March 25, 1992

Utah Division of Oil, Gas, and Mining
355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203

I, _____, DOGM, received the Valley Camp of Utah, Inc. 1991 Annual Monitoring submittal from Mr. Ed Foust, VCU, Inc., on the above date.

RECEIVED
MAR 2 5 1992
DIVISION OF
OIL GAS & MINING

VALLEY CAMP OF UTAH
1991
ANNUAL MONITORING

PERMITTEE: VALLEY CAMP OF UTAH, INC.
MINE: BELINA COMPLEX
MAILING ADDRESS: SCOFIELD RT. HELPER, UTAH 84526
COMPANY REPRESENTATIVE: STEVE TANNER
RESIDENT AGENT: W.L. WRIGHT
PERMIT NUMBER: ACT 007/001
MSHA ID NUMBER: 42-0179, 42-0180
DATE OF INITIAL PPP: PAP SUBMITTED 2/9/81
DATE: OF PERMIT RENEWAL: JULY 5, 1990
QUANITY OF COAL MINED 1991: 678,120 TONS

R645-301-100: Coal Mine Permitting: OSM Stipulation #3

R645-301-200 & 300: Soils & Biology: Reveg. Test Plots

R645-301-500: Engineering: Mine Progress Belina No. 2 Map, Coal Analysis, Pond Certifications

R645-301-700: Hydrology: Spring Depletion, Water Quality Data, Subsidence Map

Facsimile Telephone No. 202-208-6082
Room 7312 Main Interior
1951 Constitution Ave., N.W.
Washington, DC 20240

To: JOE HELFRICH

Address: UTAH SRA

Fax No.: (801) 359-3940

From: APPLICANT/VIOLATOR SYSTEM OFFICE

Contact: JOE THOMPSON

Address: Room 7424 MIB - HQS.

Fax No.: 1-202-208-6082

Office No.: 1-202-208-4421 or FTS 268-4421

No. of Pages Following this Page: _____

01/14/92 COLLECTION MANAGEMENT INFORMATION SYSTEM 11:11:41
COMPANY / CITATION FORMATTED PRINT PAGE NO: 1

COMPANY INFORMATION

101-COMPANY INDEX : 708.00

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011-DATA ENTRY IDENTIFIER =
012-UPDATE DATE = 900404
013-UPDATE IDENTIFIER = W08SM13
101P-COIN PREFIX = 708
101S-COIN SUFFIX = 00
102-COMPANY NAME = VALLEY CAMP COAL CO
103-STREET ADDRESS = POB 218
104-CITY = TRIADELPHIA
105-STATE = WV
106-ZIP CODE = 26059
107-PHONE NUMBER = 304-547-1500
112-CORPORATION STATUS =
113-PERSON TITLE =

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01/14/92 COLLECTION MANAGEMENT INFORMATION SYSTEM 11:11:41
COMPANY / CITATION FORMATTED PRINT PAGE NO: 2

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115-SOCIAL SECURITY NUM 2 =
115-SOCIAL SECURITY NUM 3 =
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155-BANKRUPTCY CHAPTER =
157-DT BANKRUPTCY CLOSED =
158-DT BANK DISCHARGED =
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195-COMP UNCOLLECTIBLE AMT = 0.00
196-COMP ESCROW AMOUNT = 0.00
197-COMP COLLATERAL FLAG =
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01/14/92 COLLECTION MANAGEMENT INFORMATION SYSTEM 11:11:41
COMPANY / CITATION FORMATTED PRINT PAGE NO: 3

CITATION INFORMATION

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010-ENTRY DATE = 011-DATA ENTRY IDENTIFIER =
012-UPDATE DATE = 911024 013-UPDATE IDENTIFIER = W08SM13
015-FY QUARTER = 151-DT SENT NWD CNTR = 880930

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155-BANKRUPTCY CHAPTER     =             157-DATE BANK CLOSED       =
158-DT BNKR DISCHARGED     =             202-1-PERMIT NUMBER 1      =
202-2-PERMIT NUMBER 2      =             202-3-PERMIT NUMBER 3      =
202-4-PERMIT NUMBER 4      =             202-5-PERMIT NUMBER 5      =
202-6-PERMIT NUMBER 6      =             203-INDX NR OF OPERATOR    =
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206-1-MSHA NUMBER 1        = 46-01482    206-2-MSHA NUMBER 2        =
206-3-MSHA NUMBER 3        =             206-4-MSHA NUMBER 4        =
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01/14/92          COLLECTION MANAGEMENT INFORMATION SYSTEM          11:11:41
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211-CITATION YEAR          = 80          212-DATE OF INSPECTION     = 800729
213-DATE OF SERVICE        = 800729
214-UNDERLYING NOV         = N80-1-38-23
215-2ND UNDERLYING NOV     =             216-DATE NOPA ISSUED       = 820929
217-DATE NOPA SERVED       = 821004      218-MINE SITE STATUS       =
220-COMPANY NAME           = VALLEY CAMP COAL CO
221-1ST CHAR OF COMP NAME  = V           222-FISCAL YEAR            = 80
223-REGION                 = E           227-CIT SCHED ABATE DT     =
228-DT CIT ON HOLD         = 900216      229-REASON ON HOLD         = F
230-CITATION AVS STATUS    = I           231-DT CIT TERMINATED      = 800909
232-DT CITATION CLOSED     = 911009      233-DT CITATION VACATED    =
235-DT INFRML CONF REQ     = 800924      236-DT CONF APRVL DEC      = 801002
237-CONF APRVL CODE        = A           238-DT INFRML CONF HELD    = 801104
239-DT RCPT OF IC RPT      = 801118      240-DT IC RPT RCVD BY VIOL=
241-DT VIOLATOR RH REQUEST= 800804       242-DT REVIEW HEARING HELD= 840516
243-DT RH RESULTS RECVD    = 840522      244-DT RH RSLT APPEALED    = 840605
245-DT VIOLATOR PH REQ     =             246-PH ASSIGN RCPT DATE    =
247-DATE P HEARING HELD    =             248-DT PH RESULTS RCVD     =
249-DT IBLA HRNG REQ       = 840605      250-DT IBLA HRNG RENDRD    = 891116
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264-DT TO COLLECTIONS CNTR=              265-DT FROM COLLEC CNTR    =
266-DT REF MAILED TO SOL   =             267-DT TO 2ND COLL CNTR    =
268-DT FRM 2ND COLL CNTR   =             269-DT ELIGIB. LETTR SNT   =
270-DATE ICP WITHDRAWN     =             271-SOCM EDIT ERR CODE     =
272-SOCM EDIT ERR FLAG     = 0           273-CREDIT REPRTNG AGNCY   = 1
274-ACCNTS RECEIVABLE DT   = 900112      275-FINAL ORDER TYPE       =
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905-DATE CP JUDGMENT       =             907-DATE CASE CLOSED       =
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914-CIT ESCROW AMOUNT      = 0.00        915-OSM REC ON INJNCTN     =
917-DT REC TO SOL          =             923-DT COMPLAINT FILED     =
927-DT INJNCTN JUDGMNT     =             928-DT CONTEMPT ENTERED    =
929-INJUNCTION CLOSE DT    =             930-DT OF ABATEMNT PLAN    =
931-ABATE PLAN ADHERENCE   =             932-ABATE PLAN ADHRNC DT   =
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01/14/92          COLLECTION MANAGEMENT INFORMATION SYSTEM          11:11:41
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101-COIN NUMBER : 708.00 201-CITATION NUMBER : C80-1-38-10
301-VIOLATION NUMBER : 1 801-PAYMENT NUMBER : 3

001-RECORD TYPE	= 8	002-SOCM INDICATOR	= 1
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012-UPDATE DATE	=	013-UPDATE IDENTIFIER	=
802-SRCE OF DEBT/PAYMENT	= MA	803-AMOUNT DUE	= 22500.00
804-DATE DUE	=	805-AMOUNT PAID	=
806-DT PAYMENT RECEIVED	=	807-PAYOR NAME	=
809-PAYOR TELEPHONE NUM	=	810-RT NUMBER	=
815-AMOUNT OF REFUND	=	825-AMT OF INTEREST PAID	=
827-AMT ADMIN COST PAID	=	829-AMT LATE PNLTY PAID	=

PENALTY INFORMATION

101-COIN NUMBER : 708.00 201-CITATION NUMBER : C80-1-38-10
301-VIOLATION NUMBER : 1 801-PAYMENT NUMBER : 4

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01/14/92 COLLECTION MANAGEMENT INFORMATION SYSTEM 11:11:41
COMPANY / CITATION FORMATTED PRINT PAGE NO: 12

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012-UPDATE DATE	= 911024	013-UPDATE IDENTIFIER	= W08SM13
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806-DT PAYMENT RECEIVED	=	807-PAYOR NAME	=
809-PAYOR TELEPHONE NUM	=	810-RT NUMBER	=
815-AMOUNT OF REFUND	=	825-AMT OF INTEREST PAID	=
827-AMT ADMIN COST PAID	=	829-AMT LATE PNLTY PAID	=

PENALTY INFORMATION

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301-VIOLATION NUMBER : 1 801-PAYMENT NUMBER : 5

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010-ENTRY DATE	= 911024	011-DATA ENTRY IDENTIFIER	= W08SM13

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01/14/92 COLLECTION MANAGEMENT INFORMATION SYSTEM 11:11:41
COMPANY / CITATION FORMATTED PRINT PAGE NO: 13

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804-DATE DUE	= 911010	805-AMOUNT PAID	= 10000.00
806-DT PAYMENT RECEIVED	= 911010		
807-PAYOR NAME	= VALLEY CAMP COAL CO		
809-PAYOR TELEPHONE NUM	=	810-RT NUMBER	= RT200014
815-AMOUNT OF REFUND	=	825-AMT OF INTEREST PAID	=
827-AMT ADMIN COST PAID	=	829-AMT LATE PNLTY PAID	=

COMPANY / CITATION FORMATTED PRINT PAGE NO: 6

933-PYMT PLAN ADHERENCE =
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952-INTEREST DUE = 3472.88
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964-CRA INTEREST OWED = 3472.88
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970-SOL RETURN AMTOWE =
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977-IRS AMOUNT OWED =
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979-IRS INTEREST OWED =
980-IRS LATE PENALTY OWED =

VIOLATION INFORMATION

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01/14/92 COLLECTION MANAGEMENT INFORMATION SYSTEM 11:11:41
COMPANY / CITATION FORMATTED PRINT PAGE NO: 7

101-COIN NUMBER : 708.00
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301-VIOLATION NUMBER : 1

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006-PRGRM OF LAST UPDATE = CHGVIOCOL
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011-DATA ENTRY IDENTIFIER =
012-UPDATE DATE = 911024
013-UPDATE IDENTIFIER = W08SM13
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303-DT ABATEMENT SCHED =
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311-ABATEMENT DATE = 800909
312-DT VIOLATION CLOSED = 911009
313-REASON VIOL CLOSED = PD
509-VIOL ASSESSED AMT = 22500.00
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514-VIOL ESCROW AMOUNT = 0.00

ASSESSMENT INFORMATION

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301-VIOLATION NUMBER : 1
701-ASSESSMENT NUMBER : 1

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002-SOCM INDICATOR = 1
004-DATE OF LAST UPDATE =
006-PRGRM OF LAST UPDATE =

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01/14/92 COLLECTION MANAGEMENT INFORMATION SYSTEM 11:11:41
COMPANY / CITATION FORMATTED PRINT PAGE NO: 8

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011-DATA ENTRY IDENTIFIER =
012-UPDATE DATE =
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ASSESSMENT INFORMATION

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301-VIOLATION NUMBER : 1
701-ASSESSMENT NUMBER : 2

001-RECORD TYPE = 7
002-SOCM INDICATOR = 1
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006-PRGRM OF LAST UPDATE =
010-ENTRY DATE =
011-DATA ENTRY IDENTIFIER =

012-UPDATE DATE = 013-UPDATE IDENTIFIER =
703-PENALTY ASSESSED = 22500.00

ASSESSMENT INFORMATION

101-COIN NUMBER : 708.00 201-CITATION NUMBER : C80-1-38-10
301-VIOLATION NUMBER : 1 701-ASSESSMENT NUMBER : 3

>

01/14/92 COLLECTION MANAGEMENT INFORMATION SYSTEM 11:11:41
COMPANY / CITATION FORMATTED PRINT PAGE NO: 9

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012-UPDATE DATE = 013-UPDATE IDENTIFIER =
703-PENALTY ASSESSED = 22500.00

PENALTY INFORMATION

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301-VIOLATION NUMBER : 1 801-PAYMENT NUMBER : 1

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804-DATE DUE = 805-AMOUNT PAID =
806-DT PAYMENT RECEIVED = 807-PAYOR NAME =
809-PAYOR TELEPHONE NUM = 810-RT NUMBER =

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01/14/92 COLLECTION MANAGEMENT INFORMATION SYSTEM 11:11:41
COMPANY / CITATION FORMATTED PRINT PAGE NO: 10

815-AMOUNT OF REFUND = 825-AMT OF INTEREST PAID =
827-AMT ADMIN COST PAID = 829-AMT LATE PNLTY PAID =

PENALTY INFORMATION

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301-VIOLATION NUMBER : 1 801-PAYMENT NUMBER : 2

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>

01/14/92 COLLECTION MANAGEMENT INFORMATION SYSTEM 11:11:41
COMPANY / CITATION FORMATTED PRINT PAGE NO: 11

PENALTY INFORMATION

RECEIVED
JAN 1 3 1992
VALLEY CAMP OF UTAH, INC.

Prepared by

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(801) 489-6937

Prepared for

VALLEY CAMP OF UTAH, INC.
Scofield Route
Helper, Utah 84526

Report: Patrick Collins, Ph.D.

Fieldwork: P. Collins
D. Collins

Report Date: January 1992

RESULTS OF VEGETATION SAMPLING AND MONITORING FOR THE UTAH AND BELINA REVEGETATION TEST PLOTS

1991

INTRODUCTION

Following are fourth year results from vegetation monitoring of test plots for Valley Camp of Utah. The plots are located near Scofield, Utah. Quantitative data were also submitted in 1988 - 1990 for the test plots.

The test plots were constructed in 1987 to test revegetation potential of available soil material on the mine area. The test plot design was developed by the State of Utah, Division of Oil, Gas & Mining (DOGM) and Valley Camp of Utah, Inc. Plot construction (layout and earthmoving work) was accomplished by (or under the direction of) Valley Camp of Utah. Seed, fertilizer and hydromulch by the specified design was applied by Mt. Nebo Scientific in October of 1987.

Two main areas were used as sites for the vegetation test plots. These areas were called the Utah Site and the Belina Site. The Utah Site is located south of the truck load-out pad and east of the railroad tracks on an old coal storage area. The Belina Site is on the slope south of the sediment pond.

Monitoring was initiated by sampling the vegetation on the two sites by *Mt. Nebo Scientific* in August-September of 1988 through 1991.

METHODS

Quantitative and qualitative data were taken on each of the two sites. Bi-directional random placement of sampling plots were designed to provide unbiased accuracy of the data compiled. A randomized block design was implemented to insure adequate representation of the entire plot. On the Utah site, three 12.5 meter transects were regularly placed on the plot to adequately cover the entire plot. Twenty sample points were then placed every 1.5 meters along these transects. A one meter buffer strip was placed around the entire plot where sample points were avoided to limit sample bias. There was only one treatment to be monitored on this plot.

The Belina Site, however, had four different treatments to be sampled. Therefore, a total of four areas or "subplots" were sampled. The subplots were labeled on the data summary tables by directional locations and treatments and are listed below:

1) NE Subplot, Light Soil A, Fertilized
2) NW Subplot, Light Soil A, Unfertilized
3) SE Subplot, Gray Soil B, Fertilized
4) SW Subplot, Gray Soil B, Unfertilized

Three transects were also placed on each of the subplots listed above. Eight sample locations were regularly placed on each treatment with a total of 40 samples for all treatments. A one meter buffer

strip was also placed around each of the treatments where quadrat placement was avoided.

Cover estimates were made using ocular methods with meter square quadrats. Species cover, total cover, composition and relative frequency were also assessed from the quadrats. Also recorded on data sheets were estimated precipitation, slope, exposure, grazing use, animal disturbance and other appropriate notes. Density of woody species have been negligible, and therefore not sampled quantitatively. Productivity will be measured in a subsequent season if the data were determined to be meaningful by DOGM and a Valley Camp representative.

Sampling adequacy for cover on the Utah Site was achieved using formula suggested by DOGM (see Table 9 footnote). Sample number of the Belina Site was determined by L. Kunzler (Biologist, DOGM). All sample means, standard deviations, and sample sizes were included in this report to enable the reviewers to apply further statistical tests if desired.

Plant species nomenclature follows Welsh et al. (A Utah Flora. 1987. Great Basin Naturalist Memoir No. 9). Sample design and methodologies were approved by a representative of the State of Utah, DOGM (L. Kunzler, Reclamation Biologist). Mr. Kunzler was present on site upon initiation of the test plot sampling in 1988.

RESULTS

Summary Tables

All results of the vegetation sampling for 1991 are shown on the summary tables (Tables 1 - 10). Included in these tables are:

1) percent cover and standard deviations (total living cover, mulch & litter, bare ground, & rock),

2) composition (% shrubs, forbs, & grasses),

3) cover and frequency by species,

4) sample sizes.

Nomenclature

Because the author decided to use more recent nomenclature for plant species for the summary tables, and because some of the species on the original seed mix list have been changed, a list is provided below showing the old and new scientific names.

Old Name (on seed mix lists)	New Name (Welsh 1987)
Shrubs	
Amelanchier alnifolia	Amelanchier alnifolia
Artemisia tridentata var. vaseyana	Artemisia tridentata vaseyana
Chrysothamnus nauseosus albicaulis	C. nauseosus albicaulis
Rosa woodsii	Rosa woodsii
Sambucus coerulea	Sambucus coerulea
Symphoricarpos oreophilus	Symphoricarpos oreophilus
Forbs	
Achillea millefolium	Achillea millefolium
Artemisia ludoviciana	Artemisia ludoviciana
Linum lewisii	Linum perenne ssp. lewisii
Hedysarum boreale	Hedysarum boreale
Medicago sativa	Medicago sativa
Melilotus officinalis	Melilotus officinalis
Penstemon strictus	Penstemon strictus
Grasses	
Agropyron dasystachyum	Elymus lanceolatus
Agropyron smithii	Elymus smithii
Bromus marginatus	Bromus carinatus
Poa canbyi	Poa canbyi
Poa pratensis	Poa pratensis

The test plots will continue to be monitored according to the schedule accepted by the State of Utah, DOGM.

TABLE 1: **1991 SAMPLING RESULTS - BELINA PLOT**
(NE Subplot, Light Soil A, Fertilized)

Total cover and composition for the revegetation test plots of Valley Camp of Utah. The table shows means, standard deviations and sample sizes.

COVER

	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE *
Total Living Cover	40.63	3.90	8
Litter	13.13	4.96	8
Bareground	7.50	2.50	8
Rock	38.75	5.99	8

COMPOSITION

	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE *
Shrubs	0.00	0.00	8
Forbs	4.53	5.49	8
Grasses	95.47	5.49	8

*Sample size was determined by Division of Oil, Gas & Mining (see METHODS).

TABLE 2: **1991 SAMPLING RESULTS - BELINA PLOT**
(NE Subplot, Light Soil A, Fertilized)

Mean percent cover, standard deviation, sample size and relative frequency by species for the revegetation test plots of Valley Camp of Utah.

COVER BY SPECIES

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
SHRUBS				
FORBS				
Circium sp.	0.25	0.66	8.0	12.50
Epilobium halleanum	1.25	2.17	8.0	25.00
Linum lewsii	0.25	0.66	8.0	12.50
GRASSES				
Bromus carinatus	17.50	7.86	8.0	100.00
Dactylus glomeratus	8.63	9.49	8.0	62.50
Elymus smithii	4.38	6.82	8.0	37.00
Elymus spicatus	2.75	2.82	8.0	50.00
Poa pratensis	5.63	5.27	8.0	62.50

TABLE 3: **1991 SAMPLING RESULTS - BELINA PLOT**
(NW Subplot, Light Soil A, Unfertilized)

Total cover and composition for the revegetation test plots of Valley Camp of Utah. The table shows means, standard deviations and sample sizes.

COVER

	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE *
Total Living Cover	44.38	8.08	8.0
Litter	12.50	3.54	8.0
Bareground	6.25	2.17	8.0
Rock	36.88	9.98	8.0

COMPOSITION

	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE *
Shrubs	0.25	0.66	8.0
Forbs	9.13	12.09	8.0
Grasses	90.62	12.13	8.0

*Sample size was determined by Division of Oil, Gas & Mining (see METHODS).

TABLE 4: **1991 SAMPLING RESULTS - BELINA PLOT**
(NW Subplot, Light Soil A, Unfertilized)

Mean percent cover, standard deviation, sample size and relative frequency by species for the revegetation test plots of Valley Camp of Utah.

COVER BY SPECIES

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
SHRUBS				
Artemisia tridentata	0.13	0.33	8.0	12.50
FORBS				
Circium sp.	0.63	1.65	8.0	12.50
Epilobium halleanum	2.13	3.41	8.0	37.50
Urtica dioica	1.25	3.31	8.0	12.50
GRASSES				
Bromus carinatus	4.88	3.37	8.0	75.00
Dactylis glomerata	10.00	10.61	8.0	75.00
Elymus smithii	15.75	11.85	8.0	100.00
Elymus spicatus	2.50	2.50	8.0	50.00
Poa pratensis	7.13	7.85	8.0	62.50

TABLE 5: **1991 SAMPLING RESULTS - BELINA PLOT**
(SE Subplot, Gray Soil B, Fertilized)

Total cover and composition for the revegetation test plots of Valley Camp of Utah. The table shows means, standard deviations and sample sizes.

