6	6	1	
IONIC RATIOS(%)					
NA+K	42	42	42	1	
CA	35	35	35	1	
MG	23	23	23	1	
HCO3+CO3	15	15	15	1	
CL	7	7	7	1	
SO4	78	78	78	1	
TDS(SUM)	4522.3	4522.3	4522.3	1.0	
TDS(SUM)/SP COND	0.98	0.98	0.98	1.00	
TDS(CALC)	4208.6	4208.6	4208.6	1.0	
TDS/TDS(CALC)	1.05	1.05	1.05	1.00	
TOTAL CATIONS	61.74	61.74	61.74	1.00	
TOTAL ANIONS	67.55	67.55	67.55	1.00	
CAT-AN BALANCE	-4.50	-4.50	-4.50	1.00	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA3 WATER BEARING UNIT=QAL

	RAW DATA			
	21MAR89	19MAY89	11SEP89	06DEC89
WATER DEPTH	21.8	22.2	22.3	21.2
WATER LEVEL ELEV	5923.6	5923.2	5923.1	5924.2
SP COND - FIELD				
PH		7.1		
TEMP(CELSIUS)		17.5		
TDS		22488.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		980.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		1195.60		
CO3		0.00		
CL		1400.00		
SO4		14118		
NO3(N)				
CATIONS				
NA		4474.00		
K		16.00		
CA		398.00		
MG		1300.00		
FE,TOT				
FE,DISS		0.02		
MN		0.56		
CALCULATED DATA				
HARDNESS		6325		
NC HARDNESS				
SAR		24		
IONIC RATIOS(%)				
NA+K		61		
CA		6		
MG		33		
HCO3+CO3		6		
CL		11		
SO4		83		
TDS(SUM)		22902.2		
TDS(SUM)/SP COND				
TDS(CALC)		22294.5		
TDS/TDS(CALC)		1.01		
TOTAL CATIONS		321.85		
TOTAL ANIONS		353.03		
CAT-AN BALANCE		-4.60		

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA3 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	21.9	21.2	22.3	4.0	0.5
WATER LEVEL ELEV	5923.5	5923.1	5924.2	4.0	0.5
SP COND - FIELD				0	
PH	7.1	7.1	7.1	1.0	
TEMP(CELSIUS)	17.5	17.5	17.5	1.0	
TDS	22488.0	22488.0	22488.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	980.00	980.00	980.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	1195.60	1195.60	1195.60	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	1400.00	1400.00	1400.00	1.00	
SO4	14118	14118	14118	1.00	
NO3(N)				0.00	
CATIONS					
NA	4474.00	4474.00	4474.00	1.00	
K	16.00	16.00	16.00	1.00	
CA	398.00	398.00	398.00	1.00	
MG	1300.00	1300.00	1300.00	1.00	
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	1.00	
MN	0.56	0.56	0.56	1.00	
CALCULATED DATA					
HARDNESS	6325	6325	6325	1	
NC HARDNESS				0	
SAR	24	24	24	1	
IONIC RATIOS(%)					
NA+K	61	61	61	1	
CA	6	6	6	1	
MG	33	33	33	1	
HCO3+CO3	6	6	6	1	
CL	11	11	11	1	
SO4	83	83	83	1	
TDS(SUM)	22902.2	22902.2	22902.2	1.0	
TDS(SUM)/SP COND				0.00	
TDS(CALC)	22294.5	22294.5	22294.5	1.0	
TDS/TDS(CALC)	1.01	1.01	1.01	1.00	
TOTAL CATIONS	321.85	321.85	321.85	1.00	
TOTAL ANIONS	353.03	353.03	353.03	1.00	
CAT-AN BALANCE	-4.60	-4.60	-4.60	1.00	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=R0A4 WATER BEARING UNIT=QAL

	RAW DATA			
	21MAR89	19MAY89	11SEP89	06DEC89
WATER DEPTH	21.0	21.1	21.6	19.6
WATER LEVEL ELEV	5922.1	5922.0	5921.5	5923.5
SP COND - FIELD		7590		
PH		7.6		
TEMP(CELSIUS)		14.6		
TDS		8186.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		560.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		683.20		
CO3		0.00		
CL		300.00		
SO4		5186.00		
NO3(N)				
CATIONS				
NA		1420.00		
K		7.00		
CA		436.00		
MG		497.00		
FE,TOT				
FE,DISS		0.02		
MN		0.17		
CALCULATED DATA				
HARDNESS		3128		
NC HARDNESS				
SAR		11		
IONIC RATIOS(%)				
NA+K		50		
CA		17		
MG		33		
HCO3+CO3		9		
CL		7		
SO4		85		
TDS(SUM)		8529.4		
TDS(SUM)/SP COND		1.12		
TDS(CALC)		8182.1		
TDS/TDS(CALC)		1.00		
TOTAL CATIONS		124.60		
TOTAL ANIONS		127.64		
CAT-AN BALANCE		-1.20		

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA4 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	20.8	19.6	21.6	4.0	0.9
WATER LEVEL ELEV	5922.3	5921.5	5923.5	4.0	0.9
SP COND - FIELD	7590	7590	7590	1	
PH	7.6	7.6	7.6	1.0	
TEMP(CELSIUS)	14.6	14.6	14.6	1.0	
TDS	8186.0	8186.0	8186.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	560.00	560.00	560.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	683.20	683.20	683.20	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	300.00	300.00	300.00	1.00	
SO4	5186.00	5186.00	5186.00	1.00	
NO3(N)				0.00	
CATIONS					
NA	1420.00	1420.00	1420.00	1.00	
K	7.00	7.00	7.00	1.00	
CA	436.00	436.00	436.00	1.00	
MG	497.00	497.00	497.00	1.00	
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	1.00	
MN	0.17	0.17	0.17	1.00	
CALCULATED DATA					
HARDNESS	3128	3128	3128	1	
NC HARDNESS				0	
SAR	11	11	11	1	
IONIC RATIOS(%)					
NA+K	50	50	50	1	
CA	17	17	17	1	
MG	33	33	33	1	
HCO3+CO3	9	9	9	1	
CL	7	7	7	1	
SO4	85	85	85	1	
TDS(SUM)	8529.4	8529.4	8529.4	1.0	
TDS(SUM)/SP COND	1.12	1.12	1.12	1.00	
TDS(CALC)	8182.1	8182.1	8182.1	1.0	
TDS/TDS(CALC)	1.00	1.00	1.00	1.00	
TOTAL CATIONS	124.60	124.60	124.60	1.00	
TOTAL ANIONS	127.64	127.64	127.64	1.00	
CAT-AN BALANCE	-1.20	-1.20	-1.20	1.00	

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA5 WATER BEARING UNIT=CAL

	RAW DATA			
	21MAR89	19MAY89	11SEP89	06DEC89
WATER DEPTH	19.5	19.2	19.4	19.2
WATER LEVEL ELEV	5921.7	5922.0	5921.8	5922.0
SP COND - FIELD				
PH		7.8		
TEMP(CELSIUS)		14.5		
TDS		23108.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		498.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		607.56		
CO3		0.00		
CL		1150.00		
SO4		15270		
NO3(N)				
CATIONS				
NA		6275.00		
K		7.00		
CA		361.00		
MG		1100.00		
FE,TOT				
FE,DISS		0.02		
MN		0.17		
CALCULATED DATA				
HARDNESS		5413		
NC HARDNESS				
SAR		37		
IONIC RATIOS(%)				
NA+K		72		
CA		5		
MG		24		
HCO3+CO3		3		
CL		9		
SO4		88		
TDS(SUM)		24770.7		
TDS(SUM)/SP COND				
TDS(CALC)		24461.9		
TDS/TDS(CALC)		0.94		
TOTAL CATIONS		381.65		
TOTAL ANIONS		360.32		
CAT-AN BALANCE		2.90		

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=R0A5 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	19.3	19.2	19.5	4.0	0.2
WATER LEVEL ELEV	5921.9	5921.7	5922.0	4.0	0.1
SP COND - FIELD				0	
PH	7.8	7.8	7.8	1.0	
TEMP(CELSIUS)	14.5	14.5	14.5	1.0	
TDS	23108.0	23108.0	23108.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	498.00	498.00	498.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	607.56	607.56	607.56	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	1150.00	1150.00	1150.00	1.00	
SO4	15270	15270	15270	1.00	
NO3(N)				0.00	
CATIONS					
NA	6275.00	6275.00	6275.00	1.00	
K	7.00	7.00	7.00	1.00	
CA	361.00	361.00	361.00	1.00	
MG	1100.00	1100.00	1100.00	1.00	
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	1.00	
MN	0.17	0.17	0.17	1.00	
CALCULATED DATA					
HARDNESS	5413	5413	5413	1	
NC HARDNESS				0	
SAR	37	37	37	1	
IONIC RATIOS(%)					
NA+K	72	72	72	1	
CA	5	5	5	1	
MG	24	24	24	1	
HCO3+CO3	3	3	3	1	
CL	9	9	9	1	
SO4	88	88	88	1	
TDS(SUM)	24770.7	24770.7	24770.7	1.0	
TDS(SUM)/SP COND				0.00	
TDS(CALC)	24461.9	24461.9	24461.9	1.0	
TDS/TDS(CALC)	0.94	0.94	0.94	1.00	
TOTAL CATIONS	381.65	381.65	381.65	1.00	
TOTAL ANIONS	360.32	360.32	360.32	1.00	
CAT-AN BALANCE	2.90	2.90	2.90	1.00	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA6 WATER BEARING UNIT=QAL

	RAW DATA			
	21MAR89	19MAY89	11SEP89	06DEC89
WATER DEPTH	14.4	14.2	14.4	14.3
WATER LEVEL ELEV	5926.0	5926.2	5926.0	5926.1
SP COND - FIELD				
PH		8.0		
TEMP(CELSIUS)		14.4		
TDS		12936.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		400.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		488.00		
CO3		0.00		
CL		550.00		
SO4		8067.00		
NO3(N)				
CATIONS				
NA		2940.00		
K		13.00		
CA		445.00		
MG		690.00		
FE,TOT				
FE,DISS		0.02		
MN		0.01		
CALCULATED DATA				
HARDNESS		3942		
NC HARDNESS				
SAR		20		
IONIC RATIOS(%)				
NA+K		62		
CA		11		
MG		27		
HCO3+CO3		4		
CL		8		
SO4		88		
TDS(SUM)		13193.0		
TDS(SUM)/SP COND				
TDS(CALC)		12945.0		
TDS/TDS(CALC)		1.00		
TOTAL CATIONS		207.19		
TOTAL ANIONS		191.47		
CAT-AN BALANCE		3.90		

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA6 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	14.3	14.2	14.4	4.0	0.1
WATER LEVEL ELEV	5926.1	5926.0	5926.2	4.0	0.1
SP COND - FIELD				0	
PH	8.0	8.0	8.0	1.0	
TEMP(CELSIUS)	14.4	14.4	14.4	1.0	
TDS	12936.0	12936.0	12936.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	400.00	400.00	400.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	488.00	488.00	488.00	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	550.00	550.00	550.00	1.00	
SO4	8067.00	8067.00	8067.00	1.00	
NO3(N)				0.00	
CATIONS					
NA	2940.00	2940.00	2940.00	1.00	
K	13.00	13.00	13.00	1.00	
CA	445.00	445.00	445.00	1.00	
MG	690.00	690.00	690.00	1.00	
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	1.00	
MN	0.01	0.01	0.01	1.00	
CALCULATED DATA					
HARDNESS	3942	3942	3942	1	
NC HARDNESS				0	
SAR	20	20	20	1	
IONIC RATIOS(%)					
NA+K	62	62	62	1	
CA	11	11	11	1	
MG	27	27	27	1	
HCO3+CO3	4	4	4	1	
CL	8	8	8	1	
SO4	88	88	88	1	
TDS(SUM)	13193.0	13193.0	13193.0	1.0	
TDS(SUM)/SP COND				0.00	
TDS(CALC)	12945.0	12945.0	12945.0	1.0	
TDS/TDS(CALC)	1.00	1.00	1.00	1.00	
TOTAL CATIONS	207.19	207.19	207.19	1.00	
TOTAL ANIONS	191.47	191.47	191.47	1.00	
CAT-AN BALANCE	3.90	3.90	3.90	1.00	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-1 WATER BEARING UNIT=CAL

	RAW DATA			
	27MAR89	18MAY89	12SEP89	05DEC89
WATER DEPTH	9.0	9.2	9.9	7.4
WATER LEVEL ELEV	6061.3	6061.1	6060.4	6062.9
SP COND - FIELD		7150		
PH		7.5	6.9	
TEMP(CELSIUS)		15.2	11.4	
TDS		17358.0	21194.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		308.00	800.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		375.76	976.00	
CO3		0.00	0.00	
CL		700.00	650.00	
SO4		10660	13007	
NO3(N)				
CATIONS				
NA		3773.00	4900.00	
K		48.00	54.00	
CA		360.00	449.00	
MG		652.00	1100.00	
FE,TOT				
FE,DISS		0.02	0.02	
MN		27.00	1.33	
CALCULATED DATA				
HARDNESS		3573	5633	
NC HARDNESS				
SAR		27	28	
IONIC RATIOS(%)				
NA+K		70	66	
CA		8	7	
MG		23	28	
HCO3+CO3		2	5	
CL		8	6	
SO4		90	89	
TDS(SUM)		16595.8	21137.3	
TDS(SUM)/SP COND		2.32		
TDS(CALC)		16404.8	20641.2	
TDS/TDS(CALC)		1.06	1.03	
TOTAL CATIONS		237.93	327.47	
TOTAL ANIONS		247.85	305.14	
CAT-AN BALANCE		-2.00	3.50	

EMERY MINE GROUNDWATER MONITORING REPORT
FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=SURFACE MINE(1) WELL=SML-1 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	8.9	7.4	9.9	4.0	1.1
WATER LEVEL ELEV	6061.4	6060.4	6062.9	4.0	1.1
SP COND - FIELD	7150	7150	7150	1	
PH	7.2	6.9	7.5	2.0	0.4
TEMP(CELSIUS)	13.3	11.4	15.2	2.0	2.7
TDS	19276.0	17358.0	21194.0	2.0	2712.5
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	554.00	308.00	800.00	2.00	347.90
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	675.88	375.76	976.00	2.00	424.43
CO3	0.00	0.00	0.00	2.00	0.00
CL	675.00	650.00	700.00	2.00	35.36
SO4	11833.5	10660	13007	2.00	1659.58
NO3(N)				0.00	
CATIONS					
NA	4336.50	3773.00	4900.00	2.00	796.91
K	51.00	48.00	54.00	2.00	4.24
CA	404.50	360.00	449.00	2.00	62.93
MG	876.00	652.00	1100.00	2.00	316.78
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	2.00	0.00
MN	14.16	1.33	27.00	2.00	18.15
CALCULATED DATA					
HARDNESS	4603	3573	5633	2	1457
NC HARDNESS				0	
SAR	28	27	28	2	1
IONIC RATIOS(%)					
NA+K	68	66	70	2	3
CA	7	7	8	2	1
MG	25	23	28	2	4
HCO3+CO3	4	2	5	2	2
CL	7	6	8	2	1
SO4	89	89	90	2	1
TDS(SUM)	18866.6	16595.8	21137.3	2.0	3211.4
TDS(SUM)/SP COND	2.32	2.32	2.32	1.00	
TDS(CALC)	18523.0	16404.8	20641.2	2.0	2995.6
TDS/TDS(CALC)	1.04	1.03	1.06	2.00	0.02
TOTAL CATIONS	282.70	237.93	327.47	2.00	63.31
TOTAL ANIONS	276.50	247.85	305.14	2.00	40.51
CAT-AN BALANCE	0.75	-2.00	3.50	2.00	3.89

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-2 WATER BEARING UNIT=CAL

	RAW DATA			
	27MAR89	18MAY89	12SEP89	05DEC89
WATER DEPTH	5.4	6.2	10.3	10.8
WATER LEVEL ELEV	6042.8	6042.0	6037.9	6037.4
SP COND - FIELD				
PH				
TEMP(CELSIUS)				
TDS				
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL				
NONCARBONATE				
ANIONS				
HCO3				
CO3				
CL				
SO4				
NO3(N)				
CATIONS				
NA				
K				
CA				
MG				
FE,TOT				
FE,DISS				
MN				
CALCULATED DATA				
HARDNESS				
NC HARDNESS				
SAR				
IONIC RATIOS(%)				
NA+K				
CA				
MG				
HCO3+CO3				
CL				
SO4				
TDS(SUM)				
TDS(SUM)/SP COND				
TDS(CALC)				
TDS/TDS(CALC)				
TOTAL CATIONS				
TOTAL ANIONS				
CAT-AN BALANCE				

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-2 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	8.2	5.4	10.8	4.0	2.8
WATER LEVEL ELEV	6040.0	6037.4	6042.8	4.0	2.8
SP COND - FIELD				0	
PH				0.0	
TEMP(CELSIUS)				0.0	
TDS				0.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL				0.00	
NONCARBONATE				0.00	
ANIONS					
HCO3				0.00	
CO3				0.00	
CL				0.00	
SO4				0.00	
NO3(N)				0.00	
CATIONS					
NA				0.00	
K				0.00	
CA				0.00	
MG				0.00	
FE,TOT				0.00	
FE,DISS				0.00	
MN				0.00	
CALCULATED DATA					
HARDNESS				0	
NC HARDNESS				0	
SAR				0	
IONIC RATIOS(%)					
NA+K				0	
CA				0	
MG				0	
HCO3+CO3				0	
CL				0	
SO4				0	
TDS(SUM)				0.0	
TDS(SUM)/SP COND				0.00	
TDS(CALC)				0.0	
TDS/TDS(CALC)				0.00	
TOTAL CATIONS				0.00	
TOTAL ANIONS				0.00	
CAT-AN BALANCE				0.00	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-3 WATER BEARING UNIT=CAL

	RAW DATA			
	27MAR89	18MAY89	11SEP89	06DEC89
WATER DEPTH	8.0	6.8	6.8	7.5
WATER LEVEL ELEV	6048.0	6049.2	6049.2	6048.5
SP COND - FIELD				
PH		7.3	6.9	
TEMP(CELSIUS)		13.8	13.0	
TDS		52334.0	54396.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		690.00	680.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		841.80	829.60	
CO3		0.00	0.00	
CL		1200.00	980.00	
SO4		35274	39020	
NO3(N)				
CATIONS				
NA		11650	14200	
K		69.00	100.00	
CA		414.00	505.00	
MG		2110.00	2250.00	
FE,TOT				
FE,DISS		0.02	0.02	
MN		2.75	3.41	
CALCULATED DATA				
HARDNESS		9686	10488	
NC HARDNESS				
SAR		51	60	
IONIC RATIOS(%)				
NA+K		72	75	
CA		3	3	
MG		25	22	
HCO3+CO3		2	2	
CL		4	3	
SO4		94	95	
TDS(SUM)		51561.6	57888.0	
TDS(SUM)/SP COND				
TDS(CALC)		51133.7	57466.3	
TDS/TDS(CALC)		1.02	0.95	
TOTAL CATIONS		702.87	830.67	
TOTAL ANIONS		782.06	853.64	
CAT-AN BALANCE		-5.30	-1.40	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-3 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	7.3	6.8	8.0	4.0	0.6
WATER LEVEL ELEV	6048.7	6048.0	6049.2	4.0	0.6
SP COND - FIELD				0	
PH	7.1	6.9	7.3	2.0	0.3
TEMP(CELSIUS)	13.4	13.0	13.8	2.0	0.6
TDS	53365.0	52334.0	54396.0	2.0	1458.1
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	685.00	680.00	690.00	2.00	7.07
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	835.70	829.60	841.80	2.00	8.63
CO3	0.00	0.00	0.00	2.00	0.00
CL	1090.00	980.00	1200.00	2.00	155.56
SO4	37147	35274	39020	2.00	2648.82
NO3(N)				0.00	
CATIONS					
NA	12925	11650	14200	2.00	1803.12
K	84.50	69.00	100.00	2.00	21.92
CA	459.50	414.00	505.00	2.00	64.35
MG	2180.00	2110.00	2250.00	2.00	98.99
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	2.00	0.00
MN	3.08	2.75	3.41	2.00	0.47
CALCULATED DATA					
HARDNESS	10087	9686	10488	2	567
NC HARDNESS				0	
SAR	56	51	60	2	6
IONIC RATIOS(%)					
NA+K	74	72	75	2	2
CA	3	3	3	2	0
MG	23	22	25	2	2
HCO3+CO3	2	2	2	2	0
CL	4	3	4	2	1
SO4	95	94	95	2	1
TDS(SUM)	54724.8	51561.6	57888.0	2.0	4473.5
TDS(SUM)/SP COND				0.00	
TDS(CALC)	54300.0	51133.7	57466.3	2.0	4477.9
TDS/TDS(CALC)	0.99	0.95	1.02	2.00	0.05
TOTAL CATIONS	766.77	702.87	830.67	2.00	90.37
TOTAL ANIONS	817.85	782.06	853.64	2.00	50.62
CAT-AN BALANCE	-3.35	-5.30	-1.40	2.00	2.76

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-4 WATER BEARING UNIT=CAL

	RAW DATA			
	27MAR89	26MAY89	11SEP89	06DEC89
WATER DEPTH	10.4	10.4	12.1	11.2
WATER LEVEL ELEV	5928.8	5928.8	5927.1	5928.0
SP COND - FIELD		4130	3730	
PH		7.1	7.4	
TEMP(CELSIUS)		16.8	15.0	
TDS		4276.0	3386.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		284.00	338.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		346.48	412.36	
CO3		0.00	0.00	
CL		63.00	60.00	
SO4		2638.00	2058.00	
NO3(N)				
CATIONS				
NA		748.00	408.00	
K		13.00	10.00	
CA		247.00	270.00	
MG		203.00	229.00	
FE,TOT				
FE,DISS		0.02	0.02	
MN		0.04	0.03	
CALCULATED DATA				
HARDNESS		1450	1614	
NC HARDNESS				
SAR		9	4	
IONIC RATIOS(%)				
NA+K		53	36	
CA		20	27	
MG		27	37	
HCO3+CO3		9	13	
CL		3	3	
SO4		88	84	
TDS(SUM)		4258.5	3447.4	
TDS(SUM)/SP COND		1.03	0.92	
TDS(CALC)		4082.4	3237.8	
TDS/TDS(CALC)		1.05	1.05	
TOTAL CATIONS		61.90	50.32	
TOTAL ANIONS		62.38	51.30	
CAT-AN BALANCE		-0.40	-1.00	

FOR ALL DATA FROM 890101 THROUGH 891231

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-4 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	11.0	10.4	12.1	4.0	0.8
WATER LEVEL ELEV	5928.2	5927.1	5928.8	4.0	0.8
SP COND - FIELD	3930	3730	4130	2	283
PH	7.2	7.1	7.4	2.0	0.2
TEMP(CELSIUS)	15.9	15.0	16.8	2.0	1.3
TDS	3831.0	3386.0	4276.0	2.0	629.3
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	311.00	284.00	338.00	2.00	38.18
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	379.42	346.48	412.36	2.00	46.58
CO3	0.00	0.00	0.00	2.00	0.00
CL	61.50	60.00	63.00	2.00	2.12
SO4	2348.00	2058.00	2638.00	2.00	410.12
NO3(N)				0.00	
CATIONS					
NA	578.00	408.00	748.00	2.00	240.42
K	11.50	10.00	13.00	2.00	2.12
CA	258.50	247.00	270.00	2.00	16.26
MG	216.00	203.00	229.00	2.00	18.38
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	2.00	0.00
MN	0.03	0.03	0.04	2.00	0.01
CALCULATED DATA					
HARDNESS	1532	1450	1614	2	116
NC HARDNESS				0	
SAR	6	4	9	2	3
IONIC RATIOS(%)					
NA+K	44	36	53	2	12
CA	23	20	27	2	5
MG	32	27	37	2	7
HCO3+CO3	11	9	13	2	3
CL	3	3	3	2	0
SO4	86	84	88	2	3
TDS(SUM)	3853.0	3447.4	4258.5	2.0	573.6
TDS(SUM)/SP COND	0.98	0.92	1.03	2.00	0.08
TDS(CALC)	3660.1	3237.8	4082.4	2.0	597.2
TDS/TDS(CALC)	1.05	1.05	1.05	2.00	0.00
TOTAL CATIONS	56.11	50.32	61.90	2.00	8.19
TOTAL ANIONS	56.84	51.30	62.38	2.00	7.83
CAT-AN BALANCE	-0.70	-1.00	-0.40	2.00	0.42

EMERY MINE SURFACE WATER MONITORING REPORT
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SITE=S01A

	RAW DATA			
	10MAR89	30MAY89	12SEP89	26DEC89
FLOW(CFS)	25.00	0.00	0.00	1.00
SP COND - FIELD	1870			1020
PH	8.1			8.9
TEMP(CELSIUS)	16.3			5.8
TSS	1267.0			28.0
TDS	1352.0			1154.0
SS				0.2
OIL & GREASE	1.0			1.0
ACIDITY,TOT				0.00
ALKALINITY(CACO3)				
TOTAL	254.00			400.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	309.88			488.00
CO3	0.00			0.00
CL,DISS	44.00			47.00
SO4,DISS	718.00			539.00
CATIONS				
NA,DISS	281.00			168.00
K,DISS	5.00			5.00
CA,DISS	91.00			121.00
MG,DISS	63.00			80.00
FE,DISS				0.50
MN,DISS				0.03
OTHER IONS				
CL,TOTAL				
SO4,TOTAL				
NA,TOTAL				170.00
K,TOTAL				5.00
CA,TOTAL				126.00
MG,TOTAL				88.00
FE,TOT	28.70			0.40
MN,TOTAL	0.32			0.03
CALCULATED DATA				
HARDNESS	486			631
NC. HARDNESS				
SAR	6			3
IONIC RATIOS(%)				
NA+K	56			37
CA	21			30
MG	23			33
HCO3+CO3	24			39
CL	6			6
SO4	70			55
TDS(SUM)	1550.8			1448.5
TDS(SUM)/SP COND	0.83			1.42
TDS(CALC)	1393.2			1200.5
TDS/TDS(CALC)	0.97			0.96
TOTAL CATIONS	23.11			20.07
TOTAL ANIONS	21.31	0.00	0.00	20.55
CAT-AN BALANCE	4.10			-1.20

EMERY MINE SURFACE WATER MONITORING REPORT
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SITE=S01A

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	6.50	0.00	25.00	4.00	12.34
SP COND - FIELD	1445	1020	1870	2	601
PH	8.5	8.1	8.9	2.0	0.6
TEMP(CELSIUS)	11.0	5.8	16.3	2.0	7.4
TSS	647.5	28.0	1267.0	2.0	876.1
TDS	1253.0	1154.0	1352.0	2.0	140.0
SS	0.2	0.2	0.2	1.0	
OIL & GREASE	1.0	1.0	1.0	2.0	0.0
ACIDITY,TOT	0.00	0.00	0.00	1.00	
ALKALINITY(CACO3)					
TOTAL	327.00	254.00	400.00	2.00	103.24
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	398.94	309.88	488.00	2.00	125.95
CO3	0.00	0.00	0.00	2.00	0.00
CL,DISS	45.50	44.00	47.00	2.00	2.12
SO4,DISS	628.50	539.00	718.00	2.00	126.57
CATIONS					
NA,DISS	224.50	168.00	281.00	2.00	79.90
K,DISS	5.00	5.00	5.00	2.00	0.00
CA,DISS	106.00	91.00	121.00	2.00	21.21
MG,DISS	71.50	63.00	80.00	2.00	12.02
FE,DISS	0.50	0.50	0.50	1.00	
MN,DISS	0.03	0.03	0.03	1.00	
OTHER IONS					
CL,TOTAL				0.00	
SO4,TOTAL				0.00	
NA,TOTAL	170.00	170.00	170.00	1.00	
K,TOTAL	5.00	5.00	5.00	1.00	
CA,TOTAL	126.00	126.00	126.00	1.00	
MG,TOTAL	88.00	88.00	88.00	1.00	
FE,TOT	14.55	0.40	28.70	2.00	20.01
MN,TOTAL	0.17	0.03	0.32	2.00	0.21
CALCULATED DATA					
HARDNESS	559	486	631	2	103
NC HARDNESS				0	
SAR	4	3	6	2	2
IONIC RATIOS(%)					
NA+K	47	37	56	2	13
CA	25	21	30	2	7
MG	28	23	33	2	7
HCO3+CO3	31	24	39	2	11
CL	6	6	6	2	0
SO4	62	55	70	2	11
TDS(SUM)	1499.6	1448.5	1550.8	2.0	72.3
TDS(SUM)/SP COND	1.12	0.83	1.42	2.00	0.42
TDS(CALC)	1296.9	1200.5	1393.2	2.0	136.3
TDS/TDS(CALC)	0.97	0.96	0.97	2.00	0.01
TOTAL CATIONS	21.59	20.07	23.11	2.00	2.15
TOTAL ANIONS	10.46	0.00	21.31	4.00	12.09
CAT-AN BALANCE	1.45	-1.20	4.10	2.00	3.75

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SITE=S02

	RAW DATA		
	13MAR89	30MAY89	12SEP89
FLOW(CFS)	0.56	1.00	0.15
SP COND - FIELD	1480	5790	
PH	8.2	8.1	8.0
TEMP(CELSIUS)	14.7	13.1	9.9
TSS	1015.0	62.0	882.0
TDS	1046.0	5882.0	9782.0
SS			4.2
OIL & GREASE			
ACIDITY,TOT			0.00
ALKALINITY(CACO3)			
TOTAL	223.00	316.00	438.00
NONCARBONATE	0.00	0.00	0.00
ANIONS			
HCO3	272.06	385.52	534.36
CO3	0.00	0.00	0.00
CL,DISS	28.00	101.00	210.00
SO4,DISS	554.00	3645.00	6182.00
CATIONS			
NA,DISS	201.00	842.00	1560.00
K,DISS	4.00	17.00	25.00
CA,DISS	76.00	325.00	505.00
MG,DISS	61.00	367.00	535.00
FE,DISS			
MN,DISS			0.12
OTHER IONS			
CL,TOTAL			
SO4,TOTAL			
NA,TOTAL			1988.00
K,TOTAL			25.00
CA,TOTAL			572.00
MG,TOTAL			555.00
FE,TOT	41.00	0.51	12.40
MN,TOTAL	0.75	0.40	0.33
CALCULATED DATA			
HARDNESS.	440	2317	3456
NC HARDNESS			
SAR	4	8	12
IONIC RATIOS(%)			
NA+K	50	44	50
CA	21	19	18
MG	28	36	32
HCO3+CO3	27	7	6
CL	5	3	4
SO4	69	89	90
TDS(SUM)	1248.1	5712.3	9564.1
TDS(SUM)/SP COND	0.84	0.99	
TDS(CALC)	1109.8	5516.3	9292.5
TDS/TDS(CALC)	0.94	1.07	1.05
TOTAL CATIONS	19.15	83.50	138.16
TOTAL ANIONS	16.98	86.83	143.39
CAT-AN BALANCE	6.00	-2.00	-1.90

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SITE=S02

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.57	0.15	1.00	3.00	0.43
SP COND - FIELD	3635	1480	5790	2	3048
PH	8.1	8.0	8.2	3.0	0.1
TEMP(CELSIUS)	12.6	9.9	14.7	3.0	2.4
TSS	653.0	62.0	1015.0	3.0	516.1
TDS	5570.0	1046.0	9782.0	3.0	4376.3
SS	4.2	4.2	4.2	1.0	
OIL & GREASE				0.0	
ACIDITY,TOT	0.00	0.00	0.00	1.00	
ALKALINITY(CACO3)					
TOTAL	325.67	223.00	438.00	3.00	107.83
NONCARBONATE	0.00	0.00	0.00	3.00	0.00
ANIONS					
HCO3	397.31	272.06	534.36	3.00	131.55
CO3	0.00	0.00	0.00	3.00	0.00
CL,DISS	113.00	28.00	210.00	3.00	91.59
SO4,DISS	3460.33	554.00	6182.00	3.00	2818.54
CATIONS					
NA,DISS	867.67	201.00	1560.00	3.00	679.86
K,DISS	15.33	4.00	25.00	3.00	10.60
CA,DISS	302.00	76.00	505.00	3.00	215.42
MG,DISS	321.00	61.00	535.00	3.00	240.32
FE,DISS				0.00	
MN,DISS	0.12	0.12	0.12	1.00	
OTHER IONS					
CL,TOTAL				0.00	
SO4,TOTAL				0.00	
NA,TOTAL	1988.00	1988.00	1988.00	1.00	
K,TOTAL	25.00	25.00	25.00	1.00	
CA,TOTAL	572.00	572.00	572.00	1.00	
MG,TOTAL	555.00	555.00	555.00	1.00	
FE,TOT	17.97	0.51	41.00	3.00	20.81
MN,TOTAL	0.49	0.33	0.75	3.00	0.23
CALCULATED DATA					
HARDNESS	2071	440	3456	3	1523
NC HARDNESS				0	
SAR	8	4	12	3	4
IONIC RATIOS(%)					
NA+K	48	44	50	3	3
CA	20	18	21	3	2
MG	32	28	36	3	4
HCO3+CO3	13	6	27	3	11
CL	4	3	5	3	1
SO4	83	69	90	3	12
TDS(SUM)	5508.2	1248.1	9564.1	3.0	4161.7
TDS(SUM)/SP COND	0.91	0.84	0.99	2.00	0.10
TDS(CALC)	5306.2	1109.8	9292.5	3.0	4095.4
TDS/TDS(CALC)	1.02	0.94	1.07	3.00	0.07
TOTAL CATIONS	80.27	19.15	138.16	3.00	59.57
TOTAL ANIONS	82.40	16.98	143.39	3.00	63.32
CAT-AN BALANCE	0.70	-2.00	6.00	3.00	4.59

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SITE=S03

	RAW DATA			
	13MAR89	30MAY89	13SEP89	26DEC89
FLOW(CFS)	47.90	23.30	4.20	5.00
SP COND - FIELD	1400	3560	3240	1420
PH	8.2	7.9	8.1	7.7
TEMP(CELSIUS)	12.5	15.5	10.5	2.9
TSS	2307.0	18.0	32.0	106.0
TDS	978.0	2996.0	2884.0	1744.0
SS			0.1	0.2
OIL & GREASE				2.0
ACIDITY,TOT			0.00	0.00
ALKALINITY(CACO3)				
TOTAL	248.00	284.00	354.00	432.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	302.56	346.48	431.88	527.04
CO3	0.00	0.00	0.00	0.00
CL,DISS	34.00	90.00	88.00	47.00
SO4,DISS	482.00	1809.00	1823.00	912.00
CATIONS				
NA,DISS	198.00	669.00	642.00	315.00
K,DISS	4.00	12.00	11.00	8.00
CA,DISS	79.00	105.00	141.00	133.00
MG,DISS	53.00	108.00	154.00	94.00
FE,DISS			0.12	0.05
MN,DISS			0.02	0.04
OTHER IONS				
CL,TOTAL				
SO4,TOTAL				
NA,TOTAL			788.00	406.00
K,TOTAL			11.00	8.00
CA,TOTAL			176.00	142.00
MG,TOTAL			163.00	94.00
FE,TOT	42.00	0.59	1.10	1.02
MN,TOTAL	0.68	0.04	0.03	0.04
CALCULATED DATA				
HARDNESS	415	705	984	718
NC. HARDNESS				
SAR	4	11	9	5
IONIC RATIOS(%)				
NA+K	51	68	59	49
CA	23	12	15	23
MG	26	20	26	27
HCO3+CO3	31	12	15	30
CL	6	6	5	5
SO4	63	82	80	66
TDS(SUM)	1204.6	3153.4	3291.0	2036.1
TDS(SUM)/SP COND	0.86	0.89	1.02	1.43
TDS(CALC)	1050.8	2977.3	3071.5	1768.2
TDS/TDS(CALC)	0.93	1.01	0.94	0.99
TOTAL CATIONS	18.55	43.55	47.92	28.28
TOTAL ANIONS	16.03	45.99	47.52	28.95
CAT-AN BALANCE	7.30	-2.70	0.40	-1.20

EMERY MINE SURFACE WATER MONITORING REPORT
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SITE=S03

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	20.10	4.20	47.90	4.00	20.53
SP COND - FIELD	2405	1400	3560	4	1156
PH	8.0	7.7	8.2	4.0	0.2
TEMP(CELSIUS)	10.3	2.9	15.5	4.0	5.4
TSS	615.8	18.0	2307.0	4.0	1128.2
TDS	2150.5	978.0	2996.0	4.0	964.9
SS	0.1	0.1	0.2	2.0	0.1
OIL & GREASE	2.0	2.0	2.0	1.0	
ACIDITY,TOT	0.00	0.00	0.00	2.00	0.00
ALKALINITY(CACO3)					
TOTAL	329.50	248.00	432.00	4.00	81.28
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	401.99	302.56	527.04	4.00	99.16
CO3	0.00	0.00	0.00	4.00	0.00
CL,DISS	64.75	34.00	90.00	4.00	28.51
SO4,DISS	1256.50	482.00	1823.00	4.00	669.50
CATIONS					
NA,DISS	456.00	198.00	669.00	4.00	235.52
K,DISS	8.75	4.00	12.00	4.00	3.59
CA,DISS	114.50	79.00	141.00	4.00	28.25
MG,DISS	102.25	53.00	154.00	4.00	41.65
FE,DISS	0.08	0.05	0.12	2.00	0.05
MN,DISS	0.03	0.02	0.04	2.00	0.01
OTHER IONS					
CL,TOTAL				0.00	
SO4,TOTAL				0.00	
NA,TOTAL	597.00	406.00	788.00	2.00	270.11
K,TOTAL	9.50	8.00	11.00	2.00	2.12
CA,TOTAL	159.00	142.00	176.00	2.00	24.04
MG,TOTAL	128.50	94.00	163.00	2.00	48.79
FE,TOT	11.18	0.59	42.00	4.00	20.55
MN,TOTAL	0.20	0.03	0.68	4.00	0.32
CALCULATED DATA					
HARDNESS	706	415	984	4	232
NC HARDNESS				0	
SAR	7	4	11	4	3
IONIC RATIOS(%)					
NA+K	57	49	68	4	8
CA	18	12	23	4	6
MG	25	20	27	4	3
HCO3+CO3	22	12	31	4	10
CL	5	5	6	4	1
SO4	73	63	82	4	10
TDS(SUM)	2421.3	1204.6	3291.0	4.0	986.8
TDS(SUM)/SP COND	1.05	0.86	1.43	4.00	0.27
TDS(CALC)	2216.9	1050.8	3071.5	4.0	978.0
TDS/TDS(CALC)	0.97	0.93	1.01	4.00	0.04
TOTAL CATIONS	34.57	18.55	47.92	4.00	13.60
TOTAL ANIONS	34.62	16.03	47.52	4.00	14.98
CAT-AN BALANCE	0.95	-2.70	7.30	4.00	4.42

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SITE=SO4

	RAW DATA			
	13MAR89	30MAY89	13SEP89	26DEC89
FLOW(CFS)	42.60	12.00	2.40	5.00
SP COND - FIELD	1530	3510	3530	1900
PH	8.1	7.9	7.7	7.4
TEMP(CELSIUS)	13.0	16.9	15.2	2.5
TSS	2280.0	8.0	32.0	84.0
TDS	1088.0	3028.0	2758.0	2314.0
SS			0.1	0.2
OIL & GREASE	1.0	1.0	1.0	
ACIDITY,TOT			0.00	0.00
ALKALINITY(CACO3)				
TOTAL	250.00	288.00	354.00	484.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	305.00	351.36	431.88	590.48
CO3	0.00	0.00	0.00	0.00
CL,DISS	43.00	91.00	84.00	69.00
SO4,DISS	543.00	1778.00	1665.00	1315.00
CATIONS				
NA,DISS	194.00	723.00	652.00	521.00
K,DISS	4.00	14.00	10.00	6.00
CA,DISS	90.00	110.00	136.00	133.00
MG,DISS	64.00	114.00	109.00	105.00
FE,DISS			0.12	0.09
MN,DISS			0.01	0.02
OTHER IONS				
CL,TOTAL				
SO4,TOTAL				
NA,TOTAL			779.00	617.00
K,TOTAL			10.00	6.00
CA,TOTAL			165.00	138.00
MG,TOTAL			142.00	110.00
FE,TOT	29.00	0.32	0.46	0.76
MN,TOTAL	0.50	0.03	0.02	0.02
CALCULATED DATA				
HARDNESS	487	742	787	763
NC. HARDNESS				
SAR	4	12	10	8
IONIC RATIOS(%)				
NA+K	47	68	64	60
CA	25	12	15	17
MG	29	20	20	23
HCO3+CO3	29	13	16	25
CL	7	6	5	5
SO4	65	82	79	70
TDS(SUM)	1284.5	3195.2	3088.0	2739.6
TDS(SUM)/SP COND	0.84	0.91	0.87	1.44
TDS(CALC)	1129.5	3016.6	2868.5	2439.4
TDS/TDS(CALC)	0.96	1.00	0.96	0.95
TOTAL CATIONS	19.35	46.69	44.38	38.09
TOTAL ANIONS	17.56	45.43	44.11	39.00
CAT-AN BALANCE	4.90	1.40	0.30	-1.20