COVER

	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE *
Total Living Cover	41.25	5.99	8.0
Litter	7.50	2.50	8.0
Bareground	13.13	7.04	8.0
Rock	38.13	9.33	8.0

COMPOSITION

	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE *
Shrubs	0.00	0.00	8.0
Forbs	17.96	15.78	8.0
Grasses	82.04	15.78	8.0

*Sample size was determined by Division of Oil, Gas & Mining (see METHODS).

TABLE 6: **1991 SAMPLING RESULTS - BELINA PLOT**
(SE Subplot, Gray Soil B, Fertilized)

Mean percent cover, standard deviation, sample size and relative frequency by species for the revegetation test plots of Valley Camp of Utah.

COVER BY SPECIES

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
SHRUBS				
FORBS				
Artemisia ludiviciana	1.13	1.69	8.0	37.50
Epilobium halleanum	3.00	2.60	8.0	75.00
Hedysarum boreale	1.63	2.18	8.0	37.50
Penstemon strictus	0.88	2.32	8.0	12.50
GRASSES				
Bromus carinatus	16.50	18.53	8.0	75.00
Dactylis glomerata	3.00	7.94	8.0	12.50
Elymus smithii	3.50	2.87	8.0	62.50
Elymus spicatus	4.63	6.78	8.0	37.50
Poa pratensis	16.50	18.53	8.0	50.00

TABLE 7: **1991 SAMPLING RESULTS - BELINA PLOT**
(SW Subplot, Gray Soil B, Unfertilized)

Total cover and composition for the revegetation test plots of Valley Camp of Utah. The table shows means, standard deviations and sample sizes.

COVER

	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE *
Total Living Cover	40.00	6.61	8.0
Litter	8.75	2.17	8.0
Bareground	5.63	1.65	8.0
Rock	45.63	7.26	8.0

COMPOSITION

	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE *
Shrubs	0.00	0.00	8.0
Forbs	27.46	21.83	8.0
Grasses	72.54	21.83	8.0

*Sample size was determined by Division of Oil, Gas & Mining (see METHODS).

TABLE 8: **1991 SAMPLING RESULTS - BELINA PLOT**
(SW Subplot, Gray Soil B, Unfertilized)

Mean percent cover, standard deviation, sample size and relative frequency by species for the revegetation test plots of Valley Camp of Utah.

COVER BY SPECIES

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
SHRUBS				
FORBS				
Circium sp.	0.25	0.66	8.0	12.50
Epilobium halleanum	5.75	3.38	8.0	87.50
Gayophytum ramosissimum				
Hedysarum boreale	3.38	5.10	8.0	37.50
Machaeranthera canescens	0.63	1.65	8.0	12.50
Linum lewsii	0.13	0.33	8.0	12.50
GRASSES				
Agropyron cristatum				
Bromus carinatus	14.00	10.32	8.0	87.50
Dactylis glomerata	3.00	3.08	8.0	50.00
Elymus smithii	3.13	3.48	8.0	50.00
Elymus spicatus	4.13	5.73	8.0	50.00
Poa pratensis	5.63	6.34	8.0	62.50

TABLE 9: **1991 SAMPLING RESULTS - UTAH PLOT**
(Single plot design)

Total cover and composition for the revegetation test plots of Valley Camp of Utah. The table shows means, standard deviations and sample sizes.

COVER

	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE *
Total Living Cover	36.50	10.26	20.00
Litter	10.50	3.50	20.00
Bareground	43.00	12.49	20.00
Rock	10.00	5.92	20.00

COMPOSITION

	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE
Shrubs	5.81	8.21	20.00
Forbs	41.91	20.59	20.00
Grasses	52.28	18.72	20.00

* Sample size insures adequate sample with the following formula:

$$Nmin = \frac{(t \text{ squared}) \times (\text{variance})}{25}$$

TABLE 10: **1991 SAMPLING RESULTS - UTAH PLOT**
(Single Plot Design)

.ean percent cover, standard deviation, sample size and relative frequency by species for the revegetation test plots of Valley Camp of Utah.

COVER BY SPECIES

SPECIES	% MEAN COVER	STANDARD DEVIATION	SAMPLE SIZE	RELATIVE FREQUENCY
SHRUBS				
Artemisia tridentata	2.10	2.96	20.0	45.00
FORBS				
Artemisia ludoviciana	3.05	4.03	20.0	45.00
Chaenactis douglasii	0.25	1.09	20.0	5.00
Circium sp.	0.25	1.09	20.0	5.00
Cynoglossum officinale	0.10	0.44	20.0	5.00
Epilobium halleanum	0.70	1.27	20.0	30.00
Linum perenne ssp. lewisii	3.50	3.15	20.0	70.00
Machaeranthera grindelioides	0.15	0.65	20.0	5.00
Medicago sativa	4.35	5.78	20.0	50.00
Melilotus officinalis	1.85	3.75	20.0	25.00
erbascum thapsus	1.50	2.06	20.0	45.00
GRASSES				
Bromus carinatus	0.50	1.50	20.0	10.00
Elymus lanceolatus	8.40	5.47	20.0	95.00
Elymus smithii	9.80	6.60	20.0	100.00
Hordeum jubatum				

1992 ANNUAL MAINTENANCE REPORT

STABILITY: There were no indications of instability, structural weaknesses or other hazardous conditions.

CAPACITY: 001A=2.52, 002A=0.48, 003A=2.35, 004A=11.20, and 005A=250gpm. The water level was below the decant valve of 001A through 003A and no discharge from these ponds occured again this year, 004A discharged in May only of this year, Filter pond 005A discharged January through July and in September.

MONITORING: As required by U.P.D.E.S..

OBSERVATIONS DURING INSPECTIONS: Embankment seepage, Interior erosion, Spillway continuity, Inlet Erosion, Spillway Erosion, Slope Movement, Dewatering device for clogging.

Field survey for sediment levels will be accomplished during the summer/fall at their lowest level of water.

These facilities were also inspected by UDOGM and OSM inspectors during the year with no apparent problems.

Edwin Brookshire Foust P.E.
License No. UT. 0532309110

1992 ANNUAL MAINTENANCE INSPECTION CERTIFICATION

I hereby certify, in accordance with R645-301-514.310 through R614-301-514.313 and others applicable to the maintenance of sediment ponds 001A through 004A and filter pond 005A. I, or persons under my supervision, have conducted adequate inspections of the maintenance of the said structures; and the attached report is certified in accordance with the rules of professional conduct promulgated by the Utah Board of Examiners for Engineers.

REGISTERED PROFESSIONAL ENGINEER
No. 5323
EDWIN
BROOKSHIRE
FOUST
STATE OF UTAH

Edwin Brookshire Foust P.E.
License No. UT. 0532309110

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

December 13, 1991

VALLEY CAMP OF UTAH, INC.
Scofield Route
Helper UT 84526

Sample identification by
VALLEY CAMP OF UTAH, INC.

Kind of sample reported to us: Coal

Special Sample

Sample taken at: Valley Camp

Sample taken by: Valley Camp

Date sampled: November 27, 1991

Date received: December 2, 1991

Analysis Report No. 59-140025

ANALYSIS OF ASH	WEIGHT %, IGNITED BASIS
Silicon dioxide	47.99
Aluminum oxide	10.04
Titanium dioxide	0.80
Iron oxide	7.98
Calcium oxide	19.82
Magnesium oxide	1.80
Potassium oxide	0.28
Sodium oxide	0.43
Sulfur trioxide	9.53
Phosphorus pentoxide	0.40
Strontium oxide	0.05
Barium oxide	0.02
Manganese oxide	0.02
Undetermined	0.84
	100.00

Silica Value = 61.85
Base:Acid Ratio = 0.52
T_{250} Temperature = 2290 °F

Type of Ash = LIGNITIC
Fouling Index = 0.43
Slagging Index = 2134.40

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Dave Counsill

Manager, Huntington Laboratory

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300

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December 13, 1991

VALLEY CAMP OF UTAH, INC.
Scofield Route
Helper UT 84526

Sample identification by
VALLEY CAMP OF UTAH, INC.

Kind of sample reported to us Coal

Special Sample

Sample taken at Valley Camp

Sample taken by Valley Camp

Date sampled November 27, 1991

Date received December 2, 1991

Analysis Report No. 59-140025

PROXIMATE ANALYSIS

	As Received	Dry Basis		
% Moisture	10.32	xxxxx		
% Ash	5.97	6.66		
% Volatile	39.95	44.55		
% Fixed Carbon	43.76	48.79		
	100.00	100.00		
Btu/lb	11881	13248	MAF	14193
% Sulfur	0.48	0.54		
Alkalies as Sodium Oxide	0.04	0.04		

FUSION TEMPERATURE OF ASH, (°F)

	Reducing	Oxidizing
Initial Deformation (IT)	2118	2160
Softening (ST)	2125	2170
Hemispherical (HT)	2134	2200
Fluid (FT)	2217	2278

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Dave Council

Manager, Huntington Laboratory JK

COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300

SINCE 1908

Member of the SGS Group (Société Générale de Surveillance)

PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

January 7, 1992

VALLEY CAMP OF UTAH, INC.
Scofield Route
Helper UT 84526

Sample identification by
VALLEY CAMP OF UTAH, INC.

Kind of sample reported to us Coal

Special Sample

Sample taken at Valley Camp

Sample taken by Valley Camp

Date sampled November 27, 1991

Date received December 2, 1991

Analysis Report No. 59-140025

CHLORINE

	As Received	Dry Basis
% Total Moisture	10.32	xxxxx
% Chlorine	0.00	0.00

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

OVER 40 BRANCH LABORATORIES STRATEGICALLY LOCATED IN PRINCIPAL COAL MINING AREAS, TIDEWATER AND GREAT LAKES PORTS, AND RIVER LOADING FACILITIES

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COMMERCIAL TESTING & ENGINEERING CO.
GENERAL OFFICES: 1919 SOUTH HIGHLAND AVE., SUITE 210-B, LOMBARD, ILLINOIS 60148 • (708) 953-9300

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PLEASE ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1020, HUNTINGTON, UT 84528
TELEPHONE: (801) 653-2311
FAX: (801) 653-2479

January 7, 1992

VALLEY CAMP OF UTAH, INC.
Scofield Route
Helper UT 84526

Sample identification by
VALLEY CAMP OF UTAH, INC.

Kind of sample reported to us Coal

Special Sample

Sample taken at Valley Camp

Sample taken by Valley Camp

Date sampled November 27, 1991

Date received December 2, 1991

Analysis Report No. 59-140025

FLUORINE 40 ug/g

Respectfully submitted,
COMMERCIAL TESTING & ENGINEERING CO.

Manager, Huntington Laboratory

INSPECTORATE
WORLDWIDE QUALITY SERVICES

INSPECTORATE GRIFFITH (USA) INC.

24426 S. Main St., Ste. 703 Carson, California 90745
Tel: 213-835-4017 Tlx: 178413 Fax: 213-835-4631

MARCH 6, 1992

VALLEY CAMP OF UTAH, INC.
SCOFIELD ROUTE
HELPER, UTAH 84526

DRAFT SURVEY REPORT

RE: M/V "ANGELIC SPIRIT"
CARGO DESCRIBED AS : STEAM COAL
STOWAGE : CARGO HOLDS 1 - 7
LOAD PORT : BERTH-49, PORT OF LOS ANGELES, CALIFORNIA U.S.A.
SURVEY DATES : FEBRUARY 27 & 28 1992
OUR REFERENCE : LA/92/40263

			LIGHT	LADEN
DATE			(0730) 02/27/92	(2200) 02/28/92
	DRAFTS			
1.	FORE :	PORT	15'07"	25'11"
		STARBOARD	15'08"	26'00"
		STEM CORRECTION	- 0'01.46"	- 0'00.9"
		MEAN	15'06.04"	25'10.6"
2.	AFT :	PORT	23'09"	30'09"
		STARBOARD	23'10"	30'11"
		STERN CORRECTION	+ 0'04.2"	+ 0'02.5"
		MEAN	24'01.7"	31'00.5"
3.	MIDSHIP:	PORT	19'04"	28'05.5"
		STARBOARD	19'09"	28'11.5"
		MIDSHIP CORRECTION	0'00"	0'00"
		MEAN	19'06.5"	28'08.5"
4.	MEAN AND FORE AND AFT		19'09.87"	28'05.55"
5.	MEAN OF MEANS		19'08.185"	28'07.025"
6.	DRAFT (CORR.FOR HOG & SAG)		19'07.3425"	28'07.7625"
7.	DISPLACEMENT		32,694.693 L/T	48,979.882 L/T
	TRIM BY STERN		8'07.66"	5'01.9"
	CORR.FOR TRIM		- 425.006	- 188.580
8.	DISPLACEMENT		32,269.687 L/T	48,791.302 L/T
	WATER DENSITY OBSERVED		1.025	1.025
	CORR.FOR DENSITY		0.000	0.000

INSPECTORATE
WORLDWIDE QUALITY SERVICES

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Tel: 213-835-4017 Tlx: 178413 Fax: 213-835-4631

MARCH 6, 1992

VALLEY CAMP OF UTAH, INC.
SCOFIELD ROUTE
HELPER, UTAH 84526

CERTIFICATE OF QUANTITY (WEIGHT)

RE: M/V "ANGELIC SPIRIT"

CARGO DESCRIBED AS	:	STEAM COAL
STOWAGE	:	CARGO HOLDS 2, 4, & 6
LOAD PORT	:	BERTH-49, PORT OF LOS ANGELES, CALIFORNIA U.S.A.
SURVEY DATES	:	FEBRUARY 27 & 28, 1992
OUR REFERENCE	:	LA/92-40263

According to instructions received, we performed a draft survey on the above vessel, using international accepted methods.

The cargo weight as determined by this draft survey is: 28,189.620 metric tons.

INSPECTORATE GRIFFITH (USA) INC.

STEVEN C. GLYNN
LOS ANGELES, CA.
OPERATIONS

INSPECTORATE

WORLDWIDE QUALITY SERVICES

MARCH 6, 1992

VALLEY CAMP OF UTAH, INC.
SCOFIELD ROUTE
HELPER, UTAH 84526

CERTIFICATE OF QUALITY (SAMPLING AND ANALYSIS

RE: M/V "ANGELIC SPIRIT"
CARGO DESCRIBED AS : 28,189.506 M/T STEAM COAL
STOWAGE : CARGO HOLDS 2, 4, & 6
LOAD PORT : BERTH-49, PORT OF LOS ANGELES, CALIFORNIA U.S.A.
DATES : FEBRUARY 27 & 28, 1992
OUR REFERENCE : LA/92-40263

ANALYSIS FINDINGS CONTINUED:

MINERAL ANALYSIS OF ASH	%IGNITED BASIS
SILICON DIOXIDE	54.47
ALUMINUM DIOXIDE	9.94
TITANIUM DIOXIDE	0.48
FERRIC OXIDE	7.24
CALCIUM DIOXIDE	17.52
MAGNESIUM OXIDE	2.89
POTASSIUM OXIDE	1.03
SODIUM OXIDE	0.30
PHOSPHORUS PENTOXIDE	0.23
SULPHUR TRIOXIDE	5.88
UNDETERMINED	0.02

TEST	RESULT
CHLORINE	0.02PPM
NITROGEN	1.34%

REDUCING FUSION	
INITIAL TEMPERATURE	2117 DEGREES F
SOFTENING TEMPERATURE	2142 DEGREES F
HEMISPHERICAL TEMPERATURE	2167 DEGREES F
FLUID TEMPERATURE	2192 DEGREES F

INSPECTORATE GRIFFITH (USA) INC.

STEVEN C. GLYNN
LOS ANGELES, CA.
OPERATIONS

INSPECTORATE
WORLDWIDE QUALITY SERVICES

INSPECTORATE GRIFFITH (USA) INC.

24426 S. Main St., Ste. 703 Carson, California 90745
Tel: 213-835-4017 Tlx: 178413 Fax: 213-835-4631

MARCH 6, 1992

VALLEY CAMP OF UTAH, INC.
SCOFIELD ROUTE
HELPER, UTAH 84526

CERTIFICATE OF QUALITY (SAMPLING AND ANALYSIS)

RE: M/V "ANGELIC SPIRIT"
CARGO DESCRIBED AS : 28,189.620 M/T STEAM COAL
STOWAGE : CARGO HOLDS 2, 4, & 6
LOAD PORT : BERTH-49, PORT OF LOS ANGELES, CALIFORNIA U.S.A.
DATES : FEBRUARY 27 & 28, 1992
OUR REFERENCE : LA/92-40263

According to instructions received, we performed the above mentioned intervention.

Systematic sampling was effected throughout entire vessel loading operations, February 27 & 28, 1992, at Berth-49, Port of Los Angeles, California.

Accordingly, we report the following findings:

TEST	AS RECEIVED	DRY BASIS	AIR DRIED
% TOTAL MOISTURE	10.43	XXXXX	3.58
% ASH	6.69	7.47	7.20
% VOLATILE MATTER	38.60	43.10	41.56
% FIXED CARBON	44.28	49.43	47.66
% SULPHUR	0.45	0.50	0.48
% BTU/LB	11680	13040	12573
KCAL/KG	6489	7244	6985

SIZE CONSIST	% WEIGHT
PLUS 2 INCH	0.7
2 " X 1-1/2	2.0
1-1/2" X 1"	8.9
1" X 1/2"	19.4
1/2" X 1/4	23.3
1/4" X 0	45.7

(CONTINUED ON NEXT PAGE)

INSPECTORATE
WORLDWIDE QUALITY SERVICES

INSPECTORATE GRIFFITH (USA) INC.

24426 S. Main St., Ste. 703 Carson, California 90745
Tel: 213-835-4017 Tlx: 178413 Fax: 213-835-4631

MARCH 6, 1992

VALLEY CAMP OF UTAH, INC.
SCOFIELD ROUTE
HELPER, UTAH 84526

DRAFT SURVEY REPORT

RE: M/V "DYNASTY"
CARGO DESCRIBED AS : STEAM COAL
STOWAGE : CARGO HOLDS 2, 4, & 6
LOAD PORT : BERTH-49, PORT OF LOS ANGELES, CALIFORNIA U.S.A.
SURVEY DATES : FEBRUARY 27 & 28 1992
OUR REFERENCE : LA/92-40263

		LIGHT	LADEN
DATE		(0730) 02/27/92	(2200) 02/28/92
9.	DISPLACEMENT	32,269.687 L/T	48,791.302 L/T
	FUEL OIL	672.087	1,664.000
	DIESEL OIL	153.734	153.734
	FRESH WATER	285.421	255.895
	BALLAST	18,918.111	6,732.833
	TOTAL	20,029.353 L/T	8,806.462
10.	NET DISPLACEMENT	12,240.334 L/T	76,662.936 L/T
	TOTAL WEIGHT OF CARGO	27,744.504 L/T OR 28,189.620 M/T	

INSPECTORATE GRIFFITH (USA) INC.

STEVEN C. GLYNN
LOS ANGELES, CA.
OPERATIONS

INSPECTORATE
WORLDWIDE QUALITY SERVICES

INSPECTORATE GRIFFITH (USA) INC.

24426 S. Main St., Ste. 703 Carson, California 90745
Tel: 213-835-4017 Tlx: 178413 Fax: 213-835-4631

MARCH 6, 1992

VALLEY CAMP OF UTAH, INC.
SCOFIELD ROUTE
HELPER, UTAH 84526

CERTIFICATE OF HOLD CLEANLINESS

RE: M/V "ANGELIC SPIRIT"
CARGO DESCRIBED AS : STEAM COAL
STOWAGE : CARGO HOLDS 2, 4, & 6
LOAD PORT : BERTH-49, PORT OF LOS ANGELES, CALIFORNIA U.S.A.
SURVEY DATE : FEBRUARY 27 & 28, 1992
OUR REFERENCE : LA/92-40263

According to instructions received, we performed the above mentioned intervention.

We attended a survey onboard the above named vessel while at Port of Long Beach, California, for the purpose of inspecting the condition of cargo holds and report the following:

The vessel's holds 2, 4, & 6 were inspected and found to be dry and clean without apparent odors and/or other dangerous substances, as far as visually could be ascertained. Holds 2, 4, & 6 passed final inspection at 0730 hours on February 27, 1992

INSPECTORATE GRIFFITH (USA) INC.

STEVEN C. GLYNN
LOS ANGELES, CA.
OPERATIONS

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
6771 SOUTH 900 EAST
P.O. BOX 21146
SALT LAKE CITY, UTAH 84121-0146
(801) 566-5599

December 11, 1991

Mr. Steve Tanner
Valley Camp of Utah, Inc.
Scofield Route
Helper, UT 84526

RE: 1991 Spring Depletion Analysis.

Dear Steve:

As requested we have completed our annual spring depletion analysis for Springs monitored for Valley Camp of Utah and have plotted spring flow data collected since 1980 for springs S7-11, S24-12, S25-13, S31-13, S36-17, S36-19 and S36-23 in two formats. The first format shows flow variation over a years time period where one year is overlaid on top of the other. The second format shows flows for the complete period of record as sequential time plots. Copies of these plots are attached. An analysis of the curves indicates that overall local trends are quite consistent between springs monitored for any given year. Areawide trends are identified in Table 1 by shading data for the year in which overall changes at all springs were the same. Trends for any given spring throughout the period of record however do show some interesting correlations as will be discussed later.

TABLE 1
VARIATION IN SPRING FLOW FROM PREVIOUS YEAR

SPRING NUMBER	YEAR										
	81	82	83	84	85	86	87	88	89	90	91
S7-11	DN	UP	UP	DN	DN	UP	DN	UP	DN	UP	UP
S24-12	DN	UP	UP	DN	DN	UP	DN	UP	DN	DN	-
S25-13	DN	UP	UP	DN	DN	-	DN	UP	DN	-	UP
S31-13	DN	UP	-	-	DN	UP	DN	UP	DN	-	UP
S36-17	DN	UP	UP	DN	DN	UP	DN	DN	UP	DN	UP
S36-19	DN	UP	UP	-	DN	UP	DN	UP	DN	UP	-
S36-23	DN	UP	UP	UP	DN	UP	DN	UP	DN	UP	UP

Identical responses in all springs have been noted for the years 1981, 1982, 1985 and 1987. Years 1983, 1986 and 1991 showed consistent increases in flow over the previous year except for one or two springs each year when little or no change was noted in the data. Data for 1984, 1988 and 1989 show that all but one spring each year showed consistent responses with other local springs. 1990 data showed the most variation of all data recorded throughout the period of record. Generally speaking, flow variations in monitored springs were mixed during 1990. Flows from three of the springs increased while two springs showed little variation and two showed decreased flows.

Springs monitored during the 1991 monitoring period showed stable or increased flows over those recorded in 1990. Springs S7-11, S25-13, S31-13, S36-17 and S36-23 all showed increases while springs S24-12 and S36-19 showed little change.

A review of yearly data shown in the attached spring depletion curves shows little if any consistent trend toward either increased or decreased flows except at spring S24-12. Spring S24-12 is the only spring which showed consistent declines over the last three or four years of record. For the other springs monitored over time, no more than two years (except for spring S36-23 where three consecutive years occurred) at a time could be identified wherein 1) the flow continued on either an uphill or downhill trend and 2) where the associated spring depletion curve showed a marked change in flow condition.

Table 2 has been developed to show trends which occurred in the data. Trends are shown in the table by shading any two or more consecutive years where a consistent trend was noted. Note from the matrix that no trend continues for more than a two year period (except at S36-23 as noted above), even during the last three or four year period of drought. It should also be noted that in spite of recent drought conditions, three of the seven springs monitored during 1990 recorded higher flows than those recorded in 1989, and all springs showed consistent or increased flows in 1991 over those recorded in 1990. The subtle increase in flows during 1991 may be the result of increased local precipitation amounts received over that experienced since the mid 1980's. A brief review and analysis of each spring follows.

<u>Spring S7-11</u>

Spring Depletion Figure 1 shows monthly and annual fluctuations in flow from spring S7-11 which is located at the far south edge of the mine permit boundary near Monument Peak. Data collected indicates that flows recorded at the spring during June have been as high as approximately 0.077 cfs (35 gpm) and as low as approximately 0.001 cfs (0.45 gpm). An extrapolation of 1990 data into June may indicate however that 1990 June flows were even less than the previously recorded low. The most severe flow conditions at this location were found during the fall of 1989 where seep conditions were found. Flows recorded in the late summer and fall of 1990 and appear to have returned to approximate average conditions in 1991.

Figure 8 shows relative consistency in flows over time with some higher spring flows being recorded throughout the period of record.

TABLE 2
SPRING FLOW TRENDS

SPRING NUMBER	YEAR										
	81	82	83	84	85	86	87	88	89	90	91
S7-11	DN	UP	UP	DN	DN	UP	DN	UP	DN	UP	UP
S24-12	DN	UP	UP	DN	DN	UP	DN	UP	DN	DN	-
S25-13	DN	UP	UP	DN	DN	-	DN	UP	DN	-	UP
S31-13	DN	UP	-	-	DN	UP	DN	UP	DN	-	UP
S36-17	DN	UP	UP	DN	DN	UP	DN	DN	UP	DN	UP
S36-19	DN	UP	UP	-	DN	UP	DN	UP	DN	UP	-
S36-23	DN	UP	UP	UP	DN	UP	DN	UP	DN	UP	UP

Although flows have varied greatly throughout the period of record, no indications are evident that would conclude that mining impacts have been felt within the spring recharge area. Because of its location, it is felt that Spring S7-11 is outside the potential mine impact area for the foreseeable future.

<u>Spring S24-12</u>

Flow rates within this spring (located within the South Fork of Eccles Creek along the western mine permit boundary) were relatively consistent for the period of record prior to 1989 as shown in Figures 2 and 9. With the exception of 1989 through 1991 data, all recorded flows have been within a 0.0008 to 0.007 cfs (0.36 to 3.14 gpm) range. As shown on the figures, monthly fluctuations have been moderate indicating a relatively consistent source of recharge water or a relatively large recharge zone. Water levels however within the last three years show a decline in flow rate. Between June 1988 and June 1989 flows dropped from approximately 0.002 cfs (0.9 gpm) to 0.0005 cfs (0.22 gpm), and in June of 1990 they dropped again to a low of 0.00015 cfs (0.07 gpm). Flows during the June 1991 period were recorded to be 0.0001 cfs (0.04 gpm).

The fact that the spring has noted a decline is of concern to this particular spring because of its record of consistency prior to 1989. The cause of the declines over the last two or three years may be the result of 1) climatic trends, or 2) mining impact. Climatic trends throughout the area would indicate that a decrease in flow rate would be expected to occur, however, the decreases noted on the figure are larger than would normally be expected based on past history and not characteristic of other local springs. Whether or not the impacts at this spring are the result of local mining activities is uncertain because of the timing of the impact. It is possible that either (or both) Valley Camp or Coastal States Energy (located immediately west of Valley Camp) mines have impacted recharge water.

The fact that no recovery has been noted in flows at Spring S24-12 over the last year increases the probability of mining impact since slightly increased precipitation (over that received since 1985) was received locally. As stated in 1990, a final determination of the causes of the impact to S24-12 would require that additional hydrogeologic information related to both mines be analyzed. Forecasts indicate that winter 1991-1992 precipitation will be at or above normal. Additional data gathered during the summer and fall period of 1992 will continue to confirm impact.

Spring S25-13

Flow variations shown on Figures 3 and 10 for spring S25-13 have remained relatively consistent throughout the years in spite of recent drought conditions. Although annual fluctuations have been relatively minor, seasonal variations are seen to be large, perhaps indicating a small recharge area. This is logical since the spring is located at a relatively high elevation west of the Belina Mine portals. Based upon available data, seasonal variations ranging from 0.08 to 0.0002 cfs (36 to 0.09 gpm) appear to be possible. No trends appear to be evident at this spring at the current time.

Spring S31-13

Spring S31-13 is located along the eastern mine permit boundary in Finn Canyon near the Old Black Diamond Mine. This spring has characteristics similar to those noted above for Spring S24-12 in that only moderate annual or seasonal fluctuations in flow have been noted (see Figures 4 and 11). A slight decrease in flow is noted between the years 1988 and 1990 (believed to be the result of local climatic conditions), however no continued trend is visible. The hypothesis stated last year that flows were expected to increase upon increased precipitation appears to be valid since flows appear to have increased by approximately 215% between the fall of 1990 and the fall of 1991 (0.0028/.0013).

Spring S36-17

Flows recorded for Spring S36-17 located within the mid sections of the mine permit area in Boardinghouse Canyon show a fair amount of variation in flow in terms of both seasonal and annual fluctuation (see Figures 5 and 12). It appears that early spring flows are generally found to be within the range of 0.01 to 0.1 cfs (4.5 to 45 gpm). Fall flows are more widely varied with recorded flows ranging from 0.0004 to 0.018 cfs (0.18 to 8.1 gpm). Since no trend toward decreased flows is evident, it appears that mining impacts have not been felt at this spring.

Measurements taken during 1991 generally indicate that spring flows are high in comparison to data collected during drier flow years including 1981, 1987, 1988 and 1990. Data obtained in July of 1989 and 1991 (shown with question marks on Figure 5) are not included in the projected discharge curve because it is believed that they may be in error.

Spring S36-19

Spring S36-19 is found near a southern permit boundary within Coal Canyon. Mining within the area of spring S36-19 is scheduled for the 10 year mine plan as shown on permit Map R614-301-722.100a. At this time it is not believed that this spring would be impacted by mining activities being conducted by Valley Camp. This is certainly the case for the current period as can be seen from Figures 6 and 13 where spring flows recorded during 1990 and 1991 are higher than 1989 flows even in spite of recent drought conditions. The dry measurement recorded in September of 1991 is believed to be in error.

The reason for the increase during the last few years may possibly be explained if 1) the spring were lower than upgradient mine workings and 2) if the tributary recharge area were large. A spring lower than upgradient mine workings would make possible increased flows by the diversion of in-mine waters into the recharge zone supplying the spring. A review however indicates that this is not the case. A large recharge zone may also result in increased flows simply as a result of lag time between recharge and discharge to the spring. Based upon response times and conditions of other local springs it is believed that this is not the case.

Spring S36-23

Spring S36-23, located near the western permit boundary in the Middle Fork of Burnout Canyon has perhaps the most consistent flow record of all springs monitored in this monitoring program (see Figures 7 and 14). With a total seasonal and annual flow variation throughout the period of record of 0.0048 to 0.018 cfs (2.15 to 8.1 gpm), this spring has shown remarkable consistency. Although the years between 1988 and 1990 saw some of the lowest flows recorded for the spring, the spring was able to maintain what appears to be a minimum of over 60 percent of its average flow rate. No long term flow trends are evident from the data collected and it

appears that flows did increase at the spring subsequent to increased precipitation recorded in 1991.

Conclusion

In summary, it is believed that springs monitored as part of the ongoing water monitoring program required under the coal mining regulations have not been impacted as a direct result of mining activities within the area of the Belina Mines except for perhaps Spring S24-12. Flows from Spring S24-12 were noted during the 1991 sampling period to have continued their decreased trend since 1988. Although the cause for the decrease may be climatic, it is believed that the probability is greater that it is due to local mining impacts. A more precise determination of the cause of the noted declines requires that additional information related to mining activities of local mines be reviewed and analyzed.

Should you have any questions related to the material contained within this letter, please call.

Sincerely,

David E. Hansen, Ph.D., P.E.
Principal

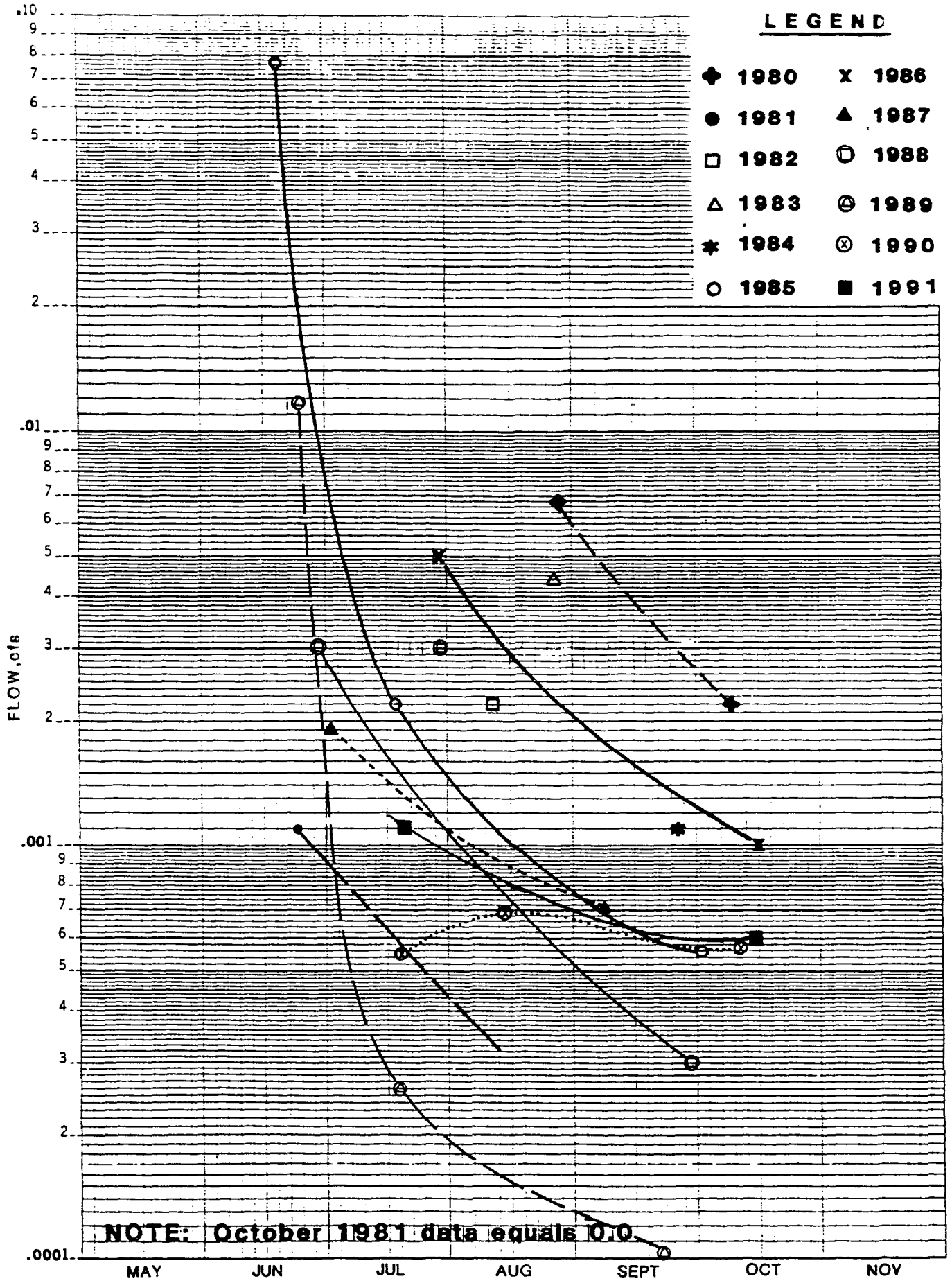

Figure 1. Spring S7-11 Depletion Curve

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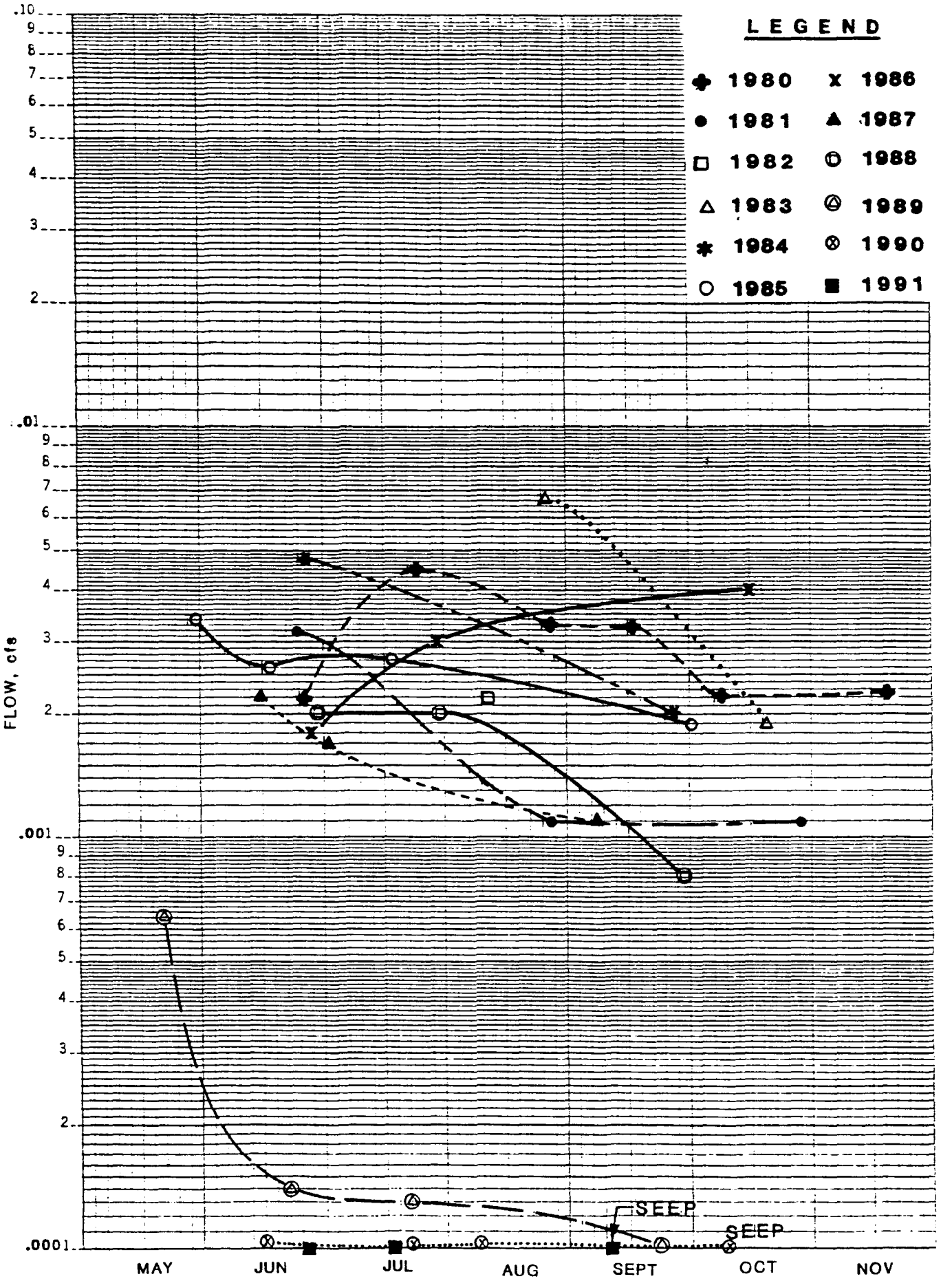