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SITE=S04

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	15.50	2.40	42.60	4.00	18.52
SP COND - FIELD	2618	1530	3530	4	1053
PH	7.8	7.4	8.1	4.0	0.3
TEMP(CELSIUS)	11.9	2.5	16.9	4.0	6.5
TSS	601.0	8.0	2280.0	4.0	1119.8
TDS	2297.0	1088.0	3028.0	4.0	858.1
SS	0.1	0.1	0.2	2.0	0.1
OIL & GREASE	1.0	1.0	1.0	3.0	0.0
ACIDITY,TOT	0.00	0.00	0.00	2.00	0.00
ALKALINITY(CACO3)					
TOTAL	344.00	250.00	484.00	4.00	102.75
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	419.68	305.00	590.48	4.00	125.35
CO3	0.00	0.00	0.00	4.00	0.00
CL,DISS	71.75	43.00	91.00	4.00	21.25
SO4,DISS	1325.25	543.00	1778.00	4.00	557.50
CATIONS					
NA,DISS	522.50	194.00	723.00	4.00	234.44
K,DISS	8.50	4.00	14.00	4.00	4.43
CA,DISS	117.25	90.00	136.00	4.00	21.56
MG,DISS	98.00	64.00	114.00	4.00	22.96
FE,DISS	0.10	0.09	0.12	2.00	0.02
MN,DISS	0.01	0.01	0.02	2.00	0.01
OTHER IONS					
CL,TOTAL				0.00	
SO4,TOTAL				0.00	
NA,TOTAL	698.00	617.00	779.00	2.00	114.55
K,TOTAL	8.00	6.00	10.00	2.00	2.83
CA,TOTAL	151.50	138.00	165.00	2.00	19.09
MG,TOTAL	126.00	110.00	142.00	2.00	22.63
FE,TOT	7.63	0.32	29.00	4.00	14.24
MN,TOTAL	0.14	0.02	0.50	4.00	0.24
CALCULATED DATA					
HARDNESS	695	487	787	4	140
NC HARDNESS				0	
SAR	8	4	12	4	3
IONIC RATIOS(%)					
NA+K	60	47	68	4	9
CA	17	12	25	4	5
MG	23	20	29	4	4
HCO3+CO3	21	13	29	4	7
CL	6	5	7	4	1
SO4	74	65	82	4	8
TDS(SUM)	2576.8	1284.5	3195.2	4.0	883.2
TDS(SUM)/SP COND	1.02	0.84	1.44	4.00	0.28
TDS(CALC)	2363.5	1129.5	3016.6	4.0	858.3
TDS/TDS(CALC)	0.97	0.95	1.00	4.00	0.02
TOTAL CATIONS	37.13	19.35	46.69	4.00	12.39
TOTAL ANIONS	36.53	17.56	45.43	4.00	12.94
CAT-AN BALANCE	1.35	-1.20	4.90	4.00	2.60

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SITE=SJ5

	RAW DATA		
	13MAR89	30MAY89	13SEP89
FLOW(CFS)	0.67	0.10	0.70
SP COND - FIELD	1580	3880	3530
PH	8.2	8.3	7.9
TEMP(CELSIUS)	12.5	14.9	12.5
TSS	1967.0	4.0	2.0
TDS	1168.0	3832.0	3426.0
SS			0.1
OIL & GREASE			
ACIDITY,TOT			0.00
ALKALINITY(CACO3)			
TOTAL	248.00	252.00	318.00
NONCARBONATE	0.00	0.00	0.00
ANIONS			
HCO3	302.56	307.44	387.96
CO3	0.00	0.00	0.00
CL,DISS	29.00	66.00	61.00
SO4,DISS	609.00	2297.00	2077.00
CATIONS			
NA,DISS	202.00	490.00	495.00
K,DISS	3.00	12.00	9.00
CA,DISS	99.00	209.00	204.00
MG,DISS	80.00	253.00	288.00
FE,DISS			0.02
MN,DISS			0.04
OTHER IONS			
CL,TOTAL			
SO4,TOTAL			
NA,TOTAL			608.00
K,TOTAL			9.00
CA,TOTAL			220.00
MG,TOTAL			298.00
FE,TOT	35.00	0.10	0.04
MN,TOTAL	0.61	0.06	0.04
CALCULATED DATA			
HARDNESS	576	1560	1691
NC HARDNESS			
SAR	4	5	5
IONIC RATIOS(%)			
NA+K	43	41	39
CA	24	20	18
MG	32	39	43
HCO3+CO3	27	9	12
CL	4	3	3
SO4	69	87	84
TDS(SUM)	1371.4	3660.6	3522.0
TDS(SUM)/SP COND	0.87	0.94	1.00
TDS(CALC)	1217.6	3504.4	3324.8
TDS/TDS(CALC)	0.96	1.09	1.03
TOTAL CATIONS	21.66	52.87	55.64
TOTAL ANIONS	18.66	55.67	51.32
CAT-AN BALANCE	7.40	-2.60	4.00

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SITE=S05

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.49	0.10	0.70	3.00	0.34
SP COND - FIELD	2997	1580	3880	3	1239
PH	8.1	7.9	8.3	3.0	0.2
TEMP(CELSIUS)	13.3	12.5	14.9	3.0	1.4
TSS	657.7	2.0	1967.0	3.0	1133.9
TDS	2808.7	1168.0	3832.0	3.0	1435.3
SS	0.1	0.1	0.1	1.0	-
OIL & GREASE				0.0	
ACIDITY,TOT	0.00	0.00	0.00	1.00	
ALKALINITY(CACO3)					
TOTAL	272.67	248.00	318.00	3.00	39.31
NONCARBONATE	0.00	0.00	0.00	3.00	0.00
ANIONS					
HCO3	332.65	302.56	387.96	3.00	47.96
CO3	0.00	0.00	0.00	3.00	0.00
CL,DISS	52.00	29.00	66.00	3.00	20.07
SO4,DISS	1661.00	609.00	2297.00	3.00	917.68
CATIONS					
NA,DISS	395.67	202.00	495.00	3.00	167.74
K,DISS	8.00	3.00	12.00	3.00	4.58
CA,DISS	170.67	99.00	209.00	3.00	62.12
MG,DISS	207.00	80.00	288.00	3.00	111.37
FE,DISS	0.02	0.02	0.02	1.00	
MN,DISS	0.04	0.04	0.04	1.00	
OTHER IONS					
CL,TOTAL				0.00	
SO4,TOTAL				0.00	
NA,TOTAL	608.00	608.00	608.00	1.00	
K,TOTAL	9.00	9.00	9.00	1.00	
CA,TOTAL	220.00	220.00	220.00	1.00	
MG,TOTAL	298.00	298.00	298.00	1.00	
FE,TOT	11.71	0.04	35.00	3.00	20.17
MN,TOTAL	0.24	0.04	0.61	3.00	0.32
CALCULATED DATA					
HARDNESS	1276	576	1691	3	609
NC HARDNESS				0	
SAR	5	4	5	3	1
IONIC RATIOS(%)					
NA+K	41	39	43	3	2
CA	21	18	24	3	3
MG	38	32	43	3	5
HCO3+CO3	16	9	27	3	9
CL	4	3	4	3	1
SO4	80	69	87	3	10
TDS(SUM)	2851.3	1371.4	3660.6	3.0	1283.6
TDS(SUM)/SP COND	0.94	0.87	1.00	3.00	0.07
TDS(CALC)	2682.3	1217.6	3504.4	3.0	1271.6
TDS/TDS(CALC)	1.03	0.96	1.09	3.00	0.07
TOTAL CATIONS	43.39	21.66	55.64	3.00	18.87
TOTAL ANIONS	41.89	18.66	55.67	3.00	20.23
CAT-AN BALANCE	2.93	-2.60	7.40	3.00	5.08

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SITE=S06

RAW DATA

	18JAN89	27FEB89	10MAR89	17APR89	19MAY89	30JUN89	06JUL89	30AUG89	11SEP89	31OCT89	21NOV89	13DEC89
FLOW(CFS)	1.13	1.04	1.04	2.36	1.00	0.76	0.58	0.63	0.18	0.42	0.56	0.59
SP COND - FIELD	3370	3890	3830	3630	3640	4270	4300	4490	4400	3710	4020	4340
PH	7.5	7.7	7.6	7.6	7.9	7.8	7.7	8.2	8.6	7.8	8.1	7.9
TEMP(CELSIUS)												
TSS	14.0	4.0	8.0	2.0	2.0	2.0	6.0	6.0	10.0	2.0	2.0	12.0
TDS	3056.0	2986.0	2880.0	3004.0	2926.0	3248.0	3312.0	3298.0	3326.0	3376.0	3518.0	3408.0
SS												
OIL & GREASE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
ACIDITY,TOT												
ALKALINITY(CACO3)												
TOTAL												
NONCARBONATE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ANIONS												
HCO3												
CO3												
CL,DISS												
SO4,DISS												
CATIONS												
NA,DISS												
K,DISS												
CA,DISS												
MG,DISS												
FE,DISS												
MN,DISS												
OTHER IONS												
CL,TOTAL												
SO4,TOTAL												
NA,TOTAL												
K,TOTAL												
CA,TOTAL												
MG,TOTAL												
FE,TOT	0.57	1.18	0.73	0.36	0.25	0.41	0.33	0.31	0.43	0.65	0.78	0.14
MN,TOTAL	0.06	0.09	0.05	0.05	0.03	0.10	0.08	0.03	0.02	0.03	0.03	0.01
CALCULATED DATA												
HARDNESS												
NC HARDNESS												
SAR												
IONIC RATIOS(%)												
NA+K												
CA												
MG												
HCO3+CO3												
CL												
SO4												
TDS(SUM)	0.6	1.3	0.8	0.4	0.3	0.5	0.4	0.3	0.4	0.7	0.8	0.1
TDS(SUM)/SP COND	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TDS(CALC)												
TDS/TDS(CALC)												
TOTAL CATIONS	0.02	0.05	0.03	0.01	0.01	0.02	0.01	0.01	0.02	0.02	0.03	0.01
TOTAL ANIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CAT-AN BALANCE	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

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SITE=S06

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.86	0.18	2.36	12.00	0.55
SP COND - FIELD	3991	3370	4490	12	365
PH	7.9	7.5	8.6	12.0	0.3
TEMP(CELSIUS)				0.0	
TSS	5.8	2.0	14.0	12.0	4.3
TDS	3194.8	2880.0	3518.0	12.0	212.7
SS				0.0	
OIL & GREASE	1.0	1.0	1.0	12.0	0.0
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL				0.00	
NONCARBONATE	0.00	0.00	0.00	12.00	0.00
ANIONS					
HCO3				0.00	
CO3				0.00	
CL,DISS				0.00	
SO4,DISS				0.00	
CATIONS					
NA,DISS				0.00	
K,DISS				0.00	
CA,DISS				0.00	
MG,DISS				0.00	
FE,DISS				0.00	
MN,DISS				0.00	
OTHER IONS					
CL,TOTAL				0.00	
SO4,TOTAL				0.00	
NA,TOTAL				0.00	
K,TOTAL				0.00	
CA,TOTAL				0.00	
MG,TOTAL				0.00	
FE,TOT	0.51	0.14	1.18	12.00	0.29
MN,TOTAL	0.05	0.01	0.10	12.00	0.03
CALCULATED DATA					
HARDNESS				0	
NC HARDNESS				0	
SAR				0	
IONIC RATIOS(%)					
NA+K				0	
CA				0	
MG				0	
HCO3+CO3				0	
CL				0	
SO4				0	
TDS(SUM)	0.6	0.2	1.3	12.0	0.3
TDS(SUM)/SP COND	0.00	0.00	0.00	12.00	0.00
TDS(CALC)				0.0	
TDS/TDS(CALC)				0.00	
TOTAL CATIONS	0.02	0.01	0.05	12.00	0.01
TOTAL ANIONS	0.00	0.00	0.00	12.00	0.00
CAT-AN BALANCE	100.00	100.00	100.00	12.00	0.00

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SITE=S08

	RAW DATA		
	13MAR89	30MAY89	13SEP89
FLOW(CFS)	0.00	0.00	0.00
SP COND - FIELD			
PH			
TEMP(CELSIUS)			
TSS			
TDS			
SS			
OIL & GREASE			
ACIDITY,TOT			
ALKALINITY(CACO3)			
TOTAL			
NONCARBONATE	0.00	0.00	0.00
ANIONS			
HCO3			
CO3			
CL,DISS			
SO4,DISS			
CATIONS			
NA,DISS			
K,DISS			
CA,DISS			
MG,DISS			
FE,DISS			
MN,DISS			
OTHER IONS			
CL,TOTAL			
SO4,TOTAL			
NA,TOTAL			
K,TOTAL			
CA,TOTAL			
MG,TOTAL			
FE,TOT			
MN,TOTAL			
CALCULATED DATA			
HARDNESS			
NC HARDNESS			
SAR			
IONIC RATIOS(%)			
NA+K			
CA			
MG			
HCO3+CO3			
CL			
SO4			
TDS(SUM)			
TDS(SUM)/SP COND			
TDS(CALC)			
TDS/TDS(CALC)			
TOTAL CATIONS			
TOTAL ANIONS	0.00	0.00	0.00
CAT-AN BALANCE			

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SITE=S08

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.00	0.00	0.00	3.00	0.00
SP COND - FIELD				0	
PH				0.0	
TEMP(CELSIUS)				0.0	
TSS				0.0	
TDS				0.0	
SS				0.0	
OIL & GREASE				0.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL				0.00	
NONCARBONATE	0.00	0.00	0.00	3.00	0.00
ANIONS					
HCO3				0.00	
CO3				0.00	
CL,DISS				0.00	
SO4,DISS				0.00	
CATIONS					
NA,DISS				0.00	
K,DISS				0.00	
CA,DISS				0.00	
MG,DISS				0.00	
FE,DISS				0.00	
MN,DISS				0.00	
OTHER IONS					
CL,TOTAL				0.00	
SO4,TOTAL				0.00	
NA,TOTAL				0.00	
K,TOTAL				0.00	
CA,TOTAL				0.00	
MG,TOTAL				0.00	
FE,TOT				0.00	
MN,TOTAL				0.00	
CALCULATED DATA					
HARDNESS				0	
NC HARDNESS				0	
SAR				0	
IONIC RATIOS(%)					
NA+K				0	
CA				0	
MG				0	
HCO3+CO3				0	
CL				0	
SO4				0	
TDS(SUM)				0.0	
TDS(SUM)/SP COND				0.00	
TDS(CALC)				0.0	
TDS/TDS(CALC)				0.00	
TOTAL CATIONS				0.00	
TOTAL ANIONS	0.00	0.00	0.00	3.00	0.00
CAT-AN BALANCE				0.00	

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SITE=S09

	RAW DATA			
	10MAR89	30MAY89	13SEP89	26DEC89
FLOW(CFS)	9.00	4.20	0.60	
SP COND - FIELD	3400	4170	5690	3500
PH	8.0	8.4	7.9	8.0
TEMP(CELSIUS)	7.7	18.0	23.6	3.5
TSS	164.0	2.0	2.0	150.0
TDS	3102.0	4234.0	4302.0	4400.0
SS			0.1	0.2
OIL & GREASE				
ACIDITY,TOT			0.00	0.00
ALKALINITY(CACO3)				
TOTAL	263.00	198.00	234.00	436.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	320.86	241.56	285.48	531.92
CO3	0.00	0.00	0.00	0.00
CL,DISS	146.00	250.00	230.00	220.00
SO4,DISS	1745.00	2470.00	2758.00	2455.00
CATIONS				
NA,DISS	329.00	478.00	524.00	441.00
K,DISS	11.00	16.00	10.00	9.00
CA,DISS	235.00	257.00	255.00	306.00
MG,DISS	245.00	344.00	418.00	394.00
FE,DISS			0.03	0.42
MN,DISS			0.03	0.09
OTHER IONS				
CL,TOTAL				
SO4,TOTAL				
NA,TOTAL			658.00	459.00
K,TOTAL			10.00	10.00
CA,TOTAL			299.00	366.00
MG,TOTAL			436.00	413.00
FE,TOT	3.07	0.18	0.13	2.34
MN,TOTAL	0.09	0.03	0.03	0.09
CALCULATED DATA				
HARDNESS	1592	2053	2351	2380
NC HARDNESS				
SAR	4	5	5	4
IONIC RATIOS(%)				
NA+K	31	34	33	29
CA	25	21	18	23
MG	43	45	49	48
HCO3+CO3	12	6	7	13
CL	9	11	9	9
SO4	79	82	84	77
TDS(SUM)	3048.4	4066.8	4480.5	4357.4
TDS(SUM)/SP COND	0.90	0.98	0.79	1.24
TDS(CALC)	2885.3	3944.0	4335.4	4087.1
TDS/TDS(CALC)	1.08	1.07	0.99	1.08
TOTAL CATIONS	46.59	62.33	70.16	67.11
TOTAL ANIONS	45.74	62.47	68.59	66.04
CAT-AN BALANCE	0.90	-0.10	1.10	0.80

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SITE=S09

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	4.60	0.60	9.00	3.00	4.21
SP COND - FIELD	4190	3400	5690	4	1057
PH	8.1	7.9	8.4	4.0	0.2
TEMP(CELSIUS)	13.2	3.5	23.6	4.0	9.2
TSS	79.5	2.0	164.0	4.0	89.7
TDS	4009.5	3102.0	4400.0	4.0	608.8
SS	0.1	0.1	0.2	2.0	0.1
OIL & GREASE				0.0	
ACIDITY,TOT	0.00	0.00	0.00	2.00	0.00
ALKALINITY(CACO3)					
TOTAL	282.75	198.00	436.00	4.00	105.57
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	344.95	241.56	531.92	4.00	128.79
CO3	0.00	0.00	0.00	4.00	0.00
CL,DISS	211.50	146.00	250.00	4.00	45.41
SO4,DISS	2357.00	1745.00	2758.00	4.00	431.17
CATIONS					
NA,DISS	443.00	329.00	524.00	4.00	83.24
K,DISS	11.50	9.00	16.00	4.00	3.11
CA,DISS	263.25	235.00	306.00	4.00	30.18
MG,DISS	350.25	245.00	418.00	4.00	76.64
FE,DISS	0.22	0.03	0.42	2.00	0.28
MN,DISS	0.06	0.03	0.09	2.00	0.04
OTHER IONS					
CL,TOTAL				0.00	
SO4,TOTAL				0.00	
NA,TOTAL	558.50	459.00	658.00	2.00	140.71
K,TOTAL	10.00	10.00	10.00	2.00	0.00
CA,TOTAL	332.50	299.00	366.00	2.00	47.38
MG,TOTAL	424.50	413.00	436.00	2.00	16.26
FE,TOT	1.43	0.13	3.07	4.00	1.50
MN,TOTAL	0.06	0.03	0.09	4.00	0.03
CALCULATED DATA					
HARDNESS	2094	1592	2380	4	366
NC HARDNESS				0	
SAR	4	4	5	4	1
IONIC RATIOS(%)					
NA+K	32	29	34	4	2
CA	22	18	25	4	3
MG	47	43	49	4	3
HCO3+CO3	9	6	13	4	3
CL	10	9	11	4	1
SO4	81	77	84	4	3
TDS(SUM)	3988.3	3048.4	4480.5	4.0	650.2
TDS(SUM)/SP COND	0.98	0.79	1.24	4.00	0.20
TDS(CALC)	3813.0	2885.3	4335.4	4.0	639.2
TDS/TDS(CALC)	1.05	0.99	1.08	4.00	0.04
TOTAL CATIONS	61.55	46.59	70.16	4.00	10.48
TOTAL ANIONS	60.71	45.74	68.59	4.00	10.29
CAT-AN BALANCE	0.67	-0.10	1.10	4.00	0.53

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SITE=S10

	RAW DATA		
	10MAR89	30MAY89	13SEP89
FLOW(CFS)	1.60	0.00	0.00
SP COND - FIELD	1370		
PH	7.9		
TEMP(CELSIUS)	6.7		
TSS	26.0		
TDS	998.0		
SS			
OIL & GREASE			
ACIDITY,TOT			
ALKALINITY(CACO3)			
TOTAL	192.00		
NONCARBONATE	0.00	0.00	0.00
ANIONS			
HCO3	234.24		
CO3	0.00		
CL,DISS	70.00		
SO4,DISS	475.00		
CATIONS			
NA,DISS	78.00		
K,DISS	4.00		
CA,DISS	133.00		
MG,DISS	86.00		
FE,DISS			
MN,DISS			
OTHER IONS			
CL,TOTAL			
SO4,TOTAL			
NA,TOTAL			
K,TOTAL			
CA,TOTAL			
MG,TOTAL			
FE,TOT	0.41		
MN,TOTAL	0.03		
CALCULATED DATA			
HARDNESS	685		
NC HARDNESS			
SAR	1		
IONIC RATIOS(%)			
NA+K	20		
CA	39		
MG	41		
HCO3+CO3	24		
CL	13		
SO4	63		
TDS(SUM)	1094.3		
TDS(SUM)/SP COND	0.80		
TDS(CALC)	975.3		
TDS/TDS(CALC)	1.02		
TOTAL CATIONS	17.22		
TOTAL ANIONS	15.72	0.00	0.00
CAT-AN BALANCE	4.60		

EMERY MINE SURFACE WATER MONITORING REPORT
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SITE=S10

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.53	0.00	1.60	3.00	0.92
SP COND - FIELD	1370	1370	1370	1	
PH	7.9	7.9	7.9	1.0	
TEMP(CELSIUS)	6.7	6.7	6.7	1.0	
TSS	26.0	26.0	26.0	1.0	
TDS	998.0	998.0	998.0	1.0	
SS				0.0	
OIL & GREASE				0.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	192.00	192.00	192.00	1.00	
NONCARBONATE	0.00	0.00	0.00	3.00	0.00
ANIONS					
HCO3	234.24	234.24	234.24	1.00	
CO3	0.00	0.00	0.00	1.00	
CL,DISS	70.00	70.00	70.00	1.00	
SO4,DISS	475.00	475.00	475.00	1.00	
CATIONS					
NA,DISS	78.00	78.00	78.00	1.00	
K,DISS	4.00	4.00	4.00	1.00	
CA,DISS	133.00	133.00	133.00	1.00	
MG,DISS	86.00	86.00	86.00	1.00	
FE,DISS				0.00	
MN,DISS				0.00	
OTHER IONS					
CL,TOTAL				0.00	
SO4,TOTAL				0.00	
NA,TOTAL				0.00	
K,TOTAL				0.00	
CA,TOTAL				0.00	
MG,TOTAL				0.00	
FE,TOT	0.41	0.41	0.41	1.00	
MN,TOTAL	0.03	0.03	0.03	1.00	
CALCULATED DATA					
HARDNESS	685	685	685	1	
NC HARDNESS				0	
SAR	1	1	1	1	
IONIC RATIOS(%)					
NA+K	20	20	20	1	
CA	39	39	39	1	
MG	41	41	41	1	
HCO3+CO3	24	24	24	1	
CL	13	13	13	1	
SO4	63	63	63	1	
TDS(SUM)	1094.3	1094.3	1094.3	1.0	
TDS(SUM)/SP COND	0.80	0.80	0.80	1.00	
TDS(CALC)	975.3	975.3	975.3	1.0	
TDS/TDS(CALC)	1.02	1.02	1.02	1.00	
TOTAL CATIONS	17.22	17.22	17.22	1.00	
TOTAL ANIONS	5.24	0.00	15.72	3.00	9.08
CAT-AN BALANCE	4.60	4.60	4.60	1.00	

SITE=S12

	RAW DATA					
	28JUL89	30AUG89	11SEP89	31OCT89	21NOV89	13DEC89
FLOW(CFS)	0.35	0.24	0.38	0.50	0.24	0.35
SP COND - FIELD	2050	2330	2520	2580	2060	2260
PH	8.4	8.9	9.0	8.3	8.7	8.5
TEMP(CELSIUS)						
TSS	18.0	18.0	12.0	10.0	8.0	18.0
TDS	1364.0	1494.0	1682.0	2122.0	1468.0	1522.0
SS						
OIL & GREASE	1.0	1.0	1.0	1.0	1.0	2.0
ACIDITY,TOT						
ALKALINITY(CACO3)						
TOTAL						
NONCARBONATE	0.00	0.00	0.00	0.00	0.00	0.00
ANIONS						
HCO3						
CO3						
CL,DISS						
SO4,DISS						
CATIONS						
NA,DISS						
K,DISS						
CA,DISS						
MG,DISS						
FE,DISS						
MN,DISS						
OTHER IONS						
CL,TOTAL						
SO4,TOTAL						
NA,TOTAL						
K,TOTAL						
CA,TOTAL						
MG,TOTAL						
FE,TOT	0.19	0.32	0.21	0.15	0.28	0.25
MN,TOTAL	0.01	0.01	0.01	0.01	0.01	0.01
CALCULATED DATA						
HARDNESS						
NC HARDNESS						
SAR						
IONIC RATIOS(%)						
NA+K						
CA						
MG						
HCO3+CO3						
CL						
SO4						
TDS(SUM)	0.2	0.3	0.2	0.2	0.3	0.3
TDS(SUM)/SP COND	0.00	0.00	0.00	0.00	0.00	0.00
TDS(CALC)						
TDS/TDS(CALC)						
TOTAL CATIONS	0.01	0.01	0.01	0.01	0.01	0.01
TOTAL ANIONS	0.00	0.00	0.00	0.00	0.00	0.00
CAT-AN BALANCE	100.00	100.00	100.00	100.00	100.00	100.00

EMERY MINE SURFACE WATER MONITORING REPORT
FOR ALL DATA FROM 890101 THROUGH 891231
*****

SITE=S12

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.34	0.24	0.50	6.00	0.10
SP COND - FIELD	2300	2050	2580	6	223
PH	8.6	8.3	9.0	6.0	0.3
TEMP(CELSIUS)				0.0	
TSS	14.0	8.0	18.0	6.0	4.6
TDS	1608.7	1364.0	2122.0	6.0	271.7
SS				0.0	
OIL & GREASE	1.2	1.0	2.0	6.0	0.4
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL				0.00	
NONCARBONATE	0.00	0.00	0.00	6.00	0.00
ANIONS					
HCO3				0.00	
CO3				0.00	
CL,DISS				0.00	
SO4,DISS				0.00	
CATIONS					
NA,DISS				0.00	
K,DISS				0.00	
CA,DISS				0.00	
MG,DISS				0.00	
FE,DISS				0.00	
MN,DISS				0.00	
OTHER IONS					
CL,TOTAL				0.00	
SO4,TOTAL				0.00	
NA,TOTAL				0.00	
K,TOTAL				0.00	
CA,TOTAL				0.00	
MG,TOTAL				0.00	
FE,TOT	0.23	0.15	0.32	6.00	0.06
MN,TOTAL	0.01	0.01	0.01	6.00	0.00
CALCULATED DATA					
HARDNESS				0	
NC HARDNESS				0	
SAR				0	
IONIC RATIOS(%)					
NA+K				0	
CA				0	
MG				0	
HCO3+CO3				0	
CL				0	
SO4				0	
TDS(SUM)	0.2	0.2	0.3	6.0	0.1
TDS(SUM)/SP COND	0.00	0.00	0.00	6.00	0.00
TDS(CALC)				0.0	
TDS/TDS(CALC)				0.00	
TOTAL CATIONS	0.01	0.01	0.01	6.00	0.00
TOTAL ANIONS	0.00	0.00	0.00	6.00	0.00
CAT-AN BALANCE	100.00	100.00	100.00	6.00	0.00

WATER LEVEL DATA FOR THE EMERY MINE
FOR THE PERIOD FROM 890101 TO 891231

WELL=AA AQUIFER=BG

DATE	READING	WLELEV
30MAR89	60.0	5909.7
18MAY89	60.5	5909.2
11SEP89	59.9	5909.8
06DEC89	61.1	5908.6

WELL=AA AQUIFER=L

DATE	READING	WLELEV
30MAR89	86.0	5882.6
18MAY89	98.2	5870.4
11SEP89	86.8	5881.8
06DEC89	87.4	5881.2

WELL=AA AQUIFER=M

DATE	READING	WLELEV
30MAR89	86.0	5883.2
18MAY89	85.2	5884.0
11SEP89	84.5	5884.7
06DEC89	80.7	5888.5

WELL=AA AQUIFER=U

DATE	READING	WLELEV
30MAR89	113.1	5856.7
18MAY89	112.2	5857.6
11SEP89	111.8	5858.0
06DEC89	111.6	5858.2

WELL=BRYANT AQUIFER=U

DATE	READING	WLELEV
30MAR89	289.0	5735.5
19MAY89	298.4	5726.1
11SEP89	290.8	5733.7
06DEC89	290.6	5733.9

WATER LEVEL DATA FOR THE EMERY MINE
FOR THE PERIOD FROM 890101 TO 891231

WELL=EMRIA1 AQUIFER=UM

DATE	READING	WLELEV
27MAR89	140.8	6014.9
18MAY89	141.0	6014.7
12SEP89	141.8	6013.9
05DEC89	141.8	6013.9

WELL=EMRIA2 AQUIFER=BGUML

DATE	READING	WLELEV
27MAR89	25.8	6057.6
19MAY89	38.5	6044.9
12SEP89	40.7	6042.7
05DEC89	41.5	6041.9

WELL=EMRIA3 AQUIFER=BGU

DATE	READING	WLELEV
27MAR89	45.8	6046.0
18MAY89	68.3	6023.5
12SEP89	69.2	6022.6
05DEC89	71.3	6020.5

WELL=FC346WW AQUIFER=UM

DATE	READING	WLELEV
27MAR89	82.3	6040.9
26MAY89	84.4	6038.8
12SEP89	84.5	6038.7
05DEC89	95.1	6028.1

WELL=H AQUIFER=BG

DATE	READING	WLELEV
27MAR89	35.4	6196.2
18MAY89	35.8	6195.8
12SEP89	36.3	6195.3
06DEC89	36.5	6195.1

WELL=H AQUIFER=L

DATE	READING	WLELEV
27MAR89	48.5	6181.9
18MAY89	53.1	6177.3
12SEP89	54.4	6176.0
06DEC89	53.6	6176.8

WELL=H AQUIFER=M

DATE	READING	WLELEV
27MAR89	212.8	6017.6
18MAY89	298.0	5932.4
12SEP89	308.0	5922.4
06DEC89	331.0	5899.4

WELL=H AQUIFER=U

DATE	READING	WLELEV
27MAR89	47.0	6183.4
18MAY89	56.9	6173.5
12SEP89	57.1	6173.3
06DEC89	56.8	6173.6

WELL=I AQUIFER=BG

DATE	READING	WLELEV
27MAR89	40.5	6069.1
19MAY89	40.8	6068.8
12SEP89	42.8	6066.8
06DEC89	44.2	6065.4

WELL=I AQUIFER=L

DATE	READING	WLELEV
27MAR89	15.1	6093.6
19MAY89	14.2	6094.5
12SEP89	16.3	6092.4
06DEC89	17.0	6091.7

WELL=I AQUIFER=M

DATE	READING	WLELEV
27MAR89	224.0	5884.9
19MAY89	225.4	5883.5
12SEP89	227.3	5881.6
06DEC89	229.3	5879.6

WELL=I2 AQUIFER=U

DATE	READING	WLELEV
21APR89	395.0	5705.0
18MAY89	400.8	5699.2
11SEP89	399.8	5700.2
06DEC89	.	.

WELL=KEMMER AQUIFER=L

DATE	READING	WLELEV
27MAR89	-25.0	6311.7
18MAY89	-25.0	6311.7
11SEP89	-25.0	6311.7
05DEC89	-21.0	6307.7

WELL=LEWIS AQUIFER=U

DATE	READING	WLELEV
27MAR89	.	.
19MAY89	261.0	5759.4
11SEP89	257.7	5762.7
06DEC89	258.0	5762.4

WELL=MUDDY1 AQUIFER=U

DATE	READING	WLELEV
27MAR89	128.8	5939.4
18MAY89	128.0	5940.2
11SEP89	128.3	5939.9
06DEC89	128.2	5940.0

WELL=MUDDY2 AQUIFER=U

DATE	READING	WLELEV
27MAR89	66.3	5980.5
26MAY89	95.2	5951.6
11SEP89	96.9	5949.9
06DEC89	97.7	5949.1

WELL=RDA1 AQUIFER=QAL

DATE	READING	WLELEV
21MAR89	14.7	5943.8
19MAY89	15.0	5943.5
11SEP89	15.2	5943.3
06DEC89	14.8	5943.7

WELL=RDA2 AQUIFER=QAL

DATE	READING	WLELEV
21MAR89	14.5	5941.2
19MAY89	15.0	5940.7
11SEP89	15.0	5940.7
06DEC89	15.4	5940.3

WELL=RDA3 AQUIFER=QAL

DATE	READING	WLELEV
21MAR89	22.9	5923.6
19MAY89	23.3	5923.2
11SEP89	23.4	5923.1
06DEC89	22.3	5924.2

WELL=RDA4 AQUIFER=QAL

DATE	READING	WLELEV
21MAR89	21.9	5922.1
19MAY89	22.0	5922.0
11SEP89	22.5	5921.5
06DEC89	20.5	5923.5

WELL=RDA5 AQUIFER=QAL

DATE	READING	WLELEV
21MAR89	20.7	5921.7
19MAY89	20.4	5922.0
11SEP89	20.6	5921.8
06DEC89	20.4	5922.0

WELL=RDA6 AQUIFER=QAL

DATE	READING	WLELEV
21MAR89	16.0	5926.0
19MAY89	15.8	5926.2
11SEP89	16.0	5926.0
06DEC89	15.9	5926.1

WELL=R1 AQUIFER=L

DATE	READING	WLELEV
27MAR89	-235.3	6269.5
26MAY89	-235.3	6269.5
11SEP89	-246.9	6281.1
05DEC89	-242.2	6276.4

WELL=R2 AQUIFER=BG

DATE	READING	WLELEV
27MAR89	82.0	5949.7
26MAY89	83.0	5948.7
11SEP89	85.2	5946.5
05DEC89	86.5	5945.2

WELL=R2 AQUIFER=M

DATE	READING	WLELEV
27MAR89	.	.
26MAY89	410.1	5621.0
11SEP89	408.0	5623.1
05DEC89	.	.

WELL=R2 AQUIFER=U

DATE	READING	WLELEV
27MAR89	359.0	5672.7
26MAY89	.	.
11SEP89	483.3	5548.4
05DEC89	482.0	5549.7

WELL=SM1-1 AQUIFER=CAL

DATE	READING	WLELEV
27MAR89	10.3	6061.3
18MAY89	10.5	6061.1
12SEP89	11.2	6060.4
05DEC89	8.7	6062.9

WELL=SM1-2 AQUIFER=CAL

DATE	READING	WLELEV
27MAR89	9.0	6042.8
18MAY89	9.8	6042.0
12SEP89	13.9	6037.9
05DEC89	14.4	6037.4

WELL=SM1-3 AQUIFER=CAL

DATE	READING	WLELEV
27MAR89	8.5	6048.0
18MAY89	7.3	6049.2
11SEP89	7.3	6049.2
06DEC89	8.0	6048.5

WELL=SM1-4 AQUIFER=CAL

DATE	READING	WLELEV
27MAR89	12.8	5928.8
26MAY89	12.8	5928.8
11SEP89	14.5	5927.1
06DEC89	13.6	5928.0

WELL=TP AQUIFER=U

DATE	READING	WLELEV
27MAR89	335.0	5667.7
26MAY89	.	.
11SEP89	343.0	5659.7
05DEC89	365.0	5637.7

WELL=T1 AQUIFER=BG

DATE	READING	WLELEV
27MAR89	18.0	5985.2
26MAY89	12.8	5990.4
11SEP89	13.2	5990.0
05DEC89	13.0	5990.2

WELL=T1 AQUIFER=U

DATE	READING	WLELEV
27MAR89	.	.
26MAY89	.	.
11SEP89	337.0	5666.2
05DEC89	.	.

WELL=T2 AQUIFER=BG

DATE	READING	WLELEV
27MAR89	18.0	5985.0
26MAY89	12.8	5990.2
11SEP89	13.6	5989.4
05DEC89	12.5	5990.5

WELL=T2 AQUIFER=U

DATE	READING	WLELEV
27MAR89	352.0	5645.7
26MAY89	.	.
11SEP89	313.0	5684.7
05DEC89	307.2	5690.5

---------- WELL=USGS1-2 AQUIFER=U ----------

DATE	READING	WLELEV
27MAR89	95.1	5951.2
19MAY89	96.8	5949.5
11SEP89	98.4	5947.9
06DEC89	100.4	5945.9

---------- WELL=USGS3-1 AQUIFER=BG ----------

DATE	READING	WLELEV
27MAR89	18.1	6028.8
18MAY89	18.5	6028.4
11SEP89	19.2	6027.7
06DEC89	19.6	6027.3

---------- WELL=USGS4-1 AQUIFER=BG ----------

DATE	READING	WLELEV
27MAR89	18.1	6029.4
18MAY89	18.5	6029.0
11SEP89	18.7	6028.8
06DEC89	19.6	6027.9

---------- WELL=WW1 AQUIFER=L ----------

DATE	READING	WLELEV
21APR89	67.8	5852.2
26MAY89	68.0	5852.0
11SEP89	68.3	5851.7
06DEC89	67.7	5852.3

---------- WELL=ZZ AQUIFER=L ----------

DATE	READING	WLELEV
27MAR89	148.5	5920.2
18MAY89	148.8	5919.9
11SEP89	149.8	5918.9
06DEC89	149.6	5919.1

Subsidence Monitoring -- 1989

Mining Activities

During the 1989 calendar year, the following mining activities were conducted at the Emery Mine.

1 Right	Developed 1,900 feet
2 Right	Developed 2,900 feet
4 Federal	Retreated with rooms on right side and roomed out
5 Federal	Developed 1,500 feet with rooms on left side
1 South	Developed 2,900 feet

Subsidence Monitoring

The table on the following page summarizes the survey data obtained for stations surveyed in 1989 and includes initial baseline survey data, survey elevations from the latest 1989 survey and the most recent previous check survey. The table includes the baseline data for four new stations established in 1989.