Figure 2. Spring S24-12 Depletion Curve

HANSEN ALLEN & LUCE INC

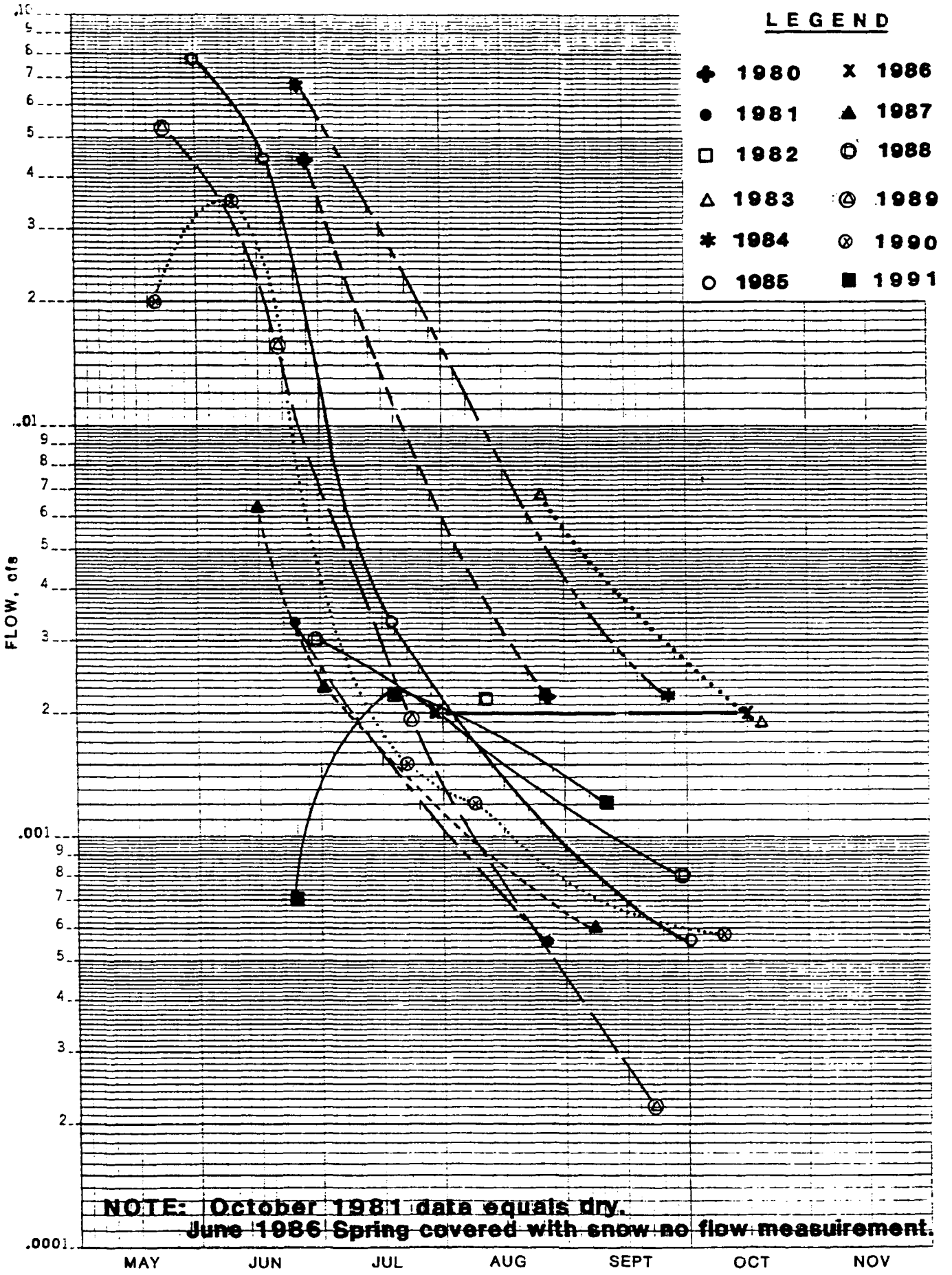

Figure 3. Spring S25-13 Depletion Curve

HANSEN ALLEN & LUCE inc

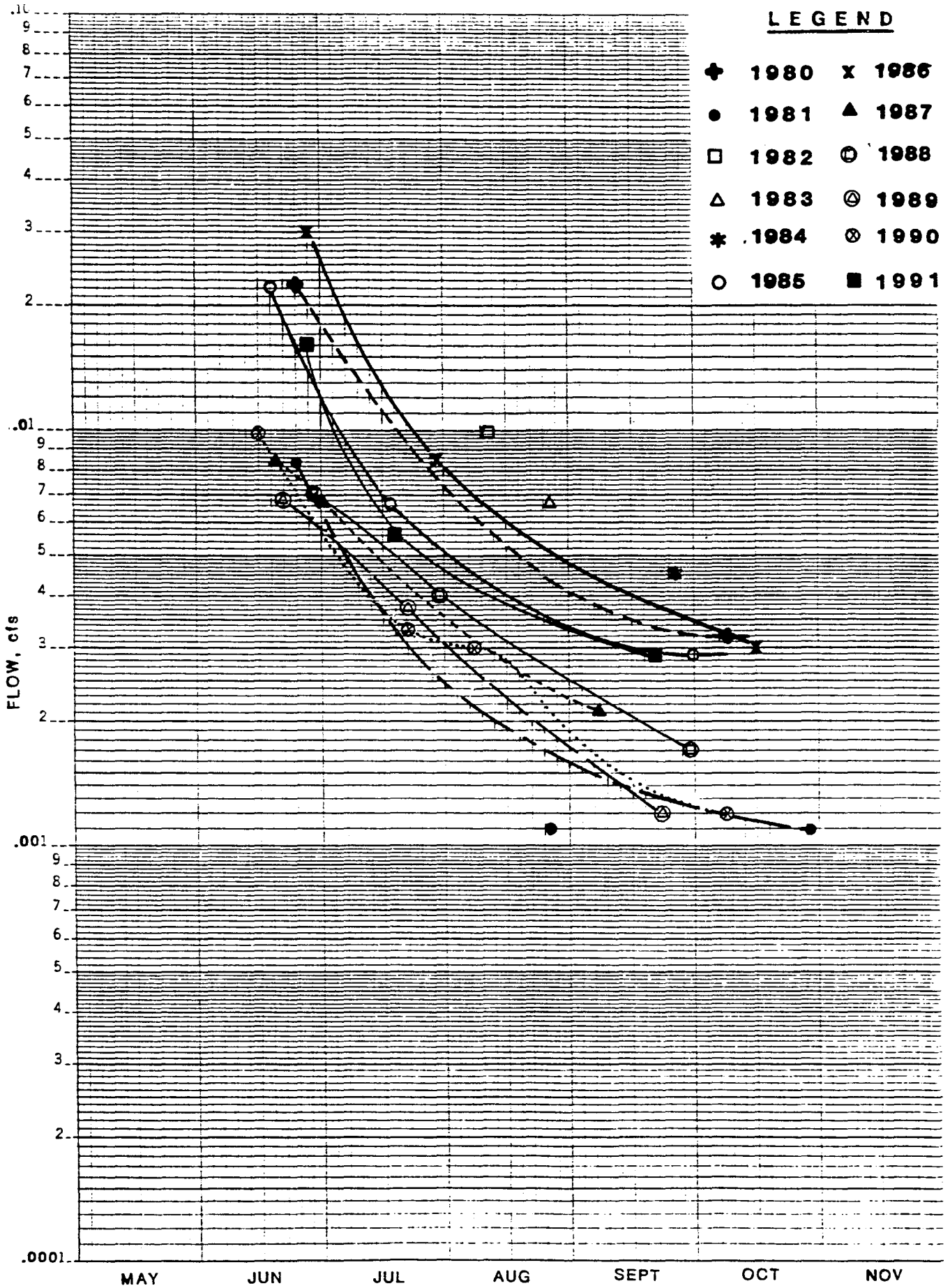

Figure 4. Spring S31-13 Depletion Curve

HANSEN ALLEN & LUCE INC

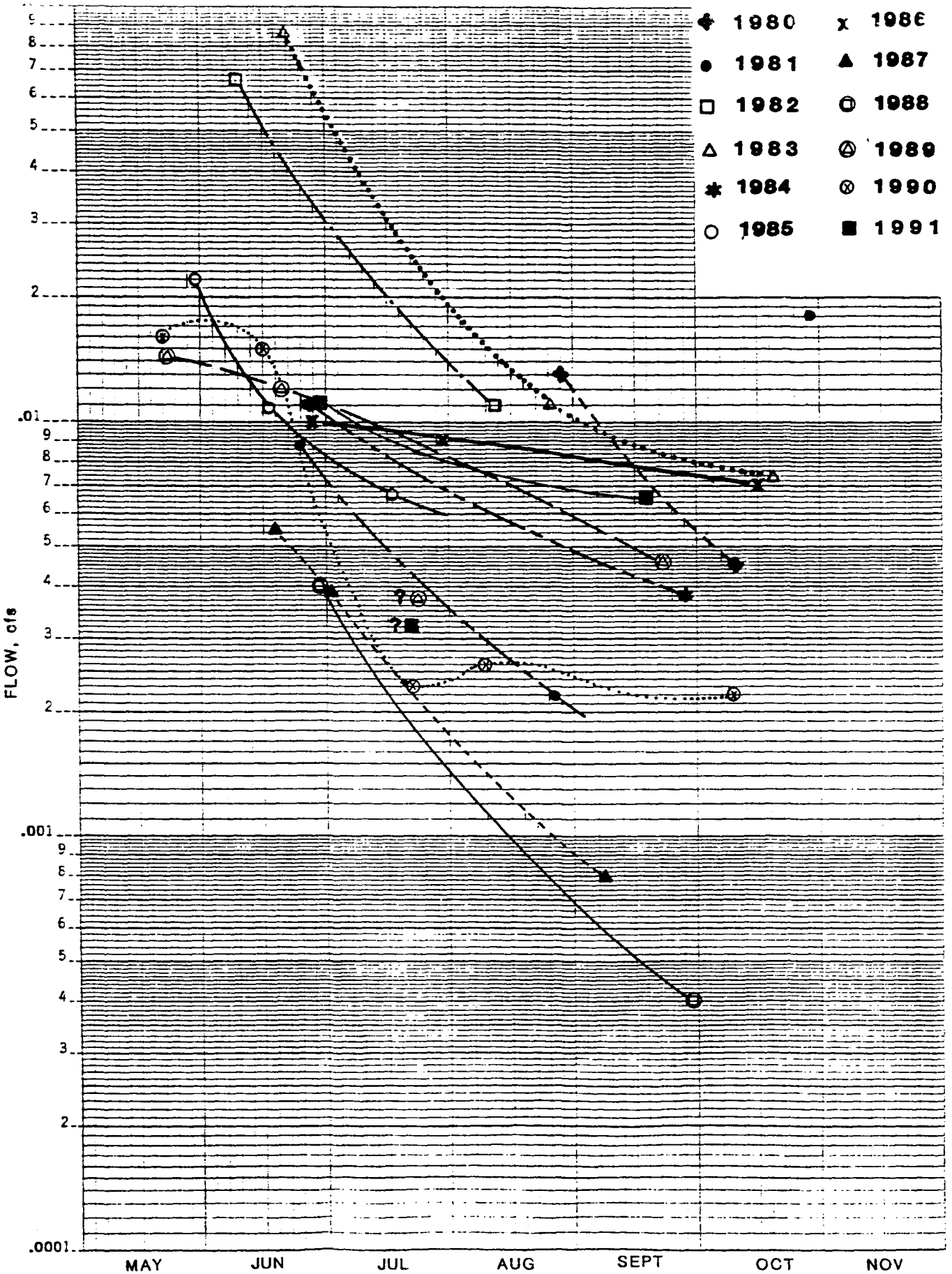

Figure 5. Spring S36-17 Depletion Curve

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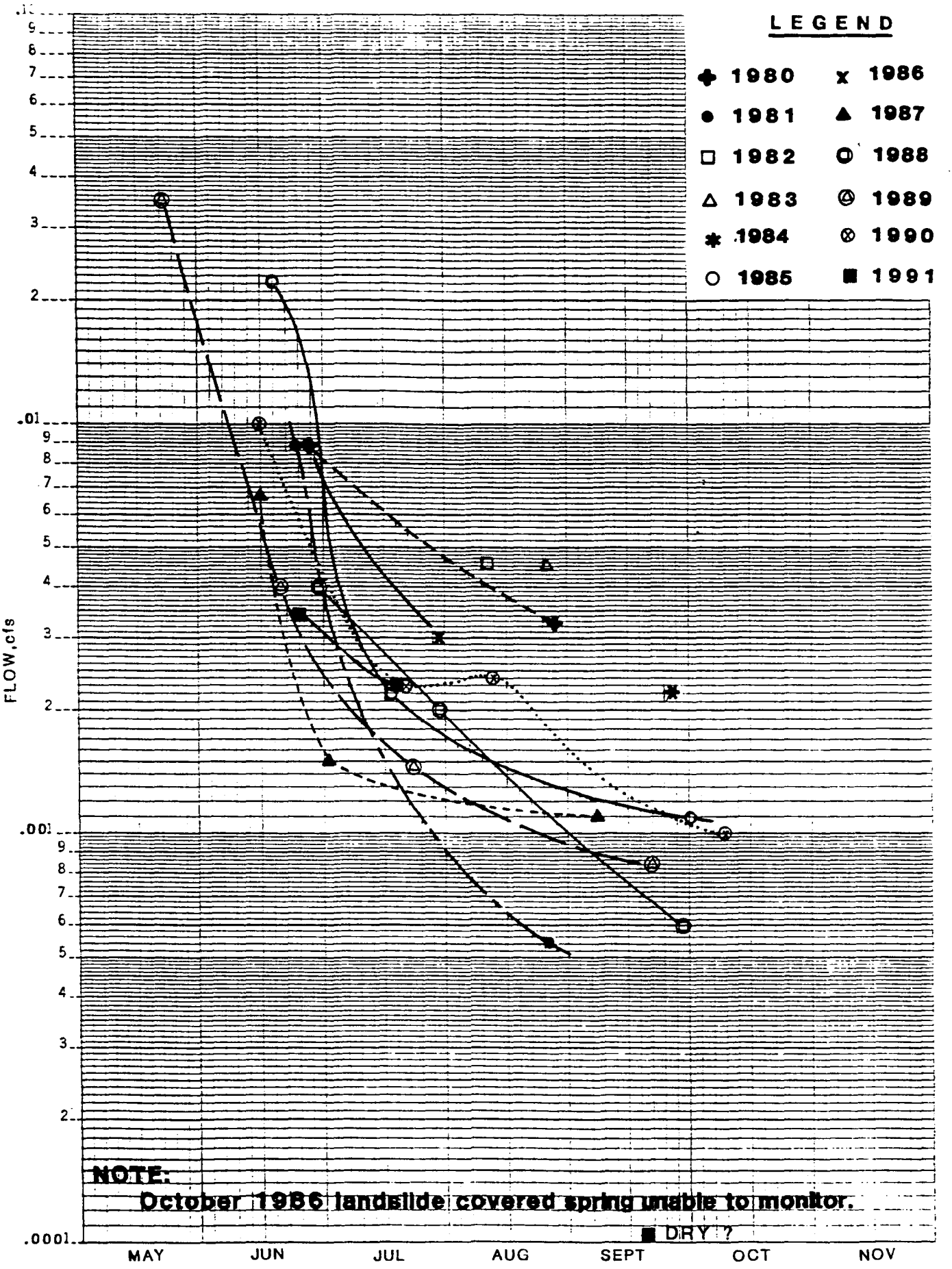

Figure 6. Spring S36-19 Depletion Curve

HANSEN ALLEN & LUCE inc

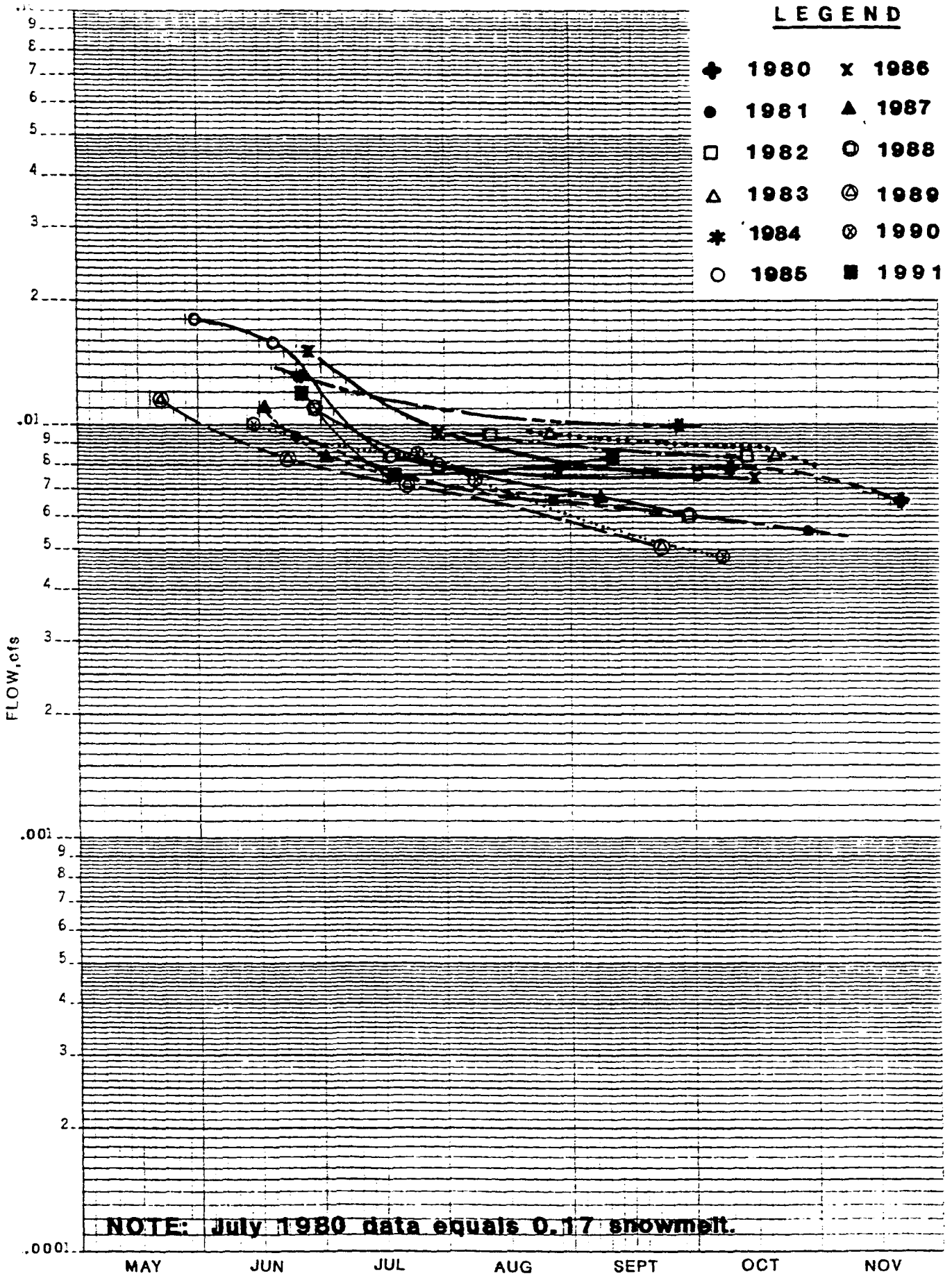

Figure 7. Spring S36-23 Depletion Curve

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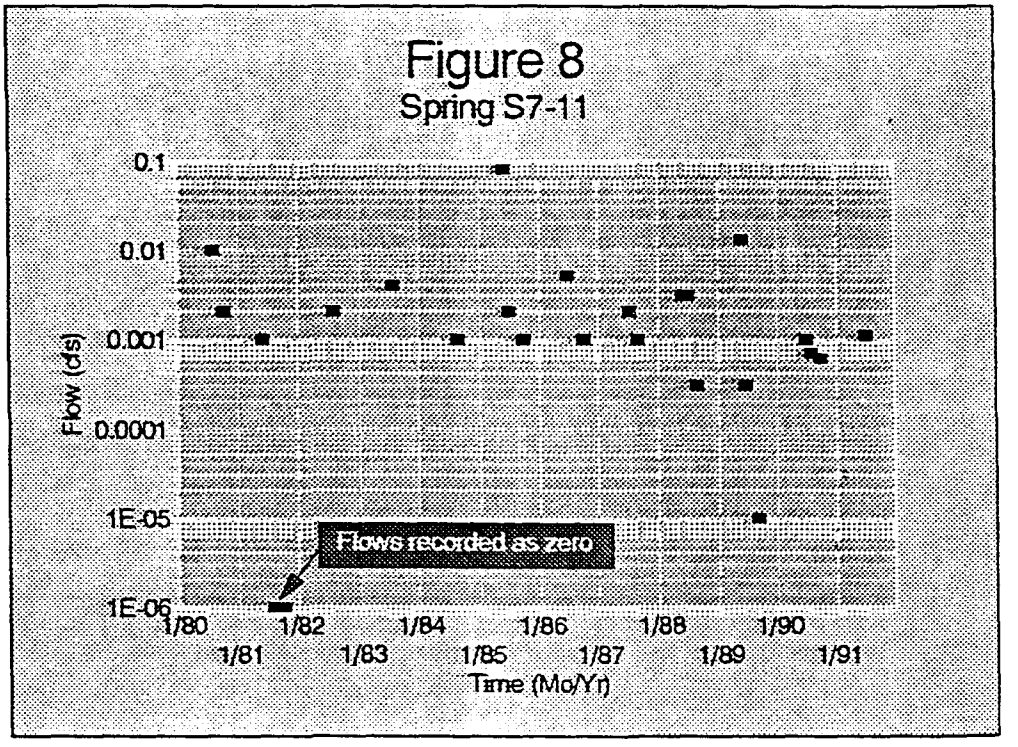

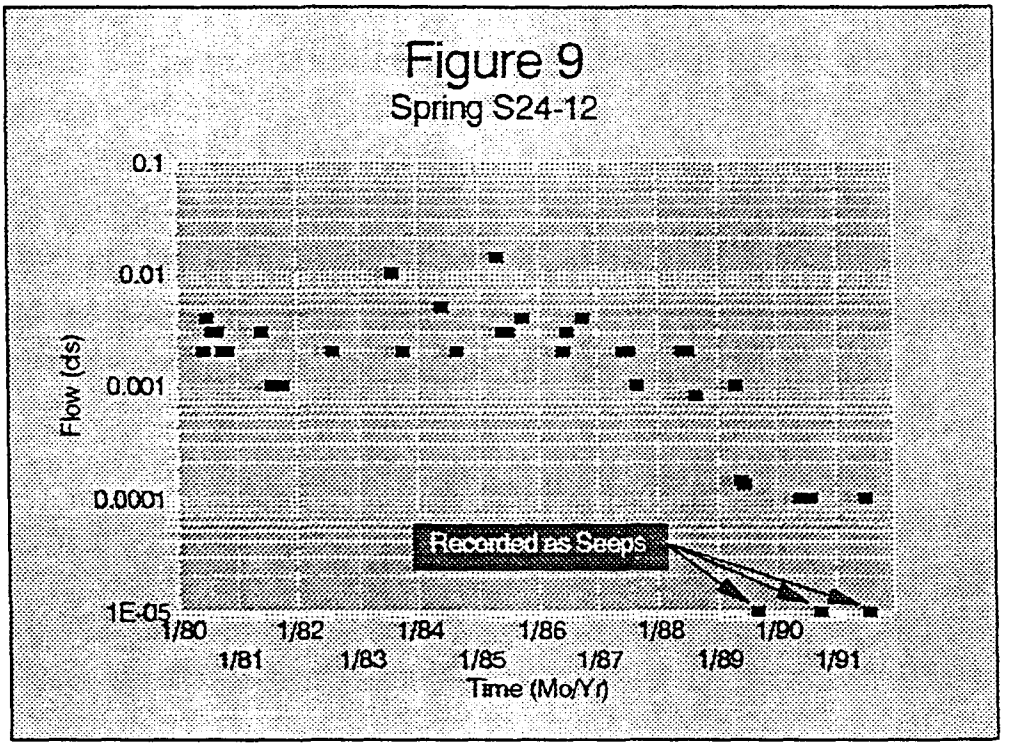

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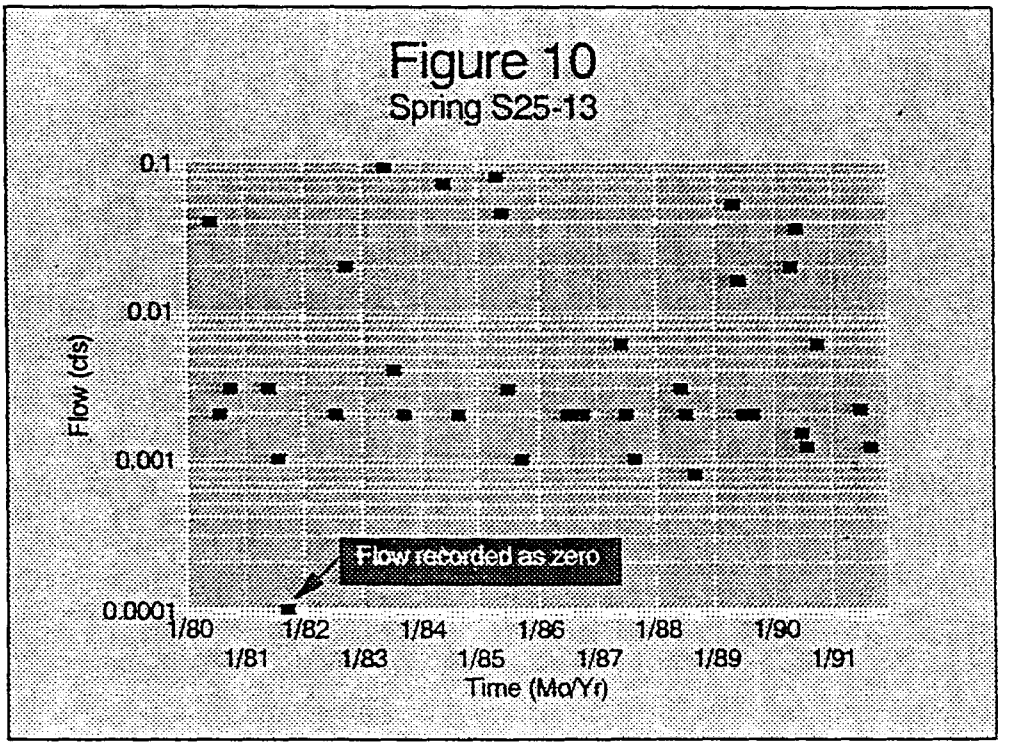


Figure 10
Spring S25-13
0.1
0.01
0.001
0.0001
Flow (cfs)
Flow recorded as zero
1/80
1/81
1/82
1/83
1/84
1/85
1/86
1/87
1/88
1/89
1/90
1/91
Time (Mo/Yr)

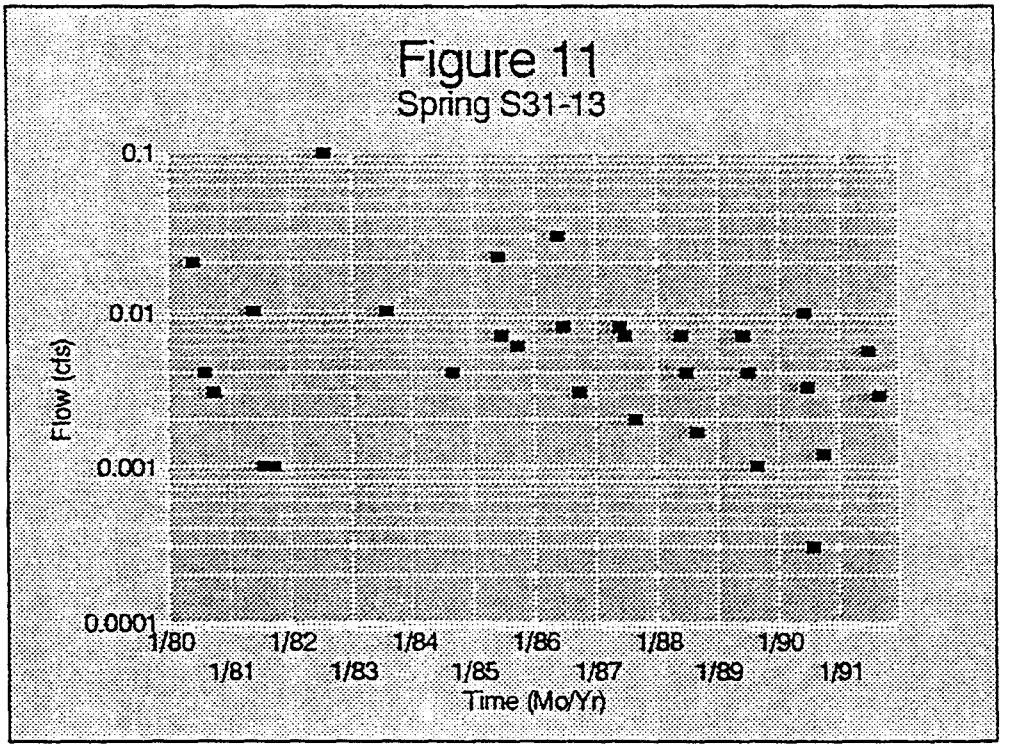
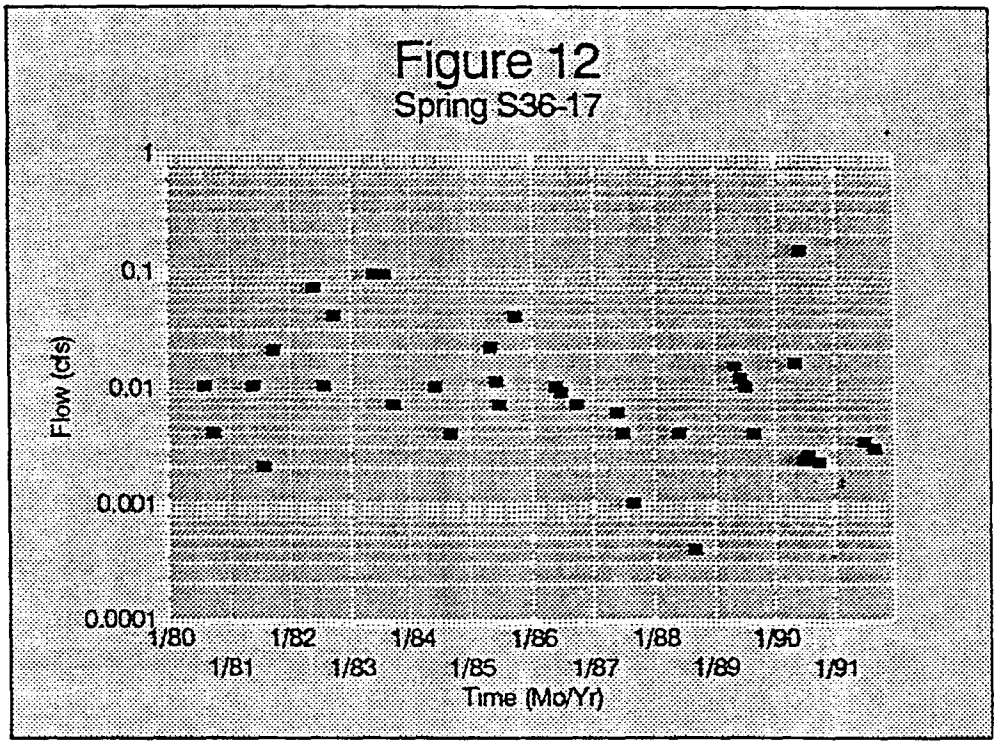
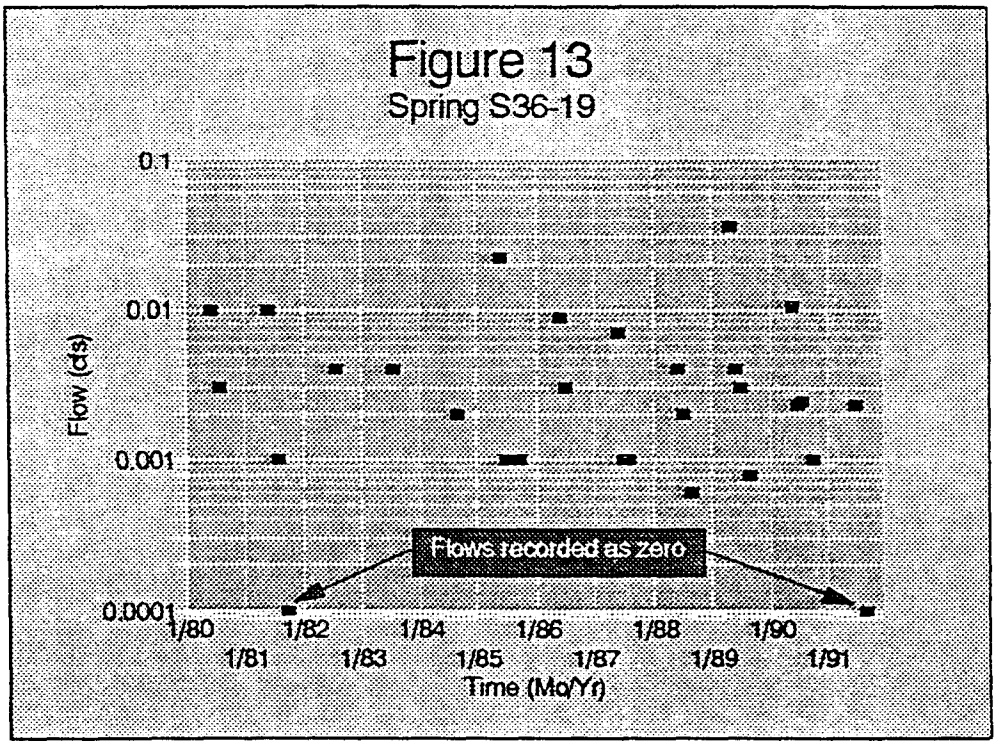


Figure 11
Spring S31-13
0.1
0.01
0.001
0.0001
Flow (cfs)
1/80
1/81
1/82
1/83
1/84
1/85
1/86
1/87
1/88
1/89
1/90
1/91
Time (Mo/Yr)





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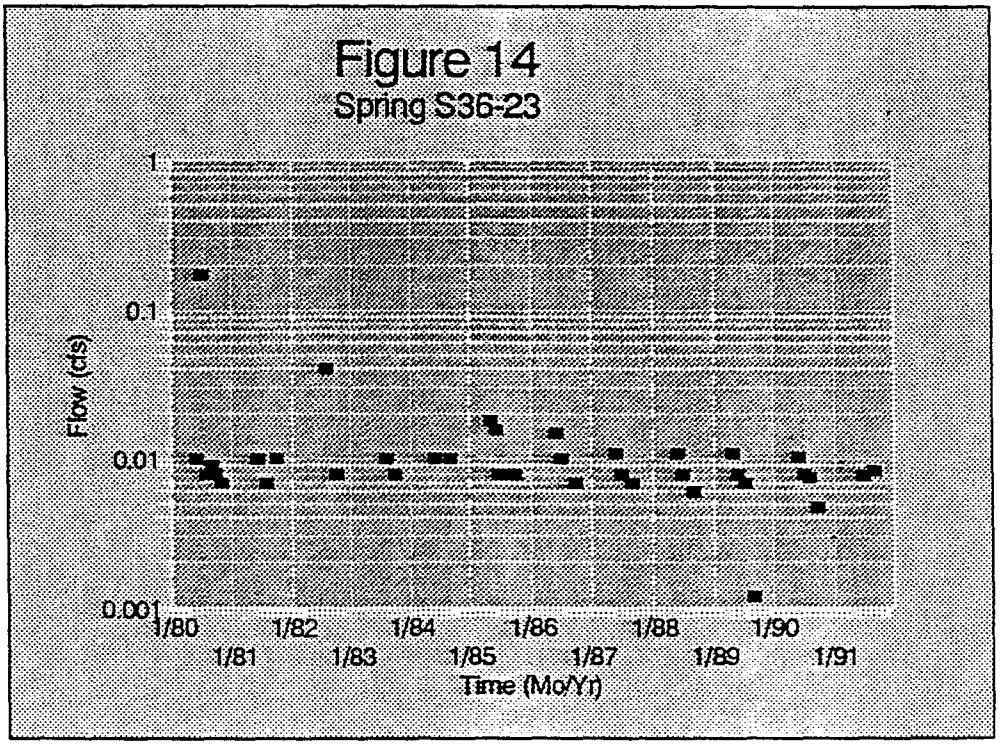
SPRING FLOW PLOTS



HANSEN ALLEN & LUCE INC

CONSULTANTS & ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-1
Location Mud Creek below Utah #2 Mine

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	TOC	DISSOLVED OXYGEN	OIL & GREASE	PHENOL
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
4-25-89	14:25	10.77	6	6	7.6							10.2		
5-23-89	17:10	12.05	17	10	7.5							8.0		
6-21-89	17:30	6.21	13	16	7.6							8.8	<0.5	
7-19-89	15:55	4.35	25	20	7.4									
9-25-89	14:30	5.54	21	13	7.5							10.7	<0.5	
4-16-90	12:50	10.41	17	11	7.4									
5-22-90	11:20	12.51	20	11	7.4									
6-14-90	17:50	10.08	18	17	7.9							7.3		
7-23-90	18:40	3.41	17	15	7.9							11.3		
8-14-90	17:30	4.77	15	20	7.5							9.8		
10-11-90	16:15	3.79	10	8	7.3							14.0	2.4	
4-24-91	13:30	1.39	11.5	10.5	7.5							17	<0.5	
5-30-91	15:45	18.23	9	9.8	7.5							12.4	<0.5	
6-4-91	8:36	11.26	25	13	7.6							11.4		
7-18-91	13:00	4.16	27	23	7.6							9.8	4.8	
9-10-91	12:15	3.79	17	11	7.5							11.8	<0.5	

DATE	NITROGEN AMMONIA as NH3-N	NITROGEN NITRATE as NO3-N	NITROGEN NITRITE as NO2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO4-P	PHOSPHATE ORTHO as PO4-P	SULFATE as SO4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND.	TURBIDITY	CARBONATE ALK. as CO3	BI-CARBONATE ALK. as HCO3	TOTAL ALK. as CaCO3	TOTAL HARDNESS as CaCO3	ACIDITY as CaCO3	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	μmhos/cm	FTU	MG/L	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
4-25-89	<0.2	0.120	<0.01			0.046		614			30		311		44	515			220		245			
5-23-89								770			30		285			480		0	223					
6-21-89								66			14	<0.1	381			562		0	234			<10		
7-19-89								107					437			660		0	285					
9-25-89								147			12	<0.1	425			704		0	271		316	12		
4-16-90								90			22		431			748		0	252					
5-22-90								73			48		276			466		0	216					
6-14-90								56			64	<0.1	343			490		0	246		246	<10		
7-23-90								114			18		403			732		2.5	271		286			
8-14-90								106			29	<0.1	389			660		6.1	238					
10-11-90	<0.1	0.11	<0.01			<0.01		102			8.4	<0.1	368			586		6.1	286		312	<10		
4-24-91	<0.2	0.13	0.007			0.028		139			8.0	<0.1	506			525		0	268		356	<10		
5-30-91	<0.2	0.262	0.012			0.115		523			60	<0.1	244			386		0	185		201	<10		
6-4-91								57			40	<0.1	305			458		4.8	240					
7-18-91	<0.2	0.020	0.29			0.031		179			96	<0.1	518			772		7.0	274					
9-10-91								215			18	<0.1	1202			313		0	301		406	<10		

DATE	ALUMINUM TOTAL	ANTIMONY TOTAL	ARSENIC TOTAL	BARIUM TOTAL	BERYLLIUM TOTAL	BORON TOTAL	CADMIUM TOTAL	CALCIUM TOTAL	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT TOTAL	COPPER TOTAL	CYANIDE as CN	FLUORIDE DISS.
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
4-25-89	<0.1						<0.01	71.2	28.0			<0.01		
5-23-89								38.4	16.1					
6-21-89								44.2	19.1					
7-19-89								49.8	18.3					
9-25-89								68.0	21.4					
4-16-90								54.2	54					
5-22-90								49.4	13.3					
6-14-90								59.4	17.4					
7-23-90								54.8	18.3					
8-14-90								52.3	19.0					
10-11-90	<0.1		<0.01	<0.01		0.18	<0.01	71.8	18.9	<0.01		<0.01		0.21
4-24-91	<0.1		<0.01	0.057		0.19	<0.01	68.8	62.9	<0.01		<0.01		0.16
5-30-91	<0.1		<0.01	0.053		0.058	<0.01	56.7	14.9	<0.01		<0.01		0.201
6-2-91								55.3	16.2					
7-18-91								69.0	19.2					
9-10-91	<0.1		<0.01	<0.01		0.106	<0.01	87	23.4	<0.01		<0.01		0.39

DATE	GERMANIUM TOTAL	IRON DISS.	IRON TOTAL	LEAD TOTAL	MAGNESIUM TOTAL	MANGANESE TOTAL	MERCURY TOTAL	MOLYBDENUM TOTAL	NICKEL TOTAL	POTASSIUM TOTAL	SELENIUM TOTAL	SILICA as SiO_2	SILVER TOTAL	SODIUM TOTAL	ZINC TOTAL	VANADIUM TOTAL	SULFIDE as S	MAJOR CATIONS	MAJOR ANIONS	$\frac{C-A}{C+A} \times 100$	COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MEQ/L	MEQ/L		
4-25-89			0.56	<0.01	21.2	0.030		<0.01	<0.01	1.9	<0.002			15.1	0.188		<0.1	6.00	5.69	2.82	
5-23-89					30.8					1.9				13.1				5.07	5.71	5.97	
6-21-89					32.8					3.1				17.2				5.73	5.75	0.14	
7-19-89					42.9					4.0				18.2				6.91	7.41	3.53	
9-25-89			0.205		48.8	0.028				4.9				23.1				8.54	8.11	2.60	
4-16-90					37.4					3.4				26.6				7.03	7.53	3.44	
5-22-90					24.2					1.8				10.9				4.98	5.44	4.40	
6-14-90		<0.01	0.795		26.2	0.060				2.5				11.2				5.67	5.69	0.15	
7-23-90					46.4					3.8				14.3				7.27	7.41	0.97	
8-14-90					46.1					3.9				14.8				7.15	6.85	2.14	
10-11-90		<0.01	0.195	<0.01	41.7	0.028	<0.0002	<0.01	<0.01	2.9	<0.002			12.1	<0.01		<0.1	7.62	7.56	0.44	
4-24-91		0.042	0.772	<0.01	46.2	0.063	<0.0002	<0.01	<0.01	3.9	<0.002			49.4	<0.01		<0.5	9.53	9.06	2.53	
5-30-91			1.32	<0.01	15.9	0.064	<0.0002	0.011	<0.01	1.2	<0.002			18.1	0.019		<0.1	4.96	4.71	2.59	
6-2-91					17.8					1.5				21.8				5.21	5.74	4.81	
7-18-91					38.0					4.3				59.3				9.26	8.99	1.46	
9-10-91			0.062	<0.01	46.0	0.047	<0.0002	<0.01	<0.01	6.6	<0.005			57	0.040		<0.2	10.78	10.10	3.28	

9-7-87

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE INC
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-1
Location Mud Creek below Utah #2 Mine

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH3-N	NITROGEN NITRATE as NO3-N	NITROGEN NITRITE as NO2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO4-P	PHOSPHATE ORTHO as PO4-P	SULFATE as SO4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND	TURBIDITY	CARBONATE ALK. as CO3	BI-CARBONATE ALK as HCO3	TOTAL ALK. as CaCO3	TOTAL HARDNESS as CaCO3	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	µMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
5-30-91	15:45	4.16	9	9.8	7.5																									336							
9-10-91	12:15	3.79	17	11	7.5																									313							

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT DISS.	COPPER DISS.	CYANIDE as CN	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE + NITRITE	COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L	
5-30-91	<0.1		<0.01	<0.01		<0.02	<0.01			<0.01		<0.01				<0.01		<0.01			<0.0002	<0.01	<0.01		<.002				<0.01				
9-10-91	<0.1		<0.01	<0.01		0.105	<0.01			<0.01		<0.01				0.020		<0.01			<0.0002	<0.01	<0.01		<0.005				0.011				

CHEMTECH
ANALYTICAL LABORATORY
6100 S. STRATLER
MURRAY, UTAH 84107
PHONE (801) 262-7299
FAX (801) 262-7378

DATE: 10-15-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	VC-1	
LAB #:	U068526	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (D), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (D), mg/l	0.105	ICP 10-15-91 EPA 200.7
Cadmium as Cd (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (D), mg/l	0.020	AR 9-30-91 EPA 236.1
Lead as Pb (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (D), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (D), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (D), mg/l	0.011	ICP 10-15-91 EPA 200.7

Rex Henderson

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CERTIFICATE OF ANALYSIS

SAMPLE ID:	VC-1	
LAB #:	U068526	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (T), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (T), mg/l	0.106	AR 10-15-91 EPA 200.7
Cadmium as Cd (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (T), mg/l	0.062	AR 9-30-91 EPA 236.1
Lead as Pb (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (T), mg/l	0.047	ICP 10-15-91 EPA 200.7
Mercury as Hg (T), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (T), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (T), mg/l	0.040	ICP 10-15-91 EPA 200.7

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DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	VC-1	
LAB #:	U068526	ANALYST/DATE/METHOD
PARAMETER		
Acidity as $CaCO_3$, mg/l	<10	RG 9-12-91 EPA 310.1
Bicarbonate as HCO_3, mg/l	301	RG 9-10-91 EPA 310.1
Carbonate as CO_3, mg/l	0	RG 9-16-91 EPA 310.1
Calcium as Ca, mg/l	87	AR 9-30-91 EPA 215.1
Chloride as Cl, mg/l	23.4	TM 9-12-91 EPA 325.3
Flouride as F, mg/l	0.39	TM 9-12-91 EPA 340.1
Hardness as $CaCO_3$, mg/l	406	TM 9-12-91 EPA 130.2
Magnesium as Mg, mg/l	46.0	AR 9-30-91 EPA 242.1
Potassium as K, mg/l	6.6	AR 9-30-91 EPA 258.1
Sodium as Na, mg/l	57	AR 9-30-91 EPA 273.1
Sulfate as SO_4, mg/l	215	TM 9-13-91 EPA 375.4
TDS, mg/l	1,202	RG 9-12-91 EPA 160.1
Ammonia as NH_3-N, mg/l	<.2	TM 9-12-91 EPA 350.3
Nitrate as NO_3-N, mg/l	0.29	JO 9-16-91 EPA 352.1
Nitrite as NO_2-N, mg/l	0.020	TM 9-12-91 EPA 354.1
Phosphate as PO_4-P (T), mg/l	0.031	TM 9-13-91 EPA 365.2
Oil & Grease, mg/l	<.5	RG 9-12-91 EPA 413.1
TSS, mg/l	18	RG 9-12-91 EPA 160.2
Sulfide as S, mg/l	<.2	RG 9-16-91 EPA 376.1
Settleable Solids, ml/l	<.1	RG 9-11-91 SM 208-F