Emery Mine Subsidence Monitoring Report -- 1989

Station	Location	Baseline				Previous Survey		1989 Survey	
		Northing	Easting	Elevation	Date	Elevation	Date	Elevation	Date
H-6	1 East	196,403.18	2,070,884.42	6,092.21	Dec-81	6,092.32	May-86		
SMK-2	1 East	197,094.12	2,069,844.82	6,099.91	Feb-81	6,099.46	May-86		
H-1	2 East	196,595.37	2,072,825.14	6,078.84	May-80	6,079.08	Oct-85		
SMK-3	2 East	197,304.72	2,071,450.90	6,083.56	Jun-81	6,078.32	Dec-88	6,078.17	Dec-89
83-1	3 East	197,431.73	2,072,907.02	6,062.29	Jun-83	6,062.03	Dec-88	6,061.78	Dec-89
E	3 East	197,803.76	2,072,023.67	6,079.67	May-81	6,079.40	Dec-88	6,078.60	Dec-89
86-6	4 East	199,025.80	2,073,046.70	6,075.64	Sep-86			6,076.29	Mar-89
86-9	4 East	198,236.28	2,074,137.07	6,069.17	Sep-86			6,069.14	Mar-89
88-7	4 East	197,096.86	2,075,534.68	6,053.99	Oct-88				
86-7	5 East	199,752.34	2,073,666.90	6,099.96	Sep-86			6,100.69	Mar-89
86-10	5 East	198,804.10	2,075,063.22	6,074.13	Sep-86				
86-8	7 North	200,823.57	2,073,450.93	6,121.41	Sep-86			6,108.49	Mar-89
86-1	1 Federal	196,195.95	2,066,451.12	5,999.53	Sep-86				
86-2	1 Federal	196,991.96	2,065,342.60	6,036.66	Sep-86				
86-4	1 Federal	199,177.18	2,062,679.70	6,074.13	Sep-86				
86-5	1 Federal	198,495.12	2,064,069.40	6,159.24	Sep-86				
87-1	2 Federal	195,498.41	2,066,141.87	5,995.61	May-87			5,986.59	Dec-89
88-6	3 Federal	195,517.06	2,065,670.10	5,970.89	Oct-88			5,971.03	Dec-89
88-4	4 Federal	196,346.15	2,064,618.22	5,985.47	Oct-88				
88-5	4 Federal	196,312.43	2,065,049.88	5,992.04	Oct-88			5,992.68	Dec-89
88-3	5 Federal	197,031.84	2,064,091.02	6,010.55	Oct-88				
86-13	6 Federal	197,515.26	2,064,041.37	6,032.25	Oct-86				
89-1	1R 1 Fed	200,820.64	2,064,974.76	6,197.18	Dec-89			New Station	
89-2	1R 1 Fed	201,172.57	2,065,398.39	6,196.83	Dec-89			New Station	
89-3	2R 1 Fed	199,428.72	2,064,637.87	6,166.98	Dec-89			New Station	
89-4	2R 1 Fed	200,808.75	2,066,115.13	6,181.46	Dec-89			New Station	
86-12	3R 1 Fed	199,324.35	2,065,857.05	6,168.57	Oct-86				
86-11	4R 1 Fed	198,669.66	2,066,811.32	6,149.97	Oct-86				
86-3	4R 1 Fed	199,162.30	2,067,668.46	6,147.18	Sep-86				
C-36	6R 1 Fed	196,855.12	2,066,750.82	6,027.17				6,027.17	Dec-89
Q	1L 6 South	191,929.15	2,066,753.80	5,931.20	Jun-81	5,929.69	Nov-88	5,929.56	Dec-89
L	2 West	193,219.03	2,065,365.10	5,946.18				5,946.19	Dec-89
N	1R 2 West	193,874.72	2,065,955.61	5,948.67	Dec-82	5,946.55	Nov-88	5,946.47	Dec-89
W	2R 2 West	194,616.64	2,065,467.15	5,957.05	Jan-81	5,955.01	Nov-88	5,955.01	Dec-89
83-3	3R 2 West	194,594.74	2,064,492.11	5,962.25	May-84	5,961.10	May-86	Removed during restoration	
83-4	3R 2 West	194,929.82	2,064,644.95	5,966.22	May-84	5,965.57	May-86	Removed during restoration	
83-5	4R 2 West	194,627.68	2,063,887.44	5,969.53	May-84	5,968.36	Jul-87	5,968.52	Dec-89
83-6	4R 2 West	194,965.20	2,064,059.57	5,971.07	May-84	5,968.20	May-86	Removed during restoration	
85-1	5R 2 West	194,958.12	2,063,444.68	5,974.25	Dec-85	5,973.19	Jul-87	5,973.25	Dec-89
85-2	5R 2 West	195,463.95	2,063,363.96	5,978.85	Dec-85	5,978.01	Jul-87	5,978.21	Dec-89

Emery Mine Revegetation Demonstration Sites
Annual Monitoring Report - 1989

Consolidation Coal Company
Emery Mine
UDOGM Permit #ACT/015/015

Prepared By:

Richard Denning
Consolidation Coal Company
March 23, 1990

Three Emery Mine revegetation demonstration sites, referred to as the Demonstration Site, the Borehole Site and the Flume Site were surveyed during September 13-14, 1989 by Richard Denning, a member of the Consolidation Coal Company environmental staff. The sites, established in 1984, were partially reconstructed in 1987. Due to the site rework which utilized new revegetation techniques, vegetation monitoring will be conducted thru 1991 to allow sufficient time to evaluate the success of these techniques.

METHODS

The 1989 survey field methods used for the seeded plots are those specified by Utah, Division of Oil, Gas and Mining (UDOGM) guidelines. Sample adequacy for the seeded plots was calculated by Bio-Resources Inc. in 1985 and similar sample sets were used for the 1989 survey. Seeded plots were sampled by counting the number of stems in a 1/2 meter^2 plot. Each 1/2m^2 plot was checked using five quadrats. The number of 1/2m^2 plots varied from 2 thru 6 due to the size of the revegetation treatment site. Vegetation density and frequency are reported on attached tables and calculated as follows:

> Density equals the total number of stems per species in a treatment plot divided by the number of 1/2m^2 plots sampled.
>
> Frequency, expressed as a percent, equals the number of Daubenmire quadrats containing the species divided by the total number of quadrats samples.

Typed versions of the field sheets for the seeded plots are provided in this report. Note that data entry code DRKR stands for "dry crispies", which matured earlier and were not identifiable at the time of monitoring although the vast majority of these dried stems appeared to be halogeton or kochia.

Field observations of reconstructed plots containing transplants and containerized seedlings (A1 and B1) and those involving new revegetation techniques (A2) are discussed later.

DISCUSSION

The following summary tables are included in this report:

TABLE 1 - Species Codes
TABLE 2 - Flume Site Densities and Frequencies
TABLE 3 - Borehole Access Site Densities and Frequencies
TABLE 4 - Main Demonstration Site Densities
TABLE 5 - Main Demonstration Site Frequencies
TABLE 6 - Mature Transplants, 1987, 1988 and 1989 Observations

DEMONSTRATION SITE - 1987 RECONSTRUCTED PLOTS

The mature transplants in Plot A1 as listed in Table 6 show a 33% survival rate after their third growing season. The plants, due primarily to a dry summer, are not as healthy this year.

The field observations for the containerized transplants in Plot B1 are summarized below. The survey shows a decrease in the overall survival rate from 66% in 1987 to 41% in 1988 to 16% in 1989. Fourwing saltbush and black greasewood exhibited the best third year survival.

PLOT B1 Containerized Transplants
1989 Survey Observations

Species	Total Plants	Count of Living Plants	Count of Dead Plants (Listed by Year When First Observed Dead)		
			1987	1988	1989
ATCA	26	9	1	6	10
ATCO	25	1	6	11	7
ATGA	21	4	1	8	8
CHNA	24	0	24	0	0
SAVE	23	5	9	4	5
TOTAL	119	19	41	29	30

Survival Rates

Survey Year	Percentage of Transplants Still Living					
	ATCA	ATCO	ATGA	CHNA	SAVE	TOTAL
1987	96%	76%	95%	0	61%	66%
1988	73%	32%	57%	0	43%	41%
1989	35%	4%	19%	0	21%	16%

Five water harvesting furrows created in 1987 on Plot A2 and seeded with fourwing saltbush, blackgreasewood, winterfat and rubber rabbitbrush show no survival of the seeded species. The trenches were silting in and several invading species had established themselves in the silt. Suaeda torreyana (SUTO) was the primary invader. Comparisons of the species count for the last three surveys is listed below.

Plot A2-Water Harvesting Trenches

Species	Stem Count 1987	Stem Count 1988	Stem Count 1989	Stems/½ m² 1987	Stems/½ m² 1988	Stems/½ m² 1989
ATCA	123	17	0	2.7	0.4	0
SAVE	36	15	0	0.8	0.3	0
AGSP	-	-	1	-	-	0.02
ATGA	-	-	1	-	-	0.02
SUTO	-	-	19	-	-	0.4

Plots B2 and C2 were rototilled and seeded with Plot B2 additionally receiving mulch and fertilizer in April 1987. Both plots were again reseeded in September 1987. The 1989 vegetation survey shows no survival of the seeded species.

DEMONSTRATION SITE - ORIGINAL 1984 PLOTS

An overview of this area shows that satisfactory vegetative cover has developed in two spots. One of these spots is in Plot C1 and the other in Plots D2 and D2A. Reclamation techniques between these plots differ significantly. Plot C1 was mulched and irrigated. Plots D2 and D2A were mulched and received shrub transplants but were not irrigated. Additionally, Plot D2A received topsoil. Plot C1 received a different seed mixture than Plots D2 and D2A. The only thing in common besides the mulch application is that these two spots of vegetation occur in shallow depressions. The depressions could function as water harvesting features without causing significant siltation.

Flume Site

Species densities and frequencies are listed for 1987, 1988 and 1989 field surveys in Table 2.

Borehole Site

Observations of twenty mat saltbush (ATCO2) specimens transplanted in April 1987 showed that all have died.

Species densities and frequencies are listed for 1987, 1988 and 1989 field surveys in Table 3.

EMERY REVEGETATION DEMONSTRATION SITE

REVISED PLOT LAYOUT (1987)

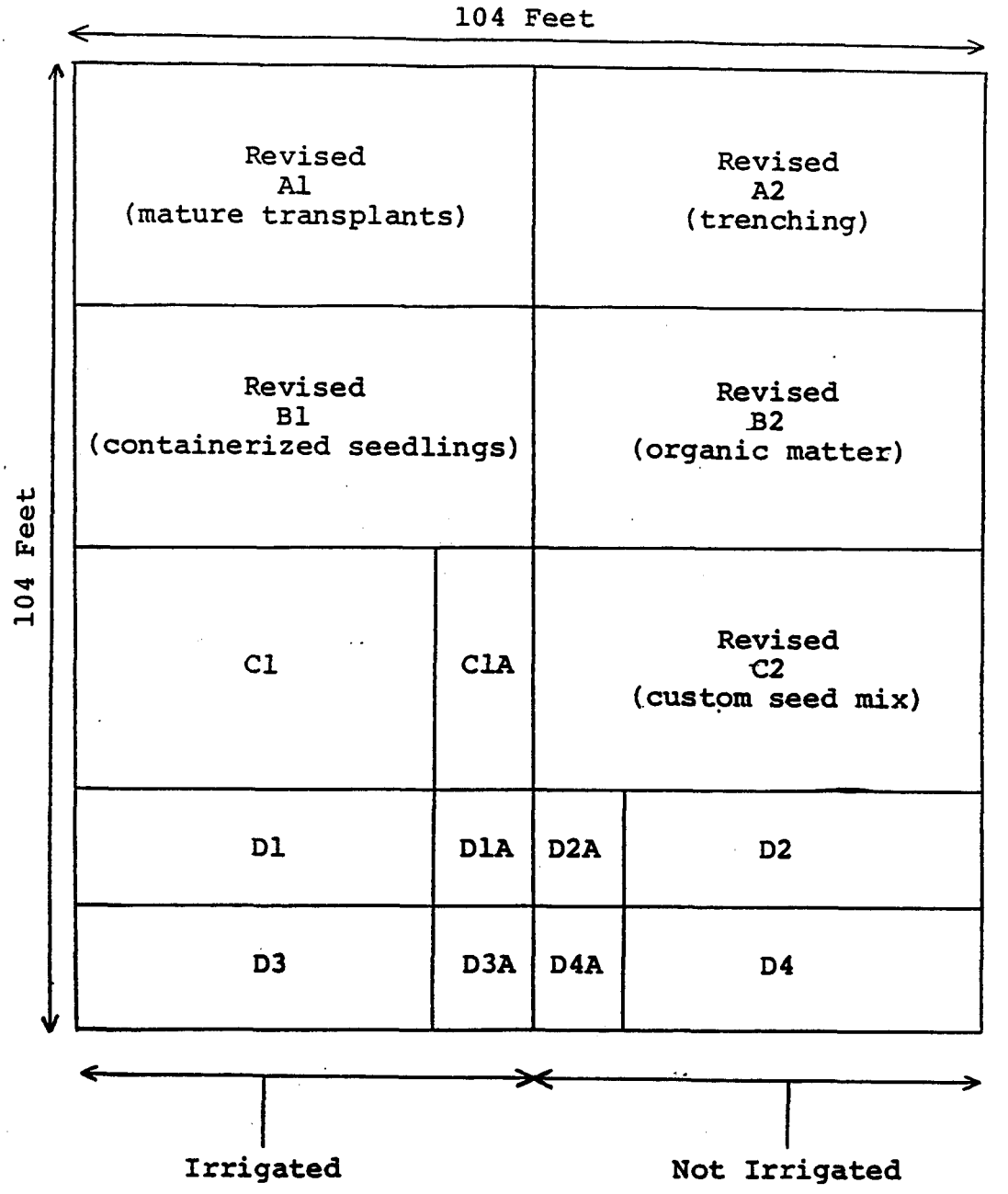

TABLE 1. EMERY REVEGETATION DEMONSTRATION SITE: SPECIES CODES

Species Codes	Species	Common Name
GRASSES		
AGCR	Agropyron cristatum	crested wheatgrass
AGSM	Agropyron smithii	western wheatgrass
AGTR	Agropyron trachycaulum	slender wheatgrass
AGSP	Agropyron ssp.	wheatgrass
ARPU	Aristida purpurea	poverty grass
BOGR	Bouteloua gracilis	blue grama
BRTE	Bromus tectorum	cheatgrass brome
HIJA	Hilaria jamesii	galleta
HOVU	Hordeum vulgare	
MUPU	Muhlenbergia pungens	muhly
ORHY	Oryzopsis hymenoides	indian ricegrass
SPAI	Sporobolus airoides	alkali sacaton
SPCON	Sporobolus contracta	spike dropseed
SPCR	Sporobolus cryptandrus	sand dropseed
SPGI	Sporobolus gigantus	giant dropseed
SPSP	Sporobolus ssp.	dropseed
TRAE	Triticum aestivum	wheat
SHRUBS		
ARCAC	Artamesia cana cana	silver sagebrush
ARNO	Artamesia nova	black sagebrush
ATAN	Atriplex (annual)	
ATCA	Atriplex canescens	fourwing saltbush
ATCO	Atriplex confertifolia	shadscale saltbush
ATCU	Atriplex cuneata	castle valley clover
ATCO2	Atriplex corrugata	mat saltbush
ATGA	Atriplex gardneri	gardner saltbush
ATPA	Atriplex patula	orache
ATSP	Atriplex spp.	saltbush
CELA	Ceratoides lanata	winterfat
CHLI	Chrysothamnus linifolius	
CHNA	Chrysothamnus nauseosus	rubber rabbitbrush
EPVI	Ephedra viridus	green mormon tea
GUSA	Gutierrezia sarothrae	broom snakeweed
SAVE	Sarcobatus vermiculatus	black greasewood
TARA	Tamarix ramosissima	tamarisk
FORBS		
AMAC	Ambrosia acanthicarpa	ragweed
ASSP	Astragalus spp.	milkvetch
CRSP	Crypthantha spp.	cryptantha
DESP	Descurainia spp.	tansy mustard
EUSP	Euphorbia spp.	spurge
HAGL	Halogeton glomeratus	common halogeton
KOSC	Kochia scoparia	fireweed summercypress
LEER	Leucelene ericoides	
MEOF	Melilotus officinalis	yellow sweetclover
SAIB	Salsola iberica	
SAKA	Salsola kali	russian thistle
SPPA	Sphaeralcea parvifolia	
STEX	Stephanomenia exigua	
SUTO	Suaeda torreyana	
TRDU	Tragopogon dubius	yellow salsify
UNKNOWN		
DRKR	"Dry Crispies"	

EMERY MINE
TABLE 2

Flume Site Densities and Frequencies

Species	*Average Stems/1/2 m²			Frequency (%)		
	1987	1988	1989	1987	1988	1989
Grasses						
AGSM	1.0	--	--	17	--	--
AGTR	--	--	0.8	--	--	3
AGSP	--	--	0.7	--	--	3
SPSP	--	1.3	0.2	--	30	3
Shrubs						
ATCA	0.3	--	0.7	7	--	13
CHLI	0.2	--	--	3	--	--
CHNR	0.2	--	--	3	--	--
CHNA	--	0.5	0.2	--	10	3
SAVE	0.2	--	--	3	--	--
GUSA	--	0.5	--	--	3	--
Forbs						
SAKA	1.0	16.5	0.2	13	67	3
DRKR**	46.0	--	0.3	97	--	3
KOSC	--	20.0	6.0	--	80	40
DESP	--	0.2	--	--	3	--
HAGL	--	--	0.2	--	--	3

* Six 1/2 m² sample plots
** DRKR = dry crispies (considered KOSC by observer)

EMERY MINE
TABLE 3

Borehole Access Site
Densities and Frequencies

Species	*Average Stems/1/2 m²			Frequency (%)		
	1987	1988	1989	1987	1988	1989
Grasses						
AGSM	4.4	7.7	--	14	14	--
Shrubs						
ATAN	0.7	4.1	--	11	29	--
ATCA	0.2	--	--	3	--	--
ATCO	--	0.4	--	--	6	--
ATCO2	--	--	0.7	--	--	13
ATSP	--	3.7	--	--	49	--
CHNA	--	--	0.3	--	--	7
Forbs						
HAGL	53.0	51.3	5.8	57	91	17
SAKA	0.3	--	--	6	--	--
Unknown	0.7	--	--	6	--	--
DRKR**	41.0	25.4	2.5	57	54	23
SUTO	--	0.1	2.2	--	3	20

* Six 1/2 m² sample plots

** DRKR = dry crispies (considered HAGL by observer)

Consolidation Coal Company
Emery Mine
1989 Vegetation Survey
TABLE 4
Demonstration Site Densities
Average Stems/1/2 m²

	Irrigated								Reconstructed in 1987 Not Irrigated				
	No Topsoil			Topsoil					No Topsoil				
Plot #	C1	D1	D3*	C1A	D1A	D3A*	D2A	D4A*	A2	B2*	C2	D2	D4*
**N =	5	5	3	2	2	2	2	2	5	5	5	5	5
SPECIES													
Grasses													
AGSP	1.6			1.5								0.6	1.4
SPCR	3.4												
SPSP	3.4												
Shrubs													
ATCA					1.0	0.5		0.5				1.4	0.2
CELA	0.2												
SAVE						0.5							
Forbs													
DESP	0.4				6.5		2.0						
HAGL				1.5		1.5	0.5	3.5			5.0	0.4	5.6
KOSC	2.4		2.7		11.5	2.5	47.0				0.6	19.2	
SUTO			0.7							0.6	0.2		
DRKR***	3.6	10.6	0.7	14.0		7.5		9.0	20.8	27.6		5.2	6.4

* These plots not mulched
** N=number of 1/2m² sample plots
*** DRKR=dry crispies (considered halogeton or kochia by observer)

Consolidation Coal Company
Emery Mine
1989 Vegetation Survey
TABLE 5
Demonstration Site Densities
& Occurrence in Observed Subplots

	Irrigated								Not Irrigated				
	No Topsoil			Topsoil					Reconstructed in 1987 No Topsoil				
Plot #	C1	D1	D3*	C1A	D1A	D3A*	D2A	D4A*	A2	B2*	C2	D2	D4*
**N =	5	5	3	2	2	2	2	2	5	5	5	5	5
SPECIES													
Grasses													
AGSP	16			10								4	8
SPCR	32												
SPSP	28												
Shrubs													
ATCA					20	10		10				12	4
CELA	4												
SAVE						10							
Forbs													
DESP	4				30		30						
HAGL				10		30	10	10			20	8	24
KOSC	16		20		40	10	90				8	40	
SUTO			13							12	4		
DRKR***	32	44	7	80		60		40	68	52		16	36

* These plots not mulched
** N=number of 1/2m² sample plots (there are 5 subplots per N)
*** DRKR= dry crispies (considered halogeton or kochia by observer)

Emery Mine Revegetation Site
TABLE 6
Revised Plot A1
Mature Transplant Plot

	1987 Field Observations			1988 Field Observations			1989 Field Observations		
Species	Condition	Crown Width	Notes	Condition	Crown Width	Notes	Condition	Crown Width	Notes
1) ARNO - Black sagebrush	alive	20",9" alive	11 seed shoots approx. 4"	alive	10"	barely alive	dead	---	---
2) CHNA - Rubber rabbitbrush	dead	28"	2 small SAVE under canopy	dead	---	---	dead	---	---
3) ATCA - Fourwing saltbush	dead	47"	2 small ATCA under canopy	dead	---	---	dead	---	1 12" c.w. ATCA under canopy
4) ATCO - Shadscale	dead	12"	2 small ATCA under canopy	dead	---	---	dead	---	---
5) CHNA - Rubber rabbitbrush	dead	13"	---	dead	---	---	dead	---	---
6) SAVE - Black greasewood	healthy	28"	---	alive	30"	---	alive	34"	---
7) SAVE - Black greasewood	healthy	52"	---	alive	24"	---	alive	30"	barely alive
8) ATCO - Shadscale	alive	24"	20% of stem alive	alive	12"	barely alive	alive	15"	barely alive 1 18" c.w. ATGA under canopy
9) SAVE - Black greasewood	healthy	27"	---	alive	20"	---	alive	27"	1 small ATCA under canopy
10) ATCO - Shadscale	healthy	18"	---	alive	10"	barely alive	dead	---	---
11) ARCAC - Silver Sagebrush	alive	24"	---	alive	20"	---	dead	---	---
12) ATCA - Fourwing saltbush	dead	24"	---	---	---	no observation	-	---	no observation
13) ATCO - Shadscale	dead	11"	---	---	---	no observation	-	---	no observation
14) SAVE - Black greaswood	dead	24"	---	dead	---	---	dead	---	---
15) ATCA - Fourwing saltbush	----	--	no observation	alive	8"	---	alive	8"	---

Sheet No. EMERY MINE	Date: 9-14-89	Name: R. DENNING

Location: FLUMESITE (combined mulched & unmulched)

Notes: All willow & poplar transplants are dead

Sample No. 1	Density				
Species	1	2	3	4	5
CHNA	1				
AGTR	5				
SPSP	1				
ATCA		1		1	
AGSP				1	
BAREGROUND			X		
% COVER	100	2		5	2

Sample No. 4	Density				
Species	1	2	3	4	5
KOSC	1				
ATCA	1				
HAGL		1			
BAREGROUND			X	X	X
% COVER	20				

Sample No. 2	Density				
Species	1	2	3	4	5
KOSC		3	5	1	
BAREGROUND	X				X
% COVER		2	15	5	

Sample No. 5	Density				
Species	1	2	3	4	5
KOSC			3	3	1
DRKR	2				
BAREGROUND		X			
% COVER			5	10	2

Sample No. 3	Density				
Species	1	2	3	4	5
ATCA				1	
SAKA			1		
BAREGROUND	X	X			X
% COVER			40	20	

Sample No. 6	Density				
Species	1	2	3	4	5
AGSP				1	2
KOSC	3	5	7	2	2
% COVER	<1	<1	<1	2	5
ADDITIONAL SPECIES LIST					
ATAN ATCU CLLU HAGL SAVE SASP TARA					

Sheet No. EMERY MINE	Date: 9-14-89	Name: R. DENNING

Location: BOREHOLE SITE (combined mulched & unmulched)

Notes: 6 sites @30 paces alg transect line;mat saltbush transp-20dead,0alive

Sample No. 1	Density				
Species	1	2	3	4	5
DRKR *	3			1	7
BAREGROUND		X	X		
*DRKR - appear to be dead HAGL					

Sample No. 4	Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 2	Density				
Species	1	2	3	4	5
HAGL	19	3	7	4	2
CHNA		1			1
DRKR			2	2	
SUTO				1	
% COVER	<1	40	5	10	40

Sample No. 5	Density				
Species	1	2	3	4	5
SUTO	1	1			
BAREGROUND			X	X	X
% COVER	10	10			

Sample No. 3	Density				
Species	1	2	3	4	5
ATCO2	1	1	1	1	
BAREGROUND					X
% COVER	70	100	100	40	

Sample No. 6	Density				
Species	1	2	3	4	5
SUTO	6	3	1		
DRKR				2	1
% COVER	15	25	5		
ADDITIONAL SPECIES LIST					
ATAN ATCA ATCU AGSP SAKA SAVE SPSP					

Sheet No. EMERY MINE	Date: 9-13-89	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT A2	Notes: Recnsrt in 1987 combining old plots A2 & A2A;area is beside trenches

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
DRKR	2	6	5		6
BAREGROUND				X	

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
DRKR		1	20	11	12
BAREGROUND	X				

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
DRKR	4	7	2	4	3

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
DRKR	2	1	2		16
BAREGROUND				X	

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
ATCA					
DESP					
KOSC					
SAVE					
SPCR					
SUTO					

Sheet No. EMERY MINE	Date: 9-13-89	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT B2	Notes: Recnsrt in 1987 combining old plots B2 & B2A

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
SUTO	1				
DRKR	1			5	
BAREGROUND		X	X		X
% COVER	5				

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
DRKR	2	5			
BAREGROUND			X	X	X

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
SUTO	1				
DRKR	2		8	10	12
BAREGROUND		X			
% COVER	10				

Sample No. 5	CENTER 6X6 from SE Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X
% COVER					

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
SUTO				1	
DRKR	8	26	10	25	24
% COVER				4	

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
SAVE					

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Location: DEMONSTRATION SITE PLOT C1	Notes: Depression contains good grass growth.

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
SPCR		1	2	1	
SPSP	1	1		1	
DRKR	1				4
% COVER	10	20	5	5	

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
KOSC					2
DRKR	5	1		2	2
BAREGROUND			X		

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
AGSP	1		4	2	1
CELA			1		
DESP	2				
DRKR	2				1
BAREGROUND		X			
% COVER	4		8	5	2

Sample No. 5	CENTER 6X6 from NE Density				
Species	1	2	3	4	5
KOSC	1		8		1
SPSP		2	2	2	8
% COVER	<1	15	5	10	60

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
SPCR	1	3	5	2	2
% COVER	30	25	100	20	20

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
ATCA					
HAGL					
OPPO					
SAVE					
SUTO					

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Location: DEMONSTRATION SITE PLOT C2	Notes: Recnsrt in 1987 combining old plots C2 & C2A

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
HAGL	8	5	6	1	5
KOSC	1				2
% COVER	5	1	1	<1	1

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
SUTO	1				
BAREGROUND		X	X	X	X
% COVER	20				

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
AGSP					
ATCA					
DESP					
SPCR					

Sheet No. EMERY MINE	Date: 9-13-89	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT C1A	Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
DRKR		1	5	7	3						
BAREGROUND	X										

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
GSP					3						
HAGL				3							
DRKR	6	1	3	2							
% COVER				<1	2						

ADDITIONAL SPECIES LIST	Density					Sample No.	Density				
	1	2	3	4	5	Species	1	2	3	4	5
CELA											
HAGL											
KOSC											
SPCR											

Sheet No. EMERY MINE	Date: 9-13-89	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT D1

Notes:

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
DRKR		3	1		1
BAREGROUND	X			X	

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
DRKR			5	10	10
BAREGROUND	X	X			

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 5	CENTER 6X6 from SW Density				
Species	1	2	3	4	5
DRKR	7	3	4	5	4

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
SAVE					
SPCR					
SUTO					

Sheet No. EMERY MINE	Date: 9-13-89	Name: R. DENNING
Location: DEMONSTRATION SITE PLOT D2		Notes: Depression contains good growth

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
ATCA				1	
HAGL			1		
KOSC	20	13	10	7	5
DRKR		5			
% COVER				50	

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
ATCA			2	4	
AGSP				3	
HAGL					1
KOSC	1	19	7	4	10
DRKR	4	5		12	
% COVER	1	2	40	2	5

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
ATGA					
DESP					
SPCR					

Sheet No. EMERY MINE	Date: 9-13-89	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT D3	Notes:

Sample No. 1	South Density					ADDITIONAL SPECIES LIST	Density				
Species	1	2	3	4	5		1	2	3	4	5
KOSC				2	1	ATCA					
BAREGROUND	X	X	X			HAGL					
						SPCR					

Sample No. 2	North Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X						

Sample No. 3	East Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
KOSC		5									
SUTO			1	1							
DRKR			2								
BAREGROUND	X				X						
% COVER		<1	5	5							

Sheet No. EMERY MINE	Date: 9-13-89	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT D4

Notes:

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
DRKR			2	1	1
BAREGROUND	X	X			

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
AGSP			6	1	
HAGL	4	6	5	5	7
DRKR	1				17

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
HAGL					1
DRKR		1		7	
BAREGROUND	X		X		

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
ATCA					1
DRKR		1			1
BAREGROUND	X		X	X	

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
KOSC					
SAVE					

Sheet No. EMERY MINE	Date: 9-13-89	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT D1A

Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
ATCA			1	1							
KOSC	11	6		2	4						
DESP	1			5	7						
% COVER	3	<1	5	<1	<1						

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X						

ADDITIONAL SPECIES LIST	Density					Sample No.	Density				
	1	2	3	4	5	Species	1	2	3	4	5
ATGA											
SAVE											
SPCR											

Sheet No. EMERY MINE	Date: 9-13-89	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT D2A	Notes: Depression contains good growth

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
HAGL					1						
KOSC	16	11	32	13	6						
DESP			2								
% COVER	10	1	5	1	5						

Sample No. 2	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
ATCA	1				1						
DESP	1	1									
KOSC		3	10	2	1						
SAVE					1						
DRKR				12							
% COVER	40	1	1	1	15						

Sample No.	Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5

Sheet No. EMERY MINE	Date: 9-13-89	Name: R. DENNING

Location: DEMONSTATION SITE PLOT D3A

Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
HAGL		1		1							
KOSC					5						
SAVE					1						
DRKR		1		2							
BAREGROUND	X		X								
% COVER		<1		<1	90						

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
TCA	1										
HAGL				1							
DRKR		3	5	1	3						
% COVER	15			<1							

ADDITIONAL SPECIES LIST	Density					Sample No.	Density				
	1	2	3	4	5	Species	1	2	3	4	5
AGSP											
ATGA											
CELA											
DESP											
UTO											

Sheet No. EMERY MINE	Date: 9-13-89	Name: R. DENNING

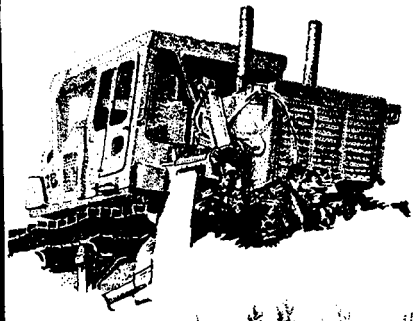
Location: DEMONSTRATION SITE PLOT D4A

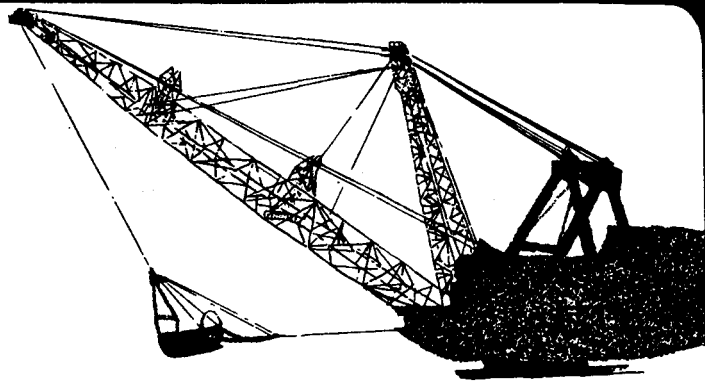
Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
ATCA			1								
HAGL					7						
DRKR	1	3	9	2							

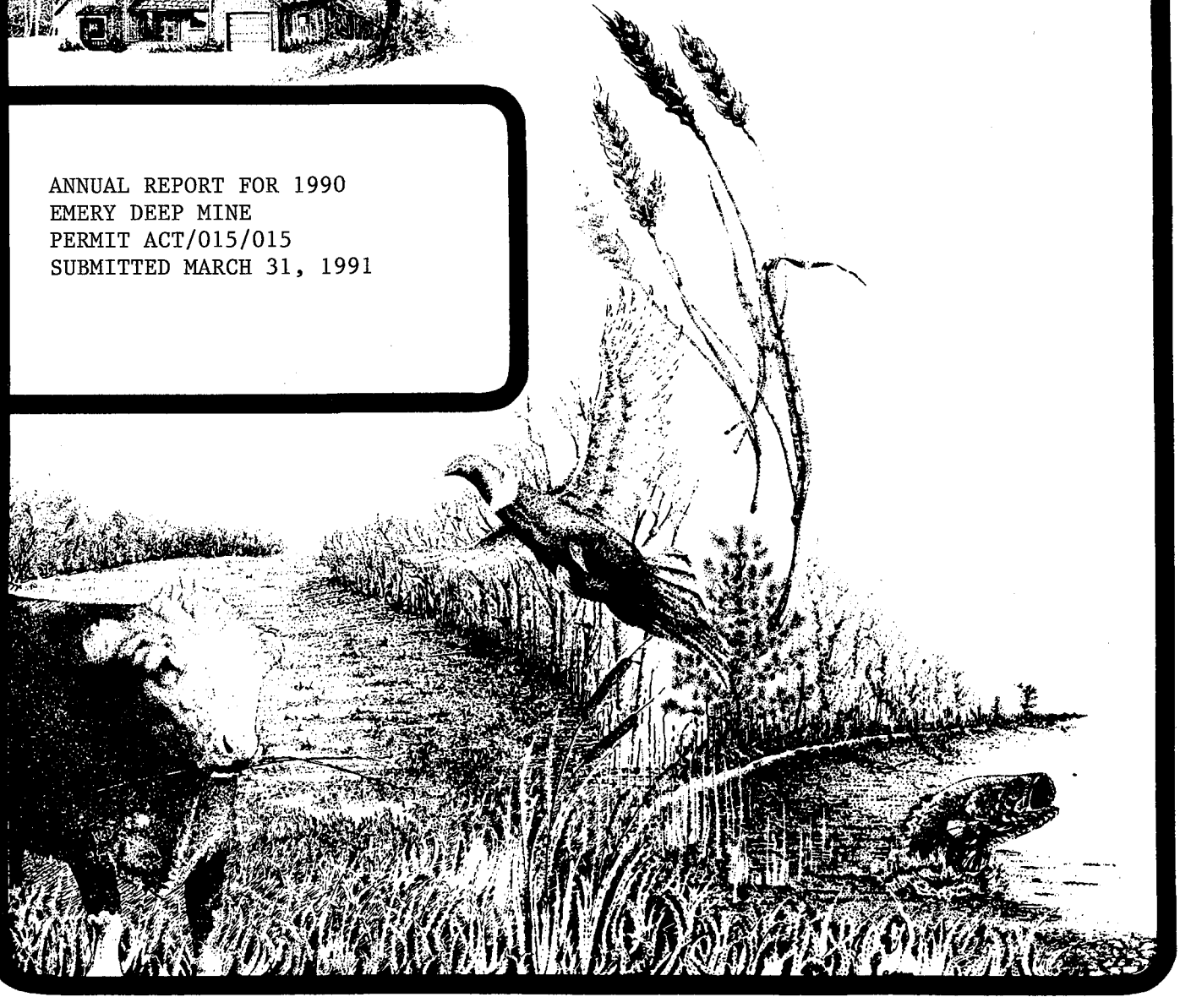
Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
DRKR			1		2						
BAREGROUND	X	X		X							

ADDITIONAL SPECIES LIST	Density					Sample No.	Density				
	1	2	3	4	5	Species	1	2	3	4	5
SAVE											





ANNUAL REPORT FOR 1990
EMERY DEEP MINE
PERMIT ACT/015/015
SUBMITTED MARCH 31, 1991



COAL MINING AND RECLAMATION OPERATIONS FOR 1990

(Must be submitted to the Division by March 31, 1991)

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
3 Triad Centter, Suite 350
355 West North Temple
Salt Lake City, Utah 84180-1203

(801) 538-5340

Permittee: Consolidation Coal Company

Mine Name: Emery Deep Mine

Mailing Address: 12755 Olive Blvd., St. Louis, MO 63141

Company Representative: Kevin L. Cheeks

Resident Agent: Dee Bray

Permit Number: ACT/015/015

Date of Initial Permanent Program Permit January 10, 1986

Date of Permit Renewal: January 8, 1991

Quantity of Coal Mined (tonnage) 1990: 335,586

Attach Updated Mine Sequence Map.

All monitoring activities during the report period must be submitted with this report (including, but not limited to):

A. Summarized Water Monitoring Data

B. Precipitation or Other Climatological Data

C. Subsidence Monitoring Report

D. Vegetation Data (test plots) or Revegetation Success Monitoring (includes interim and final)

E. Annual Impoundment Inspection

F. Permit Stipulation Status, if applicable. Status of Division Orders, if applicable.

jbe
A:/Annual

CONSOLIDATION COAL COMPANY

EMERY MINE

EMERY, UTAH

ANNUAL IMPOUNDMENT CERTIFICATION

POND # 1 PERMIT NO. ACT / 015/015
INSPECTED BY Bruce T S. Ware DATE 12-20-90

I. PHYSICAL INSPECTION (Stability & Structural Condition)

		Yes	No
A.	Upstream Cracking or Movement		X
B.	Downstream Cracking or Movement		X
C.	Erosion		X
D.	Proper Operation of Discharge System(s)	X	
E.	Significant Seepage or Piping		X
F.	Existing and Required Monitoring	N.A.	
G.	Any Fires		X

II. FIELD DATA

A.	Maximum Measured Depth	6.7	Ft.
B.	Estimated Average Depth	5.4	Ft.
C.	Surface Area	113,160 Sq.	Ft.
D.	Estimated Pond Volume (487,022 Cu. Ft.	) 11.18	Ac-Ft.
E.	Normal Pool Elevation	5937.7	Ft.
F.	Top of Dam Elevation	5944.0	Ft.

This is a annual report for 1990.
(indicate time period)

Bruce T.S. Ware
Name

4502
Utah Registration No. (Seal)

Bruce,T.S. Ware
Firm

637-2620
Phone Number

Helper, Ut 84526
Address

Bruce T S Ware
Signature

3-21-91
Date

REGISTERED LAND SURVEYOR No. 4502 BRUCE T. S. WARE STATE OF UTAH

CONSOLIDATION COAL COMPANY

EMERY MINE

EMERY, UTAH

ANNUAL IMPOUNDMENT CERTIFICATION

POND # 2
INSPECTED BY Bruce T.S. Ware

PERMIT NO. ACT / 015/015
DATE 12-20-90

I. PHYSICAL INSPECTION (Stability & Structural Condition)

		Yes	No
A.	Upstream Cracking or Movement		X
B.	Downstream Cracking or Movement		X
C.	Erosion		X
D.	Proper Operation of Discharge System(s)	Dry	
E.	Significant Seepage or Piping		X
F.	Existing and Required Monitoring	N.A.	
G.	Any Fires		X

II. FIELD DATA

A.	Maximum Measured Depth	10.0	Ft.
B.	Estimated Average Depth	9.5	Ft.
C.	Surface Area	6933 Sq.	Ft.
D.	Estimated Pond Volume (41,024 Cu. Ft.)	0.94	Ac-Ft.
E.	Normal Pool Elevation	Dry	Ft.
F.	Top of Dam Elevation	5912	Ft.

This is a annual report for 1990.
(indicate time period)

Bruce T.S. Ware
Name

4502
Utah Registration No. (Seal)

REGISTERED LAND SURVEYOR No. 4502 BRUCE T. S. WARE STATE OF UTAH

Bruce T.S. Ware
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Helper, Ut 84526
Address

Bruce T.S. Ware
Signature

3-21-91
Date

CONSOLIDATION COAL COMPANY

EMERY MINE

EMERY, UTAH

ANNUAL IMPOUNDMENT CERTIFICATION

POND # 3
INSPECTED BY Bruce T.S. Ware

PERMIT NO. ACT / 015/015
DATE 12-20-90

I. PHYSICAL INSPECTION (Stability & Structural Condition)

		Yes	No
A.	Upstream Cracking or Movement		X
B.	Downstream Cracking or Movement		X
C.	Erosion		X
D.	Proper Operation of Discharge System(s)	Dry	
E.	Significant Seepage or Piping		X
F.	Existing and Required Monitoring	N.A.	
G.	Any Fires		X

II. FIELD DATA

A.	Maximum Measured Depth	* 5.6	Ft.
B.	Estimated Average Depth	5.0	Ft.
C.	Surface Area	10,300 Sq.	Ft.
D.	Estimated Pond Volume (63,103 Cu. Ft.	) 0.79	Ac-Ft.
E.	Normal Pool Elevation	Dry	Ft.
F.	Top of Dam Elevation	5911	Ft.

* To Dewatering Pipe

This is a annual report for 1990.
(indicate time period)

Bruce T.S. Ware
Name

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Utah Registration No. (Seal)

Bruce T.S. Ware
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Phone Number

Helper, Ut 84526
Address

Bruce T.S. Ware
Signature

3-21-91
Date

REGISTERED LAND SURVEYOR No. 4502 BRUCE T. S. WARE STATE OF UTAH

CONSOLIDATION COAL COMPANY

EMERY MINE

EMERY, UTAH

ANNUAL IMPOUNDMENT CERTIFICATION

POND # 4 PERMIT NO. ACT / 015/015
INSPECTED BY Bruce T.S. Ware DATE 12-20-90

I. PHYSICAL INSPECTION (Stability & Structural Condition)

		Yes	No
A.	Upstream Cracking or Movement		X
B.	Downstream Cracking or Movement		X
C.	Erosion		X
D.	Proper Operation of Discharge System(s)	Dry	
E.	Significant Seepage or Piping		X
F.	Existing and Required Monitoring	N.A.	
G.	Any Fires		X

II. FIELD DATA

A.	Maximum Measured Depth	3.8	Ft.
B.	Estimated Average Depth	3.8	Ft.
C.	Surface Area	50,150 Sq.	Ft.
D.	Estimated Pond Volume (167,331 Cu. Ft.	) 3.84	Ac-Ft.
E.	Normal Pool Elevation	* Dry	Ft.
F.	Top of Dam Elevation	5955	Ft.

* This is a evaporation pond

This is a annual report for 1990.
(indicate time period)

Bruce T.S. Ware
Name

4502
Utah Registration No. (Seal)

REGISTERED LAND SURVEYOR No. 4502 BRUCE T. S. WARE STATE OF UTAH

Bruce T.S. Ware
Firm

637-2620
Phone Number

Helper, Ut 84526
Address

Bruce T.S. Ware
Signature

3-21-91
Date

CONSOLIDATION COAL COMPANY

EMERY MINE

EMERY, UTAH

ANNUAL IMPOUNDMENT CERTIFICATION

POND # 5
INSPECTED BY Bruce T.S. Ware

PERMIT NO. ACT / 015/015
DATE 12-20-90

I. PHYSICAL INSPECTION (Stability & Structural Condition)

		Yes	No
A.	Upstream Cracking or Movement		X
B.	Downstream Cracking or Movement		X
C.	Erosion		X
D.	Proper Operation of Discharge System(s)	Dry	
E.	Significant Seepage or Piping		X
F.	Existing and Required Monitoring	N.A.	
G.	Any Fires		X

II. FIELD DATA

A.	Maximum Measured Depth	6.3	Ft.
B.	Estimated Average Depth	6.1	Ft.
C.	Surface Area	44,600 Sq.	Ft.
D.	Estimated Pond Volume (174,510 Cu. Ft.)	4.01	Ac-Ft.
E.	Normal Pool Elevation	Dry	Ft.
F.	Top of Dam Elevation	5949	Ft.

This is a annual report for 1990.
(indicate time period)

Bruce T.S. Ware
Name

4502
Utah Registration No. (Seal)

Bruce T.S. Ware
Firm

637-2620
Phone Number

Helper, Ut 84526
Address

Bruce T.S. Ware
Signature

3-21-91
Date

REGISTERED LAND SURVEYOR No. 4502 BRUCE T. S. WARE STATE OF UTAH

CONSOLIDATION COAL COMPANY

EMERY MINE

EMERY, UTAH

ANNUAL IMPOUNDMENT CERTIFICATION

POND # 6 PERMIT NO. ACT / 015/015
INSPECTED BY Bruce T.S. Ware DATE 12-20-90

I. PHYSICAL INSPECTION (Stability & Structural Condition)

		Yes	No
A.	Upstream Cracking or Movement		X
B.	Downstream Cracking or Movement		X
C.	Erosion		X
D.	Proper Operation of Discharge System(s)	X	
E.	Significant Seepage or Piping		X *
F.	Existing and Required Monitoring	N.A.	
G.	Any Fires		X

* Small seepage on South side of pond

II. FIELD DATA

A.	Maximum Measured Depth	7.9	Ft.
B.	Estimated Average Depth	7.4	Ft.
C.	Surface Area	66,375 Sq.	Ft.
D.	Estimated Pond Volume (387,800 Cu. Ft.)	8.90	Ac-Ft.
E.	Normal Pool Elevation	6019.8	Ft.
F.	Top of Dam Elevation	6023.0	Ft.

This is a annual report for 1990.
(indicate time period)

Bruce T.S. Ware
Name

4502
Utah Registration No. (Seal)

Bruce T.S. Ware
Firm

637-2620
Phone Number

Helper, Ut 84526
Address

Bruce T.S. Ware
Signature

3-21-91
Date

REGISTERED LAND SURVEYOR
RG. 4502
BRUCE T. S. WARE
STATE OF UTAH

1990 N.P.D.E.S. REPORT SUMMARY

Permit No. UT0022616 - Emery Deep Mine

Outfall 001 - Sedimentation Pond for Deep Mine Pumps #1 and #2

The attached sheets summarize the effluent quality by month and quarter for 1990.

Outfall 002 - Mine Yard Area

No discharges occurred during 1990.

Outfall 003 - Sedimentation Pond for Deep Mine Pump #3

The attached sheets summarize the effluent quality by month and quarter for 1990.

Outfall 004 - Alternate discharge point for Deep Mine Pump #3 did not discharge in 1990.

Permit No. UT0024040 - Emery Mine Preparation Plant

Outfalls 001 and 002

No discharges occurred during 1990.

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE FIRST QUARTER 1990
REPORT PREPARED ON 03/13/91 AT 14:11:02

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001		FIRST QUARTER 1990				
FLOW INSPECTIONS	0.55	0.55	0.56	CFS	N/A	7
PH	7.6		8.4	STD UNITS		7
TOT SUSP SOLIDS	1	6.1	12	MG/L		7
OIL & GREASE	1.0	2.0	5.0	MG/L		4
TOTAL IRON	0.20	0.48	0.66	MG/L		7
FLOW	0.355	0.357	0.362	MGD	N/A	7
TOT DISS SOLIDS	3306	3477	3566	MG/L		7
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		5.2				
POINT 001		JANUARY 1990				
FLOW INSPECTIONS	0.55	0.55	0.55	CFS	N/A	3
PH	7.6		7.9	STD UNITS		3
TOT SUSP SOLIDS	3	7.0	12	MG/L		3
OIL & GREASE	1.0	3.0	5.0	MG/L		2
TOTAL IRON	0.50	0.59	0.66	MG/L		3
FLOW	0.355	0.355	0.355	MGD	N/A	3
TOT DISS SOLIDS	3306	3425	3492	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		5.1				
POINT 001		FEBRUARY 1990				
FLOW INSPECTIONS	0.56	0.56	0.56	CFS	N/A	2
PH	8.0		8.4	STD UNITS		2
TOT SUSP SOLIDS	1	4.5	8	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.37	0.55	MG/L		2
FLOW	0.362	0.362	0.362	MGD	N/A	2
TOT DISS SOLIDS	3506	3516	3526	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		5.3				
POINT 001		MARCH 1990				
FLOW INSPECTIONS	0.55	0.55	0.55	CFS	N/A	2
PH	8.1		8.1	STD UNITS		2
TOT SUSP SOLIDS	1	6.5	12	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.28	0.42	0.57	MG/L		2
FLOW	0.355	0.355	0.355	MGD	N/A	2
TOT DISS SOLIDS	3462	3514	3566	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		5.2				

POINT 003 DISCHARGES AT THE EMERY DEEP MINE FOR THE FIRST QUARTER 1990
REPORT PREPARED ON 03/13/91 AT 14:11:02

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 003		FIRST QUARTER 1990				
FLOW INSPECTIONS	0.37	0.38	0.39	CFS	N/A	7
PH	8.6		8.7	STD UNITS		7
TOT SUSP SOLIDS	12	21.3	37	MG/L		7
OIL & GREASE	1.0	2.0	5.0	MG/L		4
TOTAL IRON	0.27	0.38	0.53	MG/L		7
FLOW	0.239	0.245	0.252	MGD	N/A	7
TOT DISS SOLIDS	1364	1406	1448	MG/L		7
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		1.4				
POINT 003		JANUARY 1990				
FLOW INSPECTIONS	0.37	0.37	0.37	CFS	N/A	3
PH	8.6		8.7	STD UNITS		3
TOT SUSP SOLIDS	12	19.3	24	MG/L		3
OIL & GREASE	1.0	3.0	5.0	MG/L		2
TOTAL IRON	0.30	0.39	0.53	MG/L		3
FLOW	0.239	0.239	0.239	MGD	N/A	3
TOT DISS SOLIDS	1414	1427	1446	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		1.4				
POINT 003		FEBRUARY 1990				
FLOW INSPECTIONS	0.38	0.38	0.38	CFS	N/A	2
PH	8.7		8.7	STD UNITS		2
TOT SUSP SOLIDS	18	27.5	37	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.27	0.36	0.45	MG/L		2
FLOW	0.246	0.246	0.246	MGD	N/A	2
TOT DISS SOLIDS	1364	1375	1386	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		1.4	AVE DAILY TSS EXCEEDED			
POINT 003		MARCH 1990				
FLOW INSPECTIONS	0.39	0.39	0.39	CFS	N/A	2
PH	8.6		8.7	STD UNITS		2
TOT SUSP SOLIDS	16	18.0	20	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.30	0.39	0.48	MG/L		2
FLOW	0.252	0.252	0.252	MGD	N/A	2
TOT DISS SOLIDS	1364	1406	1448	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		1.5				

FOR THE FIRST QUARTER 1990

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
900102	1050	0.55	0.355	7.8	0.50	12.0		3306								LAB-CONSOL INST Q=0.76 CFS
900110	1040	0.55	0.355	7.6	0.66	6.0	1.0	3492								LAB-ACZ
900123	1615	0.55	0.355	7.9	0.61	3.0	5.0	3478								LAB-UTAH DEH INST Q=0.19 CFS
900207	1215	0.56	0.362	8.0	0.20	1.0		3506								LAB-CONSOL INST Q=0.49 CFS
900222	950	0.56	0.362	8.4	0.55	8.0	1.0	3526								LAB-ACZ
900305		0.55	0.355	8.1	0.28	1.0		3462								LAB-CONSOL
900312	1217	0.55	0.355	8.1	0.57	12.0	1.0	3566								LAB-ACZ

POINT=003

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
900102	1030	0.37	0.239	8.6	0.30	22.0		1414								LAB-CONSOL INST Q=0.67 CFS
900110	1000	0.37	0.239	8.6	0.53	12.0	1.0	1446								LAB-ACZ
900123	1990	0.37	0.239	8.7	0.35	24.0	5.0	1420								LAB-UTAH DEH INST Q=0.25 CFS
900207	1155	0.38	0.246	8.7	0.27	37.0		1364								LAB-CONSOL INST Q=0.90 CFS
900222	915	0.38	0.246	8.7	0.45	18.0	1.0	1386								LAB-ACZ
900305		0.39	0.252	8.6	0.30	16.0		1364								LAB-CONSOL
900313	1040	0.39	0.252	8.7	0.48	20.0	1.0	1448								LAB-ACZ

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE SECOND QUARTER 1990
REPORT PREPARED ON 03/13/91 AT 14:23:09

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001		SECOND QUARTER 1990				
FLOW INSPECTIONS	0.00	0.44	0.78	CFS	N/A	29
PH	8.1		8.3	STD UNITS		7
TOT SUSP SOLIDS	2	4.6	11	MG/L		7
OIL & GREASE	1.0	1.0	1.0	MG/L		4
TOTAL IRON	0.20	0.34	0.60	MG/L		7
FLOW	0.019	0.362	0.504	MGD	N/A	23
TOT DISS SOLIDS	3510	3701	3892	MG/L		7
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		4.6				
POINT 001		APRIL 1990				
FLOW INSPECTIONS	0.00	0.49	0.78	CFS	N/A	22
PH	8.1		8.2	STD UNITS		2
TOT SUSP SOLIDS	2	3.0	4	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.23	0.27	0.31	MG/L		2
FLOW	0.136	0.409	0.504	MGD	N/A	17
TOT DISS SOLIDS	3510	3557	3604	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		5.4				
POINT 001		MAY 1990				
FLOW INSPECTIONS	0.00	0.29	0.48	CFS	N/A	5
PH	8.1		8.2	STD UNITS		3
TOT SUSP SOLIDS	2	2.3	3	MG/L		3
OIL & GREASE	1.0	1.0	1.0	MG/L		2
TOTAL IRON	0.20	0.41	0.60	MG/L		3
FLOW	0.019	0.238	0.310	MGD	N/A	4
TOT DISS SOLIDS	3722	3789	3892	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		4.9				
POINT 001		JUNE 1990				
FLOW INSPECTIONS	0.33	0.33	0.33	CFS	N/A	2
PH	8.1		8.3	STD UNITS		2
TOT SUSP SOLIDS	8	9.5	11	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.22	0.31	0.41	MG/L		2
FLOW	0.213	0.213	0.213	MGD	N/A	2
TOT DISS SOLIDS	3602	3711	3820	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		3.3				

POINT 003 DISCHARGES AT THE EMERY DEEP MINE FOR THE SECOND QUARTER 1990
REPORT PREPARED ON 03/13/91 AT 14:23:09

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 003		SECOND QUARTER 1990				
FLOW INSPECTIONS	0.37	0.50	0.72	CFS	N/A	8
PH	8.3		8.7	STD UNITS		8
TOT SUSP SOLIDS	2	6.9	10	MG/L		8
OIL & GREASE	1.0	2.0	5.0	MG/L		5
TOTAL IRON	0.05	0.13	0.25	MG/L		8
FLOW	0.239	0.325	0.465	MGD	N/A	8
TOT DISS SOLIDS	1316	1574	2308	MG/L		8
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		2.2				
POINT 003		APRIL 1990				
FLOW INSPECTIONS	0.37	0.37	0.37	CFS	N/A	3
PH	8.6		8.6	STD UNITS		3
TOT SUSP SOLIDS	2	4.7	7	MG/L		3
OIL & GREASE	1.0	3.0	5.0	MG/L		2
TOTAL IRON	0.06	0.09	0.11	MG/L		3
FLOW	0.239	0.239	0.239	MGD	N/A	3
TOT DISS SOLIDS	1316	1360	1388	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		1.4				
POINT 003		MAY 1990				
FLOW INSPECTIONS	0.49	0.49	0.49	CFS	N/A	3
PH	8.3		8.7	STD UNITS		3
TOT SUSP SOLIDS	5	7.7	10	MG/L		3
OIL & GREASE	1.0	1.5	2.0	MG/L		2
TOTAL IRON	0.12	0.20	0.25	MG/L		3
FLOW	0.317	0.317	0.317	MGD	N/A	3
TOT DISS SOLIDS	1344	1491	1742	MG/L		3
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		2.0				
POINT 003		JUNE 1990				
FLOW INSPECTIONS	0.72	0.72	0.72	CFS	N/A	2
PH	8.4		8.4	STD UNITS		2
TOT SUSP SOLIDS	8	9.0	10	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.05	0.09	0.13	MG/L		2
FLOW	0.465	0.465	0.465	MGD	N/A	2
TOT DISS SOLIDS	1732	2020	2308	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		3.9				

FOR THE SECOND QUARTER 1990

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
900406		0.49	0.317	8.1	0.23	4.0		3510								LAB-CONSOL
900410		0.21	0.136													
900411		0.73	0.472													
900412		0.68	0.439													
900413		0.00														
900414		0.64	0.414													
900415		0.74	0.478													
900416		0.67	0.433													
900417		0.00														
900418		0.63	0.407	8.2	0.31	2.0	1.0	3604								LAB-ACZ INST Q=1.78 CFS
900419		0.27	0.175													
900420		0.72	0.465													
900421		0.74	0.478													
900422		0.74	0.478													
900423		0.74	0.478													
900424		0.78	0.504													
900425		0.77	0.498													
900426		0.46	0.297													
900427		0.75	0.485													
900428		0.00														
900429		0.00														
900430		0.00														
900501		0.00														
900502		0.48	0.310	8.1	0.20	3.0		3754								LAB-CONSOL INST Q=0.25 CFS
900503		0.03	0.019													
900514	900	0.48	0.310	8.2	0.60	2.0	1.0	3892								LAB-ACZ INST Q=1.59 CFS
900521	1200	0.48	0.310	8.1	0.43	2.0	1.0	3722								LAB-ACZ
900601		0.33	0.213	8.1	0.22	11.0		3602								LAB-CONSOL INST Q=0.62 CFS
900614	935	0.33	0.213	8.3	0.41	8.0	1.0	3820								LAB-ACZ

POINT=003

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
900406		0.37	0.239	8.6	0.06	7.0		1376								LAB-CONSOL
900417	1500	0.37	0.239	8.6	0.10	5.0	5.0	1388								LAB-UTAH DEH INST Q=02.80CFS
900418	730	0.37	0.239	8.6	0.11	2.0	1.0	1316								LAB-ACZ INST Q=1.23 CFS
900502		0.49	0.317	8.7	0.12	5.0		1344								LAB-CONSOL INST Q=1.06 CFS
900514	925	0.49	0.317	8.7	0.25	8.0	2.0	1386								LAB-ACZ INST Q=0.62 CFS
900521	1230	0.49	0.317	8.3	0.24	10.0	1.0	1742								LAB-ACZ
900601		0.72	0.465	8.4	0.05	8.0		1732								LAB-CONSOL INST Q=1.06 CFS
900614	840	0.72	0.465	8.4	0.13	10.0	1.0	2308								LAB-ACZ INST Q=1.70 CFS

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE THIRD QUARTER 1990
REPORT PREPARED ON 03/13/91 AT 14:24:03

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001		THIRD QUARTER 1990				
FLOW INSPECTIONS	0.30	0.30	0.31	CFS	N/A	6
PH	8.0		8.1	STD UNITS		6
TOT SUSP SOLIDS	5	13.5	28	MG/L		6
OIL & GREASE	1.0	1.3	2.0	MG/L		3
TOTAL IRON	0.20	0.30	0.52	MG/L		6
FLOW	0.194	0.196	0.200	MGD	N/A	6
TOT DISS SOLIDS	3896	3948	4022	MG/L		6
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		3.2				
POINT 001		JULY 1990				
FLOW INSPECTIONS	0.30	0.30	0.30	CFS	N/A	2
PH	8.0		8.1	STD UNITS		2
TOT SUSP SOLIDS	5	16.5	28	MG/L		2
OIL & GREASE	2.0	2.0	2.0	MG/L		1
TOTAL IRON	0.28	0.40	0.52	MG/L		2
FLOW	0.194	0.194	0.194	MGD	N/A	2
TOT DISS SOLIDS	3914	3931	3948	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		3.2				
POINT 001		AUGUST 1990				
FLOW INSPECTIONS	0.30	0.30	0.30	CFS	N/A	2
PH	8.0		8.1	STD UNITS		2
TOT SUSP SOLIDS	7	9.5	12	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.25	0.27	0.29	MG/L		2
FLOW	0.194	0.194	0.194	MGD	N/A	2
TOT DISS SOLIDS	3988	4005	4022	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		3.2				
POINT 001		SEPTEMBER 1990				
FLOW INSPECTIONS	0.31	0.31	0.31	CFS	N/A	2
PH	8.0		8.0	STD UNITS		2
TOT SUSP SOLIDS	6	14.5	23	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.22	0.24	MG/L		2
FLOW	0.200	0.200	0.200	MGD	N/A	2
TOT DISS SOLIDS	3896	3908	3920	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		3.3				

POINT 003 DISCHARGES AT THE EMERY DEEP MINE FOR THE THIRD QUARTER 1990
REPORT PREPARED ON 03/13/91 AT 14:24:03

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 003		THIRD QUARTER 1990				
FLOW INSPECTIONS	0.70	0.70	0.71	CFS	N/A	6
PH	8.2		8.4	STD UNITS		6
TOT SUSP SOLIDS	4	7.5	14	MG/L		6
OIL & GREASE	1.0	2.7	6.0	MG/L		3
TOTAL IRON	0.05	0.11	0.20	MG/L		6
FLOW	0.452	0.455	0.459	MGD	N/A	6
TOT DISS SOLIDS	2218	2257	2306	MG/L		6
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		4.3				
POINT 003		JULY 1990				
FLOW INSPECTIONS	0.71	0.71	0.71	CFS	N/A	2
PH	8.2		8.4	STD UNITS		2
TOT SUSP SOLIDS	5	9.5	14	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.07	0.13	0.20	MG/L		2
FLOW	0.459	0.459	0.459	MGD	N/A	2
TOT DISS SOLIDS	2218	2241	2264	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		4.3				
POINT 003		AUGUST 1990				
FLOW INSPECTIONS	0.70	0.70	0.70	CFS	N/A	2
PH	8.2		8.2	STD UNITS		2
TOT SUSP SOLIDS	4	5.0	6	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.05	0.12	0.20	MG/L		2
FLOW	0.452	0.452	0.452	MGD	N/A	2
TOT DISS SOLIDS	2268	2287	2306	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		4.3				
POINT 003		SEPTEMBER 1990				
FLOW INSPECTIONS	0.70	0.70	0.70	CFS	N/A	2
PH	8.3		8.4	STD UNITS		2
TOT SUSP SOLIDS	4	8.0	12	MG/L		2
OIL & GREASE	6.0	6.0	6.0	MG/L		1
TOTAL IRON	0.05	0.06	0.07	MG/L		2
FLOW	0.452	0.452	0.452	MGD	N/A	2
TOT DISS SOLIDS	2222	2242	2262	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		4.2				

FOR THE THIRD QUARTER 1990

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
900712		0.30	0.194	8.0	0.28	5.0		3948								LAB-CONSOL
900720	745	0.30	0.194	8.1	0.52	28.0	2.0	3914								LAB-ACZ INST Q=1.78 CFS
900801		0.30	0.194	8.0	0.29	7.0		4022								LAB-CONSOL
900813	830	0.30	0.194	8.1	0.25	12.0	1.0	3988								LAB-ACZ
900904		0.31	0.200	8.0	0.20	23.0		3896								LAB-CONSOL
900920	815	0.31	0.200	8.0	0.24	6.0	1.0	3920								LAB-ACZ

POINT=003

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
900712		0.71	0.459	8.2	0.20	5.0		2218								LAB-CONSOL
900720	815	0.71	0.459	8.4	0.07	14.0	1.0	2264								LAB-ACZ INST Q=1.59 CFS
900801		0.70	0.452	8.2	0.20	6.0		2306								LAB-CONSOL
900813	915	0.70	0.452	8.2	0.05	4.0	1.0	2268								LAB-ACZ INST
900904		0.70	0.452	8.4	0.05	12.0		2262								LAB-CONSOL
900920	835	0.70	0.452	8.3	0.07	4.0	6.0	2222								LAB-ACZ INST

POINT 001 DISCHARGES AT THE EMERY DEEP MINE FOR THE FOURTH QUARTER 1990
REPORT PREPARED ON 03/13/91 AT 14:24:34

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 001	FOURTH QUARTER 1990					
FLOW INSPECTIONS	0.02	0.49	1.46	CFS	N/A	35
PH	7.7		8.3	STD UNITS		6
TOT SUSP SOLIDS	2	4.8	10	MG/L		6
OIL & GREASE	1.0	1.0	1.0	MG/L		3
TOTAL IRON	0.20	0.47	0.91	MG/L		6
FLOW	0.013	0.318	0.944	MGD	N/A	35
TOT DISS SOLIDS	3802	3911	4044	MG/L		6
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 5.4						
POINT 001	OCTOBER 1990					
FLOW INSPECTIONS	0.02	0.43	1.46	CFS	N/A	16
PH	8.0		8.0	STD UNITS		2
TOT SUSP SOLIDS	2	6.0	10	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.55	0.91	MG/L		2
FLOW	0.013	0.276	0.944	MGD	N/A	16
TOT DISS SOLIDS	3854	3921	3988	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 5.8						
POINT 001	NOVEMBER 1990					
FLOW INSPECTIONS	0.22	0.57	0.78	CFS	N/A	17
PH	7.7		8.1	STD UNITS		2
TOT SUSP SOLIDS	4	5.0	6	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.41	0.62	MG/L		2
FLOW	0.142	0.369	0.504	MGD	N/A	17
TOT DISS SOLIDS	3926	3985	4044	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 6.9						
POINT 001	DECEMBER 1990					
FLOW INSPECTIONS	0.34	0.34	0.34	CFS	N/A	2
PH	8.0		8.3	STD UNITS		2
TOT SUSP SOLIDS	2	3.5	5	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.20	0.45	0.71	MG/L		2
FLOW	0.220	0.220	0.220	MGD	N/A	2
TOT DISS SOLIDS	3802	3826	3850	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD - 3.5						

POINT 003 DISCHARGES AT THE EMERY DEEP MINE FOR THE FOURTH QUARTER 1990
REPORT PREPARED ON 03/13/91 AT 14:24:34

PARAMETER	MINIMUM	ARITHMETIC AVERAGE	MAXIMUM	UNITS	NUMBER EXCEED	NR. MSMTS
POINT 003		FOURTH QUARTER 1990				
FLOW INSPECTIONS	0.46	0.66	1.06	CFS	N/A	19
PH	8.0		8.6	STD UNITS		6
TOT SUSP SOLIDS	2	5.7	14	MG/L		6
OIL & GREASE	1.0	1.3	2.0	MG/L		3
TOTAL IRON	0.05	0.15	0.33	MG/L		6
FLOW	0.297	0.425	0.685	MGD	N/A	19
TOT DISS SOLIDS	1854	2204	2372	MG/L		6
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		3.7				
POINT 003		OCTOBER 1990				
FLOW INSPECTIONS	0.46	0.67	1.06	CFS	N/A	15
PH	8.1		8.1	STD UNITS		2
TOT SUSP SOLIDS	7	10.5	14	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.08	0.20	0.33	MG/L		2
FLOW	0.297	0.433	0.685	MGD	N/A	15
TOT DISS SOLIDS	2306	2328	2350	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		4.2				
POINT 003		NOVEMBER 1990				
FLOW INSPECTIONS	0.58	0.58	0.58	CFS	N/A	2
PH	8.0		8.3	STD UNITS		2
TOT SUSP SOLIDS	4	4.0	4	MG/L		2
OIL & GREASE	2.0	2.0	2.0	MG/L		1
TOTAL IRON	0.12	0.16	0.20	MG/L		2
FLOW	0.375	0.375	0.375	MGD	N/A	2
TOT DISS SOLIDS	1854	1989	2124	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		3.1				
POINT 003		DECEMBER 1990				
FLOW INSPECTIONS	0.63	0.63	0.63	CFS	N/A	2
PH	8.1		8.6	STD UNITS		2
TOT SUSP SOLIDS	2	2.5	3	MG/L		2
OIL & GREASE	1.0	1.0	1.0	MG/L		1
TOTAL IRON	0.05	0.07	0.10	MG/L		2
FLOW	0.407	0.407	0.407	MGD	N/A	2
TOT DISS SOLIDS	2218	2295	2372	MG/L		2
SETTLABLE SOLIDS				ML/L		0
NOTE: AVE DAILY TDS LOAD -		3.9				

FOR THE FOURTH QUARTER 1990

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=001

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
901001		0.43	0.278	8.0	0.20	10.0		3854								LAB-CONSOL INST Q=0.76 CFS
901017		0.67	0.433	8.0	0.91	2.0	1.0	3988								LAB-ACZ INST Q=1.48 CFS
901018		0.83	0.536													
901019		1.46	0.944													
901020		0.76	0.491													
901021		0.09	0.058													
901022		0.05	0.032													
901023		0.04	0.026													
901024		0.03	0.019													
901025		0.02	0.013													
901026		0.41	0.265													
901027		0.10	0.065													
901028		0.63	0.407													
901029		0.10	0.065													
901030		0.45	0.291													
901031		0.77	0.498													
901101		0.57	0.368	8.1	0.20	6.0		3926								LAB-CONSOL INST Q=1.78 CFS
901102		0.68	0.439													
901103		0.64	0.414													
901104		0.62	0.401													
901105		0.65	0.420													
901106		0.71	0.459	7.7	0.62	4.0	1.0	4044								LAB-ACZ INST Q=1.86 CFS
901107		0.75	0.485													
901108		0.22	0.142													
901109		0.31	0.200													
901110		0.78	0.504													
901111		0.67	0.433													
901112		0.24	0.155													
901113		0.27	0.175													
901114		0.63	0.407													
901115		0.68	0.439													
901116		0.68	0.439													
901117		0.61	0.394													
901203		0.34	0.220	8.0	0.20	5.0		3802								LAB-CONSOL INST Q=1.44 CFS
901219	1130	0.34	0.220	8.3	0.71	2.0	1.0	3850								LAB-ACZ

FOR THE FOURTH QUARTER 1990

FLOW = CALCULATED FLOW IN MILLION GALLONS PER DAY
CFS = FLOW IN CUBIC FEET PER SECOND AS MEASURED IN FIELD
E = EXCEEDENCE

POINT=003

DATE	TIME	CFS	FLOW	PH	TFE	TSS	OANDG	TDS	SS	EPH	ETFE	ETSS	EOANDG	ETDS	ESS	COMMENTS
901001		0.67	0.433	8.1	0.08	7.0		2306								LAB-CONSOL INST Q=1.06 CFS
901017	905	0.67	0.433	8.1	0.33	14.0	1.0	2350								LAB-ACZ INST Q=1.44 CFS
901019		0.57	0.368													
901020		0.78	0.504													
901021		0.66	0.427													
901022		0.56	0.362													
901023		0.66	0.427													
901024		0.52	0.336													
901025		0.60	0.388													
901026		0.55	0.355													
901027		0.46	0.297													
901028		0.68	0.439													
901029		0.89	0.575													
901030		0.73	0.472													
901031		1.06	0.685													
901101		0.58	0.375	8.3	0.20	4.0		2124								LAB-CONSOL INST Q=2.18 CFS
901106	900	0.58	0.375	8.0	0.12	4.0	2.0	1854								LAB-ACZ
901203		0.63	0.407	8.1	0.05	3.0		2218								LAB-CONSOL INST Q=2.39 CFS
901219	1150	0.63	0.407	8.6	0.10	2.0	1.0	2372								LAB-ACZ INST Q=2.39 CFS

EMERY MINE - MONITORING WELL DATA

The following wells were sampled in 1990.

Well Name	Water Bearing Unit(s)
Emery Deep Mine Wells	
Bryant	Upper Ferron S.S.
Emria 2	Bluegate Shale Upper Ferron S.S. Middle Ferron S.S. Lower Ferron S.S.
Kemmer	Lower Ferron S.S.
Lewis	Upper Ferron S.S.
TP	Upper Ferron S.S.
T1	Bluegate Shale
USGS 1-2	Upper Ferron S.S.
ZZ	Lower Ferron S.S.
Refuse Disposal Area Wells	
RDA1	Quitchupah Alluvium
RDA2	Quitchupah Alluvium
RDA3	Quitchupah Alluvium
RDA4	Quitchupah Alluvium
RDA5	Quitchupah Alluvium
RDA6	Quitchupah Alluvium
Surface Mine Wells	
SM1-1	Christiansen Alluvium
SM1-2	Christiansen Alluvium
SM1-3	Christiansen Alluvium
SM1-4	Christiansen Alluvium

EMERY MINE GROUNDWATER MONITORING REPORT 14:13 WEDNESDAY, MARCH 1991
FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=BRYANT WATER BEARING UNIT=U

	RAW DATA			
	15MAR90	08JUN90	17SEP90	08NOV90
WATER DEPTH	288.1	288.8	290.8	290.4
WATER LEVEL ELEV	5732.7	5732.0	5730.0	5730.4
SP COND - FIELD		1800	1980	
PH		7.6	9.0	
TEMP(CELSIUS)		16.7	21.4	
TDS		1152.0	1148.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		210.00	215.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		87.84	112.24	
CO3		82.80	73.80	
CL		70.00	77.00	
SO4		593.00	562.00	
NO3(N)		0.02		
CATIONS				
NA		350.00	412.00	
K		3.00	3.00	
CA		21.00	2.00	
MG		15.00	9.00	
FE,TOT				
FE,DISS		0.02	0.03	
MN		0.01	0.01	
CALCULATED DATA				
HARDNESS		114	42	
NC HARDNESS				
SAR		14	28	
IONIC RATIOS(%)				
NA+K		87	96	
CA		6	1	
MG		7	4	
HCO3+CO3		23	24	
CL		11	12	
SO4		67	64	
TDS(SUM)		1223.8	1251.1	
TDS(SUM)/SP COND		0.68	0.63	
TDS(CALC)		1179.1	1194.0	
TDS/TDS(CALC)		0.98	0.96	
TOTAL CATIONS		17.58	18.84	
TOTAL ANIONS		18.56	18.17	
CAT-AN BALANCE		-2.70	1.80	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=BRYANT WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	289.5	288.1	290.8	4.0	1.3
WATER LEVEL ELEV	5731.3	5730.0	5732.7	4.0	1.3
SP COND - FIELD	1890	1800	1980	2	127
PH	8.3	7.6	9.0	2.0	1.0
TEMP(CELSIUS)	19.0	16.7	21.4	2.0	3.3
TDS	1150.0	1148.0	1152.0	2.0	2.8
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	212.50	210.00	215.00	2.00	3.54
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	100.04	87.84	112.24	2.00	17.25
CO3	78.30	73.80	82.80	2.00	6.36
CL	73.50	70.00	77.00	2.00	4.95
SO4	577.50	562.00	593.00	2.00	21.92
NO3(N)	0.02	0.02	0.02	1.00	
CATIONS					
NA	381.00	350.00	412.00	2.00	43.84
K	3.00	3.00	3.00	2.00	0.00
CA	11.50	2.00	21.00	2.00	13.44
MG	12.00	9.00	15.00	2.00	4.24
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.03	2.00	0.01
MN	0.01	0.01	0.01	2.00	0.00
CALCULATED DATA					
HARDNESS	78	42	114	2	51
NC HARDNESS				0	
SAR	21	14	28	2	9
IONIC RATIOS(%)					
NA+K	91	87	96	2	6
CA	3	1	6	2	4
MG	5	4	7	2	2
HCO3+CO3	23	23	24	2	1
CL	11	11	12	2	1
SO4	66	64	67	2	2
TDS(SUM)	1237.4	1223.8	1251.1	2.0	19.3
TDS(SUM)/SP COND	0.66	0.63	0.68	2.00	0.03
TDS(CALC)	1186.6	1179.1	1194.0	2.0	10.5
TDS/TDS(CALC)	0.97	0.96	0.98	2.00	0.01
TOTAL CATIONS	18.21	17.58	18.84	2.00	0.89
TOTAL ANIONS	18.37	18.17	18.56	2.00	0.27
CAT-AN BALANCE	-0.45	-2.70	1.80	2.00	3.18

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=EMRIA2 WATER BEARING UNIT=BGUML

	RAW DATA			
	12MAR90	08JUN90	19SEP90	07NOV90
WATER DEPTH	41.3	43.7	44.7	45.6
WATER LEVEL ELEV	6041.0	6038.6	6037.6	6036.7
SP COND - FIELD				
PH			6.7	
TEMP(CELSIUS)		21.1	9.4	
TDS		13204.0	14722.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		371.00	257.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		452.62	313.54	
CO3		0.00	0.00	
CL		600.00	79.00	
SO4		8965.00	9936.00	
NO3(N)		0.99		
CATIONS				
NA		630.00	381.00	
K		12.00	11.00	
CA		662.00	483.00	
MG		1675.00	2100.00	
FE,TOT				
FE,DISS		0.34	2.13	
MN		5.40	7.54	
CALCULATED DATA				
HARDNESS		8523	9818	
NC HARDNESS				
SAR		3	2	
IONIC RATIOS(%)				
NA+K		14	8	
CA		17	11	
MG		69	81	
HCO3+CO3		4	2	
CL		8	1	
SO4		88	97	
TDS(SUM)		13004.4	13313.2	
TDS(SUM)/SP COND				
TDS(CALC)		12774.3	13153.8	
TDS/TDS(CALC)		1.03	1.12	
TOTAL CATIONS		198.74	214.05	
TOTAL ANIONS		211.08	214.24	
CAT-AN BALANCE		-3.00	0.00	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=EMRIA2 WATER BEARING UNIT=BGUML

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	43.8	41.3	45.6	4.0	1.9
WATER LEVEL ELEV	6038.5	6036.7	6041.0	4.0	1.9
SP COND - FIELD				0	
PH	6.7	6.7	6.7	1.0	
TEMP(CELSIUS)	15.2	9.4	21.1	2.0	8.3
TDS	13963.0	13204.0	14722.0	2.0	1073.4
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	314.00	257.00	371.00	2.00	80.61
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	383.08	313.54	452.62	2.00	98.34
CO3	0.00	0.00	0.00	2.00	0.00
CL	339.50	79.00	600.00	2.00	368.40
SO4	9450.50	8965.00	9936.00	2.00	686.60
NO3(N)	0.99	0.99	0.99	1.00	
CATIONS					
NA	505.50	381.00	630.00	2.00	176.07
K	11.50	11.00	12.00	2.00	0.71
CA	572.50	483.00	662.00	2.00	126.57
MG	1887.50	1675.00	2100.00	2.00	300.52
FE,TOT				0.00	
FE,DISS	1.23	0.34	2.13	2.00	1.27
MN	6.47	5.40	7.54	2.00	1.51
CALCULATED DATA					
HARDNESS	9171	8523	9818	2	916
NC HARDNESS				0	
SAR	2	2	3	2	1
IONIC RATIOS(%)					
NA+K	11	8	14	2	4
CA	14	11	17	2	4
MG	75	69	81	2	8
HCO3+CO3	3	2	4	2	1
CL	5	1	8	2	5
SO4	93	88	97	2	6
TDS(SUM)	13158.8	13004.4	13313.2	2.0	218.4
TDS(SUM)/SP COND				0.00	
TDS(CALC)	12964.1	12774.3	13153.8	2.0	268.4
TDS/TDS(CALC)	1.08	1.03	1.12	2.00	0.06
TOTAL CATIONS	206.40	198.74	214.05	2.00	10.83
TOTAL ANIONS	212.66	211.08	214.24	2.00	2.23
CAT-AN BALANCE	-1.50	-3.00	0.00	2.00	2.12

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=I2 WATER BEARING UNIT=U

	RAW DATA			
	15MAR90	01JUN90	17SEP90	07NOV90
WATER DEPTH			396.0	399.0
WATER LEVEL ELEV			5706.0	5703.0
SP COND - FIELD				
PH				
TEMP(CELSIUS)				
TDS				
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL				
NONCARBONATE				
ANIONS				
HCO3				
CO3				
CL				
SO4				
NO3(N)				
CATIONS				
NA				
K				
CA				
MG				
FE,TOT				
FE,DISS				
MN				
CALCULATED DATA				
HARDNESS				
NC HARDNESS				
SAR				
IONIC RATIOS(%)				
NA+K				
CA				
MG				
HCO3+CO3				
CL				
SO4				
TDS(SUM)				
TDS(SUM)/SP COND				
TDS(CALC)				
TDS/TDS(CALC)				
TOTAL CATIONS				
TOTAL ANIONS				
CAT-AN BALANCE				

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=I2 WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	397.5	396.0	399.0	2.0	2.1
WATER LEVEL ELEV	5704.5	5703.0	5706.0	2.0	2.1
SP COND - FIELD				0	
PH				0.0	
TEMP(CELSIUS)				0.0	
TDS				0.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL				0.00	
NONCARBONATE				0.00	
ANIONS					
HCO3				0.00	
CO3				0.00	
CL				0.00	
SO4				0.00	
NO3(N)				0.00	
CATIONS					
NA				0.00	
K				0.00	
CA				0.00	
MG				0.00	
FE,TOT				0.00	
FE,DISS				0.00	
MN				0.00	
CALCULATED DATA					
HARDNESS				0	
NC HARDNESS				0	
SAR				0	
IONIC RATIOS(%)					
NA+K				0	
CA				0	
MG				0	
HCO3+CO3				0	
CL				0	
SO4				0	
TDS(SUM)				0.0	
TDS(SUM)/SP COND				0.00	
TDS(CALC)				0.0	
TDS/TDS(CALC)				0.00	
TOTAL CATIONS				0.00	
TOTAL ANIONS				0.00	
CAT-AN BALANCE				0.00	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=KEMMER WATER BEARING UNIT=L