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TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S36-23	
LAB #:	U068531	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (D), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (D), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (D), mg/l	<.01	AR 9-30-91 EPA 236.1
Lead as Pb (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (D), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (D), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (D), mg/l	0.012	ICP 10-15-91 EPA 200.7

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DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S36-23	
LAB #:	U068531	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (T), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (T), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Lead as Pb (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (T), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (T), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (T), mg/l	0.019	ICP 10-15-91 EPA 200.7

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DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S36-23	
LAB #:	U068531	ANALYST/DATE/METHOD
PARAMETER		
Acidity as $CaCO_3$, mg/l	<10	RG 9-12-91 EPA 310.1
Bicarbonate as HCO_3, mg/l	258	RG 9-10-91 EPA 310.1
Carbonate as CO_3, mg/l	0	RG 9-16-91 EPA 310.1
Calcium as Ca, mg/l	71	AR 9-30-91 EPA 215.1
Chloride as Cl, mg/l	2.1	TM 9-12-91 EPA 325.3
Flouride as F, mg/l	0.17	TM 9-12-91 EPA 340.1
Hardness as $CaCO_3$, mg/l	212	TM 9-12-91 EPA 130.2
Magnesium as Mg, mg/l	10.3	AR 9-30-91 EPA 242.1
Potassium as K, mg/l	0.5	AR 9-30-91 EPA 258.1
Sodium as Na, mg/l	3.4	AR 9-30-91 EPA 273.1
Sulfate as SO_4, mg/l	1.8	TM 9-13-91 EPA 375.4
TDS, mg/l	240	RG 9-12-91 EPA 160.1
Ammonia as NH_3-N, mg/l	<.2	TM 9-12-91 EPA 350.3
Nitrate as NO_3-N, mg/l	0.34	JO 9-16-91 EPA 352.1
Nitrite as NO_2-N, mg/l	<.005	TM 9-12-91 EPA 354.1
Phosphate as PO_4-P (T), mg/l	0.017	TM 9-13-91 EPA 365.2
Sulfide as S, mg/l	<.2	RG 9-16-91 EPA 376.1

Rex Henderson

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE INC
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station S36-23
Location

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
4-26-89	11:00		Inaccessible											
5-23-89	12:30	0.011	13	3	7.5									
6-21-89	14:10	0.008	10	3	7.3									
7-19-89	12:10	0.007	18	4	7.4									
9-25-89	15:55	0.0012	21	6	7.6									
4-16-90	09:30		Inaccessible											
5-22-90	13:20		Inaccessible											
6-14-90	16:10	0.0104	15	5	7.6									
7-23-90	17:45	0.0083	16	4	7.6									
8-9-90	13:04	0.0074	17	6	7.4									
10-11-90	13:20	0.0048	9	5	7.3									
4-24-91	14:30		INACCESSIBLE											
5-30-91	14:00		INACCESSIBLE											
7-18-91	18:15	.0077	7.8	6	7.8									
9-10-91	15:00	0.0084	9	4	7.6									

DATE	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	FLUORIDE as F	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL RETURNABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND.	TURBIDITY	CARBONATE ALK. CO_3	BI-CARBONATE ALK. as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ACIDITY as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	μMHOS/CM	FTU	MG/L	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
4-26-89																								
5-23-89	<0.2	0.433	0.0054				0.0716	57.1					184			489		0	200		142			
6-21-89								54.9					241			600		0	249			<10		
7-19-89								71.0					336			621		0	264					
9-25-89								7.6					261			627		0	268		220			
4-16-90																								
5-22-90																								
6-14-90								8.5					246			499		0	221		183			
7-23-90								4.2					221			621		0	258		209			
8-9-90								<1					226			598		0	271					
10-11-90	<0.1	0.446	<0.01			0.022		6.6					279			612		6.1	246		215			
4-24-91																								
5-30-91																								
7-18-91								.77					224					0	242					
9-10-91	<0.2	0.34	<0.005			0.017		1.8					240			398		0	258		212	<10		

DATE	ALUMINUM TOTAL	ANTIMONY TOTAL	ARSENIC TOTAL	BARIUM TOTAL	BERYLLIUM TOTAL	BORON TOTAL	CADMIUM TOTAL	CALCIUM TOTAL	CHLORIDE DISS.	CHROMIUM HEXas CR	COBALT TOTAL	COPPER TOTAL	CYANIDE as CN	FLUORIDE DISS.
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
4-25-89														
5-23-89	<0.1						<0.01	45.5	3.6			0.012		
6-21-89								56.8	5.3					
7-19-89								60.2	5.2					
9-25-89								71.1	7.7					
4-16-90														
5-22-90														
6-14-90								63.8	7.7					
7-23-90								72.8	<0.1					
8-9-90								64.9	<0.1					
10-11-90	<0.1		<0.01	<0.01		<0.1	<0.01	76.1	1.6	<0.01		<0.01		<0.1
4-24-91														
5-30-91														
7-18-91								69.2	1.7					
9-19-91	<0.1		<0.01	<0.011		<0.05	<0.01	71	2.1	<0.01		<0.01		

DATE	GERMANIUM TOTAL	IRON DISS.	IRON TOTAL	LEAD TOTAL	MAGNESIUM TOTAL	MANGANESE TOTAL	MERCURY TOTAL	MOLYBDENUM TOTAL	NICKEL TOTAL	POTASSIUM TOTAL	SELENIUM TOTAL	SILICA as SiO_2	SILVER TOTAL	SODIUM TOTAL	ZINC TOTAL	VANADIUM TOTAL	SULFIDE as S	MAJOR CATIONS	MAJOR ANIONS	$\frac{C-A}{C+A} \times 100$	COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MEQ/L	MEQ/L		
4-25-89																					Road Impassible - Snow
5-23-89		<0.01		<0.01	20.6	<0.01		<0.01	<0.01	0.5	<0.002			2.4	0.048		<0.1	4.08	4.57	5.61	
6-21-89					27.8					0.3				2.6				5.24	5.37	1.23	
7-19-89					19.7					21.3				4.1				5.95	5.95	5.34	
9-25-89		<0.01	0.155		13.1	<0.01				0.9				2.8				4.77	4.77	0.03	
4-16-90																					Road Impassible - Snow
5-22-90																					Road Impassible - Snow
6-14-90		<0.01			9.1	<0.01				0.8				3.2				4.09	3.88	2.72	
7-23-90					10.6					0.2				1.9				4.59	4.32	3.09	
8-9-90					10.3					0.4				1.9				4.18	4.44	3.05	
10-11-90		<0.01	0.123	<0.01	10.0	<0.01	<0.0002	<0.01	<0.01	0.4	<0.002			2.1	<0.01		<0.1	4.72	4.42	3.28	
4-24-91																					Road Impassible - Snow
5-30-91																					Road Impassible - Snow
7-18-91					7.2					0.3				4.4				4.33	5.62	12.92	
9-19-91			0.17	<0.01	10.3	<0.01	<0.0002	<0.01	<0.01	0.5	<0.005			3.4	0.019		<0.2	4.55	4.34	2.38	

R-7-87

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station S 36-23
Location

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP.	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND.	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	µMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
9-14-91	15:00	0.0084	9	4	7.6																									258							

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT DISS.	COPPER DISS.	CYANIDE as Cn	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE - NITRITE	COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L	
9-16-91	<0.1		<0.01	<0.01		<0.05	<0.01			<0.01		<0.01				<0.01		<0.01		<0.01	<0.0002	<0.01	<0.01		<0.005				0.012				

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station S 36-19
Location

DATE	TIME	FLOW CFS	TEMPERATURE AIR °C	TEMPERATURE WATER °C	pH	COLIFORM TOTAL MPN	COLIFORM FECAL MPN	FECAL STREP MPN	C.O.D. MG/L	B.O.D. MG/L	T.O.C. MG/L	DISSOLVED OXYGEN MG/L	OIL & GREASE MG/L	PHENOL MG/L	NITROGEN AMMONIA as NH3-N MG/L	NITROGEN NITRATE as NO3-N MG/L	NITROGEN NITRITE as NO2-N MG/L	NITROGEN TOTAL KJELDAHL MG/L	NITROGEN ORGANIC MG/L	PHOSPHATE TOTAL as PO4-P MG/L	PHOSPHATE ORTHO as PO4-P MG/L	SULFATE as SO4 MG/L	HYDROXIDE as OH MG/L	SURFACTANT as MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS ML/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL SOLIDS MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SPECIFIC COND. µMHOS/CM	TURBIDITY FTU	CARBONATE ALK. as CO3 MG/L	BI-CARBONATE ALK. as HCO3 MG/L	TOTAL ALK. as CaCO3 MG/L	TOTAL HARDNESS as CaCO3 MG/L	ACIDITY as CaCO3 MG/L	ALPHA RADIO-ACTIVITY pCi/L	BETA RADIO-ACTIVITY pCi/L
4-25-89	11:00		Inaccessible																																				
5-23-89	11:50	0.035	17	4	7.2										<0.2	0.170	<0.005				0.040	48.8					81			175		0	67.2		34.1			
6-21-89	15:45	0.004	10	7	7.5																	24.8					138			274		0	125			<10		
7-19-89	11:45	0.003	23	8	7.5																	10.2					145			375		0	174					
9-25-89	16:25	0.0008	18	6	7.5																	5.6					655			474		0	176		150			
4-16-90	09:30		Inaccessible																																				
5-22-90	13:20		Inaccessible																																				
6-14-90	15:40	0.0104	17	8	7.7																	12.5					158			233		0	103		83			
7-23-90	17:20	0.0023	16	7	7.6																	5.7					126			370		0	144		121			
8-13-90	10:40	0.0024	22	6	7.3																	1.6					111			453		0	159					
10-11-90	12:45	0.001	5	7	7.4										<0.1	0.49	<0.01			0.067		10.5					154			416		0	190		143			
4-24-91	14:30		INACCESSIBLE																																				
5-30-91	14:00		INACCESSIBLE																																				
7-18-91	17:30	.0073	16	11	7.5																	1.2					145					0	152					
9-19-91	09:45	NO	FLOW																																				

DATE	ALUMINUM TOTAL MG/L	ANTIMONY TOTAL MG/L	ARSENIC TOTAL MG/L	BARIUM TOTAL MG/L	BERYLLIUM TOTAL MG/L	BORON TOTAL MG/L	CADMIUM TOTAL MG/L	CALCIUM TOTAL MG/L	CHLORIDE DISS. MG/L	CHROMIUM HEX as CR MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE as CN MG/L	FLUORIDE DISS. MG/L	GERMANIUM TOTAL MG/L	IRON DISS. MG/L	IRON TOTAL MG/L	LEAD TOTAL MG/L	MAGNESIUM TOTAL MG/L	MANGANESE TOTAL MG/L	MERCURY TOTAL MG/L	MOLYBDENUM TOTAL MG/L	NICKEL TOTAL MG/L	POTASSIUM TOTAL MG/L	SELENIUM TOTAL MG/L	SILICA as SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	SULFIDE as S MG/L	MAJOR CATIONS MEQ/L	MAJOR ANIONS MEQ/L	C-A / C+A × 100	COMMENTS
4-25-89																																				Road Impassible-Snow
5-23-89	<0.1						<0.01	20.8	3.1			0.015				<0.01		<0.01	11.8	<0.01		<0.01	<0.01	0.3	<0.002			1.6	0.090		<0.1	2.09	2.20	2.77	
6-21-89								33.8	6.4										13.3					0.3				1.7				2.86	2.75	2.09	
7-19-89								38.7	8.6										14.5					2.6				3.1				3.32	3.31	0.28	
9-25-89								56.8	8.5							<0.01	0.135		6.8	<0.01				1.2				2.6				3.54	3.24	4.38	
4-16-90																																				Road Impassible-Snow
5-22-90																																				Road Impassible-Snow
6-14-90								30.1	2.7							<0.01			4.8	<0.01				0.6				2.7				2.03	2.02	0.13	
7-23-90								42.6	<0.1										5.2					0.2				1.4				2.62	2.48	2.73	
8-13-90								46.3	<0.5										5.4					0.5				1.4				2.83	2.65	3.25	
10-11-90	<0.1		<0.01	<0.01		0.10	<0.01	54.1	1.6	<0.01		<0.01		<0.1		<0.01	0.255	0.155	6.7	<0.01	<0.0002	<0.01	<0.01	0.5	<0.002			1.1	0.023		<0.1	3.31	3.38	1.05	
4-24-91																																				Road Impassible-Snow
5-30-91																																				Road Impassible-Snow
7-18-91								40.2	1.4										4.5					0.3				6.0				2.65	2.56	1.72	
9-19-91																																				

R-7-87

VAUGHN HANSEN ASSOCIATES
Consultants / Engineers

WATER QUALITY DATA

Station S 36-19
Location

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	CHLORIDE as Cl	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.S.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC CONDUCTANCE	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK. as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY	
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	μmhos/cm	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L	
9-19-91	09:45	NO FLOW																																					

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX. as CR	COBALT DISS.	COPPER DISS.	CYANIDE as Cn	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE as NITRITE		COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L		
9-19-91																																		

CHEMTECH
ANALYTICAL LABORATORY
6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 10-17-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-20-91 - Valley Camp Stream

DATE SAMPLED: 9-19-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S36-17	
LAB #:	U068875	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (D), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (D), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (D), mg/l	0.07	AR 9-30-91 EPA 236.1
Lead as Pb (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (D), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (D), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (D), mg/l	<.01	ICP 10-15-91 EPA 200.7

Rex Henderson

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DATE: 10-17-91

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6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-20-91 - Valley Camp Stream

DATE SAMPLED: 9-19-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S36-17	
LAB #:	U068875	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (T), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (T), mg/l	<.05	AR 10-15-91 EPA 200.7
Cadmium as Cd (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Lead as Pb (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (T), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (T), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (T), mg/l	0.010	ICP 10-15-91 EPA 200.7

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TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-20-91 - Valley Camp Stream

DATE SAMPLED: 9-19-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S36-17	
LAB #:	U068875	ANALYST/DATE/METHOD
PARAMETER		
Acidity as $CaCO_3$, mg/l	<10	RG 9-23-91 EPA 310.1
Alkalinity as $CaCO_3$, mg/l	234	RG 9-23-91 EPA 310.1
Bicarbonate as HCO_3, mg/l	285	RG 9-23-91 EPA 310.1
Carbonate as CO_3, mg/l	0	RG 9-23-91 EPA 310.1
Calcium as Ca, mg/l	73	AR 9-30-91 EPA 215.1
Chloride as Cl, mg/l	2.0	TM 9-23-91 EPA 325.3
Flouride as F, mg/l	0.17	TM 9-23-91 EPA 340.1
Hardness as $CaCO_3$, mg/l	241	TM 9-23-91 EPA 130.2
Magnesium as Mg, mg/l	14.2	AR 9-30-91 EPA 242.1
Potassium as K, mg/l	0.6	AR 9-30-91 EPA 258.1
Sodium as Na, mg/l	2.4	AR 9-30-91 EPA 273.1
Sulfate as SO_4, mg/l	3.8	TM 9-24-91 EPA 375.4
TDS, mg/l	272	RG 9-23-91 EPA 160.1
Ammonia as NH_3-N, mg/l	<.2	TM 9-23-91 EPA 350.3
Nitrate as NO_3-N, mg/l	0.96	JO 9-25-91 EPA 352.1
Nitrite as NO_2-N, mg/l	<.005	TM 9-23-91 EPA 354.1
Phosphate as PO_4-P (T), mg/l	0.029	TM 9-24-91 EPA 365.2
Sulfide as S, mg/l	<1	RG 9-24-91 EPA 376.1

Rex Henderson

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station S 36-17
Location

DATE	TIME	FLOW CFS	TEMPERATURE AIR °C	TEMPERATURE WATER °C	pH	COLIFORM TOTAL MPN	COLIFORM FECAL MPN	FECAL STREP MPN	C.O.D. MG/L	B.O.D. MG/L	T.O.C. MG/L	DISSOLVED OXYGEN MG/L	OIL & GREASE MG/L	PHENOL MG/L	NITROGEN AMMONIA as NH_3-N MG/L	NITROGEN NITRATE as NO_3-N MG/L	NITROGEN NITRITE as NO_2-N MG/L	NITROGEN TOTAL KJELDAHL MG/L	NITROGEN ORGANIC MG/L	PHOSPHATE TOTAL as PO_4-P MG/L	PHOSPHATE ORTHO as PO_4-P MG/L	SULFATE as SO_4 MG/L	HYDROXIDE as OH MG/L	SURFACTANT as MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS ML/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL SOLIDS MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SPECIFIC COND. µmhos/cm	TURBIDITY FTU	CARBONATE ALK. as CO_3 MG/L	BI-CARBONATE ALK. as HCO_3 MG/L	TOTAL ALK. as $CaCO_3$ MG/L	TOTAL HARDNESS as $CaCO_3$ MG/L	ACIDITY as $CaCO_3$ MG/L	ALPHA RADIO-ACTIVITY pCi/L	BETA RADIO-ACTIVITY pCi/L
4-25-89	11:00		Inaccessible																																				
5-23-89	10:53	0.015	17	11	7.5										<0.2	0.305	<0.005				0.158	51.1					226			499		0	267		204			
6-27-89	11:10	0.012	10	7	7.6																	52.8					205			539		0	248			14.2		
7-19-89	09:40	0.010	19	9	7.5																	5.0					259			600		4.0	288					
9-25-89	13:10	0.004	20	7	7.6																	8.0					239			734		0	280		236			
4-16-90	09:30		Inaccessible																																				
5-22-90	13:00	0.016	16	10	7.1																	1.3					242			517		0	203					
6-14-90	13:55	0.145	15	13	7.4																	16.2					262			525		0	271		224			
7-23-90	12:00	0.0023	16	10	7.4																	11.5					259			613		2.5	293		238			
8-9-90	14:17	0.0026	15	10	7.6																	15					241			562		0	297					
10-11-90	10:25	0.0022	10	5	7.3										<0.1	0.37	<0.01			0.080		16.8					249			620		12.3	275		235			
4-24-91	14:30		Inaccessible																																				
5-30-91	14:00		Inaccessible																																				
7-18-91	14:45	.0054	26	16.2	7.8																	1.5					231			384		2.3	250					
9-19-91	12:20	0.0029	14	7	7.7										<0.2	0.96	<0.005			0.029		3.8					272			444		0	285		241	<10		

DATE	ALUMINUM TOTAL MG/L	ANTIMONY TOTAL MG/L	ARSENIC TOTAL MG/L	BARIUM TOTAL MG/L	BERYLLIUM TOTAL MG/L	BORON TOTAL MG/L	CADMIUM TOTAL MG/L	CALCIUM TOTAL MG/L	CHLORIDE DISS. MG/L	CHROMIUM HEX as CR MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE as CN MG/L	FLUORIDE DISS. MG/L	GERMANIUM TOTAL MG/L	IRON DISS. MG/L	IRON TOTAL MG/L	LEAD TOTAL MG/L	MAGNESIUM TOTAL MG/L	MANGANESE TOTAL MG/L	MERCURY TOTAL MG/L	MOLYBDENUM TOTAL MG/L	NICKEL TOTAL MG/L	POTASSIUM TOTAL MG/L	SELENIUM TOTAL MG/L	SILICA as SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	SULFIDE as S MG/L	MAJOR CATIONS MEQ/L	MAJOR ANIONS MEQ/L	$\frac{C-A}{C+A} \times 100$	COMMENTS
4-25-89																																				Road Impassible - Snow
5-23-89	<0.1						<0.01	60.2	3.5			0.012				<0.01		<0.01	29.2	<0.01		<0.01	<0.01	0.5	0.0024			2.8	0.080		<0.1	5.54	5.54	0.02	
6-27-89								70.2	10.0										21.4					0.2				1.4				5.33	5.45	1.08	
7-19-89								45.6	4.2										23.1					2.8				2.5				4.35	5.07	7.63	
9-25-89								65.4	5.3							<0.01	0.120		19.2	<0.01				1.2				3.2				5.01	4.91	1.09	
4-16-90																																				Road Impassible - Snow
5-22-90								44.8	0.6										12.4					0.4				1.9				3.35	3.37	0.33	
6-14-90								69.8	3.2							<0.01			14.2	<0.01				0.8				3.6				4.83	4.87	0.42	
7-23-90								56.3	<0.1										15.3					0.2				22.2				5.04	5.13	0.86	
8-9-90								60.4	<0.1										17.9					0.5				1.8				4.58	5.18	6.18	
10-11-90	<0.1		<0.01	<0.01		0.10	<0.01	74.4	2.0	<0.01		<0.01		0.10		<0.01	1.68	<0.01	15.6	0.068	>0.0002	<0.01	<0.01	0.5	<0.002			2.6	<0.01		<0.1	5.12	5.33	2.01	
4-24-91																																				Road Impassible - Snow
5-30-91																																				Road Impassible - Snow
7-18-91								51.5	1.2										7.6					0.2				1.7				3.57	4.34	9.66	
9-19-91	<0.1		<0.01	<0.01		<0.05	<0.01	73	2.0	<0.01		<0.01		0.17				<0.01	14.2	<0.01	<0.0002	<0.01	<0.01	0.6	<0.005			2.4	0.01		<1	4.94	4.83	1.11	

R-7-87

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station S 36-17
Location

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH3-N	NITROGEN NITRATE as NO3-N	NITROGEN NITRITE as NO2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO4-P	PHOSPHATE ORTHO as PO4-P	SULFATE as SO4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND	TURBIDITY	CARBONATE ALK. as CO3	BI-CARBONATE ALK. as HCO3	TOTAL ALK. as CaCO3	TOTAL HARDNESS as CaCO3	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY	
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	μMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L	
9-19-91	12:20	0.0029	14	7	7.7																									444								