	RAW DATA			
	12MAR90	04JUN90	17SEP90	07NOV90
WATER DEPTH	-22.0	-22.0	-19.0	-19.0
WATER LEVEL ELEV	6306.7	6306.7	6303.7	6303.7
SP COND - FIELD		1200	1120	
PH			8.4	
TEMP(CELSIUS)		21.3	23.9	
TDS		646.0	614.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		150.00	236.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		167.14	234.24	
CO3		7.80	26.40	
CL		18.00	19.00	
SO4		253.00	226.00	
NO3(N)		0.02		
CATIONS				
NA		176.00	218.00	
K		3.00	4.00	
CA		13.00	5.00	
MG		13.00	14.00	
FE,TOT				
FE,DISS		0.02	0.03	
MN		0.02	0.01	
CALCULATED DATA				
HARDNESS		86	70	
NC HARDNESS				
SAR		8	11	
IONIC RATIOS(%)				
NA+K		82	87	
CA		7	2	
MG		11	10	
HCO3+CO3		34	47	
CL		6	5	
SO4		60	47	
TDS(SUM)		652.1	746.7	
TDS(SUM)/SP COND		0.54	0.67	
TDS(CALC)		567.1	627.6	
TDS/TDS(CALC)		1.14	0.98	
TOTAL CATIONS		9.45	10.99	
TOTAL ANIONS		8.82	9.96	
CAT-AN BALANCE		3.50	4.90	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=KEMMER WATER BEARING UNIT=L

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	-20.5	-22.0	-19.0	4.0	1.7
WATER LEVEL ELEV	6305.2	6303.7	6306.7	4.0	1.7
SP COND - FIELD	1160	1120	1200	2	57
PH	8.4	8.4	8.4	1.0	
TEMP(CELSIUS)	22.6	21.3	23.9	2.0	1.8
TDS	630.0	614.0	646.0	2.0	22.6
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	193.00	150.00	236.00	2.00	60.81
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	200.69	167.14	234.24	2.00	47.45
CO3	17.10	7.80	26.40	2.00	13.15
CL	18.50	18.00	19.00	2.00	0.71
SO4	239.50	226.00	253.00	2.00	19.09
NO3(N)	0.02	0.02	0.02	1.00	
CATIONS					
NA	197.00	176.00	218.00	2.00	29.70
K	3.50	3.00	4.00	2.00	0.71
CA	9.00	5.00	13.00	2.00	5.66
MG	13.50	13.00	14.00	2.00	0.71
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.03	2.00	0.01
MN	0.01	0.01	0.02	2.00	0.01
CALCULATED DATA					
HARDNESS	78	70	86	2	11
NC HARDNESS				0	
SAR	10	8	11	2	2
IONIC RATIOS(%)					
NA+K	85	82	87	2	4
CA	5	2	7	2	3
MG	11	10	11	2	1
HCO3+CO3	41	34	47	2	9
CL	6	5	6	2	0
SO4	54	47	60	2	9
TDS(SUM)	699.4	652.1	746.7	2.0	66.9
TDS(SUM)/SP COND	0.61	0.54	0.67	2.00	0.09
TDS(CALC)	597.4	567.1	627.6	2.0	42.8
TDS/TDS(CALC)	1.06	0.98	1.14	2.00	0.11
TOTAL CATIONS	10.22	9.45	10.99	2.00	1.09
TOTAL ANIONS	9.39	8.82	9.96	2.00	0.81
CAT-AN BALANCE	4.20	3.50	4.90	2.00	0.99

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=LEWIS WATER BEARING UNIT=U

	RAW DATA			
	12MAR90	08JUN90	17SEP90	08NOV90
WATER DEPTH	258.6	259.1	260.1	260.8
WATER LEVEL ELEV	5759.9	5759.4	5758.4	5757.7
SP COND - FIELD		1270	1680	
PH			8.5	
TEMP(CELSIUS)		14.7	23.7	
TDS		916.0	910.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		315.00	312.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		335.50	341.60	
CO3		24.00	19.20	
CL		44.00	30.00	
SO4		362.00	360.00	
NO3(N)		0.02		
CATIONS				
NA		300.00	340.00	
K		1.00	1.00	
CA		17.00	1.00	
MG		11.00	2.00	
FE,TOT				
FE,DISS		0.09	0.02	
MN		0.01	0.01	
CALCULATED DATA				
HARDNESS		88	6	
NC HARDNESS				
SAR		14	45	
IONIC RATIOS(%)				
NA+K		88	99	
CA		6	0	
MG		6	1	
HCO3+CO3		42	43	
CL		8	6	
SO4		50	51	
TDS(SUM)		1096.0	1094.8	
TDS(SUM)/SP COND		0.86	0.65	
TDS(CALC)		925.4	921.2	
TDS/TDS(CALC)		0.99	0.99	
TOTAL CATIONS		14.83	15.03	
TOTAL ANIONS		15.13	14.58	
CAT-AN BALANCE		-1.00	1.50	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
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MONITORING AREA=DEEP MINE WELL=LEWIS WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	259.7	258.6	260.8	4.0	1.0
WATER LEVEL ELEV	5758.8	5757.7	5759.9	4.0	1.0
SP COND - FIELD	1475	1270	1680	2	290
PH	8.5	8.5	8.5	1.0	
TEMP(CELSIUS)	19.2	14.7	23.7	2.0	6.4
TDS	913.0	910.0	916.0	2.0	4.2
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	313.50	312.00	315.00	2.00	2.12
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	338.55	335.50	341.60	2.00	4.31
CO3	21.60	19.20	24.00	2.00	3.39
CL	37.00	30.00	44.00	2.00	9.90
SO4	361.00	360.00	362.00	2.00	1.41
NO3(N)	0.02	0.02	0.02	1.00	
CATIONS					
NA	320.00	300.00	340.00	2.00	28.28
K	1.00	1.00	1.00	2.00	0.00
CA	9.00	1.00	17.00	2.00	11.31
MG	6.50	2.00	11.00	2.00	6.36
FE,TOT				0.00	
FE,DISS	0.05	0.02	0.09	2.00	0.05
MN	0.01	0.01	0.01	2.00	0.00
CALCULATED DATA					
HARDNESS	47	6	88	2	58
NC HARDNESS				0	
SAR	30	14	45	2	22
IONIC RATIOS(%)					
NA+K	93	88	99	2	7
CA	3	0	6	2	4
MG	4	1	6	2	4
HCO3+CO3	42	42	43	2	1
CL	7	6	8	2	2
SO4	51	50	51	2	1
TDS(SUM)	1095.4	1094.8	1096.0	2.0	0.8
TDS(SUM)/SP COND	0.76	0.65	0.86	2.00	0.15
TDS(CALC)	923.3	921.2	925.4	2.0	3.0
TDS/TDS(CALC)	0.99	0.99	0.99	2.00	0.00
TOTAL CATIONS	14.93	14.83	15.03	2.00	0.14
TOTAL ANIONS	14.85	14.58	15.13	2.00	0.39
CAT-AN BALANCE	0.25	-1.00	1.50	2.00	1.77

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

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MONITORING AREA=DEEP MINE WELL=FP WATER BEARING UNIT=U

	RAW DATA			
	12MAR90	08JUN90	18SEP90	07NOV90
WATER DEPTH	360.2	365.9	371.2	370.2
WATER LEVEL ELEV	5641.7	5636.0	5630.7	5631.7
SP COND - FIELD		1580	1610	
PH		8.2	9.5	
TEMP(CELSIUS)		13.6	8.2	
TDS		978.0	998.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		519.00	506.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		35.38	368.44	
CO3		294.00	122.40	
CL		48.00	55.00	
SO4		245.00	243.00	
NO3(N)		0.02		
CATIONS				
NA		348.00	386.00	
K		1.00	1.00	
CA		2.00	1.00	
MG		1.00	1.00	
FE,TOT				
FE,DISS		0.02	0.07	
MN		0.01	0.01	
CALCULATED DATA				
HARDNESS		1	7	
NC HARDNESS				
SAR		50	65	
IONIC RATIOS(%)				
NA+K		99	99	
CA		1	0	
MG		1	0	
HCO3+CO3		62	60	
CL		8	9	
SO4		30	30	
TDS(SUM)		975.9	1177.9	
TDS(SUM)/SP COND		0.62	0.73	
TDS(CALC)		957.9	990.6	
TDS/TDS(CALC)		1.02	1.01	
TOTAL CATIONS		15.35	16.95	
TOTAL ANIONS		16.89	16.73	
CAT-AN BALANCE		-4.80	0.70	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=TP WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	366.9	360.2	371.2	4.0	5.0
WATER LEVEL ELEV	5635.0	5630.7	5641.7	4.0	5.0
SP COND - FIELD	1595	1580	1610	2	21
PH	8.8	8.2	9.5	2.0	0.9
TEMP(CELSIUS)	10.9	8.2	13.6	2.0	3.8
TDS	988.0	978.0	998.0	2.0	14.1
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	512.50	506.00	519.00	2.00	9.19
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	201.91	35.38	368.44	2.00	235.51
CO3	208.20	122.40	294.00	2.00	121.34
CL	51.50	48.00	55.00	2.00	4.95
SO4	244.00	243.00	245.00	2.00	1.41
NO3(N)	0.02	0.02	0.02	1.00	
CATIONS					
NA	367.00	348.00	386.00	2.00	26.87
K	1.00	1.00	1.00	2.00	0.00
CA	1.50	1.00	2.00	2.00	0.71
MG	1.00	1.00	1.00	2.00	0.00
FE,TOT				0.00	
FE,DISS	0.04	0.02	0.07	2.00	0.04
MN	0.01	0.01	0.01	2.00	0.00
CALCULATED DATA					
HARDNESS	4	1	7	2	4
NC HARDNESS				0	
SAR	58	50	65	2	11
IONIC RATIOS(%)					
NA+K	99	99	99	2	0
CA	0	0	1	2	0
MG	1	0	1	2	0
HCO3+CO3	61	60	62	2	1
CL	9	8	9	2	1
SO4	30	30	30	2	0
TDS(SUM)	1076.9	975.9	1177.9	2.0	142.9
TDS(SUM)/SP COND	0.67	0.62	0.73	2.00	0.08
TDS(CALC)	974.3	957.9	990.6	2.0	23.1
TDS/TDS(CALC)	1.01	1.01	1.02	2.00	0.01
TOTAL CATIONS	16.15	15.35	16.95	2.00	1.13
TOTAL ANIONS	16.81	16.73	16.89	2.00	0.11
CAT-AN BALANCE	-2.05	-4.80	0.70	2.00	3.89

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=T1 WATER BEARING UNIT=BG

	RAW DATA			
	12MAR90	08JUN90	17SEP90	07NOV90
WATER DEPTH	11.5	12.0	12.9	13.4
WATER LEVEL ELEV	5989.4	5988.9	5988.0	5987.5
SP COND - FIELD				
PH			7.2	
TEMP(CELSIUS)		11.1	18.3	
TDS		17998.0	18176.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		405.00	402.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		494.10	490.44	
CO3		0.00	0.00	
CL		29.00	160.00	
SO4		12200	12159	
NO3(N)		0.02		
CATIONS				
NA		4390.00	4290.00	
K		26.00	26.00	
CA		612.00	622.00	
MG		406.00	421.00	
FE,TOT				
FE,DISS		0.20	0.02	
MN		0.20	0.61	
CALCULATED DATA				
HARDNESS		3195	3281	
NC HARDNESS				
SAR		34	33	
IONIC RATIOS(%)				
NA+K		75	74	
CA		12	12	
MG		13	14	
HCO3+CO3		3	3	
CL		0	2	
SO4		97	95	
TDS(SUM)		18159.5	18169.1	
TDS(SUM)/SP COND				
TDS(CALC)		17908.3	17919.8	
TDS/TDS(CALC)		1.01	1.01	
TOTAL CATIONS		255.58	252.97	
TOTAL ANIONS		262.97	265.70	
CAT-AN BALANCE		-1.40	-2.50	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
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NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=T1 WATER BEARING UNIT=BG

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	12.4	11.5	13.4	4.0	0.9
WATER LEVEL ELEV	5988.4	5987.5	5989.4	4.0	0.9
SP COND - FIELD				0	
PH	7.2	7.2	7.2	1.0	
TEMP(CELSIUS)	14.7	11.1	18.3	2.0	5.1
TDS	18087.0	17998.0	18176.0	2.0	125.9
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	403.50	402.00	405.00	2.00	2.12
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	492.27	490.44	494.10	2.00	2.59
CO3	0.00	0.00	0.00	2.00	0.00
CL	94.50	29.00	160.00	2.00	92.63
SO4	12179.5	12159	12200	2.00	28.99
NO3(N)	0.02	0.02	0.02	1.00	
CATIONS					
NA	4340.00	4290.00	4390.00	2.00	70.71
K	26.00	26.00	26.00	2.00	0.00
CA	617.00	612.00	622.00	2.00	7.07
MG	413.50	406.00	421.00	2.00	10.61
FE,TOT				0.00	
FE,DISS	0.11	0.02	0.20	2.00	0.13
MN	0.40	0.20	0.61	2.00	0.29
CALCULATED DATA					
HARDNESS	3238	3195	3281	2	61
NC HARDNESS				0	
SAR	33	33	34	2	1
IONIC RATIOS(%)					
NA+K	75	74	75	2	1
CA	12	12	12	2	0
MG	13	13	14	2	0
HCO3+CO3	3	3	3	2	0
CL	1	0	2	2	1
SO4	96	95	97	2	1
TDS(SUM)	18164.3	18159.5	18169.1	2.0	6.8
TDS(SUM)/SP COND				0.00	
TDS(CALC)	17914.0	17908.3	17919.8	2.0	8.1
TDS/TDS(CALC)	1.01	1.01	1.01	2.00	0.01
TOTAL CATIONS	254.28	252.97	255.58	2.00	1.84
TOTAL ANIONS	264.34	262.97	265.70	2.00	1.94
CAT-AN BALANCE	-1.95	-2.50	-1.40	2.00	0.78

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=USGS1-2 WATER BEARING UNIT=U

	RAW DATA			
	12MAR90	04JUN90	18SEP90	07NOV90
WATER DEPTH	100.4	101.6	102.8	103.2
WATER LEVEL ELEV	5945.3	5944.1	5942.9	5942.5
SP COND - FIELD		2800	1430	
PH			7.4	
TEMP(CELSIUS)		16.1	11.5	
TDS		2414.0	1248.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		450.00	366.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		549.00	446.52	
CO3		0.00	0.00	
CL		45.00	1.00	
SO4		1455.00	584.00	
NO3(N)		0.29		
CATIONS				
NA		418.00	298.00	
K		6.00	5.00	
CA		175.00	68.00	
MG		146.00	58.00	
FE,TOT				
FE,DISS		0.03	0.02	
MN		0.06	0.06	
CALCULATED DATA				
HARDNESS		1036	408	
NC HARDNESS				
SAR		6	6	
IONIC RATIOS(%)				
NA+K		47	62	
CA		22	16	
MG		31	22	
HCO3+CO3		22	38	
CL		3	0	
SO4		75	62	
TDS(SUM)		2795.6	1460.6	
TDS(SUM)/SP COND		1.00	1.02	
TDS(CALC)		2516.5	1233.6	
TDS/TDS(CALC)		0.96	1.01	
TOTAL CATIONS		39.08	21.26	
TOTAL ANIONS		40.62	19.51	
CAT-AN BALANCE		-1.90	4.30	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=USGS1-2 WATER BEARING UNIT=U

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	102.0	100.4	103.2	4.0	1.3
WATER LEVEL ELEV	5943.7	5942.5	5945.3	4.0	1.3
SP COND - FIELD	2115	1430	2800	2	969
PH	7.4	7.4	7.4	1.0	
TEMP(CELSIUS)	13.8	11.5	16.1	2.0	3.3
TDS	1831.0	1248.0	2414.0	2.0	824.5
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	408.00	366.00	450.00	2.00	59.40
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	497.76	446.52	549.00	2.00	72.46
CO3	0.00	0.00	0.00	2.00	0.00
CL	23.00	1.00	45.00	2.00	31.11
SO4	1019.50	584.00	1455.00	2.00	615.89
NO3(N)	0.29	0.29	0.29	1.00	
CATIONS					
NA	358.00	298.00	418.00	2.00	84.85
K	5.50	5.00	6.00	2.00	0.71
CA	121.50	68.00	175.00	2.00	75.66
MG	102.00	58.00	146.00	2.00	62.23
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.03	2.00	0.01
MN	0.06	0.06	0.06	2.00	0.00
CALCULATED DATA					
HARDNESS	722	408	1036	2	444
NC HARDNESS				0	
SAR	6	6	6	2	1
IONIC RATIOS(%)					
NA+K	54	47	62	2	10
CA	19	16	22	2	5
MG	27	22	31	2	6
HCO3+CO3	30	22	38	2	11
CL	2	0	3	2	2
SO4	69	62	75	2	9
TDS(SUM)	2128.1	1460.6	2795.6	2.0	944.0
TDS(SUM)/SP COND	1.01	1.00	1.02	2.00	0.02
TDS(CALC)	1875.1	1233.6	2516.5	2.0	907.1
TDS/TDS(CALC)	0.99	0.96	1.01	2.00	0.04
TOTAL CATIONS	30.17	21.26	39.08	2.00	12.60
TOTAL ANIONS	30.06	19.51	40.62	2.00	14.93
CAT-AN BALANCE	1.20	-1.90	4.30	2.00	4.38

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=DEEP MINE WELL=ZZ WATER BEARING UNIT=L

	RAW DATA			
	12MAR90	08JUN90	18SEP90	07NOV90
WATER DEPTH	146.5	146.9	147.6	146.8
WATER LEVEL ELEV	5919.2	5918.8	5918.1	5918.9
SP COND - FIELD		1260	1090	
PH			8.7	
TEMP(CELSIUS)		14.7	14.0	
TDS		720.0	744.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		547.00	556.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		246.44	517.28	
CO3		207.00	79.20	
CL		14.00	17.00	
SO4		23.00	76.00	
NO3(N)		0.02		
CATIONS				
NA		250.00	301.00	
K		2.00	3.00	
CA		2.00	2.00	
MG		4.00	4.00	
FE,TOT				
FE,DISS		0.02	0.02	
MN		0.01	0.01	
CALCULATED DATA				
HARDNESS		21	21	
NC HARDNESS				
SAR		24	28	
IONIC RATIOS(%)				
NA+K		96	97	
CA		1	1	
MG		3	2	
HCO3+CO3		93	84	
CL		3	4	
SO4		4	12	
TDS(SUM)		752.2	999.5	
TDS(SUM)/SP COND		0.60	0.92	
TDS(CALC)		627.0	736.6	
TDS/TDS(CALC)		1.15	1.01	
TOTAL CATIONS		11.36	13.60	
TOTAL ANIONS		11.93	13.18	
CAT-AN BALANCE		-2.50	1.60	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=DEEP MINE WELL=ZZ WATER BEARING UNIT=L

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	146.9	146.5	147.6	4.0	0.5
WATER LEVEL ELEV	5918.7	5918.1	5919.2	4.0	0.5
SP COND - FIELD	1175	1090	1260	2	120
PH	8.7	8.7	8.7	1.0	
TEMP(CELSIUS)	14.3	14.0	14.7	2.0	0.5
TDS	732.0	720.0	744.0	2.0	17.0
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	551.50	547.00	556.00	2.00	6.36
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	381.86	246.44	517.28	2.00	191.51
CO3	143.10	79.20	207.00	2.00	90.37
CL	15.50	14.00	17.00	2.00	2.12
SO4	49.50	23.00	76.00	2.00	37.48
NO3(N)	0.02	0.02	0.02	1.00	
CATIONS					
NA	275.50	250.00	301.00	2.00	36.06
K	2.50	2.00	3.00	2.00	0.71
CA	2.00	2.00	2.00	2.00	0.00
MG	4.00	4.00	4.00	2.00	0.00
FE,TOT				0.00	
FE,DISS	0.02	0.02	0.02	2.00	0.00
MN	0.01	0.01	0.01	2.00	0.00
CALCULATED DATA					
HARDNESS	21	21	21	2	0
NC HARDNESS				0	
SAR	26	24	28	2	3
IONIC RATIOS(%)					
NA+K	97	96	97	2	0
CA	1	1	1	2	0
MG	3	2	3	2	0
HCO3+CO3	88	84	93	2	6
CL	3	3	4	2	0
SO4	8	4	12	2	6
TDS(SUM)	875.9	752.2	999.5	2.0	174.9
TDS(SUM)/SP COND	0.76	0.60	0.92	2.00	0.23
TDS(CALC)	681.8	627.0	736.6	2.0	77.5
TDS/TDS(CALC)	1.08	1.01	1.15	2.00	0.10
TOTAL CATIONS	12.48	11.36	13.60	2.00	1.59
TOTAL ANIONS	12.56	11.93	13.18	2.00	0.88
CAT-AN BALANCE	-0.45	-2.50	1.60	2.00	2.90

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA1 WATER BEARING UNIT=QAL

	RAW DATA			
	12MAR90	04JUN90	25SEP90	07NOV90
WATER DEPTH	14.5	10.6	15.0	15.2
WATER LEVEL ELEV	5943.3	5947.2	5942.8	5942.6
SP COND - FIELD		3770		
PH				
TEMP(CELSIUS)		11.9		
TDS		3668.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		544.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		663.68		
CO3		0.00		
CL		110.00		
SO4		2083.00		
NO3(N)		0.61		
CATIONS				
NA		468.00		
K		10.00		
CA		411.00		
MG		168.00		
FE,TOT				
FE,DISS		0.03		
MN		0.34		
CALCULATED DATA				
HARDNESS		1716		
NC HARDNESS				
SAR		5		
IONIC RATIOS(%)				
NA+K		38		
CA		37		
MG		25		
HCO3+CO3		19		
CL		5		
SO4		76		
TDS(SUM)		3916.0		
TDS(SUM)/SP COND		1.04		
TDS(CALC)		3578.6		
TDS/TDS(CALC)		1.02		
TOTAL CATIONS		54.96		
TOTAL ANIONS		57.42		
CAT-AN BALANCE		-2.20		

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA1 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	13.8	10.6	15.2	4.0	2.2
WATER LEVEL ELEV	5944.0	5942.6	5947.2	4.0	2.2
SP COND - FIELD	3770	3770	3770	1	
PH				0.0	
TEMP(CELSIUS)	11.9	11.9	11.9	1.0	
TDS	3668.0	3668.0	3668.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	544.00	544.00	544.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	663.68	663.68	663.68	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	110.00	110.00	110.00	1.00	
SO4	2083.00	2083.00	2083.00	1.00	
NO3(N)	0.61	0.61	0.61	1.00	
CATIONS					
NA	468.00	468.00	468.00	1.00	
K	10.00	10.00	10.00	1.00	
CA	411.00	411.00	411.00	1.00	
MG	168.00	168.00	168.00	1.00	
FE,TOT				0.00	
FE,DISS	0.03	0.03	0.03	1.00	
MN	0.34	0.34	0.34	1.00	
CALCULATED DATA					
HARDNESS	1716	1716	1716	1	
NC HARDNESS				0	
SAR	5	5	5	1	
IONIC RATIOS(%)					
NA+K	38	38	38	1	
CA	37	37	37	1	
MG	25	25	25	1	
HCO3+CO3	19	19	19	1	
CL	5	5	5	1	
SO4	76	76	76	1	
TDS(SUM)	3916.0	3916.0	3916.0	1.0	
TDS(SUM)/SP COND	1.04	1.04	1.04	1.00	
TDS(CALC)	3578.6	3578.6	3578.6	1.0	
TDS/TDS(CALC)	1.02	1.02	1.02	1.00	
TOTAL CATIONS	54.96	54.96	54.96	1.00	
TOTAL ANIONS	57.42	57.42	57.42	1.00	
CAT-AN BALANCE	-2.20	-2.20	-2.20	1.00	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=ROA2 WATER BEARING UNIT=QAL

	RAW DATA			
	12MAR90	04JUN90	25SEP90	07NOV90
WATER DEPTH	14.0	13.9	14.9	14.8
WATER LEVEL ELEV	5940.5	5940.6	5939.6	5939.7
SP COND - FIELD		4190		
PH				
TEMP(CELSIUS)		11.6		
TDS		4172.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		500.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		610.00		
CO3		0.00		
CL		142.00		
SO4		2440.00		
NO3(N)		0.36		
CATIONS				
NA		576.00		
K		9.00		
CA		454.00		
MG		179.00		
FE,TOT				
FE,DISS		0.03		
MN		0.01		
CALCULATED DATA				
HARDNESS		1869		
NC HARDNESS				
SAR		6		
IONIC RATIOS(%)				
NA+K		40		
CA		36		
MG		23		
HCO3+CO3		15		
CL		6		
SO4		78		
TDS(SUM)		4411.7		
TDS(SUM)/SP COND		1.05		
TDS(CALC)		4101.6		
TDS/TDS(CALC)		1.02		
TOTAL CATIONS		62.67		
TOTAL ANIONS		64.86		
CAT-AN BALANCE		-1.70		

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=R0A2 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	14.4	13.9	14.9	4.0	0.5
WATER LEVEL ELEV	5940.1	5939.6	5940.6	4.0	0.5
SP COND - FIELD	4190	4190	4190	1	
PH				0.0	
TEMP(CELSIUS)	11.6	11.6	11.6	1.0	
TDS	4172.0	4172.0	4172.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	500.00	500.00	500.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	610.00	610.00	610.00	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	142.00	142.00	142.00	1.00	
SO4	2440.00	2440.00	2440.00	1.00	
NO3(N)	0.36	0.36	0.36	1.00	
CATIONS					
NA	576.00	576.00	576.00	1.00	
K	9.00	9.00	9.00	1.00	
CA	454.00	454.00	454.00	1.00	
MG	179.00	179.00	179.00	1.00	
FE,TOT				0.00	
FE,DISS	0.03	0.03	0.03	1.00	
MN	0.01	0.01	0.01	1.00	
CALCULATED DATA					
HARDNESS	1869	1869	1869	1	
NC HARDNESS				0	
SAR	6	6	6	1	
IONIC RATIOS(%)					
NA+K	40	40	40	1	
CA	36	36	36	1	
MG	23	23	23	1	
HCO3+CO3	15	15	15	1	
CL	6	6	6	1	
SO4	78	78	78	1	
TDS(SUM)	4411.7	4411.7	4411.7	1.0	
TDS(SUM)/SP COND	1.05	1.05	1.05	1.00	
TDS(CALC)	4101.6	4101.6	4101.6	1.0	
TDS/TDS(CALC)	1.02	1.02	1.02	1.00	
TOTAL CATIONS	62.67	62.67	62.67	1.00	
TOTAL ANIONS	64.86	64.86	64.86	1.00	
CAT-AN BALANCE	-1.70	-1.70	-1.70	1.00	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA3 WATER BEARING UNIT=QAL

	RAW DATA			
	12MAR90	04JUN90	25SEP90	07NOV90
WATER DEPTH	20.9	21.3	22.2	21.5
WATER LEVEL ELEV	5924.5	5924.1	5923.2	5923.9
SP COND - FIELD		9050		
PH				
TEMP(CELSIUS)		13.5		
TDS		9250.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		686.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		836.92		
CO3		0.00		
CL		96.00		
SO4		5808.00		
NO3(N)		0.13		
CATIONS				
NA		1410.00		
K		7.00		
CA		493.00		
MG		554.00		
FE,TOT				
FE,DISS		0.31		
MN		0.51		
CALCULATED DATA				
HARDNESS		3504		
NC HARDNESS				
SAR		10		
IONIC RATIOS(%)				
NA+K		47		
CA		19		
MG		35		
HCO3+CO3		10		
CL		2		
SO4		88		
TDS(SUM)		9208.9		
TDS(SUM)/SP COND		1.02		
TDS(CALC)		8783.5		
TDS/TDS(CALC)		1.05		
TOTAL CATIONS		131.72		
TOTAL ANIONS		137.40		
CAT-AN BALANCE		-2.10		

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA3 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	21.5	20.9	22.2	4.0	0.5
WATER LEVEL ELEV	5923.9	5923.2	5924.5	4.0	0.5
SP COND - FIELD	9050	9050	9050	1	
PH				0.0	
TEMP(CELSIUS)	13.5	13.5	13.5	1.0	
TDS	9250.0	9250.0	9250.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	686.00	686.00	686.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	836.92	836.92	836.92	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	96.00	96.00	96.00	1.00	
SO4	5808.00	5808.00	5808.00	1.00	
NO3(N)	0.13	0.13	0.13	1.00	
CATIONS					
NA	1410.00	1410.00	1410.00	1.00	
K	7.00	7.00	7.00	1.00	
CA	493.00	493.00	493.00	1.00	
MG	554.00	554.00	554.00	1.00	
FE,TOT				0.00	
FE,DISS	0.31	0.31	0.31	1.00	
MN	0.51	0.51	0.51	1.00	
CALCULATED DATA					
HARDNESS	3504	3504	3504	1	
NC HARDNESS				0	
SAR	10	10	10	1	
IONIC RATIOS(%)					
NA+K	47	47	47	1	
CA	19	19	19	1	
MG	35	35	35	1	
HCO3+CO3	10	10	10	1	
CL	2	2	2	1	
SO4	88	88	88	1	
TDS(SUM)	9208.9	9208.9	9208.9	1.0	
TDS(SUM)/SP COND	1.02	1.02	1.02	1.00	
TDS(CALC)	8783.5	8783.5	8783.5	1.0	
TDS/TDS(CALC)	1.05	1.05	1.05	1.00	
TOTAL CATIONS	131.72	131.72	131.72	1.00	
TOTAL ANIONS	137.40	137.40	137.40	1.00	
CAT-AN BALANCE	-2.10	-2.10	-2.10	1.00	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA4 WATER BEARING UNIT=QAL

	RAW DATA			
	12MAR90	04JUN90	25SEP90	07NOV90
WATER DEPTH	20.3	20.6	21.1	20.9
WATER LEVEL ELEV	5922.8	5922.5	5922.0	5922.2
SP COND - FIELD		7230		
PH				
TEMP(CELSIUS)		12.8		
TDS		6960.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		562.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		685.64		
CO3		0.00		
CL		270.00		
SO4		4565.00		
NO3(N)		0.02		
CATIONS				
NA		1090.00		
K		4.00		
CA		503.00		
MG		438.00		
FE,TOT				
FE,DISS		0.09		
MN		0.10		
CALCULATED DATA				
HARDNESS		3053		
NC HARDNESS				
SAR		9		
IONIC RATIOS(%)				
NA+K		44		
CA		23		
MG		33		
HCO3+CO3		10		
CL		7		
SO4		83		
TDS(SUM)		7558.3		
TDS(SUM)/SP COND		1.05		
TDS(CALC)		7209.8		
TDS/TDS(CALC)		0.97		
TOTAL CATIONS		108.65		
TOTAL ANIONS		113.95		
CAT-AN BALANCE		-2.40		

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=ROA4 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	20.7	20.3	21.1	4.0	0.4
WATER LEVEL ELEV	5922.4	5922.0	5922.8	4.0	0.3
SP COND - FIELD	7230	7230	7230	1	
PH				0.0	
TEMP(CELSIUS)	12.8	12.8	12.8	1.0	
TDS	6960.0	6960.0	6960.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	562.00	562.00	562.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	685.64	685.64	685.64	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	270.00	270.00	270.00	1.00	
SO4	4565.00	4565.00	4565.00	1.00	
NO3(N)	0.02	0.02	0.02	1.00	
CATIONS					
NA	1090.00	1090.00	1090.00	1.00	
K	4.00	4.00	4.00	1.00	
CA	503.00	503.00	503.00	1.00	
MG	438.00	438.00	438.00	1.00	
FE,TOT				0.00	
FE,DISS	0.09	0.09	0.09	1.00	
MN	0.10	0.10	0.10	1.00	
CALCULATED DATA					
HARDNESS	3053	3053	3053	1	
NC HARDNESS				0	
SAR	9	9	9	1	
IONIC RATIOS(%)					
NA+K	44	44	44	1	
CA	23	23	23	1	
MG	33	33	33	1	
HCO3+CO3	10	10	10	1	
CL	7	7	7	1	
SO4	83	83	83	1	
TDS(SUM)	7558.3	7558.3	7558.3	1.0	
TDS(SUM)/SP COND	1.05	1.05	1.05	1.00	
TDS(CALC)	7209.8	7209.8	7209.8	1.0	
TDS/TDS(CALC)	0.97	0.97	0.97	1.00	
TOTAL CATIONS	108.65	108.65	108.65	1.00	
TOTAL ANIONS	113.95	113.95	113.95	1.00	
CAT-AN BALANCE	-2.40	-2.40	-2.40	1.00	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA5 WATER BEARING UNIT=QAL

	RAW DATA			
	12MAR90	04JUN90	25SEP90	07NOV90
WATER DEPTH	19.2	18.8	19.2	19.5
WATER LEVEL ELEV	5922.0	5922.4	5922.0	5921.7
SP COND - FIELD				
PH				
TEMP(CELSIUS)		13.8		
TDS		25040.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		499.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		608.78		
CO3		0.00		
CL		1060.00		
SO4		15624		
NO3(N)		1.22		
CATIONS				
NA		4845.00		
K		10.00		
CA		663.00		
MG		1280.00		
FE,TOT				
FE,DISS		0.20		
MN		0.35		
CALCULATED DATA				
HARDNESS		6906		
NC HARDNESS				
SAR		25		
IONIC RATIOS(%)				
NA+K		60		
CA		9		
MG		30		
HCO3+CO3		3		
CL		8		
SO4		89		
TDS(SUM)		24098.5		
TDS(SUM)/SP COND				
TDS(CALC)		23789.0		
TDS/TDS(CALC)		1.05		
TOTAL CATIONS		349.41		
TOTAL ANIONS		365.35		
CAT-AN BALANCE		-2.20		

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA5 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	19.2	18.8	19.5	4.0	0.3
WATER LEVEL ELEV	5922.0	5921.7	5922.4	4.0	0.3
SP COND - FIELD				0	
PH				0.0	
TEMP(CELSIUS)	13.8	13.8	13.8	1.0	
TDS	25040.0	25040.0	25040.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	499.00	499.00	499.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	608.78	608.78	608.78	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	1060.00	1060.00	1060.00	1.00	
SO4	15624	15624	15624	1.00	
NO3(N)	1.22	1.22	1.22	1.00	
CATIONS					
NA	4845.00	4845.00	4845.00	1.00	
K	10.00	10.00	10.00	1.00	
CA	663.00	663.00	663.00	1.00	
MG	1280.00	1280.00	1280.00	1.00	
FE,TOT				0.00	
FE,DISS	0.20	0.20	0.20	1.00	
MN	0.35	0.35	0.35	1.00	
CALCULATED DATA					
HARDNESS	6906	6906	6906	1	
NC HARDNESS				0	
SAR	25	25	25	1	
IONIC RATIOS(%)					
NA+K	60	60	60	1	
CA	9	9	9	1	
MG	30	30	30	1	
HCO3+CO3	3	3	3	1	
CL	8	8	8	1	
SO4	89	89	89	1	
TDS(SUM)	24098.5	24098.5	24098.5	1.0	
TDS(SUM)/SP COND				0.00	
TDS(CALC)	23789.0	23789.0	23789.0	1.0	
TDS/TDS(CALC)	1.05	1.05	1.05	1.00	
TOTAL CATIONS	349.41	349.41	349.41	1.00	
TOTAL ANIONS	365.35	365.35	365.35	1.00	
CAT-AN BALANCE	-2.20	-2.20	-2.20	1.00	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA6 WATER BEARING UNIT=QAL

	RAW DATA			
	12MAR90	04JUN90	25SEP90	07NOV90
WATER DEPTH	13.5	12.5	14.6	14.7
WATER LEVEL ELEV	5926.9	5927.9	5925.8	5925.7
SP COND - FIELD				
PH				
TEMP(CELSIUS)		12.3		
TDS		34732.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		728.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		888.16		
CO3		0.00		
CL		1100.00		
SO4		17009		
NO3(N)		174.28		
CATIONS				
NA		5951.00		
K		20.00		
CA		435.00		
MG		1260.00		
FE,TOT				
FE,DISS		1.60		
MN		0.10		
CALCULATED DATA				
HARDNESS		6254		
NC HARDNESS				
SAR		33		
IONIC RATIOS(%)				
NA+K		67		
CA		6		
MG		27		
HCO3+CO3		4		
CL		8		
SO4		89		
TDS(SUM)		26846.1		
TDS(SUM)/SP COND				
TDS(CALC)		26394.6		
TDS/TDS(CALC)		1.32		
TOTAL CATIONS		384.79		
TOTAL ANIONS		412.27		
CAT-AN BALANCE		-3.40		

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=REFUSE DISPOSAL WELL=RDA6 WATER BEARING UNIT=QAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	13.8	12.5	14.7	4.0	1.0
WATER LEVEL ELEV	5926.6	5925.7	5927.9	4.0	1.0
SP COND - FIELD				0	
PH				0.0	
TEMP(CELSIUS)	12.3	12.3	12.3	1.0	
TDS	34732.0	34732.0	34732.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	728.00	728.00	728.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	888.16	888.16	888.16	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	1100.00	1100.00	1100.00	1.00	
SO4	17009	17009	17009	1.00	
NO3(N)	174.28	174.28	174.28	1.00	
CATIONS					
NA	5951.00	5951.00	5951.00	1.00	
K	20.00	20.00	20.00	1.00	
CA	435.00	435.00	435.00	1.00	
MG	1260.00	1260.00	1260.00	1.00	
FE,TOT				0.00	
FE,DISS	1.60	1.60	1.60	1.00	
MN	0.10	0.10	0.10	1.00	
CALCULATED DATA					
HARDNESS	6254	6254	6254	1	
NC HARDNESS				0	
SAR	33	33	33	1	
IONIC RATIOS(%)					
NA+K	67	67	67	1	
CA	6	6	6	1	
MG	27	27	27	1	
HCO3+CO3	4	4	4	1	
CL	8	8	8	1	
SO4	89	89	89	1	
TDS(SUM)	26846.1	26846.1	26846.1	1.0	
TDS(SUM)/SP COND				0.00	
TDS(CALC)	26394.6	26394.6	26394.6	1.0	
TDS/TDS(CALC)	1.32	1.32	1.32	1.00	
TOTAL CATIONS	384.79	384.79	384.79	1.00	
TOTAL ANIONS	412.27	412.27	412.27	1.00	
CAT-AN BALANCE	-3.40	-3.40	-3.40	1.00	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-1 WATER BEARING UNIT=CAL

	RAW DATA			
	12MAR90	04JUN90	19SEP90	07NOV90
WATER DEPTH	10.1	10.5	5.2	11.9
WATER LEVEL ELEV	6060.2	6059.8	6065.1	6058.4
SP COND - FIELD				
PH			6.5	
TEMP(CELSIUS)		15.1	11.9	
TDS		21840.0	23336.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		687.00	936.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		838.14	1141.92	
CO3		0.00	0.00	
CL		1200.00	750.00	
SO4		13500	13525	
NO3(N)		53.80		
CATIONS				
NA		4550.00	4670.00	
K		30.00	37.00	
CA		685.00	457.00	
MG		1060.00	773.00	
FE,TOT				
FE,DISS		1.80	0.73	
MN		0.48	0.91	
CALCULATED DATA				
HARDNESS		6059	4312	
NC HARDNESS				
SAR		25	31	
IONIC RATIOS(%)				
NA+K		62	70	
CA		11	8	
MG		27	22	
HCO3+CO3		4	6	
CL		10	7	
SO4		86	88	
TDS(SUM)		21928.5	21355.6	
TDS(SUM)/SP COND				
TDS(CALC)		21502.4	20775.1	
TDS/TDS(CALC)		1.02	1.12	
TOTAL CATIONS		320.15	290.54	
TOTAL ANIONS		332.68	321.47	
CAT-AN BALANCE		-1.90	-5.10	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-1 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	9.4	5.2	11.9	4.0	2.9
WATER LEVEL ELEV	6060.9	6058.4	6065.1	4.0	2.9
SP COND - FIELD				0	
PH	6.5	6.5	6.5	1.0	
TEMP(CELSIUS)	13.5	11.9	15.1	2.0	2.3
TDS	22588.0	21840.0	23336.0	2.0	1057.8
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	811.50	687.00	936.00	2.00	176.07
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	990.03	838.14	1141.92	2.00	214.80
CO3	0.00	0.00	0.00	2.00	0.00
CL	975.00	750.00	1200.00	2.00	318.20
SO4	13512.5	13500	13525	2.00	17.68
NO3(N)	53.80	53.80	53.80	1.00	
CATIONS					
NA	4610.00	4550.00	4670.00	2.00	84.85
K	33.50	30.00	37.00	2.00	4.95
CA	571.00	457.00	685.00	2.00	161.22
MG	916.50	773.00	1060.00	2.00	202.94
FE,TOT				0.00	
FE,DISS	1.26	0.73	1.80	2.00	0.76
MN	0.69	0.48	0.91	2.00	0.30
CALCULATED DATA					
HARDNESS	5186	4312	6059	2	1235
NC HARDNESS				0	
SAR	28	25	31	2	4
IONIC RATIOS(%)					
NA+K	66	62	70	2	6
CA	9	8	11	2	2
MG	25	22	27	2	4
HCO3+CO3	5	4	6	2	1
CL	8	7	10	2	3
SO4	87	86	88	2	1
TDS(SUM)	21642.0	21355.6	21928.5	2.0	405.1
TDS(SUM)/SP COND				0.00	
TDS(CALC)	21138.8	20775.1	21502.4	2.0	514.3
TDS/TDS(CALC)	1.07	1.02	1.12	2.00	0.08
TOTAL CATIONS	305.35	290.54	320.15	2.00	20.94
TOTAL ANIONS	327.08	321.47	332.68	2.00	7.93
CAT-AN BALANCE	-3.50	-5.10	-1.90	2.00	2.26

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-2 WATER BEARING UNIT=CAL

	RAW DATA			
	12MAR90	04JUN90	19SEP90	07NOV90
WATER DEPTH	10.2	8.2	10.7	10.6
WATER LEVEL ELEV	6038.0	6040.0	6037.5	6037.6
SP COND - FIELD				
PH				
TEMP(CELSIUS)				
TDS				
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL				
NONCARBONATE				
ANIONS				
HCO3				
CO3				
CL				
SO4				
NO3(N)				
CATIONS				
NA				
K				
CA				
MG				
FE,TOT				
FE,DISS				
MN				
CALCULATED DATA				
HARDNESS				
NC HARDNESS				
SAR				
IONIC RATIOS(%)				
NA+K				
CA				
MG				
HCO3+CO3				
CL				
SO4				
TDS(SUM)				
TDS(SUM)/SP COND				
TDS(CALC)				
TDS/TDS(CALC)				
TOTAL CATIONS				
TOTAL ANIONS				
CAT-AN BALANCE				

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-2 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	9.9	8.2	10.7	4.0	1.2
WATER LEVEL ELEV	6038.3	6037.5	6040.0	4.0	1.2
SP COND - FIELD				0	
PH				0.0	
TEMP(CELSIUS)				0.0	
TDS				0.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL				0.00	
NONCARBONATE				0.00	
ANIONS					
HCO3				0.00	
CO3				0.00	
CL				0.00	
SO4				0.00	
NO3(N)				0.00	
CATIONS					
NA				0.00	
K				0.00	
CA				0.00	
MG				0.00	
FE,TOT				0.00	
FE,DISS				0.00	
MN				0.00	
CALCULATED DATA					
HARDNESS				0	
NC HARDNESS				0	
SAR				0	
IONIC RATIOS(%)					
NA+K				0	
CA				0	
MG				0	
HCO3+CO3				0	
CL				0	
SO4				0	
TDS(SUM)				0.0	
TDS(SUM)/SP COND				0.00	
TDS(CALC)				0.0	
TDS/TDS(CALC)				0.00	
TOTAL CATIONS				0.00	
TOTAL ANIONS				0.00	
CAT-AN BALANCE				0.00	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-3 WATER BEARING UNIT=CAL

	RAW DATA			
	12MAR90	04JUN90	19SEP90	07NOV90
WATER DEPTH	7.8	7.1	7.8	8.0
WATER LEVEL ELEV	6048.2	6048.9	6048.2	6048.0
SP COND - FIELD				
PH			6.5	
TEMP(CELSIUS)		15.3	13.3	
TDS		55942.0	60330.0	
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		712.00	676.00	
NONCARBONATE		0.00	0.00	
ANIONS				
HCO3		868.64	824.72	
CO3		0.00	0.00	
CL		168.00	1200.00	
SO4		36953	39357	
NO3(N)		133.99		
CATIONS				
NA		12380	13500	
K		95.00	74.00	
CA		479.00	863.00	
MG		2222.00	2130.00	
FE,TOT				
FE,DISS		2.00	0.02	
MN		5.00	4.03	
CALCULATED DATA				
HARDNESS		10308	10891	
NC HARDNESS				
SAR		53	56	
IONIC RATIOS(%)				
NA+K		72	73	
CA		3	5	
MG		24	22	
HCO3+CO3		2	2	
CL		1	4	
SO4		98	95	
TDS(SUM)		53319.5	57952.8	
TDS(SUM)/SP COND				
TDS(CALC)		52877.9	57533.6	
TDS/TDS(CALC)		1.06	1.05	
TOTAL CATIONS		747.90	807.57	
TOTAL ANIONS		797.95	866.78	
CAT-AN BALANCE		-3.20	-3.50	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL
*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-3 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	7.7	7.1	8.0	4.0	0.4
WATER LEVEL ELEV	6048.3	6048.0	6048.9	4.0	0.4
SP COND - FIELD				0	
PH	6.5	6.5	6.5	1.0	
TEMP(CELSIUS)	14.3	13.3	15.3	2.0	1.4
TDS	58136.0	55942.0	60330.0	2.0	3102.8
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	694.00	676.00	712.00	2.00	25.46
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	846.68	824.72	868.64	2.00	31.06
CO3	0.00	0.00	0.00	2.00	0.00
CL	684.00	168.00	1200.00	2.00	729.73
SO4	38155	36953	39357	2.00	1699.88
NO3(N)	133.99	133.99	133.99	1.00	
CATIONS					
NA	12940	12380	13500	2.00	791.96
K	84.50	74.00	95.00	2.00	14.85
CA	671.00	479.00	863.00	2.00	271.53
MG	2176.00	2130.00	2222.00	2.00	65.05
FE,TOT				0.00	
FE,DISS	1.01	0.02	2.00	2.00	1.40
MN	4.51	4.03	5.00	2.00	0.69
CALCULATED DATA					
HARDNESS	10600	10308	10891	2	412
NC HARDNESS				0	
SAR	55	53	56	2	2
IONIC RATIOS(%)					
NA+K	73	72	73	2	0
CA	4	3	5	2	2
MG	23	22	24	2	2
HCO3+CO3	2	2	2	2	0
CL	2	1	4	2	2
SO4	96	95	98	2	2
TDS(SUM)	55636.1	53319.5	57952.8	2.0	3276.2
TDS(SUM)/SP COND				0.00	
TDS(CALC)	55205.7	52877.9	57533.6	2.0	3292.0
TDS/TDS(CALC)	1.05	1.05	1.06	2.00	0.01
TOTAL CATIONS	777.73	747.90	807.57	2.00	42.19
TOTAL ANIONS	832.37	797.95	866.78	2.00	48.67
CAT-AN BALANCE	-3.35	-3.50	-3.20	2.00	0.21

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-4 WATER BEARING UNIT=CAL

	RAW DATA			
	12MAR90	08JUN90	19SEP90	08NOV90
WATER DEPTH	10.6	11.9	13.4	13.3
WATER LEVEL ELEV	5928.6	5927.3	5925.8	5925.9
SP COND - FIELD		3920		
PH				
TEMP(CELSIUS)		13.9		
TDS		3824.0		
ACIDITY,TOT				
ALKALINITY(CACO3)				
TOTAL		355.00		
NONCARBONATE		0.00		
ANIONS				
HCO3		433.10		
CO3		0.00		
CL		65.00		
SO4		2293.00		
NO3(N)		8.01		
CATIONS				
NA		466.00		
K		5.00		
CA		314.00		
MG		225.00		
FE,TOT				
FE,DISS		0.18		
MN		0.01		
CALCULATED DATA				
HARDNESS		1708		
NC HARDNESS				
SAR		5		
IONIC RATIOS(%)				
NA+K		37		
CA		29		
MG		34		
HCO3+CO3		13		
CL		3		
SO4		84		
TDS(SUM)		3810.7		
TDS(SUM)/SP COND		0.97		
TDS(CALC)		3590.6		
TDS/TDS(CALC)		1.07		
TOTAL CATIONS		54.58		
TOTAL ANIONS		57.28		
CAT-AN BALANCE		-2.40		

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

WATER BEARING UNITS: QAL=QUITCHUPAH ALLUVIUM CAL=CHRISTIANSEN ALLUVIUM BG=BLUEGATE SHALE
U=UPPER FERRON SS M=MIDDLE FERRON SS L=LOWER FERRON SS
NOTE ON WATER DEPTH: NEGATIVE VALUE INDICATES A FLOWING WELL

*****

MONITORING AREA=SURFACE MINE(1) WELL=SM1-4 WATER BEARING UNIT=CAL

	STATISTICS				
	MEAN	MIN	MAX	N	STD
WATER DEPTH	12.3	10.6	13.4	4.0	1.3
WATER LEVEL ELEV	5926.9	5925.8	5928.6	4.0	1.3
SP COND - FIELD	3920	3920	3920	1	
PH				0.0	
TEMP(CELSIUS)	13.9	13.9	13.9	1.0	
TDS	3824.0	3824.0	3824.0	1.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL	355.00	355.00	355.00	1.00	
NONCARBONATE	0.00	0.00	0.00	1.00	
ANIONS					
HCO3	433.10	433.10	433.10	1.00	
CO3	0.00	0.00	0.00	1.00	
CL	65.00	65.00	65.00	1.00	
SO4	2293.00	2293.00	2293.00	1.00	
NO3(N)	8.01	8.01	8.01	1.00	
CATIONS					
NA	466.00	466.00	466.00	1.00	
K	5.00	5.00	5.00	1.00	
CA	314.00	314.00	314.00	1.00	
MG	225.00	225.00	225.00	1.00	
FE,TOT				0.00	
FE,DISS	0.18	0.18	0.18	1.00	
MN	0.01	0.01	0.01	1.00	
CALCULATED DATA					
HARDNESS	1708	1708	1708	1	
NC HARDNESS				0	
SAR	5	5	5	1	
IONIC RATIOS(%)					
NA+K	37	37	37	1	
CA	29	29	29	1	
MG	34	34	34	1	
HCO3+CO3	13	13	13	1	
CL	3	3	3	1	
SO4	84	84	84	1	
TDS(SUM)	3810.7	3810.7	3810.7	1.0	
TDS(SUM)/SP COND	0.97	0.97	0.97	1.00	
TDS(CALC)	3590.6	3590.6	3590.6	1.0	
TDS/TDS(CALC)	1.07	1.07	1.07	1.00	
TOTAL CATIONS	54.58	54.58	54.58	1.00	
TOTAL ANIONS	57.28	57.28	57.28	1.00	
CAT-AN BALANCE	-2.40	-2.40	-2.40	1.00	

WATER LEVEL DATA FOR THE EMERY MINE
FOR THE PERIOD FROM 1/1/90 TO 12/31/90

---------- WELL=AA AQUIFER=BG ----------

DATE	READING	WLELEV
15MAR90	60.0	5909.7
11JUN90	60.0	5909.7
19SEP90	58.8	5910.9
08NOV90	60.2	5909.5

---------- WELL=AA AQUIFER=L ----------

DATE	READING	WLELEV
15MAR90	87.3	5881.3
11JUN90	87.8	5880.8
19SEP90	88.7	5879.9
08NOV90	88.5	5880.1

---------- WELL=AA AQUIFER=M ----------

DATE	READING	WLELEV
15MAR90	85.4	5883.8
11JUN90	86.0	5883.2
19SEP90	84.5	5884.7
08NOV90	84.5	5884.7

---------- WELL=AA AQUIFER=U ----------

DATE	READING	WLELEV
15MAR90	111.5	5858.3
11JUN90	111.6	5858.2
19SEP90	111.8	5858.0
08NOV90	111.7	5858.1

---------- WELL=BRYANT AQUIFER=U ----------

DATE	READING	WLELEV
15MAR90	291.8	5732.7
08JUN90	292.5	5732.0
17SEP90	294.5	5730.0
08NOV90	294.1	5730.4

WATER LEVEL DATA FOR THE EMERY MINE
FOR THE PERIOD FROM 1/1/90 TO 12/31/90

WELL=EMRIA1 AQUIFER=UM

DATE	READING	WLELEV
12MAR90	142.5	6013.2
01JUN90	142.4	6013.3
17SEP90	142.6	6013.1
07NOV90	144.0	6011.7

WELL=EMRIA2 AQUIFER=BGUML

DATE	READING	WLELEV
12MAR90	42.4	6041.0
08JUN90	44.8	6038.6
19SEP90	45.8	6037.6
07NOV90	46.7	6036.7

WELL=EMRIA3 AQUIFER=BGU

DATE	READING	WLELEV
12MAR90	52.0	6039.8
04JUN90	62.0	6029.8
19SEP90	82.5	6009.3
07NOV90	49.3	6042.5

WELL=FC346WW AQUIFER=UM

DATE	READING	WLELEV
12MAR90	101.7	6021.5
01JUN90	104.0	6019.2
17SEP90	100.6	6022.6
07NOV90	103.6	6019.6

WELL=H AQUIFER=BG

DATE	READING	WLELEV
15MAR90	36.3	6195.3
11JUN90	36.6	6195.0
19SEP90	36.2	6195.4
08NOV90	36.3	6195.3

FOR THE PERIOD FROM 1/1/90 TO 12/31/90

---------- WELL=H AQUIFER=L ----------

DATE	READING	WLELEV
15MAR90	54.6	6175.8
11JUN90	56.5	6173.9
19SEP90	58.8	6171.6
08NOV90	67.2	6163.2

---------- WELL=H AQUIFER=M ----------

DATE	READING	WLELEV
15MAR90	348.7	5881.7
11JUN90	367.0	5863.4
19SEP90	366.0	5864.4
08NOV90	375.0	5855.4

---------- WELL=H AQUIFER=U ----------

DATE	READING	WLELEV
15MAR90	57.5	6172.9
11JUN90	54.2	6176.2
19SEP90	57.0	6173.4
08NOV90	57.0	6173.4

---------- WELL=I AQUIFER=BG ----------

DATE	READING	WLELEV
15MAR90	45.2	6064.4
01JUN90	45.6	6064.0
17SEP90	45.7	6063.9
07NOV90	47.3	6062.3

---------- WELL=I AQUIFER=L ----------

DATE	READING	WLELEV
15MAR90	17.0	6091.7
01JUN90	17.8	6090.9
17SEP90	16.8	6091.9
07NOV90	18.0	6090.7

WELL=I AQUIFER=M

DATE	READING	WLELEV
15MAR90	228.5	5880.4
01JUN90	231.8	5877.1
17SEP90	233.4	5875.5
07NOV90	235.5	5873.4

WELL=I2 AQUIFER=U

DATE	READING	WLELEV
15MAR90	.	.
01JUN90	.	.
17SEP90	399.0	5706.0
07NOV90	402.0	5703.0

WELL=KEMMER AQUIFER=L

DATE	READING	WLELEV
12MAR90	-20.0	6306.7
04JUN90	-20.0	6306.7
17SEP90	-17.0	6303.7
07NOV90	-17.0	6303.7

WELL=LEWIS AQUIFER=U

DATE	READING	WLELEV
12MAR90	260.5	5759.9
08JUN90	261.0	5759.4
17SEP90	262.0	5758.4
08NOV90	262.7	5757.7

WELL=MUDDY1 AQUIFER=U

DATE	READING	WLELEV
12MAR90	128.2	5940.0
08JUN90	128.6	5939.6
18SEP90	130.2	5938.0
07NOV90	129.6	5938.6

FOR THE PERIOD FROM 1/1/90 TO 12/31/90

---------- WELL=MUDDY2 AQUIFER=U ----------

DATE	READING	WLELEV
12MAR90	97.0	5949.8
04JUN90	98.5	5948.3
18SEP90	105.0	5941.8
07NOV90	99.5	5947.3

---------- WELL=RDA1 AQUIFER=QAL ----------

DATE	READING	WLELEV
12MAR90	15.2	5943.3
04JUN90	11.3	5947.2
25SEP90	15.7	5942.8
07NOV90	15.9	5942.6

---------- WELL=RDA2 AQUIFER=QAL ----------

DATE	READING	WLELEV
12MAR90	15.2	5940.5
04JUN90	15.1	5940.6
25SEP90	16.1	5939.6
07NOV90	16.0	5939.7

---------- WELL=RDA3 AQUIFER=QAL ----------

DATE	READING	WLELEV
12MAR90	22.0	5924.5
04JUN90	22.4	5924.1
25SEP90	23.3	5923.2
07NOV90	22.6	5923.9

---------- WELL=RDA4 AQUIFER=QAL ----------

DATE	READING	WLELEV
12MAR90	21.2	5922.8
04JUN90	21.5	5922.5
25SEP90	22.0	5922.0
07NOV90	21.8	5922.2

FOR THE PERIOD FROM 1/1/90 TO 12/31/90

WELL=RDA5 AQUIFER=QAL

DATE	READING	WLELEV
12MAR90	20.4	5922.0
04JUN90	20.0	5922.4
25SEP90	20.4	5922.0
07NOV90	20.7	5921.7

WELL=RDA6 AQUIFER=QAL

DATE	READING	WLELEV
12MAR90	15.1	5926.9
04JUN90	14.1	5927.9
25SEP90	16.2	5925.8
07NOV90	16.3	5925.7

WELL=R1 AQUIFER=L

DATE	READING	WLELEV
15MAR90	-235.3	6269.5
11JUN90	-235.3	6269.5
19SEP90	-235.3	6269.5
08NOV90	-235.3	6269.5

WELL=R2 AQUIFER=BG

DATE	READING	WLELEV
15MAR90	84.3	5947.4
11JUN90	85.9	5945.8
19SEP90	85.8	5945.9
08NOV90	85.6	5946.1

WELL=R2 AQUIFER=M

DATE	READING	WLELEV
15MAR90	400.8	5630.3
11JUN90	403.9	5627.2
19SEP90	405.8	5625.3
08NOV90	405.0	5626.1

WELL=R2 AQUIFER=U

DATE	READING	WLELEV
15MAR90	481.7	5550.0
11JUN90	.	.
19SEP90	.	.
08NOV90	483.0	5548.7

WELL=SM1-1 AQUIFER=CAL

DATE	READING	WLELEV
12MAR90	11.4	6060.2
04JUN90	11.8	6059.8
19SEP90	6.5	6065.1
07NOV90	13.2	6058.4

WELL=SM1-2 AQUIFER=CAL

DATE	READING	WLELEV
12MAR90	13.8	6038.0
04JUN90	11.8	6040.0
19SEP90	14.3	6037.5
07NOV90	14.2	6037.6

WELL=SM1-3 AQUIFER=CAL

DATE	READING	WLELEV
12MAR90	8.3	6048.2
04JUN90	7.6	6048.9
19SEP90	8.3	6048.2
07NOV90	8.5	6048.0

WELL=SM1-4 AQUIFER=CAL

DATE	READING	WLELEV
12MAR90	13.0	5928.6
08JUN90	14.3	5927.3
19SEP90	15.8	5925.8
08NOV90	15.7	5925.9

FOR THE PERIOD FROM 1/1/90 TO 12/31/90

---------- WELL=TP AQUIFER=U ----------

DATE	READING	WLELEV
12MAR90	361.0	5641.7
08JUN90	366.7	5636.0
18SEP90	372.0	5630.7
07NOV90	371.0	5631.7

---------- WELL=T1 AQUIFER=BG ----------

DATE	READING	WLELEV
12MAR90	13.8	5989.4
08JUN90	14.3	5988.9
17SEP90	15.2	5988.0
07NOV90	15.7	5987.5

---------- WELL=T1 AQUIFER=U ----------

DATE	READING	WLELEV
12MAR90	334.0	5669.2
04JUN90	349.0	5654.2
18SEP90	369.0	5634.2
07NOV90	398.0	5605.2

---------- WELL=T2 AQUIFER=BG ----------

DATE	READING	WLELEV
12MAR90	14.0	5989.0
04JUN90	11.0	5992.0
18SEP90	15.6	5987.4
07NOV90	13.7	5989.3

---------- WELL=T2 AQUIFER=U ----------

DATE	READING	WLELEV
12MAR90	299.5	5698.2
04JUN90	.	.
18SEP90	.	.
07NOV90	.	.

FOR THE PERIOD FROM 1/1/90 TO 12/31/90

WELL=USGS1-2 AQUIFER=U

DATE	READING	WLELEV
12MAR90	101.0	5945.3
04JUN90	102.2	5944.1
18SEP90	103.4	5942.9
07NOV90	103.8	5942.5

WELL=USGS3-1 AQUIFER=BG

DATE	READING	WLELEV
12MAR90	18.0	6028.9
04JUN90	19.8	6027.1
18SEP90	20.5	6026.4
07NOV90	20.4	6026.5

WELL=USGS4-1 AQUIFER=BG

DATE	READING	WLELEV
12MAR90	16.7	6030.8
04JUN90	19.9	6027.6
18SEP90	20.1	6027.4
07NOV90	19.8	6027.7

WELL=WW1 AQUIFER=L

DATE	READING	WLELEV
12MAR90	67.3	5852.7
08JUN90	68.0	5852.0
26OCT90	68.5	5851.5
08NOV90	68.0	5852.0

WELL=ZZ AQUIFER=L

DATE	READING	WLELEV
12MAR90	149.5	5919.2
08JUN90	149.9	5918.8
18SEP90	150.6	5918.1
07NOV90	149.8	5918.9

FIRST QUARTER 1989 REPORT
FIELD DATA SUMMARY
CONSOLIDATION COAL COMPANY
EMERY MINE

SURFACE WATER MONITORING

Site #	Date	Location	Discharge cfs	ph	Temp °C	Conductivity Micromhos
1A	3/22/90	QC above tributary	3.34	7.4	7.7	700
2	3/20/90	CW near flume site	2.23	7.1	11.8	1920
3	3/22/90	QC below CW	5.57	7.0	7.3	1420
4	3/20/90	QC at gage site	-	7.0	11.6	1330
5	3/20/90	CW at gage site	2.23	7.1	10.0	1770
6	3/22/90	Pond 1 discharge	-	7.5	11.4	4120
7	3/22/90	Pond 2 discharge	0	-	-	-
8	3/22/90	Trib above pond	0	-	-	-
9	3/20/90	Ivie Lower	2.34	7.1	13.0	3560
10	3/20/90	Ivie Upper	0.89	7.9	13.2	1410
11	3/22/90	Pond 5 discharge	0	-	-	-
12	3/22/90	Pond 6 discharge	-	7.4	11.6	1890

SPRINGFLOW DATA

Spring	Location	Sample Date	Flow (gpm)
Christiansen	NE¼, NE¼, NW¼, NW¼ Sec. 26, T22S, R6E	3/16/90	Not Measurable
Emery Co. #1	NW¼, NE¼, NW¼, NW¼ Sec. 29, T22S, R6E	3/16/90	Not Measurable
Emery Co. #2	NE¼, SE¼, NW¼, NW¼ Sec. 29, T22S, R6E	3/16/90	No Flow
Bryant #1	SE¼, SW¼, NW¼, NE¼ Sec. 29, T22S, R6E	3/16/90	Not Measurable
Bryant #2	NW¼, SE¼, NE¼, NW¼ Sec. 29, T22S, R6E	3/16/90	No Flow

SECOND QUARTER 1990 REPORT
FIELD DATA SUMMARY
CONSOLIDATION COAL COMPANY
EMERY MINE

SURFACE WATER MONITORING

Site #	Date	Location	Discharge cfs	ph	Temp °C	Conductivity Micromhos
1A	5/18/90	QC above tributary	0.22	6.9	18.8	3540
2	5/21/90	CW near flume site	0.67	6.5	15.1	8110
3	5/18/90	QC below CW	2.67	6.8	16.6	4330
4	5/18/90	QC at gage site	2.01	6.9	16.2	3160
5	5/18/90	CW at gage site	0.67	8.1	14.2	4560
6	5/21/90	Pond 1 discharge	0.48	6.5	17.1	5030
7	5/21/90	Pond 2 discharge	0	-	-	-
8	5/21/90	Trib above pond	0	-	-	-
9	5/21/90	Ivie Lower	0.89	6.9	16.4	3820
10	5/21/90	Ivie Upper	0.06	7.5	12.6	2930
11	5/21/90	Pond 5 discharge	0	-	-	-
12	5/21/90	Pond 6 discharge	0.49	6.9	18.7	2780

SPRINGFLOW DATA

Spring	Location	Sample Date	Flow (gpm)
Christiansen	NE¼, NE¼, NW¼, NW¼ Sec. 26, T22S, R6E	5/21/90	No Flow
Emery Co. #1	NW¼, NE¼, NW¼, NW¼ Sec. 29, T22S, R6E	5/21/90	No Flow
Emery Co. #2	NE¼, SE¼, NW¼, NW¼ Sec. 29, T22S, R6E	5/21/90	No Flow
Bryant #1	SE¼, SW¼, NW¼, NE¼ Sec. 29, T22S, R6E	5/21/90	No Flow
Bryant #2	NW¼, SE¼, NE¼, NW¼ Sec. 29, T22S, R6E	5/21/90	No Flow

THIRD QUARTER 1990 REPORT
FIELD DATA SUMMARY
CONSOLIDATION COAL COMPANY
EMERY MINE

SURFACE WATER MONITORING

Site #	Date	Location	Discharge cfs	ph	Temp °C	Conductivity Micromhos
1	9/20/90	QC above pond 1 trib.	1.78	7.5	17.5	3080
1A	9/20/90	QC at Rt. 10	0.11	8.0	12.1	1970
2	9/20/90	CW near flume site	0.11	7.1	19.0	10310
3	9/20/90	QC below CW	2.45	7.3	15.9	2820
4	9/20/90	QC at gage site	2.23	7.3	15.3	2840
5	9/20/90	CW at gage site	0.22	7.5	14.8	2260
6	9/20/90	Pond 1 discharge	0	-	-	-
7	9/20/90	Pond 2 discharge	0	-	-	-
8	9/20/90	Trib above pond	0	-	-	-
9	9/21/90	Ivie Lower	0.28	7.3	22.4	3790
10	9/21/90	Ivie Upper	0.07	8.1	18.4	1100
11	9/20/90	Pond 5 discharge	0	-	-	-
12	9/20/90	Pond 6 discharge	0	-	-	-

SPRINGFLOW DATA

Spring	Location	Sample Date	Flow (gpm)
Christiansen	NE¼, NE¼, NW¼, NW¼ Sec. 26, T22S, R6E	9/19/90	No Flow
Emery Co. #1	NW¼, NE¼, NW¼, NW¼ Sec. 29, T22S, R6E	9/25/90	No Flow
Emery Co. #2	NE¼, SE¼, NW¼, NW¼ Sec. 29, T22S, R6E	9/25/90	No Flow
Bryant #1	SE¼, SW¼, NW¼, NE¼ Sec. 29, T22S, R6E	9/25/90	No Flow
Bryant #2	NW¼, SE¼, NE¼, NW¼ Sec. 29, T22S, R6E	9/25/90	No Flow

FOURTH QUARTER 1990 REPORT
FIELD DATA SUMMARY
CONSOLIDATION COAL COMPANY
EMERY MINE

SURFACE WATER MONITORING

Site #	Date	Location	Discharge cfs	ph	Temp °C	Conductivity Micromhos
1	11/6/90	QC above pond 1 trib.	5.0	7.3	6.9	1650
1A	11/6/90	QC at Rt. 10	5.9	7.3	6.5	1760
2	11/6/90	CW near flume site	0.17	6.8	7.8	7300
3	11/6/90	QC below CW	7.1	7.5	4.2	2290
4	11/6/90	QC at gage site	6.5	7.4	4.6	1530
5	11/6/90	CW at gage site	0.3	7.4	4.8	3420
6	11/6/90	Pond 1 discharge	1.86	7.6	9.3	4000
7	11/6/90	Pond 2 discharge	0	-	-	-
8	11/6/90	Trib above pond	0	-	-	-
9	11/6/90	Ivie Lower	1.0	7.5	3.8	2950
10	11/6/90	Ivie Upper	0.25	7.5	3.1	5560
11	11/6/90	Pond 5 discharge	0	-	-	-
12	11/6/90	Pond 6 discharge	0.58	7.8	8.5	2200

SPRINGFLOW DATA

Spring	Location	Sample Date	Flow (gpm)
Christiansen	NE¼, NE¼, NW¼, NW¼ Sec. 26, T22S, R6E	11/19/90	No Flow
Emery Co. #1	NW¼, NE¼, NW¼, NW¼ Sec. 29, T22S, R6E	11/19/90	Not Measurable
Emery Co. #2	NE¼, SE¼, NW¼, NW¼ Sec. 29, T22S, R6E	11/19/90	No Flow
Bryant #1	SE¼, SW¼, NW¼, NE¼ Sec. 29, T22S, R6E	11/19/90	Not Measurable
Bryant #2	NW¼, SE¼, NE¼, NW¼ Sec. 29, T22S, R6E	11/19/90	Not Measurable

SITE=S01

	--- RAW DATA---- 20SEP90	06NOV90
FLOW(CFS)	1.78	5.00
SP COND - FIELD	3080	1650
PH	7.5	7.3
TEMP(CELSIUS)	17.5	6.9
TSS	6.0	50.0
TDS	2224.0	1670.0
SS	0.2	0.2
OIL & GREASE		
ACIDITY,TOT	0.00	0.00
ALKALINITY(CACO3)		
TOTAL	345.00	328.00
NONCARBONATE	0.00	0.00
ANIONS		
HCO3	402.60	400.16
CO3	9.00	0.00
CL,DISS	74.00	57.00
SO4,DISS	1282.00	873.00
CATIONS		
NA,DISS	478.00	232.00
K,DISS	6.00	4.00
CA,DISS	149.00	152.00
MG,DISS	93.00	80.00
FE,DISS	0.11	0.02
MN,DISS	0.01	0.03
OTHER IONS		
NA,TOTAL	524.00	260.00
K,TOTAL	6.00	4.00
CA,TOTAL	155.00	162.00
MG,TOTAL	93.00	88.00
FE,TOT	0.39	0.83
MN,TOTAL	0.03	0.06
CALCULATED DATA		
HARDNESS	754	766
NC HARDNESS		
SAR	8	4
IONIC RATIOS(%)		
NA+K	58	42
CA	21	31
MG	21	27
HCO3+CO3	19	25
CL	6	6
SO4	75	69
TDS(SUM)	2493.7	1798.2
TDS(SUM)/SP COND	0.81	1.09
TDS(CALC)	2289.1	1594.8
TDS/TDS(CALC)	0.97	1.05
TOTAL CATIONS	36.04	24.36
TOTAL ANIONS	35.58	26.34
CAT-AN BALANCE	0.50	-3.90

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S01

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	3.39	1.78	5.00	2.00	2.28
SP COND - FIELD	2365	1650	3080	2	1011
PH	7.4	7.3	7.5	2.0	0.1
TEMP(CELSIUS)	12.2	6.9	17.5	2.0	7.5
TSS	28.0	6.0	50.0	2.0	31.1
TDS	1947.0	1670.0	2224.0	2.0	391.7
SS	0.2	0.2	0.2	2.0	0.0
OIL & GREASE				0.0	
ACIDITY,TOT	0.00	0.00	0.00	2.00	0.00
ALKALINITY(CACO3)					
TOTAL	336.50	328.00	345.00	2.00	12.02
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3	401.38	400.16	402.60	2.00	1.73
CO3	4.50	0.00	9.00	2.00	6.36
CL,DISS	65.50	57.00	74.00	2.00	12.02
SO4,DISS	1077.50	873.00	1282.00	2.00	289.21
CATIONS					
NA,DISS	355.00	232.00	478.00	2.00	173.95
K,DISS	5.00	4.00	6.00	2.00	1.41
CA,DISS	150.50	149.00	152.00	2.00	2.12
MG,DISS	86.50	80.00	93.00	2.00	9.19
FE,DISS	0.06	0.02	0.11	2.00	0.06
MN,DISS	0.02	0.01	0.03	2.00	0.01
OTHER IONS					
NA,TOTAL	392.00	260.00	524.00	2.00	186.68
K,TOTAL	5.00	4.00	6.00	2.00	1.41
CA,TOTAL	158.50	155.00	162.00	2.00	4.95
MG,TOTAL	90.50	88.00	93.00	2.00	3.54
FE,TOT	0.61	0.39	0.83	2.00	0.31
MN,TOTAL	0.04	0.03	0.06	2.00	0.02
CALCULATED DATA					
HARDNESS	760	754	766	2	8
NC HARDNESS				0	
SAR	6	4	8	2	3
IONIC RATIOS(%)					
NA+K	50	42	58	2	12
CA	26	21	31	2	7
MG	24	21	27	2	4
HCO3+CO3	22	19	25	2	4
CL	6	6	6	2	0
SO4	72	69	75	2	4
TDS(SUM)	2146.0	1798.2	2493.7	2.0	491.8
TDS(SUM)/SP COND	0.95	0.81	1.09	2.00	0.20
TDS(CALC)	1942.0	1594.8	2289.1	2.0	490.9
TDS/TDS(CALC)	1.01	0.97	1.05	2.00	0.05
TOTAL CATIONS	30.20	24.36	36.04	2.00	8.25
TOTAL ANIONS	31.01	26.34	35.68	2.00	6.60
CAT-AN BALANCE	-1.70	-3.90	0.50	2.00	3.11

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S01A

	RAW DATA			
	22MAR90	18MAY90	20SEP90	06NOV90
FLOW(CFS)	3.34	0.22	0.11	5.90
SP COND - FIELD	700	3540	1970	1760
PH	7.4	6.9	8.0	7.3
TEMP(CELSIUS)	7.7	18.8	12.1	6.5
TSS	54.0	70.0	20.0	406.0
TDS	672.0	2626.0	1708.0	1730.0
SS	24.1	0.4	0.2	0.2
OIL & GREASE	1.0	1.0	3.0	1.0
ACIDITY,TOT	0.00	0.00	0.00	0.00
ALKALINITY(CACO3)				
TOTAL	224.00	332.00	280.00	342.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	273.28	405.04	329.40	417.24
CO3	0.00	0.00	6.00	0.00
CL,DISS	29.00	150.00	72.00	64.00
SO4,DISS	305.00	1434.00	897.00	901.00
CATIONS				
NA,DISS	108.00	406.00	227.00	196.00
K,DISS	3.00	6.00	7.00	6.00
CA,DISS	86.00	173.00	197.00	189.00
MG,DISS	44.00	134.00	95.00	87.00
FE,DISS	0.61	0.11	0.02	0.27
MN,DISS	0.20	0.01	0.01	0.05
OTHER IONS				
NA,TOTAL	150.00		300.00	204.00
K,TOTAL	10.00		6.00	6.00
CA,TOTAL	140.00		195.00	190.00
MG,TOTAL	60.00		95.00	90.00
FE,TOT	37.50	0.79	0.79	4.15
MN,TOTAL	0.25	0.07	0.02	0.12
CALCULATED DATA				
HARDNESS	395	982	882	844
NC HARDNESS				
SAR	2	6	3	3
IONIC RATIOS(%)				
NA+K	38	48	36	34
CA	34	23	35	37
MG	29	29	28	28
HCO3+CO3	38	16	21	25
CL	7	10	8	7
SO4	55	73	71	68
TDS(SUM)	851.9	2709.6	1830.4	1860.6
TDS(SUM)/SP COND	1.22	0.77	0.93	1.06
TDS(CALC)	713.0	2503.7	1663.0	1648.5
TDS/TDS(CALC)	0.94	1.05	1.03	1.05
TOTAL CATIONS	12.72	37.48	27.70	25.28
TOTAL ANIONS	11.69	40.76	26.31	27.40
CAT-AN BALANCE	4.20	-4.20	2.60	-4.00

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S01A

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	2.39	0.11	5.90	4.00	2.78
SP COND - FIELD	1993	700	3540	4	1172
PH	7.4	6.9	8.0	4.0	0.5
TEMP(CELSIUS)	11.3	6.5	18.8	4.0	5.6
TSS	137.5	20.0	406.0	4.0	180.2
TDS	1684.0	672.0	2626.0	4.0	798.8
SS	6.2	0.2	24.1	4.0	11.9
OIL & GREASE	1.5	1.0	3.0	4.0	1.0
ACIDITY,TOT	0.00	0.00	0.00	4.00	0.00
ALKALINITY(CACO3)					
TOTAL	294.50	224.00	342.00	4.00	54.29
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	356.24	273.28	417.24	4.00	67.59
CO3	1.50	0.00	6.00	4.00	3.00
CL,DISS	78.75	29.00	150.00	4.00	51.04
SO4,DISS	884.25	305.00	1434.00	4.00	461.23
CATIONS					
NA,DISS	234.25	108.00	406.00	4.00	125.10
K,DISS	5.50	3.00	7.00	4.00	1.73
CA,DISS	161.25	86.00	197.00	4.00	51.15
MG,DISS	90.00	44.00	134.00	4.00	36.91
FE,DISS	0.25	0.02	0.61	4.00	0.26
MN,DISS	0.07	0.01	0.20	4.00	0.09
OTHER IONS					
NA,TOTAL	218.00	150.00	300.00	3.00	75.97
K,TOTAL	7.33	6.00	10.00	3.00	2.31
CA,TOTAL	175.00	140.00	195.00	3.00	30.41
MG,TOTAL	81.67	60.00	95.00	3.00	18.93
FE,TOT	10.81	0.79	37.50	4.00	17.87
MN,TOTAL	0.11	0.02	0.25	4.00	0.10
CALCULATED DATA					
HARDNESS	776	395	982	4	260
NC HARDNESS				0	
SAR	4	2	6	4	1
IONIC RATIOS(%)					
NA+K	39	34	48	4	6
CA	32	23	37	4	6
MG	29	28	29	4	1
HCO3+CO3	25	16	38	4	9
CL	8	7	10	4	2
SO4	67	55	73	4	8
TDS(SUM)	1813.1	851.9	2709.6	4.0	759.4
TDS(SUM)/SP COND	0.99	0.77	1.22	4.00	0.19
TDS(CALC)	1632.1	713.0	2503.7	4.0	731.6
TDS/TDS(CALC)	1.02	0.94	1.05	4.00	0.05
TOTAL CATIONS	25.79	12.72	37.48	4.00	10.19
TOTAL ANIONS	26.54	11.69	40.76	4.00	11.88
CAT-AN BALANCE	-0.35	-4.20	4.20	4.00	4.38

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S02

	RAW DATA			
	20MAR90	21MAY90	20SEP90	06NOV90
FLOW(CFS)	2.23	0.67	0.11	0.17
SP COND - FIELD	1920	8110	10310	7300
PH	7.1	6.5	7.1	6.8
TEMP(CELSIUS)	11.8	15.1	19.0	7.8
TSS	460.0	26.0	74.0	56.0
TDS	1750.0	7790.0	9858.0	8764.0
SS	28.2	0.3	0.2	0.2
OIL & GREASE	1.0	1.0		
ACIDITY,TOT	0.00	0.00	0.00	0.00
ALKALINITY(CACO3)				
TOTAL	260.00	450.00	425.00	2020.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	317.20	549.00	518.50	1540.86
CO3	0.00	0.00	0.00	454.20
CL,DISS	32.00	140.00	92.00	160.00
SO4,DISS	934.00	5178.00	5351.00	3408.00
CATIONS				
NA,DISS	270.00	1350.00	1430.00	1560.00
K,DISS	4.00	30.00	14.00	10.00
CA,DISS	116.00	496.00	515.00	434.00
MG,DISS	103.00	520.00	484.00	404.00
FE,DISS	0.02	0.19	0.02	0.02
MN,DISS	0.07	0.33	0.03	0.58
OTHER IONS				
NA,TOTAL	280.00		1510.00	1765.00
K,TOTAL	10.00		14.00	10.00
CA,TOTAL	205.00		563.00	435.00
MG,TOTAL	135.00		491.00	405.00
FE,TOT	29.50	0.39	0.61	1.26
MN,TOTAL	0.40	0.51	0.06	0.60
CALCULATED DATA				
HARDNESS	712	3372	3272	2748
NC HARDNESS				
SAR	4	10	11	13
IONIC RATIOS(%)				
NA+K	45	47	49	55
CA	22	19	20	18
MG	32	34	31	27
HCO3+CO3	20	7	7	35
CL	4	3	2	4
SO4	76	89	91	61
TDS(SUM)	1783.7	8309.1	8404.6	7971.7
TDS(SUM)/SP COND	0.93	1.02	0.82	1.09
TDS(CALC)	1622.5	8030.0	8141.0	7188.5
TDS/TDS(CALC)	1.08	0.97	1.21	1.22
TOTAL CATIONS	26.12	127.04	128.08	123.03
TOTAL ANIONS	26.02	123.91	122.50	115.87
CAT-AN BALANCE	0.20	1.20	2.20	3.00