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT DISS.	COPPER DISS.	CYANIDE as CN	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE + NITRITE		COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L		
9-19-91	<0.1		<0.01	<0.01		<0.05	<0.01			<0.01		<0.01				0.07		<0.01		<0.01	<0.00002	<0.01	<0.01		<0.005				<0.01					

CHEMTECH
ANALYTICAL LABORATORY
6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 10-17-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-20-91 - Valley Camp Stream

DATE SAMPLED: 9-19-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S31-13	
LAB #:	U068874	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (D), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (D), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (D), mg/l	0.04	AR 9-30-91 EPA 236.1
Lead as Pb (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (D), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (D), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (D), mg/l	<.01	ICP 10-15-91 EPA 200.7

Rex Henderson

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CERTIFICATE OF ANALYSIS

SAMPLE ID:	S31-13	
LAB #:	U068874	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (T), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (T), mg/l	<.05	AR 10-15-91 EPA 200.7
Cadmium as Cd (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Lead as Pb (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (T), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (T), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (T), mg/l	0.021	ICP 10-15-91 EPA 200.7

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DATE: 10-17-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-20-91 - Valley Camp Stream

DATE SAMPLED: 9-19-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S31-13	
LAB #:	U068874	ANALYST/DATE/METHOD
PARAMETER		
Acidity as $CaCO_3$, mg/l	<10	RG 9-23-91 EPA 310.1
Alkalinity as $CaCO_3$, mg/l	247	RG 9-23-91 EPA 310.1
Bicarbonate as HCO_3, mg/l	301	RG 9-23-91 EPA 310.1
Carbonate as CO_3, mg/l	0	RG 9-23-91 EPA 310.1
Calcium as Ca, mg/l	76	AR 9-30-91 EPA 215.1
Chloride as Cl, mg/l	1.7	TM 9-23-91 EPA 325.3
Flouride as F, mg/l	0.14	TM 9-23-91 EPA 340.1
Hardness as $CaCO_3$, mg/l	274	TM 9-23-91 EPA 130.2
Magnesium as Mg, mg/l	19.5	AR 9-30-91 EPA 242.1
Potassium as K, mg/l	1.0	AR 9-30-91 EPA 258.1
Sodium as Na, mg/l	2.3	AR 9-30-91 EPA 273.1
Sulfate as SO_4, mg/l	37.1	TM 9-24-91 EPA 375.4
TDS, mg/l	315	RG 9-23-91 EPA 160.1
Ammonia as NH_3-N, mg/l	<.2	TM 9-23-91 EPA 350.3
Nitrate as NO_3-N, mg/l	0.50	JG 9-25-91 EPA 352.1
Nitrite as NO_2-N, mg/l	<.005	TM 9-23-91 EPA 354.1
Phosphate as PO_4-P (T), mg/l	0.012	TM 9-24-91 EPA 365.2
Sulfide as S, mg/l	<1	RG 9-24-91 EPA 376.1

Rex Henderson

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station 531-13
Location

DATE	TIME	FLOW (CFS)	TEMPERATURE AIR (°C)	TEMPERATURE WATER (°C)	pH	COLIFORM TOTAL (MPN)	COLIFORM FECAL (MPN)	FECAL STREP (MPN)	C.O.D. (MG/L)	B.O.D. (MG/L)	T.O.C. (MG/L)	DISSOLVED OXYGEN (MG/L)	OIL & GREASE (MG/L)	PHENOL (MG/L)	NITROGEN AMMONIA as NH_3-N (MG/L)	NITROGEN NITRATE as NO_3-N (MG/L)	NITROGEN NITRITE as NO_2-N (MG/L)	NITROGEN TOTAL KJELDAHL (MG/L)	NITROGEN ORGANIC (MG/L)	PHOSPHATE TOTAL as PO_4-P (MG/L)	PHOSPHATE ORTHO as PO_4-P (MG/L)	SULFATE as SO_4 (MG/L)	CHLORIDE as Cl (MG/L)	SURFACTANT as MBAS (MG/L)	SOLIDS TSS (MG/L)	SOLIDS TOTAL SETTLEABLE SOLIDS (ML/L)	SOLIDS T.D.S. (MG/L)	SOLIDS TOTAL SOLIDS (MG/L)	SOLIDS TOTAL VOLATILE SOLIDS (MG/L)	SPECIFIC COND. (µMHOS/CM)	TURBIDITY (FTU)	CARBONATE ALK. as $CaCO_3$ (MG/L)	BI-CARBONATE ALK. as HCO_3 (MG/L)	TOTAL ALK. as $CaCO_3$ (MG/L)	TOTAL HARDNESS as $CaCO_3$ (MG/L)	ACIDITY as $CaCO_3$ (MG/L)	ALPHA RADIO-ACTIVITY (pCi/L)	BETA RADIO-ACTIVITY (pCi/L)
4-25-89	11:00		Inaccessible																																				
5-23-89	11:50		Inaccessible																																				
6-21-89	11:57	0.007	10	6	7.5																	61.8					256			554		0	246		202	<10		
7-19-89	11:05	0.004	25	8	7.5																	[illegible]					251			662		0	279					
9-25-89	16:50	0.001		5	7.7																	29.2					308			628		0	294		274			
4-16-90	09:30		Inaccessible																																				
5-22-90	13:20		Inaccessible																																				
6-14-90	15:10	0.0098	17	5	7.3																	18.6					234			524		0	236		203			
7-23-90	16:45	0.0033	18	8	7.6																	24.2					262			672		0	278		244			
8-10-90	11:35	0.0003	18	8	7.5																	32					285			679		0	298					
9-11-90	12:12	0.0012	8	8	7.6										<0.1	0.60	<0.01			<0.01		29.8					309			712		17.2	292		282			
4-24-91	14:30		Inaccessible																																				
5-30-91	14:00		Inaccessible																																				
7-18-91	17:00	0.0056	19	12	7.6																	25					254			415		0	259					
9-19-91	09:05	0.0029	8	7	7.6										<0.2	0.50	<0.005			0.012		37.1					315			481		0	301		274	<10		

DATE	ALUMINUM TOTAL (MG/L)	ANTIMONY TOTAL (MG/L)	ARSENIC TOTAL (MG/L)	BARIUM TOTAL (MG/L)	BERYLLIUM TOTAL (MG/L)	BORON TOTAL (MG/L)	CADMIUM TOTAL (MG/L)	CALCIUM TOTAL (MG/L)	CHLORIDE DISS. (MG/L)	CHROMIUM HEX as CR (MG/L)	COBALT TOTAL (MG/L)	COPPER TOTAL (MG/L)	CYANIDE as CN (MG/L)	FLUORIDE DISS. (MG/L)	GERMANIUM TOTAL (MG/L)	IRON DISS. (MG/L)	IRON TOTAL (MG/L)	LEAD TOTAL (MG/L)	MAGNESIUM TOTAL (MG/L)	MANGANESE TOTAL (MG/L)	MERCURY TOTAL (MG/L)	MOLYBDENUM TOTAL (MG/L)	NICKEL TOTAL (MG/L)	POTASSIUM TOTAL (MG/L)	SELENIUM TOTAL (MG/L)	SILICA as SiO_2 (MG/L)	SILVER TOTAL (MG/L)	SODIUM TOTAL (MG/L)	ZINC TOTAL (MG/L)	VANADIUM TOTAL (MG/L)	SULFIDE as S (MG/L)	MAJOR CATIONS (MEQ/L)	MAJOR ANIONS (MEQ/L)	$\frac{C-A}{C+A} \times 100$	COMMENTS
4-25-89																																				Road Impossible - Snow
5-23-89																																				Road Impossible - Snow
6-21-89								52.8	7.2							<0.01		<0.01	34.2					0.7				1.3				5.52	5.52	0.02	
7-19-89								55.7	5.3										28.4					2.8				2.4				5.29	5.		
9-25-89								59.4	4.7							<0.01	<0.01		28.1	<0.01				0.9				2.4				5.40	5.56	1.42	
4-16-90																																				Road Impossible - Snow
5-22-90																																				Road Impossible - Snow
6-14-90								63.3	3.0							<0.01			16.3	<0.01				1.3				2.5				4.64	4.34	3.36	
7-23-90								64.1	<0.1										20.1					0.7				1.8				4.95	5.06	1.13	
8-10-90								63.8	0.21										24.2					0.8				1.5				5.26	5.56	2.73	
10-11-90	<0.1		<0.01	<0.01		0.11	<0.01	82.1	1.7	<0.01		<0.01		<0.1		<0.01	0.028	<0.01	23.2	<0.01	<0.0002	<0.01	<0.01	0.9	<0.002			2.5	<0.01		<0.1	6.13	6.04	0.74	
4-23-91																																				Road Impossible - Snow
5-30-91																																				Road Impossible - Snow
7-18-91								76.8	1.2										19.2					0.5				2.6				5.54	4.80	7.15	
9-19-91	<0.1		<0.01	<0.01		<0.05	<0.01	76	1.7	<0.01		<0.01		0.14				<0.01	19.5	<0.01	<0.0002	<0.01	<0.01	1.0	<0.005			2.3	0.021		<1	5.53	5.77	2.16	

R-7-87

HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station S31-13
Location

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP.	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND.	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY	
		CFS	°F	°F		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	μMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L	
9-19-91	09:05	0.0029	8	7	7.6																									481								

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX as CR.	COBALT DISS.	COPPER DISS.	CYANIDE as Cn	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE - NITRITE		COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L		
9-19-91	<0.1		<0.01	<0.01		<0.05	<0.01			<0.01		<0.01				0.04		<0.01		<0.01	<0.0002	<0.01	<0.01		<0.005				<0.01					

CHEMTECH
ANALYTICAL LABORATORY
6100 S. STRATLER
MURRAY, UTAH 84107
PHONE (801) 262-7299
FAX (801) 262-7378

DATE: 10-15-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S25-13	
LAB #:	U068530	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (D), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (D), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (D), mg/l	<.01	AR 9-30-91 EPA 236.1
Lead as Pb (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (D), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (D), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (D), mg/l	0.011	ICP 10-15-91 EPA 200.7

Rex Henderson

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DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S25-13	
LAB #:	U068530	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (T), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (T), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Lead as Pb (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (T), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (T), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (T), mg/l	0.011	ICP 10-15-91 EPA 200.7

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DATE: 10-15-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S25-13	
LAB #:	U068530	ANALYST/DATE/METHOD
PARAMETER		
Acidity as $CaCO_3$, mg/l	<10	RG 9-12-91 EPA 310.1
Bicarbonate as HCO_3, mg/l	198	RG 9-10-91 EPA 310.1
Carbonate as CO_3, mg/l	0	RG 9-16-91 EPA 310.1
Calcium as Ca, mg/l	44	AR 9-30-91 EPA 215.1
Chloride as Cl, mg/l	3.5	TM 9-12-91 EPA 325.3
Flouride as F, mg/l	0.24	TM 9-12-91 EPA 340.1
Hardness as $CaCO_3$, mg/l	166	TM 9-12-91 EPA 130.2
Magnesium as Mg, mg/l	11.3	AR 9-30-91 EPA 242.1
Potassium as K, mg/l	1.0	AR 9-30-91 EPA 258.1
Sodium as Na, mg/l	11.8	AR 9-30-91 EPA 273.1
Sulfate as SO_4, mg/l	16.6	TM 9-13-91 EPA 375.4
TDS, mg/l	194	RG 9-12-91 EPA 160.1
Ammonia as NH_3-N, mg/l	<.2	TM 9-12-91 EPA 350.3
Nitrate as NO_3-N, mg/l	0.16	JO 9-16-91 EPA 352.1
Nitrite as NO_2-N, mg/l	<.005	TM 9-12-91 EPA 354.1
Phosphate as PO_4-P (T), mg/l	0.098	TM 9-13-91 EPA 365.2
Sulfide as S, mg/l	<.2	RG 9-16-91 EPA 376.1

Rex Henderson

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station S 25-13
Location

DATE	TIME	FLOW (CFS)	TEMPERATURE AIR (°C)	TEMPERATURE WATER (°C)	pH	COLIFORM TOTAL (MPN)	COLIFORM FECAL (MPN)	FECAL STREP (MPN)	C.O.D. (MG/L)	B.O.D. (MG/L)	T.O.C. (MG/L)	DISSOLVED OXYGEN (MG/L)	OIL & GREASE (MG/L)	PHENOL (MG/L)	NITROGEN AMMONIA as NH_3-N (MG/L)	NITROGEN NITRATE as NO_3-N (MG/L)	NITROGEN NITRITE as NO_2-N (MG/L)	NITROGEN TOTAL KJELDAHL (MG/L)	NITROGEN ORGANIC (MG/L)	PHOSPHATE TOTAL as PO_4-P (MG/L)	PHOSPHATE ORTHO as PO_4-P (MG/L)	SULFATE as SO_4 (MG/L)	HYDROXIDE as OH (MG/L)	SURFACTANT as MBAS (MG/L)	SOLIDS TSS (MG/L)	SOLIDS TOTAL SETTLEABLE SOLIDS (ML/L)	SOLIDS T.D.S. (MG/L)	SOLIDS TOTAL SOLIDS (MG/L)	SOLIDS TOTAL VOLATILE SOLIDS (MG/L)	SPECIFIC COND. (μmhos/cm)	TURBIDITY (FTU)	CARBONATE ALK. as CO_3 (MG/L)	BI-CARBONATE ALK. as HCO_3 (MG/L)	TOTAL ALK. as $CaCO_3$ (MG/L)	TOTAL HARDNESS as $CaCO_3$ (MG/L)	ACIDITY as $CaCO_3$ (MG/L)	ALPHA RADIO-ACTIVITY (pCi/L)	BETA RADIO-ACTIVITY (pCi/L)
4-25-89	12:25		Inaccessible																																			
5-23-89	15:15	0.052	15	5	7.2										<0.2	0.088	<0.005				<0.01	55.4					51			118		0	41.5		<0.5			
6-21-89	15:30	0.016	11	7	7.5																	50.1					106			172		0	70.2			22.8		
7-19-89	14:05	0.002	25	11	7.9																	8.5					185			439		6.3	184					
9-25-89	11:97	0.002	15	12	7.6																	9.6					193			355		0	184		159			
4-16-90	11:30		Inaccessible																																			
5-22-90	09:40	0.0197	11	5	7.6																	2.3					62			115		0	38.3					
6-14-90	11:40	0.0354	13	7	7.2																	20.5					108			103		0	37.8		40			
7-23-90	13:08	0.0015	17	11	7.2																	12.5					177			477		0	196		162			
8-8-90	11:05	0.0012	20	10	7.5																	18					150			339		0	154					
10-11-90	14:00	0.006	10	8	7.4										<0.1	0.46	<0.01			0.062		12.8					257			366		3.7	170		137			
4-24-91	10:50		Inaccessible																																			
5-30-91	11:45	No Tables	10	5.3	7.8										<0.2	0.383	0.009			0.107		7.6					70			77		0	46.4		42.0			
7-18-91	10:00	.0022	17	13	7.6																	9.5					154			260		0	164					
9-10-91	10:00	0.0012	12	8	7.6										<0.2	0.16	<0.005			0.098		16.6					194			315		0	198		166	<10		

DATE	ALUMINUM TOTAL (MG/L)	ANTIMONY TOTAL (MG/L)	ARSENIC TOTAL (MG/L)	BARIUM TOTAL (MG/L)	BERYLLIUM TOTAL (MG/L)	BORON TOTAL (MG/L)	CADMIUM TOTAL (MG/L)	CALCIUM TOTAL (MG/L)	CHLORIDE DISS. (MG/L)	CHROMIUM HEX as CR (MG/L)	COBALT TOTAL (MG/L)	COPPER TOTAL (MG/L)	CYANIDE as CN (MG/L)	FLUORIDE DISS. (MG/L)	GERMANIUM TOTAL (MG/L)	IRON DISS. (MG/L)	IRON TOTAL (MG/L)	LEAD TOTAL (MG/L)	MAGNESIUM TOTAL (MG/L)	MANGANESE TOTAL (MG/L)	MERCURY TOTAL (MG/L)	MOLYBDENUM TOTAL (MG/L)	NICKEL TOTAL (MG/L)	POTASSIUM TOTAL (MG/L)	SELENIUM TOTAL (MG/L)	SILICA as SiO_2 (MG/L)	SILVER TOTAL (MG/L)	SODIUM TOTAL (MG/L)	ZINC TOTAL (MG/L)	VANADIUM TOTAL (MG/L)	SULFIDE as S (MG/L)	MAJOR CATIONS (MEQ/L)	MAJOR ANIONS (MEQ/L)	$\frac{C-A}{C+A} \times 100$	COMMENTS
4-25-89																																				Covered with Snow
5-23-89	<0.1						<0.01	14.6	3.9							<0.01		<0.01	12.5	<0.01		<0.01	<0.01	0.4	0.0034			0.4	0.218		<0.1	1.78	1.94	4.26	
6-21-89								16.9	4.0										13.8					0.5				0.5				2.01	2.31	6.78	
7-19-89								45.2	7.6										11.4					10.9				2.0				3.56	3.62	0.80	
9-25-89								53.9	10.1							<0.01	0.240		12.1	0.015				1.0				2.4				3.82	3.50	4.41	
4-16-90																																				Covered with Snow
5-22-90								9.2	0.4										1.7					0.5				0.7				0.64	0.69	3.24	
6-14-90								14.1	2.2							<0.01			3.1	0.035				0.8				2.0				1.07	1.11	1.94	
7-23-90								40.2	0.41										12.7					0.4				2.2				3.16	3.48	4.93	
8-8-90								43.1	<0.1										6.3					0.4				1.1				2.73	2.90	3.07	
10-11-90	<0.1		<0.01	<0.01		0.10	<0.01	49.2	2.2	<0.01		<0.01		<0.1		<0.01	0.730	<0.01	6.5	0.038	<0.0002	<0.01	<0.01	0.4	<0.002			1.1	<0.01		<0.1	3.04	3.24	3.18	
4-24-91																																				COVERED WITH SNOW
5-30-91	<0.1		<0.01	0.013		0.021	<0.01	13.8	1.2	<0.01		<0.01		<0.1				<0.01	2.3	0.014	<0.0002	<0.01	<0.01	0.3	<0.002			4.5	0.011		<0.1	1.08	0.95	6.33	SPRING INUNDATED W/SNOW RUNOFF
7-18-91								28.5	1.8										7.5					0.4				3.6				2.71	2.94	4.01	
9-10-91	<0.1		<0.01	<0.01		<0.05	<0.01	44	3.5	<0.01		<0.01		0.24				<0.01	11.3	<0.01	<0.0002	<0.01	<0.01	1.0	<0.005			11.8	0.011		<0.2	3.67	3.70	0.55	

R-7-87

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station S 25-13
Location

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND.	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK. as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	μMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
5-30-91	11:45		10	5.3	7.8																									77							
9-10-91	10:00	0.0012	12	8	7.6																									315							

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT DISS.	COPPER DISS.	CYANIDE as Cn	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE — NITRITE		COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L		
5-30-91	<0.1		<0.01	<0.01		<0.02	<0.01			<0.01		<0.01				<0.01		<0.01			<0.0002	<0.01	<0.01		<0.002				<0.01					
9-10-91	<0.1		<0.01	<0.01		<0.05	<0.01			<0.01		<0.01				<0.01		<0.01			<0.0002	<0.01	<0.01		<0.005				0.011					

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE INC
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station S 24-12
Location

DATE	TIME	FLOW (CFS)	TEMPERATURE AIR (°C)	TEMPERATURE WATER (°C)	pH	COLIFORM TOTAL (MPN)	COLIFORM FECAL (MPN)	FECAL STREP (MPN)	C.O.D. (MG/L)	B.O.D. (MG/L)	T.O.C. (MG/L)	DISSOLVED OXYGEN (MG/L)	OIL & GREASE (MG/L)	PHENOL (MG/L)	NITROGEN AMMONIA as NH_3-N (MG/L)	NITROGEN NITRATE as NO_3-N (MG/L)	NITROGEN NITRITE as NO_2-N (MG/L)	NITROGEN TOTAL KJELDAHL (MG/L)	NITROGEN ORGANIC (MG/L)	PHOSPHATE TOTAL as PO_4-P (MG/L)	PHOSPHATE ORTHO as PO_4-P (MG/L)	SULFATE as SO_4 (MG/L)	CHLORIDE as Cl (MG/L)	SURFACTANT as MBAS (MG/L)	SOLIDS TSS (MG/L)	SOLIDS TOTAL SETTLEABLE SOLIDS (ML/L)	SOLIDS T.D.S. (MG/L)	SOLIDS TOTAL SOLIDS (MG/L)	SOLIDS TOTAL VOLATILE SOLIDS (MG/L)	SPECIFIC COND. (µmhos/cm)	TURBIDITY (FTU)	CARBONATE ALK. as CO_3 (MG/L)	BI-CARBONATE ALK. as HCO_3 (MG/L)	TOTAL ALK. as $CaCO_3$ (MG/L)	TOTAL HARDNESS as $CaCO_3$ (MG/L)	ACIDITY as $CaCO_3$ (MG/L)	ALPHA RADIO-ACTIVITY (pCi/L)	BETA RADIO-ACTIVITY (pCi/L)
4-25-89	11:40		Inaccessible																																				
5-23-89	13:30	0.001	14	9	7.3										0.36	<0.01	<0.005				0.019	79					264			667		0	261		251			
6-21-89	14:55	0.00014	17	9	7.4																	45.0					287			664		0	241			<10		
7-19-89	13:15	0.00013	23	14	7.6																	46.2					299			622		8.8	255					
9-25-89	10:15	Seep	5	5	7.2																	33.3					316			480		0	286		275			
4-6-90	11:20		Inaccessible																																				
5-22-90	13:20		Inaccessible																																				
6-14-90	10:05	0.0001	13	7	7.5																	26.1					285			635		12.2	238		245			
7-23-90	14:04	0.0001	26	17	7.3																	31.8					226			495		111	10		211			
8-7-90	16:12	0.0001	26	16	7.4																	38					239			482		1.2	250					
10-11-90	14:40	Seep	No Sample																																				
4-24-91	10:30		Inaccessible																																				
5-30-91	12:50		Inaccessible																																				
7-18-91	8:59	.0001	19	14.5	7.0																	26					250			391		2.3	265					
9-10-91	8:35	Seep	No Sample																																				