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90
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SITE=S02

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.79	0.11	2.23	4.00	0.99
SP COND - FIELD	6910	1920	10310	4	3561
PH	6.9	6.5	7.1	4.0	0.3
TEMP(CELSIUS)	13.4	7.8	19.0	4.0	4.8
TSS	154.0	26.0	460.0	4.0	205.0
TDS	7040.5	1750.0	9858.0	4.0	3626.7
SS	7.2	0.2	28.2	4.0	14.0
OIL & GREASE	1.0	1.0	1.0	2.0	0.0
ACIDITY,TOT	0.00	0.00	0.00	4.00	0.00
ALKALINITY(CACO3)					
TOTAL	788.75	260.00	2020.00	4.00	825.15
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	731.39	317.20	1540.86	4.00	549.36
CO3	113.55	0.00	454.20	4.00	227.10
CL,DISS	106.00	32.00	160.00	4.00	56.99
SO4,DISS	3717.75	934.00	5351.00	4.00	2053.05
CATIONS					
NA,DISS	1152.50	270.00	1560.00	4.00	594.66
K,DISS	14.50	4.00	30.00	4.00	11.12
CA,DISS	390.25	116.00	515.00	4.00	186.08
MG,DISS	377.75	103.00	520.00	4.00	189.47
FE,DISS	0.06	0.02	0.19	4.00	0.08
MN,DISS	0.25	0.03	0.58	4.00	0.26
OTHER IONS					
NA,TOTAL	1185.00	280.00	1765.00	3.00	794.06
K,TOTAL	11.33	10.00	14.00	3.00	2.31
CA,TOTAL	401.00	205.00	563.00	3.00	181.41
MG,TOTAL	343.67	135.00	491.00	3.00	185.76
FE,TOT	7.94	0.39	29.50	4.00	14.38
MN,TOTAL	0.39	0.06	0.60	4.00	0.24
CALCULATED DATA					
HARDNESS	2526	712	3372	4	1240
NC HARDNESS				0	
SAR	10	4	13	4	4
IONIC RATIOS(%)					
NA+K	49	45	55	4	4
CA	20	18	22	4	2
MG	31	27	34	4	3
HCO3+CO3	17	7	35	4	13
CL	3	2	4	4	1
SO4	79	61	91	4	14
TDS(SUM)	6617.3	1783.7	8404.6	4.0	3227.7
TDS(SUM)/SP COND	0.97	0.82	1.09	4.00	0.12
TDS(CALC)	6245.5	1622.5	8141.0	4.0	3111.2
TDS/TDS(CALC)	1.12	0.97	1.22	4.00	0.12
TOTAL CATIONS	101.07	26.12	128.08	4.00	50.01
TOTAL ANIONS	97.08	26.02	123.91	4.00	47.50
CAT-AN BALANCE	1.65	0.20	3.00	4.00	1.22

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S03

	RAW DATA			
	22MAR90	18MAY90	20SEP90	06NOV90
FLOW(CFS)	5.57	2.67	2.45	7.10
SP COND - FIELD	1410	4330	2820	2290
PH	7.0	6.8	7.3	7.5
TEMP(CELSIUS)	7.3	16.6	15.9	4.2
TSS	1016.0	8.0	148.0	28.0
TDS	1430.0	3396.0	2170.0	2554.0
SS	9.8	0.3	0.2	0.2
OIL & GREASE	1.0	1.0		
ACIDITY,TOT	0.00	0.00	0.00	0.00
ALKALINITY(CACO3)				
TOTAL	250.00	378.00	315.00	357.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	305.00	461.16	384.30	435.54
CO3	0.00	0.00	0.00	0.00
CL,DISS	40.00	100.00	68.00	78.00
SO4,DISS	868.00	2072.00	1264.00	1474.00
CATIONS				
NA,DISS	259.00	672.00	431.00	449.00
K,DISS	4.00	7.00	6.00	5.00
CA,DISS	106.00	169.00	152.00	157.00
MG,DISS	79.00	146.00	92.00	114.00
FE,DISS	0.12	0.19	0.12	0.08
MN,DISS	0.11	0.01	0.01	0.04
OTHER IONS				
NA,TOTAL	265.00		477.00	489.00
K,TOTAL	5.00		6.00	5.00
CA,TOTAL	180.00		155.00	157.00
MG,TOTAL	100.00		92.00	116.00
FE,TOT	27.00	0.51	2.20	0.95
MN,TOTAL	0.30	0.04	0.03	0.06
CALCULATED DATA				
HARDNESS	589	1021	757	873
NC HARDNESS				
SAR	5	9	7	7
IONIC RATIOS(%)				
NA+K	49	59	56	53
CA	23	17	22	21
MG	28	24	22	25
HCO3+CO3	21	14	18	18
CL	5	5	6	5
SO4	75	81	76	77
TDS(SUM)	1666.0	3631.9	2397.4	2712.7
TDS(SUM)/SP COND	1.18	0.84	0.85	1.18
TDS(CALC)	1510.9	3397.5	2202.1	2491.3
TDS/TDS(CALC)	0.95	1.00	0.99	1.03
TOTAL CATIONS	23.17	49.86	34.06	36.88
TOTAL ANIONS	24.46	53.76	34.53	40.03
CAT-AN BALANCE	-2.70	-3.80	-0.70	-4.10

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90
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SITE=S03

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	4.45	2.45	7.10	4.00	2.27
SP COND - FIELD	2713	1410	4330	4	1225
PH	7.1	6.8	7.5	4.0	0.3
TEMP(CELSIUS)	11.0	4.2	16.6	4.0	6.2
TSS	300.0	8.0	1016.0	4.0	481.3
TDS	2387.5	1430.0	3396.0	4.0	818.3
SS	2.6	0.2	9.8	4.0	4.8
OIL & GREASE	1.0	1.0	1.0	2.0	0.0
ACIDITY,TOT	0.00	0.00	0.00	4.00	0.00
ALKALINITY(CACO3)					
TOTAL	325.00	250.00	378.00	4.00	56.44
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	396.50	305.00	461.16	4.00	68.86
CO3	0.00	0.00	0.00	4.00	0.00
CL,DISS	71.50	40.00	100.00	4.00	24.89
SO4,DISS	1419.50	868.00	2072.00	4.00	502.35
CATIONS					
NA,DISS	452.75	259.00	672.00	4.00	169.41
K,DISS	5.50	4.00	7.00	4.00	1.29
CA,DISS	146.00	106.00	169.00	4.00	27.60
MG,DISS	107.75	79.00	146.00	4.00	29.31
FE,DISS	0.13	0.08	0.19	4.00	0.05
MN,DISS	0.04	0.01	0.11	4.00	0.05
OTHER IONS					
NA,TOTAL	410.33	265.00	489.00	3.00	126.01
K,TOTAL	5.33	5.00	6.00	3.00	0.58
CA,TOTAL	164.00	155.00	180.00	3.00	13.89
MG,TOTAL	102.67	92.00	116.00	3.00	12.22
FE,TOT	7.66	0.51	27.00	4.00	12.91
MN,TOTAL	0.11	0.03	0.30	4.00	0.13
CALCULATED DATA					
HARDNESS	810	589	1021	4	183
NC HARDNESS				0	
SAR	7	5	9	4	2
IONIC RATIOS(%)					
NA+K	54	49	59	4	4
CA	21	17	23	4	3
MG	25	22	28	4	2
HCO3+CO3	18	14	21	4	3
CL	5	5	6	4	0
SO4	77	75	81	4	3
TDS(SUM)	2602.0	1666.0	3631.9	4.0	814.7
TDS(SUM)/SP COND	1.01	0.84	1.18	4.00	0.20
TDS(CALC)	2400.5	1510.9	3397.5	4.0	781.7
TDS/TDS(CALC)	0.99	0.95	1.03	4.00	0.03
TOTAL CATIONS	35.99	23.17	49.86	4.00	10.97
TOTAL ANIONS	38.20	24.46	53.76	4.00	12.22
CAT-AN BALANCE	-2.82	-4.10	-0.70	4.00	1.54

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=SO4

	RAW DATA			
	20MAR90	18MAY90	20SEP90	06NOV90
FLOW(CFS)		2.01	2.23	6.50
SP COND - FIELD	1330	3160	2840	1530
PH	7.0	6.9	7.3	7.4
TEMP(CELSIUS)	11.6	16.2	15.3	4.6
TSS	672.0	30.0	26.0	58.0
TDS	1054.0	2406.0	2252.0	1592.0
SS	1.3	0.3	0.2	0.2
OIL & GREASE	1.0	1.0	2.0	1.0
ACIDITY,TOT	0.00	0.00	0.00	0.00
ALKALINITY(CACO3)				
TOTAL	272.00	364.00	350.00	322.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	331.84	444.08	408.70	392.84
CO3	0.00	0.00	9.00	0.00
CL,DISS	39.00	76.00	72.00	53.00
SO4,DISS	632.00	1408.00	1282.00	813.00
CATIONS				
NA,DISS	193.00	531.00	486.00	280.00
K,DISS	4.00	5.00	5.00	4.00
CA,DISS	113.00	117.00	142.00	119.00
MG,DISS	60.00	86.00	89.00	68.00
FE,DISS	0.04	0.15	0.09	0.04
MN,DISS	0.15	0.01	0.01	0.03
OTHER IONS				
NA,TOTAL	200.00		521.00	293.00
K,TOTAL	5.00		5.00	4.00
CA,TOTAL	135.00		144.00	126.00
MG,TOTAL	70.00		97.00	69.00
FE,TOT	14.50	0.51	0.56	1.23
MN,TOTAL	0.01	0.03	0.02	0.05
CALCULATED DATA				
HARDNESS	529	645	720	598
NC HARDNESS				
SAR	4	9	8	5
IONIC RATIOS(%)				
NA+K	45	64	60	52
CA	30	16	20	25
MG	26	20	21	23
HCO3+CO3	28	19	20	26
CL	6	6	6	6
SO4	67	76	75	68
TDS(SUM)	1374.6	2669.7	2493.8	1729.9
TDS(SUM)/SP COND	1.03	0.84	0.88	1.13
TDS(CALC)	1205.9	2444.0	2286.1	1530.2
TDS/TDS(CALC)	0.87	0.98	0.99	1.04
TOTAL CATIONS	19.07	36.15	35.68	23.82
TOTAL ANIONS	19.77	38.83	35.72	24.86
CAT-AN BALANCE	-1.80	-3.60	-0.10	-2.10

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S04

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	3.58	2.01	6.50	3.00	2.53
SP COND - FIELD	2215	1330	3160	4	919
PH	7.1	6.9	7.4	4.0	0.2
TEMP(CELSIUS)	11.9	4.6	16.2	4.0	5.3
TSS	196.5	26.0	672.0	4.0	317.3
TDS	1826.0	1054.0	2406.0	4.0	624.1
SS	0.5	0.2	1.3	4.0	0.5
OIL & GREASE	1.3	1.0	2.0	4.0	0.5
ACIDITY,TOT	0.00	0.00	0.00	4.00	0.00
ALKALINITY(CACO3)					
TOTAL	327.00	272.00	364.00	4.00	40.61
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	394.36	331.84	444.08	4.00	46.86
CO3	2.25	0.00	9.00	4.00	4.50
CL,DISS	60.00	39.00	76.00	4.00	17.22
SO4,DISS	1033.75	632.00	1408.00	4.00	370.51
CATIONS					
NA,DISS	372.50	193.00	531.00	4.00	162.05
K,DISS	4.50	4.00	5.00	4.00	0.58
CA,DISS	122.75	113.00	142.00	4.00	13.07
MG,DISS	75.75	60.00	89.00	4.00	14.01
FE,DISS	0.08	0.04	0.15	4.00	0.05
MN,DISS	0.05	0.01	0.15	4.00	0.07
OTHER IONS					
NA,TOTAL	338.00	200.00	521.00	3.00	165.16
K,TOTAL	4.67	4.00	5.00	3.00	0.58
CA,TOTAL	135.00	126.00	144.00	3.00	9.00
MG,TOTAL	78.67	69.00	97.00	3.00	15.89
FE,TOT	4.20	0.51	14.50	4.00	6.87
MN,TOTAL	0.03	0.01	0.05	4.00	0.02
CALCULATED DATA					
HARDNESS	623	529	720	4	80
NC HARDNESS				0	
SAR	6	4	9	4	2
IONIC RATIOS(%)					
NA+K	55	45	64	4	9
CA	23	16	30	4	6
MG	22	20	26	4	3
HCO3+CO3	23	19	28	4	4
CL	6	6	6	4	0
SO4	71	67	76	4	5
TDS(SUM)	2067.0	1374.6	2669.7	4.0	616.0
TDS(SUM)/SP COND	0.97	0.84	1.13	4.00	0.13
TDS(CALC)	1866.5	1205.9	2444.0	4.0	594.1
TDS/TDS(CALC)	0.97	0.87	1.04	4.00	0.07
TOTAL CATIONS	28.68	19.07	36.15	4.00	8.58
TOTAL ANIONS	29.80	19.77	38.83	4.00	8.98
CAT-AN BALANCE	-1.90	-3.60	-0.10	4.00	1.44

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S05

	RAW DATA			
	20MAR90	18MAY90	20SEP90	06NOV90
FLOW(CFS)	2.23	0.67	0.22	0.30
SP COND - FIELD	1770	4560	2260	3420
PH	7.1	8.1	7.5	7.4
TEMP(CELSIUS)	10.0	14.2	14.8	4.8
TSS	1208.0	6.0	112.0	6.0
TDS	1662.0	4402.0	2070.0	4442.0
SS	18.5	0.3	0.2	0.2
OIL & GREASE	1.0	1.0		
ACIDITY,TOT	0.00	0.00	0.00	0.00
ALKALINITY(CACO3)				
TOTAL	270.00	360.00	295.00	383.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	329.40	439.20	359.90	467.26
CO3	0.00	0.00	0.00	0.00
CL,DISS	29.00	75.00	38.00	74.00
SO4,DISS	893.00	2741.00	1159.00	2628.00
CATIONS				
NA,DISS	243.00	597.00	251.00	605.00
K,DISS	4.00	7.00	5.00	6.00
CA,DISS	148.00	258.00	188.00	289.00
MG,DISS	110.00	263.00	138.00	261.00
FE,DISS	0.02	0.08	0.02	0.02
MN,DISS	0.01	0.05	0.01	0.17
OTHER IONS				
NA,TOTAL	245.00		256.00	647.00
K,TOTAL	5.00		5.00	6.00
CA,TOTAL	215.00		194.00	313.00
MG,TOTAL	130.00		147.00	306.00
FE,TOT	3.06	0.21	1.84	0.43
MN,TOTAL	0.07	0.09	0.05	0.17
CALCULATED DATA				
HARDNESS	821	1723	1036	2037
NC HARDNESS				
SAR	4	6	3	6
IONIC RATIOS(%)				
NA+K	39	43	35	42
CA	27	21	30	23
MG	33	36	36	34
HCO3+CO3	22	11	19	12
CL	3	3	3	3
SO4	75	86	78	85
TDS(SUM)	1762.5	4401.2	2139.0	4330.4
TDS(SUM)/SP COND	1.00	0.97	0.95	1.27
TDS(CALC)	1595.0	4178.0	1956.0	4092.9
TDS/TDS(CALC)	1.04	1.05	1.06	1.09
TOTAL CATIONS	27.11	60.66	31.78	62.37
TOTAL ANIONS	25.20	67.81	31.10	64.46
CAT-AN BALANCE	3.60	-5.60	1.10	-1.70

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90
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SITE=S05

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.85	0.22	2.23	4.00	0.94
SP COND - FIELD	3003	1770	4560	4	1248
PH	7.5	7.1	8.1	4.0	0.4
TEMP(CELSIUS)	10.9	4.8	14.8	4.0	4.6
TSS	333.0	6.0	1208.0	4.0	585.5
TDS	3144.0	1662.0	4442.0	4.0	1485.2
SS	4.8	0.2	18.5	4.0	9.1
OIL & GREASE	1.0	1.0	1.0	2.0	0.0
ACIDITY,TOT	0.00	0.00	0.00	4.00	0.00
ALKALINITY(CACO3)					
TOTAL	327.00	270.00	383.00	4.00	53.22
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	398.94	329.40	467.26	4.00	64.93
CO3	0.00	0.00	0.00	4.00	0.00
CL,DISS	54.00	29.00	75.00	4.00	23.96
SO4,DISS	1855.25	893.00	2741.00	4.00	964.78
CATIONS					
NA,DISS	424.00	243.00	605.00	4.00	204.43
K,DISS	5.50	4.00	7.00	4.00	1.29
CA,DISS	220.75	148.00	289.00	4.00	64.32
MG,DISS	193.00	110.00	263.00	4.00	80.49
FE,DISS	0.03	0.02	0.08	4.00	0.03
MN,DISS	0.06	0.01	0.17	4.00	0.08
OTHER IONS					
NA,TOTAL	382.67	245.00	647.00	3.00	228.99
K,TOTAL	5.33	5.00	6.00	3.00	0.58
CA,TOTAL	240.67	194.00	313.00	3.00	63.52
MG,TOTAL	194.33	130.00	306.00	3.00	97.08
FE,TOT	1.38	0.21	3.06	4.00	1.33
MN,TOTAL	0.09	0.05	0.17	4.00	0.05
CALCULATED DATA					
HARDNESS	1404	821	2037	4	571
NC HARDNESS				0	
SAR	5	3	6	4	2
IONIC RATIOS(%)					
NA+K	40	35	43	4	4
CA	25	21	30	4	4
MG	35	33	36	4	1
HCO3+CO3	16	11	22	4	5
CL	3	3	3	4	0
SO4	81	75	86	4	5
TDS(SUM)	3158.3	1762.5	4401.2	4.0	1403.1
TDS(SUM)/SP COND	1.04	0.95	1.27	4.00	0.15
TDS(CALC)	2955.5	1595.0	4178.0	4.0	1370.9
TDS/TDS(CALC)	1.06	1.04	1.09	4.00	0.02
TOTAL CATIONS	45.48	27.11	62.37	4.00	18.63
TOTAL ANIONS	47.14	25.20	67.81	4.00	22.10
CAT-AN BALANCE	-0.65	-5.60	3.60	4.00	3.95

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S06

RAW DATA

	10JAN90	22FEB90	12MAR90	22MAR90	18APR90	18MAY90	14JUN90	20JUL90	13AUG90	20SEP90	17OCT90	06NOV90
FLOW(CFS)	0.55	0.56	0.55		0.63	0.48	0.33	0.30	0.30	0.31	1.48	1.86
SP COND - FIELD	4330	4230	4350	4120	4250	5030	4570	4730	4690	4740	4720	4880
PH	7.6	8.4	8.1	7.5	8.2	8.1	8.3	8.1	8.1	8.0	8.0	7.7
TEMP(CELSIUS)				11.4		17.1						
TSS	6.0	8.0	12.0	8.0	2.0	2.0	8.0	28.0	12.0	6.0	2.0	4.0
TDS	3492.0	3524.0	3566.0	3624.0	3604.0	3722.0	3820.0	3912.0	3988.0	3920.0	3988.0	4044.0
SS				0.2		0.3						
OIL & GREASE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	1.0
ACIDITY,TOT				0.00		0.00						
ALKALINITY(CACO3)												
TOTAL				430.00		452.00						
NONCARBONATE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ANIONS												
HCO3				524.60		531.92						
CO3				0.00		9.60						
CL,DISS				114.00		120.00						
SO4,DISS				2140.00		2256.00						
CATIONS												
NA,DISS				902.00		774.00						
K,DISS				8.00		7.00						
CA,DISS				152.00		186.00						
MG,DISS				141.00		163.00						
FE,DISS				0.47		0.07						
MN,DISS				0.04		0.01						
OTHER IONS												
NA,TOTAL				985.00								
K,TOTAL				8.00								
CA,TOTAL				156.00								
MG,TOTAL				142.00								
FE,TOT	0.66	0.55	0.57	0.48	0.31	0.43	0.41	0.52	0.25	0.24	0.91	0.62
MN,TOTAL	0.06	0.02	0.05	0.05	0.04	0.03	0.01	0.02	0.01	0.01	0.02	0.02
CALCULATED DATA												
HARDNESS				958		1133						
NC HARDNESS												
SAR				13		10						
IONIC RATIOS(%)												
NA+K				67		60						
CA				13		16						
MG				20		24						
HCO3+CO3				15		15						
CL				6		6						
SO4				79		79						
TDS(SUM)	0.7	0.6	0.6	3984.0	0.3	4049.4	0.4	0.5	0.3	0.2	0.9	0.6
TDS(SUM)/SP COND	0.00	0.00	0.00	0.97	0.00	0.81	0.00	0.00	0.00	0.00	0.00	0.00
TDS(CALC)				3717.4		3779.0						
TDS/TDS(CALC)				0.97		0.98						
TOTAL CATIONS	0.03	0.02	0.02	58.64	0.01	56.54	0.02	0.02	0.01	0.01	0.03	0.02
TOTAL ANIONS	0.00	0.00	0.00	56.42	0.00	59.44	0.00	0.00	0.00	0.00	0.00	0.00
CAT-AN BALANCE	100.00	100.00	100.00	1.90	100.00	-2.50	100.00	100.00	100.00	100.00	100.00	100.00

SITE=S06

	- RAW D 20DEC90
FLOW(CFS)	
SP COND - FIELD	
PH	
TEMP(CELSIUS)	
TSS	
TDS	
SS	
OIL & GREASE	
ACIDITY,TOT	
ALKALINITY(CACO3)	
TOTAL	
NONCARBONATE	0.00
ANIONS	
HCO3	
CO3	
CL,DISS	
SO4,DISS	
CATIONS	
NA,DISS	
K,DISS	
CA,DISS	
MG,DISS	
FE,DISS	
MN,DISS	
OTHER IONS	
NA,TOTAL	
K,TOTAL	
CA,TOTAL	
MG,TOTAL	
FE,TOT	
MN,TOTAL	
CALCULATED DATA	
HARDNESS	
NC HARDNESS	
SAR	
IONIC RATIOS(%)	
NA+K	
CA	
MG	
HCO3+CO3	
CL	
SO4	
TDS(SUM)	
TDS(SUM)/SP COND	
TDS(CALC)	
TDS/TDS(CALC)	
TOTAL CATIONS	
TOTAL ANIONS	0.00
CAT-AN BALANCE	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S06

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.67	0.30	1.86	11.00	0.52
SP COND - FIELD	4553	4120	5030	12	290
PH	8.0	7.5	8.4	12.0	0.3
TEMP(CELSIUS)	14.2	11.4	17.1	2.0	4.0
TSS	8.2	2.0	28.0	12.0	7.2
TDS	3767.0	3492.0	4044.0	12.0	201.3
SS	0.2	0.2	0.3	2.0	0.1
OIL & GREASE	1.1	1.0	2.0	12.0	0.3
ACIDITY,TOT	0.00	0.00	0.00	2.00	0.00
ALKALINITY(CACO3)					
TOTAL	441.00	430.00	452.00	2.00	15.56
NONCARBONATE	0.00	0.00	0.00	13.00	0.00
ANIONS					
HCO3	528.26	524.60	531.92	2.00	5.18
CO3	4.80	0.00	9.60	2.00	6.79
CL,DISS	117.00	114.00	120.00	2.00	4.24
SO4,DISS	2198.00	2140.00	2256.00	2.00	82.02
CATIONS					
NA,DISS	838.00	774.00	902.00	2.00	90.51
K,DISS	7.50	7.00	8.00	2.00	0.71
CA,DISS	169.00	152.00	186.00	2.00	24.04
MG,DISS	152.00	141.00	163.00	2.00	15.56
FE,DISS	0.27	0.07	0.47	2.00	0.28
MN,DISS	0.02	0.01	0.04	2.00	0.02
OTHER IONS					
NA,TOTAL	985.00	985.00	985.00	1.00	
K,TOTAL	8.00	8.00	8.00	1.00	
CA,TOTAL	156.00	156.00	156.00	1.00	
MG,TOTAL	142.00	142.00	142.00	1.00	
FE,TOT	0.50	0.24	0.91	12.00	0.19
MN,TOTAL	0.03	0.01	0.06	12.00	0.02
CALCULATED DATA					
HARDNESS	1046	958	1133	2	124
NC HARDNESS				0	
SAR	11	10	13	2	2
IONIC RATIOS(%)					
NA+K	64	60	67	2	5
CA	15	13	16	2	2
MG	22	20	24	2	3
HCO3+CO3	15	15	15	2	0
CL	6	6	6	2	0
SO4	79	79	79	2	0
TDS(SUM)	669.9	0.3	4049.4	12.0	1563.4
TDS(SUM)/SP COND	0.15	0.00	0.97	12.00	0.35
TDS(CALC)	3748.2	3717.4	3779.0	2.0	43.6
TDS/TDS(CALC)	0.98	0.97	0.98	2.00	0.01
TOTAL CATIONS	9.61	0.01	58.64	12.00	22.41
TOTAL ANIONS	8.91	0.00	59.44	13.00	21.76
CAT-AN BALANCE	83.28	-2.50	100.00	12.00	39.05

SITE=SJ8

	--- RAW DATA---- 22MAR90	18MAY90
FLOW(CFS)	0.00	0.00
SP COND - FIELD		
PH		
TEMP(CELSIUS)		
TSS		
TDS		
SS		
OIL & GREASE		
ACIDITY,TOT		
ALKALINITY(CACO3)		
TOTAL		
NONCARBONATE	0.00	0.00
ANIONS		
HCO3		
CO3		
CL,DISS		
SO4,DISS		
CATIONS		
NA,DISS		
K,DISS		
CA,DISS		
MG,DISS		
FE,DISS		
MN,DISS		
OTHER IONS		
NA,TOTAL		
K,TOTAL		
CA,TOTAL		
MG,TOTAL		
FE,TOT		
MN,TOTAL		
CALCULATED DATA		
HARDNESS		
NC HARDNESS		
SAR		
IONIC RATIOS(%)		
NA+K		
CA		
MG		
HCO3+CO3		
CL		
SO4		
TDS(SUM)		
TDS(SUM)/SP COND		
TDS(CALC)		
TDS/TDS(CALC)		
TOTAL CATIONS		
TOTAL ANIONS	0.00	0.00
CAT-AN BALANCE		

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90
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SITE=S08

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.00	0.00	0.00	2.00	0.00
SP COND - FIELD				0	
PH				0.0	
TEMP(CELSIUS)				0.0	
TSS				0.0	
TDS				0.0	
SS				0.0	
OIL & GREASE				0.0	
ACIDITY,TOT				0.00	
ALKALINITY(CACO3)					
TOTAL				0.00	
NONCARBONATE	0.00	0.00	0.00	2.00	0.00
ANIONS					
HCO3				0.00	
CO3				0.00	
CL,DISS				0.00	
SO4,DISS				0.00	
CATIONS					
NA,DISS				0.00	
K,DISS				0.00	
CA,DISS				0.00	
MG,DISS				0.00	
FE,DISS				0.00	
MN,DISS				0.00	
OTHER IONS					
NA,TOTAL				0.00	
K,TOTAL				0.00	
CA,TOTAL				0.00	
MG,TOTAL				0.00	
FE,TOT				0.00	
MN,TOTAL				0.00	
CALCULATED DATA					
HARDNESS				0	
NC HARDNESS				0	
SAR				0	
IONIC RATIOS(%)					
NA+K				0	
CA				0	
MG				0	
HCO3+CO3				0	
CL				0	
SO4				0	
TDS(SUM)				0.0	
TDS(SUM)/SP COND				0.00	
TDS(CALC)				0.0	
TDS/TDS(CALC)				0.00	
TOTAL CATIONS				0.00	
TOTAL ANIONS	0.00	0.00	0.00	2.00	0.00
CAT-AN BALANCE				0.00	

FOR ALL DATA FROM [illegible]/90 THROUGH 12/31/90

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SITE=S09

	RAW DATA			
	20MAR90	21MAY90	21SEP90	06NOV90
FLOW(CFS)	2.34	0.89	0.28	1.00
SP COND - FIELD	3560	3820	3790	2950
PH	7.1	6.9	7.3	7.5
TEMP(CELSIUS)	13.0	16.0	22.4	3.8
TSS	144.0	3244.0	178.0	48.0
TDS	3524.0	3242.0	2810.0	3668.0
SS	17.9	15.0	0.2	0.2
OIL & GREASE	1.0	1.0		
ACIDITY,TOT	0.00	0.00	0.00	0.00
ALKALINITY(CACO3)				
TOTAL	264.00	234.00	273.00	282.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	322.08	285.48	333.06	344.04
CO3	0.00	0.00	0.00	0.00
CL,DISS	180.00	170.00	130.00	180.00
SO4,DISS	1937.00	1943.00	1585.00	2122.00
CATIONS				
NA,DISS	454.00	429.00	348.00	427.00
K,DISS	7.00	7.00	8.00	5.00
CA,DISS	234.00	207.00	235.00	277.00
MG,DISS	245.00	227.00	185.00	246.00
FE,DISS	0.02	0.11	0.02	0.02
MN,DISS	0.01	0.01	0.02	0.07
OTHER IONS				
NA,TOTAL	465.00		399.00	497.00
K,TOTAL	30.00		8.00	5.00
CA,TOTAL	550.00		296.00	284.00
MG,TOTAL	340.00		196.00	282.00
FE,TOT	59.50	35.00	2.47	0.92
MN,TOTAL	0.85	0.43	0.13	0.07
CALCULATED DATA				
HARDNESS	1590	1448	1346	1866
NC HARDNESS				
SAR	5	5	4	5
IONIC RATIOS(%)				
NA+K	39	39	36	35
CA	23	22	28	26
MG	39	39	36	38
HCO3+CO3	10	9	13	10
CL	10	10	9	9
SO4	80	81	78	80
TDS(SUM)	3381.3	3270.8	2824.2	3601.1
TDS(SUM)/SP COND	0.95	0.86	0.75	1.22
TDS(CALC)	3217.6	3125.7	2654.9	3426.3
TDS/TDS(CALC)	1.10	1.04	1.06	1.07
TOTAL CATIONS	51.79	47.86	42.29	52.76
TOTAL ANIONS	50.72	49.97	42.13	54.90
CAT-AN BALANCE	1.00	-2.20	0.20	-2.00

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S09

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	1.13	0.28	2.34	4.00	0.87
SP COND - FIELD	3530	2950	3820	4	404
PH	7.2	6.9	7.5	4.0	0.3
TEMP(CELSIUS)	13.8	3.8	22.4	4.0	7.7
TSS	903.5	48.0	3244.0	4.0	1561.3
TDS	3311.0	2810.0	3668.0	4.0	378.0
SS	8.3	0.2	17.9	4.0	9.5
OIL & GREASE	1.0	1.0	1.0	2.0	0.0
ACIDITY,TOT	0.00	0.00	0.00	4.00	0.00
ALKALINITY(CACO3)					
TOTAL	263.25	234.00	282.00	4.00	20.84
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	321.16	285.48	344.04	4.00	25.42
CO3	0.00	0.00	0.00	4.00	0.00
CL,DISS	165.00	130.00	180.00	4.00	23.80
SO4,DISS	1896.75	1585.00	2122.00	4.00	224.86
CATIONS					
NA,DISS	414.50	348.00	454.00	4.00	46.00
K,DISS	6.75	5.00	8.00	4.00	1.26
CA,DISS	238.25	207.00	277.00	4.00	28.91
MG,DISS	225.75	185.00	246.00	4.00	28.54
FE,DISS	0.04	0.02	0.11	4.00	0.04
MN,DISS	0.03	0.01	0.07	4.00	0.03
OTHER IONS					
NA,TOTAL	453.67	399.00	497.00	3.00	49.97
K,TOTAL	14.33	5.00	30.00	3.00	13.65
CA,TOTAL	376.67	284.00	550.00	3.00	150.23
MG,TOTAL	272.67	196.00	340.00	3.00	72.45
FE,TOT	24.47	0.92	59.50	4.00	28.15
MN,TOTAL	0.37	0.07	0.85	4.00	0.36
CALCULATED DATA					
HARDNESS	1563	1346	1866	4	226
NC HARDNESS				0	
SAR	5	4	5	4	0
IONIC RATIOS(%)					
NA+K	37	35	39	4	2
CA	25	22	28	4	3
MG	38	36	39	4	1
HCO3+CO3	11	9	13	4	2
CL	9	9	10	4	1
SO4	80	78	81	4	1
TDS(SUM)	3269.4	2824.2	3601.1	4.0	327.0
TDS(SUM)/SP COND	0.94	0.75	1.22	4.00	0.20
TDS(CALC)	3106.1	2654.9	3426.3	4.0	326.0
TDS/TDS(CALC)	1.07	1.04	1.10	4.00	0.02
TOTAL CATIONS	48.68	42.29	52.76	4.00	4.75
TOTAL ANIONS	49.43	42.13	54.90	4.00	5.33
CAT-AN BALANCE	-0.75	-2.20	1.00	4.00	1.59

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S10

	RAW DATA			
	20MAR90	21MAY90	21SEP90	06NOV90
FLOW(CFS)	0.89	0.06	0.07	0.25
SP COND - FIELD	1410	3930	1100	5560
PH	7.9	7.5	8.1	7.5
TEMP(CELSIUS)	13.2	12.6	18.4	3.1
TSS	386.0	14.0	168.0	2.0
TDS	1110.0	2668.0	848.0	8112.0
SS	0.2	0.3	0.2	0.2
OIL & GREASE	1.0	1.0		
ACIDITY,TOT	0.00	0.00	0.00	0.00
ALKALINITY(CACO3)				
TOTAL	216.00	303.00	165.00	1360.00
NONCARBONATE	0.00	0.00	0.00	0.00
ANIONS				
HCO3	263.52	369.66	201.30	1659.20
CO3	0.00	0.00	0.00	0.00
CL,DISS	82.00	200.00	52.00	440.00
SO4,DISS	537.00	1511.00	372.00	2725.00
CATIONS				
NA,DISS	98.00	244.00	58.00	662.00
K,DISS	3.00	5.00	5.00	13.00
CA,DISS	137.00	253.00	133.00	450.00
MG,DISS	99.00	220.00	52.00	653.00
FE,DISS	0.03	0.08	0.06	0.02
MN,DISS	0.01	0.05	0.01	0.10
OTHER IONS				
NA,TOTAL	105.00		62.00	678.00
K,TOTAL	5.00		5.00	13.00
CA,TOTAL	175.00		133.00	499.00
MG,TOTAL	99.00		59.00	716.00
FE,TOT	5.45	0.28	3.70	0.08
MN,TOTAL	0.10	0.08	0.08	0.10
CALCULATED DATA				
HARDNESS	748	1535	546	4183
NC HARDNESS				
SAR	2	3	1	5
IONIC RATIOS(%)				
NA+K	22	26	20	28
CA	35	30	49	21
MG	42	44	32	51
HCO3+CO3	24	14	26	28
CL	13	13	12	13
SO4	63	73	62	59
TDS(SUM)	1220.3	2803.8	873.4	6602.3
TDS(SUM)/SP COND	0.87	0.71	0.79	1.19
TDS(CALC)	1086.4	2615.9	771.1	5758.9
TDS/TDS(CALC)	1.02	1.02	1.10	1.41
TOTAL CATIONS	19.32	41.47	13.57	105.30
TOTAL ANIONS	17.83	43.18	12.51	96.35
CAT-AN BALANCE	4.00	-2.00	4.10	4.40

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

*****

SITE=SL0

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.32	0.06	0.89	4.00	0.39
SP COND - FIELD	3000	1100	5560	4	2126
PH	7.7	7.5	8.1	4.0	0.3
TEMP(CELSIUS)	11.8	3.1	18.4	4.0	6.4
TSS	142.5	2.0	386.0	4.0	179.1
TDS	3184.5	848.0	8112.0	4.0	3381.8
SS	0.2	0.2	0.3	4.0	0.0
OIL & GREASE	1.0	1.0	1.0	2.0	0.0
ACIDITY,TOT	0.00	0.00	0.00	4.00	0.00
ALKALINITY(CACO3)					
TOTAL	511.00	165.00	1360.00	4.00	568.86
NONCARBONATE	0.00	0.00	0.00	4.00	0.00
ANIONS					
HCO3	623.42	201.30	1659.20	4.00	694.01
CO3	0.00	0.00	0.00	4.00	0.00
CL,DISS	193.50	52.00	440.00	4.00	176.31
SO4,DISS	1286.25	372.00	2725.00	4.00	1082.86
CATIONS					
NA,DISS	265.50	58.00	662.00	4.00	276.16
K,DISS	6.50	3.00	13.00	4.00	4.43
CA,DISS	243.25	133.00	450.00	4.00	148.64
MG,DISS	256.00	52.00	653.00	4.00	273.96
FE,DISS	0.05	0.02	0.08	4.00	0.03
MN,DISS	0.04	0.01	0.10	4.00	0.04
OTHER IONS					
NA,TOTAL	281.67	62.00	678.00	3.00	343.91
K,TOTAL	7.67	5.00	13.00	3.00	4.62
CA,TOTAL	269.00	133.00	499.00	3.00	200.29
MG,TOTAL	291.33	59.00	716.00	3.00	368.32
FE,TOT	2.38	0.08	5.45	4.00	2.64
MN,TOTAL	0.09	0.08	0.13	4.00	0.01
CALCULATED DATA					
HARDNESS	1753	546	4183	4	1675
NC HARDNESS				0	
SAR	3	1	5	4	2
IONIC RATIOS(%)					
NA+K	24	20	28	4	4
CA	34	21	49	4	12
MG	42	32	51	4	8
HCO3+CO3	23	14	28	4	6
CL	13	12	13	4	1
SO4	64	59	73	4	6
TDS(SUM)	2875.0	873.4	6602.3	4.0	2623.1
TDS(SUM)/SP COND	0.89	0.71	1.19	4.00	0.21
TDS(CALC)	2558.1	771.1	5758.9	4.0	2280.9
TDS/TDS(CALC)	1.14	1.02	1.41	4.00	0.18
TOTAL CATIONS	44.92	13.57	105.30	4.00	42.02
TOTAL ANIONS	42.47	12.51	96.35	4.00	38.33
CAT-AN BALANCE	2.62	-2.00	4.40	4.00	3.09

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90

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SITE=S12

RAW DATA

	10JAN90	22FEB90	13MAR90	22MAR90	18APR90	21MAY90	14JUN90	20JUL90	13AUG90	20SEP90	17OCT90	06NOV90
FLOW(CFS)	0.37	0.38	0.39		0.37	0.49	0.72	0.71	0.70	0.70	1.44	0.62
SP COND - FIELD	2140	1980	2080	1890	1890	2780	3030	3030	2990	2920	3090	2640
PH	8.6	8.7	8.7	7.4	8.6	8.3	8.4	8.4	8.2	8.3	8.1	8.0
TEMP(CELSIUS)				11.6		18.7						
TSS	12.0	18.0	20.0	10.0	2.0	10.0	10.0	14.0	4.0	4.0	14.0	4.0
TDS	1446.0	1387.0	1448.0	1434.0	1316.0	1742.0	2308.0	2264.0	2268.0	2222.0	2350.0	1854.0
SS				0.2		0.3						
OIL & GREASE	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	6.0	1.0	2.0
ACIDITY,TOT				0.00		0.00						
ALKALINITY(CACO3)												
TOTAL				328.00		384.00						
NONCARBONATE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ANIONS												
HCO3				361.12		429.44						
CO3				19.20		19.20						
CL,DISS				54.00		64.00						
SO4,DISS				708.00		840.00						
CATIONS												
NA,DISS				471.00		455.00						
K,DISS				3.00		4.00						
CA,DISS				26.00		51.00						
MG,DISS				20.00		43.00						
FE,DISS				0.10		0.09						
MN,DISS				0.01		0.01						
OTHER IONS												
NA,TOTAL				482.00								
K,TOTAL				3.00								
CA,TOTAL				26.00								
MG,TOTAL				22.00								
FE,TOT	0.53	0.45	0.48	0.33	0.11	0.24	0.13	0.07	0.05	0.07	0.33	0.12
MN,TOTAL	0.01	0.01	0.01	0.10	0.04	0.01	0.01	0.01	0.01	0.01	0.02	0.01
CALCULATED DATA												
HARDNESS				147		304						
NC HARDNESS												
SAR				17		11						
IONIC RATIOS(%)												
NA+K				87		77						
CA				6		10						
MG				7		14						
HCO3+CO3				29		28						
CL				7		7						
SO4				65		65						
TDS(SUM)	0.5	0.5	0.5	1665.3	0.1	1908.5	0.1	0.1	0.1	0.1	0.3	0.1
TDS(SUM)/SP COND	0.00	0.00	0.00	0.88	0.00	0.69	0.00	0.00	0.00	0.00	0.00	0.00
TDS(CALC)				1481.7		1690.2						
TDS/TDS(CALC)				0.97		1.03						
TOTAL CATIONS	0.02	0.02	0.02	23.52	0.01	25.98	0.01	0.00	0.00	0.00	0.01	0.00
TOTAL ANIONS	0.00	0.00	0.00	22.92	0.00	27.10	0.00	0.00	0.00	0.00	0.00	0.00
CAT-AN BALANCE	100.00	100.00	100.00	1.30	100.00	-2.10	100.00	100.00	100.00	100.00	100.00	100.00

SITE=S12

	- RAW D 20DEC90
FLOW(CFS)	
SP COND - FIELD	
PH	
TEMP(CELSIUS)	
TSS	
TDS	
SS	
OIL & GREASE	
ACIDITY,TOT	
ALKALINITY(CACO3)	
TOTAL	
NONCARBONATE	0.00
ANIONS	
HCO3	
CO3	
CL,DISS	
SO4,DISS	
CATIONS	
NA,DISS	
K,DISS	
CA,DISS	
MG,DISS	
FE,DISS	
MN,DISS	
OTHER IONS	
NA,TOTAL	
K,TOTAL	
CA,TOTAL	
MG,TOTAL	
FE,TOT	
MN,TOTAL	
CALCULATED DATA	
HARDNESS	
NC HARDNESS	
SAR	
IONIC RATIOS(%)	
NA+K	
CA	
MG	
HCO3+CO3	
CL	
SO4	
TDS(SUM)	
TDS(SUM)/SP COND	
TDS(CALC)	
TDS/TDS(CALC)	
TOTAL CATIONS	
TOTAL ANIONS	0.00
CAT-AN BALANCE	

FOR ALL DATA FROM 1/1/90 THROUGH 12/31/90
*****

SITE=S12

	STATISTICS				
	MEAN	MIN	MAX	N	STD
FLOW(CFS)	0.63	0.37	1.44	11.00	0.31
SP COND - FIELD	2538	1890	3090	12	498
PH	8.3	7.4	8.7	12.0	0.4
TEMP(CELSIUS)	15.1	11.6	18.7	2.0	5.0
TSS	10.2	2.0	20.0	12.0	5.8
TDS	1836.6	1316.0	2350.0	12.0	421.2
SS	0.2	0.2	0.3	2.0	0.1
OIL & GREASE	1.5	1.0	6.0	12.0	1.4
ACIDITY,TOT	0.00	0.00	0.00	2.00	0.00
ALKALINITY(CACO3)					
TOTAL	356.00	328.00	384.00	2.00	39.60
NONCARBONATE	0.00	0.00	0.00	13.00	0.00
ANIONS					
HCO3	395.28	361.12	429.44	2.00	48.31
CO3	19.20	19.20	19.20	2.00	0.00
CL,DISS	59.00	54.00	64.00	2.00	7.07
SO4,DISS	774.00	708.00	840.00	2.00	93.34
CATIONS					
NA,DISS	463.00	455.00	471.00	2.00	11.31
K,DISS	3.50	3.00	4.00	2.00	0.71
CA,DISS	38.50	26.00	51.00	2.00	17.68
MG,DISS	31.50	20.00	43.00	2.00	16.26
FE,DISS	0.09	0.09	0.10	2.00	0.01
MN,DISS	0.01	0.01	0.01	2.00	0.00
OTHER IONS					
NA,TOTAL	482.00	482.00	482.00	1.00	
K,TOTAL	3.00	3.00	3.00	1.00	
CA,TOTAL	26.00	26.00	26.00	1.00	
MG,TOTAL	22.00	22.00	22.00	1.00	
FE,TOT	0.24	0.05	0.53	12.00	0.18
MN,TOTAL	0.02	0.01	0.10	12.00	0.03
CALCULATED DATA					
HARDNESS	226	147	304	2	111
NC HARDNESS				0	
SAR	14	11	17	2	4
IONIC RATIOS(%)					
NA+K	82	77	87	2	8
CA	8	6	10	2	3
MG	10	7	14	2	5
HCO3+CO3	29	28	29	2	0
CL	7	7	7	2	0
SO4	65	65	65	2	0
TDS(SUM)	298.0	0.1	1908.5	12.0	697.4
TDS(SUM)/SP COND	0.13	0.00	0.88	12.00	0.31
TDS(CALC)	1586.0	1481.7	1690.2	2.0	147.4
TDS/TDS(CALC)	1.00	0.97	1.03	2.00	0.04
TOTAL CATIONS	4.13	0.00	25.98	12.00	9.64
TOTAL ANIONS	3.85	0.00	27.10	13.00	9.43
CAT-AN BALANCE	83.27	-2.10	100.00	12.00	39.09

Mining Activities

During the 1990 calendar year, the following mining activities were conducted at the Emery Mine.

1 Right	Retreated 400 feet
2 Right	Developed 200 feet
3 Right	Developed 750 feet with rooms on right
5 Federal	Developed 50 feet with rooms on left side; Retreated with rooms on right side
6 Federal	Developed 800 feet with rooms on right
1 South	Developed 1100 feet

Subsidence Monitoring

The table on the following page summarizes the survey data obtained for stations surveyed in 1990 and includes initial baseline survey data, survey elevations from the latest 1990 survey and the most recent previous check survey. The table includes the baseline data for five new stations (90-1 thru 90-5) established in 1990. Survey points 88-1 and 88-2 had elevations established in 1990. Survey point 89-1 was reestablished.

Station	Location	Baseline				Previous Survey		1990 Survey	
		Northing	Easting	Elevation	Date	Elevation	Date	Elevation	Date
H-6	1 East	196,403.18	2,070,884.42	6,092.21	Dec-81	6,092.32	May-86		
SMK-2	1 East	197,094.12	2,069,844.82	6,099.91	Feb-81	6,099.46	May-86		
H-1	2 East	196,595.37	2,072,825.14	6,078.84	May-80	6,079.08	Oct-85		
SMK-3	2 East	197,304.72	2,071,450.90	6,083.56	Jun-81	6,078.17	Dec-89	6,078.18	Dec-90
83-1	3 East	197,431.73	2,072,907.02	6,062.29	Jun-83	6,061.78	Dec-89	6,061.70	Dec-90
E	3 East	197,803.76	2,072,023.67	6,079.67	May-81	6,078.60	Dec-89	6,078.66	Dec-90
86-6	4 East	199,025.80	2,073,046.70	6,075.64	Sep-86	6,076.29	Mar-89		
86-9	4 East	198,236.28	2,074,137.07	6,069.17	Sep-86	6,069.14	Mar-89		
88-7	4 East	197,096.86	2,075,534.68	6,053.99	Oct-88				
86-7	5 East	199,752.34	2,073,666.90	6,099.96	Sep-86	6,100.69	Mar-89		
86-10	5 East	198,804.10	2,075,063.22	6,074.13	Sep-86				
90-1	1South-4East	193,321.82	2,071,554.61	6,064.46	Sep-90			New Point	
90-2	1South-4East	194,151.38	2,072,233.01	6,043.70	Sep-90			New Point	
90-3	1South-4East	194,697.79	2,072,613.57	6,020.54	Sep-90			New Point	
90-4	1South-4East	194,999.50	2,073,108.04	6,025.91	Sep-90			New Point	
90-5	1South-4East	195,743.01	2,073,472.37	6,025.52	Sep-90			New Point	
86-8	7 North	200,823.57	2,073,450.93	6,121.41	Sep-86	6,108.49	Mar-89		
86-1	1 Federal	196,195.95	2,066,451.12	5,999.53	Sep-86			5,999.50	Aug-90
86-2	1 Federal	196,991.96	2,065,342.60	6,036.66	Sep-86				
86-4	1 Federal	199,177.18	2,062,679.70	6,074.13	Sep-86				
86-5	1 Federal	198,495.12	2,064,069.40	6,159.24	Sep-86				
87-1	2 Federal	195,498.41	2,066,141.87	5,995.61	May-87	5,986.59	Dec-89	5,986.70	Aug-90
88-6	3 Federal	195,517.06	2,065,670.10	5,970.89	Oct-88	5,971.03	Dec-89	5,971.02	Aug-90
88-4	4 Federal	196,346.15	2,064,618.22	5,985.47	Oct-88			5,985.50	Aug-90
88-5	4 Federal	196,312.43	2,065,049.88	5,992.04	Oct-88	5,992.68	Dec-89	5,992.75	Aug-90
88-3	5 Federal	197,031.84	2,064,091.02	6,010.55	Oct-88			6,010.52	Aug-90
86-13	5 Federal	197,515.26	2,064,041.37	6,032.25	Oct-86				
88-2	6 Federal	197,475.04	2,063,677.78	6,012.88	Aug-90			New Point	
88-1	7 Federal	198,336.99	2,062,643.16	6,039.82	Aug-90			New Point	
89-1	1R 1 Fed	200,820.64	2,064,974.76	6,197.18	Dec-89			6,197.19	Oct-90
89-2	1R 1 Fed	201,172.57	2,065,398.39	6,196.83	Dec-89			6,196.98	Oct-90
89-3	2R 1 Fed	199,428.72	2,064,637.87	6,166.98	Dec-89			6,166.95	Oct-90
89-4	2R 1 Fed	200,808.75	2,066,115.13	6,181.46	Dec-89			6,181.71	Oct-90
86-12	3R 1 Fed	199,324.35	2,065,857.05	6,168.57	Oct-86				
86-11	4R 1 Fed	198,669.66	2,066,811.32	6,149.97	Oct-86				
86-3	4R 1 Fed	199,162.30	2,067,668.46	6,147.18	Sep-86				
C-36	6R 1 Fed	196,855.12	2,066,750.82	6,027.17		6,027.17	Dec-89	6,027.17	Aug-90
Q	1L 6 South	191,929.15	2,066,753.80	5,931.20	Jun-81	5,929.56	Dec-89	5,929.39	Dec-90
L	2 West	193,219.03	2,065,365.10	5,946.18		5,946.19	Dec-89	5,946.33	Dec-90
N	1R 2 West	193,874.72	2,065,955.61	5,948.67	Dec-82	5,946.47	Dec-89	5,946.63	Dec-90
W	2R 2 West	194,616.64	2,065,467.15	5,957.05	Jan-81	5,955.01	Dec-89	5,955.18	Dec-90
83-3	3R 2 West	194,594.74	2,064,492.11	5,962.25	May-84	5,961.10	May-86	Removed during restoration	
83-4	3R 2 West	194,929.82	2,064,644.95	5,966.22	May-84	5,965.57	May-86	Removed during restoration	
83-5	4R 2 West	194,627.68	2,063,887.44	5,969.53	May-84	5,968.52	Dec-89	5,968.72	Dec-90
83-6	4R 2 West	194,965.20	2,064,059.57	5,971.07	May-84	5,968.20	May-86	Removed during restoration	
85-1	5R 2 West	194,958.12	2,063,444.68	5,974.25	Dec-85	5,973.25	Dec-89	5,973.43	Dec-90
85-2	5R 2 West	195,463.95	2,063,363.96	5,978.85	Dec-85	5,978.21	Dec-89	5,978.40	Dec-90

CONSOLIDATION COAL COMPANY
EMERY MINE
1990 Annual Report

Interim Revegetation Success Monitoring

Site: Borehole Pump #3 and Sedimentation Pond #6

1. These facilities, which were built in the spring of 1989, were not mulched when they were seeded after construction.

2. Twice a month monitoring of the site shows that the initial seeding was unsuccessful in establishing a protective plant cover. In spite of this, however, no obvious erosional features have been observed.

3. In accordance with the Division's mulching requirement variance issued March 20, 1989, Consol will reseed the areas and apply an appropriate mulch during 1991.

Emery Mine Revegetation Demonstration Sites
Annual Monitoring Report - 1990

Consolidation Coal Company
Emery Mine
UDOGM Permit #ACT/015/015

Prepared By:

Richard Denning
Consolidation Coal Company
March 14, 1991

Three Emery Mine revegetation demonstration sites, referred to as the Demonstration Site, the Borehole Site and the Flume Site were surveyed during September 19-20, 1990 by Richard Denning, a member of the Consolidation Coal Company environmental staff. The sites, established in 1984, were partially reconstructed in 1987. Due to the site rework which utilized new revegetation techniques, vegetation monitoring will be conducted thru 1991 to allow sufficient time to evaluate the success of these techniques.

METHODS

The 1990 survey field methods used for the seeded plots are those specified by Utah, Division of Oil, Gas and Mining (UDOGM) guidelines. Sample adequacy for the seeded plots was calculated by Bio-Resources Inc. in 1985 and similar sample sets were used for the 1990 survey. Seeded plots were sampled by counting the number of stems in a 1/2 meter^2 plot. Each 1/2m^2 plot was checked using five quadrats. The number of 1/2m^2 plots varied from 2 thru 6 due to the size of the revegetation treatment site. Vegetation density and frequency are reported on attached tables and calculated as follows:

> Density equals the total number of stems per species in a treatment plot divided by the number of 1/2m^2 plots sampled.
>
> Frequency, expressed as a percent, equals the number of Daubenmire quadrats containing the species divided by the total number of quadrats samples.

Typed versions of the field sheets for the seeded plots are provided in this report. Note that data entry code DRKR stands for "dry crispies", which matured earlier and were not identifiable at the time of monitoring although the vast majority of these dried stems appeared to be halogeton or kochia.

Field observations of reconstructed plots containing transplants and containerized seedlings (A1 and B1) and those involving new revegetation techniques (A2) are discussed later.

DISCUSSION

The following summary tables are included in this report:

TABLE 1 - Species Codes
TABLE 2 - Flume Site Densities and Frequencies
TABLE 3 - Borehole Access Site Densities and Frequencies
TABLE 4 - Main Demonstration Site Densities
TABLE 5 - Main Demonstration Site Frequencies
TABLE 6 - Mature Transplants, 1987, 1988, 1989 and 1990 Observations

DEMONSTRATION SITE - 1987 RECONSTRUCTED PLOTS

The mature transplants in Plot A1 as listed in Table 6 continue to show a 33% survival rate after their fourth growing season. The plants, due primarily to a dry summer, show little growth since last year.

The field observations for the containerized transplants in Plot B1 are summarized below. The survey shows a decrease in the overall survival rate from 66% in 1987 to 11% in 1990. Fourwing saltbush exhibited the best fourth year survival.

PLOT B1 Containerized Transplants
1990 Survey Observations

Species	Total Plants	1990 Count of Living Plants	Count of Dead Plants (Listed by Year When First Observed Dead)			
			1987	1988	1989	1990
ATCA	26	6	1	6	10	3
ATCO	25	1	6	11	7	0
ATGA	21	4	1	8	8	0
CHNA	24	0	24	0	0	0
SAVE	23	2	9	4	5	3
TOTAL	119	13	41	29	30	6

Survival Rates

Survey Year	Percentage of Transplants Still Living					
	ATCA	ATCO	ATGA	CHNA	SAVE	TOTAL
1987	96%	76%	95%	0	61%	66%
1988	73%	32%	57%	0	43%	41%
1989	35%	4%	19%	0	21%	16%
1990	23%	4%	19%	0	9%	11%

Five water harvesting furrows created in 1987 on Plot A2 and seeded with fourwing saltbush, blackgreasewood, winterfat and rubber rabbitbrush show no survival of the seeded species. The trenches were silting in and several invading species had established themselves in the silt. Suaeda torreyana (SUTO) was the primary invader.

DEMONSTRATION SITE - ORIGINAL 1984 PLOTS

An overview of this area shows that satisfactory vegetative cover has developed in two spots. One of these spots is in Plot C1 and the other in Plots D2 and D2A. Reclamation techniques between these plots differ significantly. Plot C1 was mulched and irrigated. Plots D2 and D2A were mulched and received shrub transplants but were not irrigated. Additionally, Plot D2A received topsoil. Plot C1 received a different seed mixture than Plots D2 and D2A. The only thing in common besides the mulch application is that these two spots of vegetation occur in shallow depressions. The depressions could function as water harvesting features without causing significant siltation.

Flume Site

Species densities and frequencies are listed for 1987 thru 1990 field surveys in Table 2.

Borehole Site

Observations of twenty mat saltbush (ATCO2) specimens transplanted in April 1987 show that three plants are alive. This differs from the 1989 observations in which all appeared dead.

Species densities and frequencies are listed for 1987 thru 1990 field surveys in Table 3.

EMERY REVEGETATION DEMONSTRATION SITE

REVISED PLOT LAYOUT (1987)

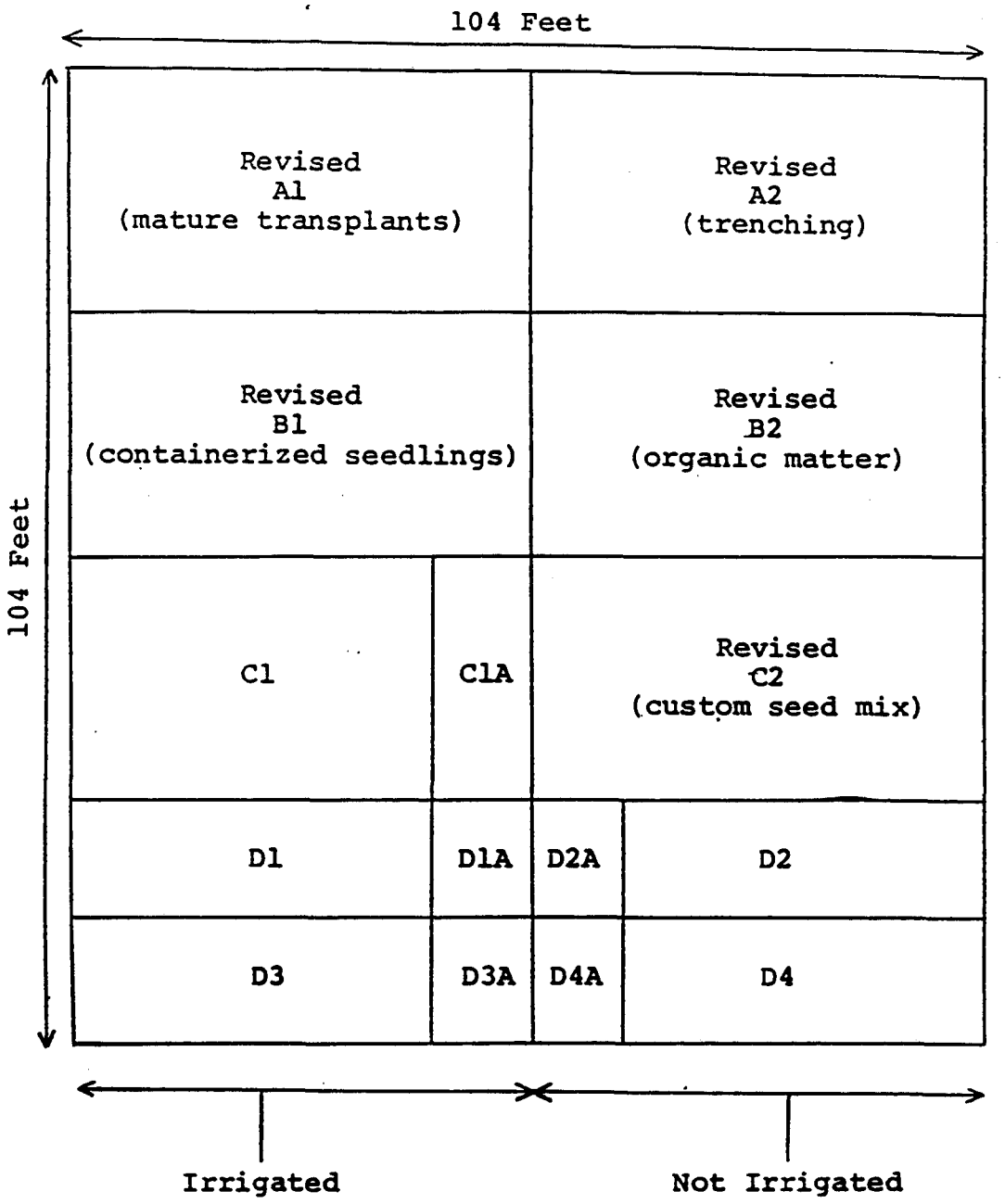

TABLE 1. EMERY REVEGETATION DEMONSTRATION SITE: SPECIES CODES

Species Codes	Species	Common Name
GRASSES		
AGCR	Agropyron cristatum	crested wheatgrass
AGSM	Agropyron smithii	western wheatgrass
AGTR	Agropyron trachycaulum	slender wheatgrass
AGSP	Agropyron ssp.	wheatgrass
ARPU	Aristida purpurea	poverty grass
BOGR	Bouteloua gracilis	blue grama
BRTE	Bromus tectorum	cheatgrass brome
HIJA	Hilaria jamesii	galleta
HOVU	Hordeum vulgare	
MUPU	Muhlenbergia pungens	muhly
ORHY	Oryzopsis hymenoides	indian ricegrass
SPAI	Sporobolus airoides	alkali sacaton
SPCON	Sporobolus contracta	spike dropseed
SPCR	Sporobolus cryptandrus	sand dropseed
SPGI	Sporobolus gigantus	giant dropseed
SPSP	Sporobolus ssp.	dropseed
TRAE	Triticum aestivum	wheat
SHRUBS		
ARCAC	Artamesia cana cana	silver sagebrush
ARNO	Artamesia nova	black sagebrush
ATAN	Atriplex (annual)	
ATCA	Atriplex canescens	fourwing saltbush
ATCO	Atriplex confertifolia	shadscale saltbush
ATCU	Atriplex cuneata	castle valley clover
ATCO2	Atriplex corrugata	mat saltbush
ATGA	Atriplex gardneri	gardner saltbush
ATPA	Atriplex patula	orache
ATSP	Atriplex spp.	saltbush
CELA	Ceratoides lanata	winterfat
CHLI	Chrysothamnus linifolius	
CHNA	Chrysothamnus nauseosus	rubber rabbitbrush
EPVI	Ephedra viridus	green mormon tea
GUSA	Gutierrezia sarothrae	broom snakeweed
SAVE	Sarcobatus vermiculatus	black greasewood
TARA	Tamarix ramosissima	tamarisk
FORBS		
AMAC	Ambrosia acanthicarpa	ragweed
ASSP	Astragalus spp.	milkvetch
CRSP	Crypthantha spp.	cryptantha
DESP	Descurainia spp.	tansy mustard
EUSP	Euphorbia spp.	spurge
HAGL	Halogeton glomeratus	common halogeton
KOSC	Kochia scoparia	fireweed summercypres
LEER	Leucelene ericoides	
MEOF	Melilotus officinalis	yellow sweetclover
SAIB	Salsola iberica	
SAKA	Salsola kali	russian thistle
SPPA	Sphaeralcea parvifolia	
STEX	Stephanomenia exigua	
SUTO	Suaeda torreyana	
TRDU	Tragopogon dubius	yellow salsify
UNKNOWN		
DRKR	"Dry Crispies"	

EMERY MINE
TABLE 2

Flume Site Densities and Frequencies

	*Average Stems/1/2 m²				Frequency (%)			
Species	1987	1988	1989	1990	1987	1988	1889	1990
Grasses								
AGSM	1.0	--	--	--	17	--	--	--
AGTR	--	--	0.8	--	--	--	3	--
AGSP	--	--	0.7	--	--	--	3	--
SPSP	--	1.3	0.2	--	--	30	3	--
Shrubs								
ATAN	--	--	--	0.2	--	--	--	3
ATCA	0.3	--	0.7	0.5	7	--	13	10
CHLI	0.2	--	--	1.0	3	--	--	13
CHNR	0.2	--	--	--	3	--	--	--
CHNA	--	0.5	0.2	0.3	--	10	3	7
SAVE	0.2	--	--	--	3	--	--	--
GUSA	--	0.5	--	--	--	3	--	--
TARA	--	--	--	0.3	--	--	--	3
Forbs								
SAKA	1.0	16.5	0.2	2.3	13	67	3	50
DRKR**	46.0	--	0.3	--	97	--	3	--
KOSC	--	20.0	6.0	--	--	80	40	--
DESP	--	0.2	--	--	--	3	--	--
HAGL	--	--	0.2	--	--	--	3	--

* Six 1/2 m² sample plots
** DRKR = dry crispies (considered KOSC by observer)

EMERY MINE
TABLE 3

Borehole Access Site
Densities and Frequencies

	*Average Stems/1/2 m²				Frequency (%)			
Species	1987	1988	1989	1990	1987	1988	1989	1990
Grasses								
AGSM	4.4	7.7	--	--	14	14	--	--
Shrubs								
ATAN	0.7	4.1	--	2.7	11	29	--	37
ATCA	0.2	--	--	--	3	--	--	--
ATCO	--	0.4	--	--	--	6	--	--
ATCO2	--	--	0.7	--	--	--	13	--
ATSP	--	3.7	--	--	--	49	--	--
CHNA	--	--	0.3	--	--	--	7	--
Forbs								
HAGL	53.0	51.3	5.8	11.5	57	91	17	27
SAKA	0.3	--	--	--	6	--	--	--
Unknown	0.7	--	--	--	6	--	--	--
DRKR**	41.0	25.4	2.5	--	57	54	23	--
SUTO	--	0.1	2.2	0.7	--	3	20	10

* Seven 1/2 m² sample plots
** DRKR = dry crispies (considered HAGL by observer)

CONSOLIDATION COAL COMPANY
Emery Mine
1990 Vegetation Survey
TABLE 4
Demonstration Site Densities
Average Stems/1/2 m²

	Irrigated								Reconstructed in 1987 Not Irrigated				
	No Topsoil			Topsoil					No Topsoil				
Plot #	C1	D1	D3*	C1A	D1A	D3A*	D2A	D4A*	A2	B2*	C2	D2	D4*
**N =	5	5	3	2	2	2	2	2	5	5	5	5	5
SPECIES													
Grasses													
SPCR	8.0	0.6		1.0					1.2		1.0		
SPSP													
AGTR							5.5						
Shrubs													
ATCA		0.2			0.5	0.5	2.5	1.0			0.2	2.0	0.4
CELA	0.2												
SAVE·		0.2											
Forbs													
HAGL	0.2	2.0	6.3		2.0	16.5	6.0	0.5	3.8	0.4	2.0	0.4	5.6
KOSC	0.4	0.4			2.0	6.5	16.5	2.0	2.4	0.4	6.8	2.0	3.6
SUTO		0.6	0.3							0.2	0.2		
DRKR***	0.2								9.2	4.6			
SAKA					0.5								

* These plots not mulched
** N=number of 1/2m² sample plots
*** DRKR-dry crispies (considered halogeton or kochia by observer)

CONSOLIDATION COAL COMPANY
Emery Mine
1990 Vegetation Survey
TABLE 5
Demonstration Site Densities
% Occurrence in Observed Subplots

	Irrigated						Not Irrigated		Reconstructed in 1987				
	No Topsoil			Topsoil					No Topsoil				
Plot #	C1	D1	D3*	C1A	D1A	D3A*	D2A	D4A*	A2	B2*	C2	D2	D4*
**N =	5	5	3	2	2	2	2	2	5	5	5	5	5
SPECIES													
Grasses													
SPCR	48	4		20					4		4		
SPSP													
AGTR							30						
Shrubs													
ATCA		4			10	10	40	20			4	24	8
CELA-	4												
SAVE		4											
Forbs													
HAGL	4	12	27		30	100	60	10	16	8	16	8	16
KOSC	8	8			20	40	80	20	8	8	20	16	12
SUTO		8	7							4	4		
DRKR***	4								36	20			
SAKA					10								

* These plots not mulched
** N=number of 1/2m² sample plots (there are 5 subplots per N)
*** DRKR-dry crispies (considered halogeton or kochia by observer)

EMERY MINE REVEGETATION SITE
TABLE 6
Revised Plot A1
Mature Transplant Plot

Species	1987 Field Observations			1988 Field Observations			1989 Field Observations			1990 Field Observations		
	Condition	Crown Width	Notes	Condition	Crown Width	Notes	Condition	Crown Width	Notes	Condition	Crown Width	Notes
1) ARNO - Black Sagebrush	alive	20",9" alive	11 seed shoots approx. 4"	alive	10"	barely alive	dead	---	---	dead	---	---
2) CHNA - Rubber rabbitbrush	dead	28"	2 small SAVE under canopy	dead	---	---	dead	---	---	dead	---	---
3) ATCA - Fourwing saltbush	dead	47"	2 small ATCA under canopy	dead	---	---	dead	---	1 12" c.w.ATCA under canopy	dead	---	1 17" c.w. ATCA under canopy
4) ATCO - Shadscale	dead	12"	2 small ATCA under canopy	dead	---	---	dead	---	---	dead	---	---
5) CHNA - Rubber rabbitbrush	dead	13"	---	dead	---	---	dead	---	---	dead	---	---
6) SAVE - Black greasewood	healthy	28"	---	alive	30"	---	alive	34"	---	alive	35"	---
7) SAVE - Black greasewood	healthy	52"	---	alive	24"	---	alive	30"	barely alive	alive	20"	barely alive
8) ATCO - Shadscale	alive	24"	20% of stem alive	alive	12"	barely alive	alive	15"	barely alive 1 18" c.w. ATGA under canopy	alive	16"	barely alive 1 9" c.w. ATGA under canopy
9) SAVE - Black greasewood	healthy	27"	---	alive	20"	---	alive	27"	1 small ATCA under canopy	alive	30"	1/3 of stems are alive, ATCA under canopy is dead.
10) ATCO - Shadscale	healthy	18"	---	alive	10"	barely alive	dead	---	---	dead	---	---
11) ARCAC - Silver Sagebrush	alive	24"	---	alive	20"	---	dead	---	---	dead	---	---
12) ATCA - Fourwing saltbush	dead	24"	---	---	---	no observation	--	---	no observation	--	---	no observation
13) ATCO - Shadscale	dead	11"	---	---	---	no observation	--	---	no observation	--	---	no observation
14) SAVE - Black greasewood	dead	24"	---	dead	---	---	dead	---	---	dead	---	---
15) ATCA - Fourwing saltbush	---	--	no observation	alive	8"	---	alive	8"	---	alive	9"	---

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Location: FLUMESITE (combined mulched & unmulched)	Notes: All willow & poplar transplants are dead

Sample No. 1	Density				
Species	1	2	3	4	5
CHLI	2	1	2		1
ATAN		1			
SAKA	1			1	
% COVER	10	5	5	2	5

Sample No. 4	Density				
Species	1	2	3	4	5
SAKA		1	1		
TARA			2		
BAREGROUND	X			X	X
% COVER		2	10		

Sample No. 2	Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 5	Density				
Species	1	2	3	4	5
ATCA	1				1
CHNA	1	1			
SAKA	1	3		1	
BAREGROUND			X		
% COVER	20	2		2	2

Sample No. 3	Density				
Species	1	2	3	4	5
SAKA	1		1	2	1
BAREGROUND		X			
% COVER	8		15	12	1

Sample No. 6	Density				
Species	1	2	3	4	5
ATCA					1
SAKA	1	2		1	1
BAREGROUND			X		
% COVER	2	2		2	100
ADDITIONAL SPECIES LIST					
SPCR SUTO					

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING

Location: BOREHOLE SITE (combined mulched & unmulched)	Notes: 6 sites @30 paces alg transect line;mat saltbush transp-17dead,3alive

Sample No. 1	Density				
Species	1	2	3	4	5
ATAN	1	1		1	3
BAREGROUND			X		
% COVER	8	5		25	5

Sample No. 4	Density				
Species	1	2	3	4	5
ATAN				2	1
HAGL		1			
SUTO					1
BAREGROUND	X		X		
% COVER		1		3	4

Sample No. 2	Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 5	Density				
Species	1	2	3	4	5
ATAN			2		2
HAGL	15	1			
SUTO		1			
BAREGROUND				X	
% COVER	3	7	2		1

Sample No. 3	Density				
Species	1	2	3	4	5
ATAN			1	1	
SUTO	2				
BAREGROUND		X			X
% COVER	3		5	3	

Sample No. 6	Density				
Species	1	2	3	4	5
ATAN					1
HAGL	7	12	7	20	6
% COVER	3	5	2	5	5
ADDITIONAL SPECIES LIST					
AGCR ATCA BOGR SAKA					

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT C2	Notes: Reconstructed in 1987 combining old plots C2 & C2A

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
ATCA			1		
HAGL	4	3	2		1
KOSC	6	12	10	5	1
SPCR				5	
% COVER	10	40	50	50	5

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
AUTO		1			
BAREGROUND	X		X	X	X
% COVER		5			

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

ADDITIONAL SPECIES LIST	Density				
AGSM	1	2	3	4	5

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Location: DEMONSTRATION SITE PLOT B2	Notes: Reconstructed in 1987 combining old plots B2 & B2A

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
DRKR			1		
BAREGROUND	X	X		X	X

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
CUTO				1	
DRKR		2			
HAGL		1			
BAREGROUND	X		X		X
% COVER		2		5	

Sample No. 5	CENTER 6X6 from SE Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
KOSC		1	1		
HAGL			1		
DRKR			18	1	1
BAREGROUND	X				
% COVER		5	5	1	1

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
SPCR					

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT A2	Notes: Recnsrt in 1987 combining old plots A2 & A2A;area is beside trenches

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
DRKR				2	1
BAREGROUND	X	X	X		
% COVER				1	1

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
[illegible]OCA				3	9
SPCR					6
DRKR			7	4	6
BAREGROUND	X	X			
% COVER			15	15	20

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
DRKR	7	14	1	4	
HAGL	1	11	5	2	
BAREGROUND					X
% COVER	1	5	2	5	

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
ATCA					
SAVE					
SUTO					

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Location: DEMONSTRATION SITE PLOT C1	Notes: Depression contains good grass growth.

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
HAGL					1
DRKR					1
BAREGROUND	X	X	X	X	
% COVER					3

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
KOSC				1	1
BAREGROUND	X	X	X		
% COVER				2	3

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
[illegible]ELA	1				
[illegible]PCR		1	2	2	1
% COVER	100	5	10	40	20

Sample No. 5	CENTER 6X6 from NE Density				
Species	1	2	3	4	5
SPCR	5		1	3	5
BAREGROUND		X			
% COVER	75		1	6	40

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
SPCR		2	3	7	8
BAREGROUND	X				
% COVER		40	15	80	100

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
ATCA					
AGSP					
SAVE					
SUTO					

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT C1A

Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X						

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
PCR				1	1						
BAREGROUND	X	X	X								
% COVER				8	3						

ADDITIONAL SPECIES LIST	Density					Sample No.	Density				
	1	2	3	4	5	Species	1	2	3	4	5
HAGL											
KOSC											

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING
Location: DEMONSTRATION SITE PLOT D1		Notes:

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
SPCR	3				
SUTO					2
BAREGROUND		X	X	X	
% COVER	35				5

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
ATCA		1			
HAGL	5	3			
SAVE					1
SUTO				1	
BAREGROUND			X		
% COVER	4	5		15	40

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
HAGL				2	
ROSC				1	1
BAREGROUND	X	X	X		
% COVER				2	5

Sample No. 5	CENTER 6X6 from SW Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
ATGA					

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING
Location: DEMONSTRATION SITE PLOT D3		Notes:

Sample No. 1	South Density					ADDITIONAL SPECIES LIST	Density				
Species	1	2	3	4	5		1	2	3	4	5
BAREGROUND	X	X	X	X	X	AGSP					
						ATCA					
						ATGA					
						KOSC					

Sample No. 2	North Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
AGL	2	7		5	5						
BAREGROUND			X								
% COVER	2	7		2	2						

Sample No. 3	CENTER Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
SUTO				1							
BAREGROUND	X	X	X		X						
% COVER				5							

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING
Location: DEMONSTRATION SITE PLOT D1A		Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
ATCA					1						
KOSC		1			3						
HAGL	1				2						
BAREGROUND			X	X							
% COVER	1	1			35						

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
HAGL	1										
SAKA	1										
BAREGROUND		X	X	X	X						
% COVER	8										

ADDITIONAL SPECIES LIST	Density					Sample No.	Density				
	1	2	3	4	5	Species	1	2	3	4	5
AGTR											
ATGA											
SAVE											

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING
Location: DEMONSTATION SITE PLOT D3A		Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
ATCA					1						
HAGL	5	3	7	3	1						
KOSC	1			3	8						
% COVER	5	2	10	3	15						

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
KOSC			1								
HAGL	6	1	2	3	2						
% COVER	5	2	3	3	2						

ADDITIONAL SPECIES LIST	Density					Sample No.	Density				
	1	2	3	4	5	Species	1	2	3	4	5
AGTR											
ATGA											
SAVE											

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT D2A	Notes: Depression contains good growth

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
HAGL	1	1	3	3	3						
KOSC	3	2	8	5	6						
% COVER	1	5	5	5	3						
RABBIT DROPPINGS	X	X	X	X	X						

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
ATCA	1	1	2	1							
AGTR	5	3	3								
HAGL			1								
KOSC	4	2			3						
RABBIT DROPPINGS			X	X	X						
% COVER	70	100	15	10	1						

ADDITIONAL SPECIES LIST	Density					Sample No.	Density				
	1	2	3	4	5	Species	1	2	3	4	5
SPCR											
SUTO											

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING
Location: DEMONSTRATION SITE PLOT D4A		Notes:

Sample No. 1	WEST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
ATCA		1	1								
HAGL				3	1						
KOSC				1							
BAREGROUND	X										
% COVER		8	20	2	1						

Sample No. 2	EAST 1/2 Density					Sample No.	Density				
Species	1	2	3	4	5	Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X						

ADDITIONAL SPECIES LIST	Density					Sample No.	Density				
	1	2	3	4	5	Species	1	2	3	4	5
SAVE											

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING

Location: DEMONSTRATION SITE PLOT D2	Notes: Depression contains good growth

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
ATCA	1		1	1	
HAGL				1	
KOSC		3	4		2
% COVER	50	1	50	60	1

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
ATCA		5	1		1
HAGL		1			
KOSC		1			
BAREGROUND	X			X	
%COVER		10	100		60

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
ARPU					
ATAN					
ATGA					
SPCR					
SUTO					

Sheet No. EMERY MINE	Date: 9-20-90	Name: R. DENNING
Location: DEMONSTRATION SITE PLOT D4		Notes:

Sample No. 1	SW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 4	SE 1/4 Density				
Species	1	2	3	4	5
ATCA	1		1		
HAGL			9	5	3
KOSC	14	2			
% COVER	10	2	10	5	2

Sample No. 2	NW 1/4 Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 5	CENTER Density				
Species	1	2	3	4	5
BAREGROUND	X	X	X	X	X

Sample No. 3	NE 1/4 Density				
Species	1	2	3	4	5
HAGL					11
KOSC					2
BAREGROUND	X	X	X	X	
% COVER					5

ADDITIONAL SPECIES LIST	Density				
	1	2	3	4	5
AGSP					
SAKA					
SAVE					