DATE	ALUMINUM TOTAL (MG/L)	ANTIMONY TOTAL (MG/L)	ARSENIC TOTAL (MG/L)	BARIUM TOTAL (MG/L)	BERYLLIUM TOTAL (MG/L)	BORON TOTAL (MG/L)	CADMIUM TOTAL (MG/L)	CALCIUM TOTAL (MG/L)	CHLORIDE DISS. (MG/L)	CHROMIUM HEX as CR (MG/L)	COBALT TOTAL (MG/L)	COPPER TOTAL (MG/L)	CYANIDE as CN (MG/L)	FLUORIDE DISS. (MG/L)	GERMANIUM TOTAL (MG/L)	IRON DISS. (MG/L)	IRON TOTAL (MG/L)	LEAD TOTAL (MG/L)	MAGNESIUM TOTAL (MG/L)	MANGANESE TOTAL (MG/L)	MERCURY TOTAL (MG/L)	MOLYBDENUM TOTAL (MG/L)	NICKEL TOTAL (MG/L)	POTASSIUM TOTAL (MG/L)	SELENIUM TOTAL (MG/L)	SILICA as SiO_2 (MG/L)	SILVER TOTAL (MG/L)	SODIUM TOTAL (MG/L)	ZINC TOTAL (MG/L)	VANADIUM TOTAL (MG/L)	SULFIDE as S (MG/L)	MAJOR CATIONS (MEQ/L)	MAJOR ANIONS (MEQ/L)	$\frac{C-A}{C+A} \times 100$	COMMENTS.
4-25-89																																			Road impossible - Snow
5-23-89	<0.1						<0.01	51.2	4.1			0.012				<0.01		<0.01	36.8	<0.01		<0.01		1.4	<0.002			2.4	0.050		<0.1	5.72	6.04	2.68	
6-21-89								48.2	6.0										30.7					2.0				2.4				5.09	5.06	0.30	
7-19-89								43.9	6.4										31.5					4.0				3.0				5.02	5.61	5.64	
9-25-89								56.5	9.0							<0.01	0.120		31.2	<0.01				2.5				3.4				5.60	5.63	0.32	
4-6-90																																			Road impossible - Snow
5-22-90																																			Road impossible - Snow
6-14-90								57.2	3.8							<0.01			24.5	<0.01				2.3				4.5				5.12	4.96	1.66	
7-23-90								37.6	0.27										30.9					1.2				2.7				4.57	4.53	0.37	
8-7-90								37.1	0.87										39.2					2.2				2.5				5.24	4.95	2.83	
10-11-90																																			Unable to collect Sample
4-24-91																																			ROAD IMPASSIBLE - SNOW
5-30-91																																			ROAD IMPASSIBLE - SNOW
7-18-91								50.1	1.4										25.4					1.1				4.2				4.80	5.00	2.04	
9-10-91																																			

9-7-87

CHEMTECH
ANALYTICAL LABORATORY
6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 10-17-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-20-91 - Valley Camp Stream

DATE SAMPLED: 9-19-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S7-11	
LAB #:	U068873	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (D), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (D), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (D), mg/l	0.03	AR 9-30-91 EPA 236.1
Lead as Pb (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (D), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (D), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (D), mg/l	<.01	ICP 10-15-91 EPA 200.7

Rex Henderson

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DATE: 10-17-91

TO: Hansen, Allen & Luce
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Midvale, UT 84047

DATE SUBMITTED: 9-20-91 - Valley Camp Stream

DATE SAMPLED: 9-19-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S7-11	
LAB #:	U068873	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (T), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (T), mg/l	<.05	AR 10-15-91 EPA 200.7
Cadmium as Cd (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Lead as Pb (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (T), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (T), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (T), mg/l	0.015	ICP 10-15-91 EPA 200.7

Rex Henderson

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PHONE: (801) 262-7299
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DATE: 10-17-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-20-91 - Valley Camp Stream

DATE SAMPLED: 9-19-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	S7-11		
LAB #:	U068873		ANALYST/DATE/METHOD
PARAMETER			
Acidity as $CaCO_3$, mg/l	<10	RG	9-23-91 EPA 310.1
Alkalinity as $CaCO_3$, mg/l	218	RG	9-23-91 EPA 310.1
Bicarbonate as HCO_3, mg/l	266	RG	9-23-91 EPA 310.1
Carbonate as CO_3, mg/l	0	RG	9-23-91 EPA 310.1
Calcium as Ca, mg/l	77	AR	9-30-91 EPA 215.1
Chloride as Cl, mg/l	18	TM	9-23-91 EPA 325.3
Flouride as F, mg/l	0.19	TM	9-23-91 EPA 340.1
Hardness as $CaCO_3$, mg/l	262	TM	9-23-91 EPA 130.2
Magnesium as Mg, mg/l	14.4	AR	9-30-91 EPA 242.1
Potassium as K, mg/l	0.7	AR	9-30-91 EPA 258.1
Sodium as Na, mg/l	8.0	AR	9-30-91 EPA 273.1
Sulfate as SO_4, mg/l	18.6	TM	9-24-91 EPA 375.4
TDS, mg/l	315	RG	9-23-91 EPA 160.1
Ammonia as NH_3-N, mg/l	<.2	TM	9-23-91 EPA 350.3
Nitrate as NO_3-N, mg/l	3.01	JO	9-25-91 EPA 352.1
Nitrite as NO_2-N, mg/l	<.005	TM	9-23-91 EPA 354.1
Phosphate as PO_4-P (T), mg/l	0.073	TM	9-24-91 EPA 365.2
Sulfide as S, mg/l	<1	RG	9-24-91 EPA 376.1

Rex Henderson

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station S 7-11
Location

DATE	TIME	FLOW	TEMPERATURE AIR °C	TEMPERATURE WATER °C	pH	COLIFORM TOTAL MPN	COLIFORM FECAL MPN	FECAL STREP MPN	C.O.D. MG/L	B.O.D. MG/L	T.O.C. MG/L	DISSOLVED OXYGEN MG/L	OIL & GREASE MG/L	PHENOL MG/L
		CFS												
4-25-89	11:00		Inaccessible											
5-23-89	11:30		Inaccessible											
6-21-89	12:37	0.013	7	7	7.8									
7-19-89	10:30	0.0003	21	16	7.4									
9-25-89	17:40	Seep		10	7.6									
4-16-90	09:30		Inaccessible											
5-22-90	13:20		Inaccessible											
6-14-90	16:00		Inaccessible											
7-23-90	16:10	0.001	15	14	7.6									
8-14-90	09:27	0.0007	11	8	7.6									
10-11-90	11:25	0.0006	2	1	7.5									
4-24-91	14:30		Inaccessible											
5-30-91	14:00		Inaccessible											
6-24-91	16:00		Inaccessible											
7-18-91	15:45	0.0011	22	18	7.7									
9-19-91	07:40		6	4	7.7									

DATE	NITROGEN AMMONIA as NH_3-N MG/L	NITROGEN NITRATE as NO_3-N MG/L	NITROGEN NITRITE as NO_2-N MG/L	NITROGEN TOTAL KJELDAHL MG/L	NITROGEN ORGANIC MG/L	PHOSPHATE TOTAL as PO_4-P MG/L	PHOSPHATE ORTHO as PO_4-P MG/L	SULFATE as SO_4 MG/L	HYDROGEN ION as pH MG/L	SURFACTANT as MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS ML/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL SOLIDS MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SPECIFIC COND. µMHOS/CM	TURBIDITY FTU	CARBONATE ALK. as CO_3 MG/L	BI-CARBONATE ALK. as HCO_3 MG/L	TOTAL ALK. as $CaCO_3$ MG/L	TOTAL HARDNESS as $CaCO_3$ MG/L	ACIDITY as $CaCO_3$ MG/L	ALPHA RADIO-ACTIVITY pCi/L	BETA RADIO-ACTIVITY pCi/L
4-25-89																									
5-23-89																									
6-21-89								8.8					86			132		0	55.8		8.2	35.4			
7-19-89								[illegible]					193			359		0	176						
9-25-89								16.4					284			566		0	199		210				
4-16-90																									
5-22-90																									
6-14-90																									
7-23-90								23.5					251			538		2.1	188		222				
8-14-90								29					252			794		0	259						
10-11-90	<0.1	[illegible]	<0.01			[illegible]		[illegible]					[illegible]			724		[illegible]	257		[illegible]				
4-24-91																									
5-30-91																									
6-24-91																									
7-18-91	0.22	1.65	0.007			0.059		26					245			416		4.8	209		207				
9-19-91	<0.2	3.01	<0.005			0.073		18.6					315			491		0	266		262	<10			

DATE	ALUMINUM TOTAL MG/L	ANTIMONY TOTAL MG/L	ARSENIC TOTAL MG/L	BARIUM TOTAL MG/L	BERYLLIUM TOTAL MG/L	BORON TOTAL MG/L	CADMIUM TOTAL MG/L	CALCIUM TOTAL MG/L	CHLORIDE DISS. MG/L	CHROMIUM HEX as CR MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE as CN MG/L	FLUORIDE DISS. MG/L
4-25-89														
5-23-89														
6-21-89								24.4	7.9					
7-19-89								22.4	11.4					
9-25-89								50.8	15.7					
4-16-90														
5-22-90														
6-14-90														
7-23-90								51.2	13.9					
8-14-90								71.8	17.8					
10-11-90	<0.1		<0.01	<0.01		[illegible]	<0.01	[illegible]	[illegible]	<0.01		<0.01		<0.1
4-24-91														
5-30-91														
6-24-91														
7-18-91	0.22		<0.01	<0.01		<0.01	<0.01	65.9	15.1	<0.01		<0.01		0.15
9-19-91	<0.1		<0.01	<0.01		<0.05	<0.01	77	18	<0.01		<0.01		0.19

DATE	GERMANIUM TOTAL MG/L	IRON DISS. MG/L	IRON TOTAL MG/L	LEAD TOTAL MG/L	MAGNESIUM TOTAL MG/L	MANGANESE TOTAL MG/L	MERCURY TOTAL MG/L	MOLYBDENUM TOTAL MG/L	NICKEL TOTAL MG/L	POTASSIUM TOTAL MG/L	SELENIUM TOTAL MG/L	SILICA as SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	SULFIDE as S MG/L	MAJOR CATIONS MEQ/L	MAJOR ANIONS MEQ/L	C-A / C+A × 100	COMMENTS
4-25-89																					Road impossible - Snow
5-23-89																					Road impossible - Snow
6-21-89		<0.01		<0.01	2.4					0.2				0.8				1.45	1.32	4.84	
7-19-89					9.6					<0.1				1.28				3.46	3.35	1.59	
9-25-89		<0.01	0.453		18.2	0.020				1.0				4.2				4.24	4.05	2.35	
4-16-90																					Road impossible - Snow
5-22-90																					Road impossible - Snow
6-14-90																					Road impossible - Snow
7-23-90			<0.01		15.0	0.012				0.4				4.3				3.99	4.03	0.58	
8-14-90					16.9					0.8				6.6				5.28	5.35	0.66	
10-11-90		<0.01	2.48	<0.01	15.7	[illegible]	<0.0002	<0.01	<0.01	[illegible]	<0.002			[illegible]	[illegible]		<0.1	[illegible]	[illegible]	[illegible]	
4-24-91																					ROAD IMPASSIBLE - SNOW
5-30-91																					ROAD IMPASSIBLE - SNOW
6-24-91																					COVERED W/SNOW BANK
7-18-91				<0.01	10.9	<0.01	<0.0002	<0.01	<0.01	0.4	<0.002			3.4	<0.01		0.3	4.37	4.59	2.42	
9-19-91				<0.01	14.4	<0.01	<0.0002	<0.01	<0.01	0.7	<0.005			8.0	0.015		<1	5.40	5.31	0.76	

R-7-87

HANSEN ALLEN & LUCE INC
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station S-7-11
Location

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	µMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
7-18-91	15:45	0.0011	22	18	7.7																									416							
9-17-91	07:40		6	4	7.7																									491							

DATE	ALUMINUM DISS	ANTIMONY DISS.	ARSENIC DISS	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT DISS	COPPER DISS	CYANIDE as CN	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE + NITRITE		COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L		
7-18-91	<0.1		<0.01	<0.01		<0.01	<0.01			<0.01		<0.01				0.27		<0.01			<0.0002	<0.01	<0.01		<0.002				<0.01					
9-17-91	<0.1		<0.01	<0.01		<0.05	<0.01			<0.01		<0.01				0.03		<0.01			<0.0002	<0.01	<0.01		<0.005				<0.01					

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-12
Location Finn Canyon Creek above Clear Creek

DATE	TIME	FLOW CFS	TEMPERATURE AIR °C	TEMPERATURE WATER °C	pH	COLIFORM TOTAL MPN	COLIFORM FECAL MPN	FECAL STREP MPN	C.O.D. MG/L	B.O.D. MG/L	T.O.C. MG/L	DISSOLVED OXYGEN MG/L	OIL & GREASE MG/L	PHENOL MG/L	NITROGEN AMMONIA as NH_3-N MG/L	NITROGEN NITRATE as NO_3-N MG/L	NITROGEN NITRITE as NO_2-N MG/L	NITROGEN TOTAL KJELDAHL MG/L	NITROGEN ORGANIC MG/L	PHOSPHATE TOTAL as PO_4-P MG/L	PHOSPHATE ORTHO as PO_4-P MG/L	SULFATE as SO_4 MG/L	HYDROXIDE as OH MG/L	SURFACTANT as MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS ML/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL SOLIDS MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SPECIFIC COND. µmhos/cm	TURBIDITY FTU	CARBONATE ALK. as CO_3 MG/L	BI-CARBONATE ALK. as HCO_3 MG/L	TOTAL ALK. as $CaCO_3$ MG/L	TOTAL HARDNESS as $CaCO_3$ MG/L	ACIDITY as $CaCO_3$ MG/L	ALPHA RADIO-ACTIVITY pCi/L	BETA RADIO-ACTIVITY pCi/L
4-25-89	10:00	0.153	8	5	8.2							8.6			<0.2	0.253	<0.01			0.055		17.8			8.5		205		67	510			216		174			
5-23-89	09:38	0.424	16	8	7.7							9.2										89.8			11		154			346		0	172					
6-21-89	09:40	0.101	5	7	7.3							7.8	<0.5									88			8.4	<0.1	218			413		0	228			<10		
7-19-89	08:30	0.002	18	9	7.3																	48					321			432		0	320					
9-25-89	15:20	0.0004	19	10	7.8							7.9	<0.5									45			61	<0.1	354			751		0	341		314	<10		
4-16-90	10:45	0.0225	15	8	7.4																	36			52		287			695		0	302					
5-22-90	11:55	0.343	17	7	7.5																	<0.5			24		156			361		0	158					
6-14-90	16:50	0.52	18	13	8.0							7.1										<0.5			41	<0.1	173			273		0	151		125	<10		
7-23-90	10:40	0.005	24	11	7.5							6.8										32.6			7.5	<0.1	268			643		0	282		248			
8-14-90	14:15	Dry																																					
10-11-90	09:06	0.001	4	5	7.5							4.0			<0.1	0.06	<0.01			0.069		42.7			14	<0.1	331			817		8.6	338		298	<10		
4-24-91	08:15	INACCESSIBLE																																					
5-30-91	08:20	0.40	11	3.5	7.5							15.2			<0.2	0.314	0.007			0.113		4.2			44	<0.1	135			822		0	136		117	<10		
6-24-91	07:48	0.17	11	9	7.25							13.0										2.6			14	<0.1	145			222		0	152					
7-18-91	13:45	.0130	24	17	7.6							8.0										21			53	<0.1	217			356		0	228					
9-19-91	14:55	NO FLOW																																					

DATE	ALUMINUM TOTAL MG/L	ANTIMONY TOTAL MG/L	ARSENIC TOTAL MG/L	BARIUM TOTAL MG/L	BERYLLIUM TOTAL MG/L	BORON TOTAL MG/L	CADMIUM TOTAL MG/L	CALCIUM TOTAL MG/L	CHLORIDE DISS. MG/L	CHROMIUM HEX as CR MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE as CN MG/L	FLUORIDE DISS. MG/L	GERMANIUM TOTAL MG/L	IRON DISS. MG/L	IRON TOTAL MG/L	LEAD TOTAL MG/L	MAGNESIUM TOTAL MG/L	MANGANESE TOTAL MG/L	MERCURY TOTAL MG/L	MOLYBDENUM TOTAL MG/L	NICKEL TOTAL MG/L	POTASSIUM TOTAL MG/L	SELENIUM TOTAL MG/L	SILICA as SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	SULFIDE as S MG/L	MAJOR CATIONS MEQ/L	MAJOR ANIONS MEQ/L	$\frac{C-A}{C+A} \times 100$	COMMENTS
4-25-89	<0.1						<0.01	51.6	7.9			<0.01					0.44	0.065	14.8	0.045		<0.01	<0.01	0.8	<0.002			4.6	0.315		<0.1	4.01	4.13	1.48	
5-23-89								32.1	3.2										39.1					0.7				1.4				4.90	4.78	1.23	
6-21-89								53.2	10.9										33.2					0.6				2.1				5.49	5.88	3.37	
7-19-89								31.8	6.4										58.9					1.4				1.9				6.55	6.42	0.98	
9-25-89								78.8	7.7								0.770		39.8	0.060				1.4				3.9				7.41	6.74	4.73	
4-16-90								42.9	5.3										32.7					1.9				12.9				6.44	5.85	3.61	
5-22-90								32.7	0.8										11.2					0.6				2.0				2.66	2.62	0.63	
6-14-90								37.3	3.4							<0.01	1.41		9.8	0.020				1.0				2.9				2.82	2.58	4.45	
7-23-90								48.2	1.3										27.4					1.0				2.9				4.84	5.34	4.87	
8-14-90																																				
10-11-90	<0.1		<0.01	<0.01		0.14	<0.01	79.1	3.6	<0.01		<0.01		0.12		<0.01	0.495	<0.01	33.5	0.130	<0.0002	<0.01	<0.01	1.6	<0.002			[illegible]	<0.01		<0.1	6.89	6.82	0.51	
4-24-91																																				CHANNEL DRIFTED IN 2½ TO 3 FT SNOW
5-30-91	<0.1		<0.01	0.043		0.030	<0.01	34.9	2.0	<0.01		<0.01		0.108			1.02	<0.01	7.2	0.021	<0.0002	<0.01	<0.01	0.3	<0.002			1.7	0.011		<0.1	2.42	2.37	0.89	
6-24-91								31.9	<2										6.8					0.3				3.3				2.30	2.55	5.01	
7-18-91								70.8	1.8										2.5					0.2				1.2				3.80	4.23	5.35	
9-19-91																																				

R-7-87

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-12
Location Finn Canyon Creek (above Clear Creek)

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY	
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	µMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L	
5-30-91	08:20	0.40	11	3.5	7.5																									187								
9-19-91	14:55	NO	FLOW																																			

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT DISS.	COPPER DISS.	CYANIDE as Cn	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE + NITRITE		COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L		
5-30-91	<0.1		<0.01	<0.01		<0.02	<0.01			<0.01		<0.01				<0.01		<0.01			<0.0002	<0.01	<0.01		<0.002				<0.01					
9-19-91																																		

CHEMTECH
ANALYTICAL LABORATORY
6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 10-17-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-20-91 - Valley Camp Stream

DATE SAMPLED: 9-19-91

CERTIFICATE OF ANALYSIS

SAMPLE ID: / LAB #:	VC-11 U068876	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (D), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (D), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (D), mg/l	0.05	AR 9-30-91 EPA 236.1
Lead as Pb (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (D), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (D), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (D), mg/l	<.01	ICP 10-15-91 EPA 200.7

Rex Henderson

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DATE SUBMITTED: 9-20-91 - Valley Camp Stream

DATE SAMPLED: 9-19-91

CERTIFICATE OF ANALYSIS

SAMPLE ID: / LAB #:	VC-11 U068876	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (T), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (T), mg/l	.05	AR 10-15-91 EPA 200.7
Cadmium as Cd (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (T), mg/l	0.062	AR 10-15-91 EPA 236.1
Lead as Pb (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (T), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (T), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (T), mg/l	<.01	ICP 10-15-91 EPA 200.7

Rex Henderson

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DATE: 10-17-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-20-91 - Valley Camp Stream

DATE SAMPLED: 9-19-91

CERTIFICATE OF ANALYSIS

SAMPLE ID: / LAB #:	VC-11 U068876	ANALYST/DATE/METHOD
PARAMETER		
Acidity as $CaCO_3$, mg/l	<10	RG 9-23-91 EPA 310.1
Alkalinity as $CaCO_3$, mg/l	237	RG 9-23-91 EPA 310.1
Bicarbonate as HCO_3, mg/l	289	RG 9-23-91 EPA 310.1
Carbonate as CO_3, mg/l	0	RG 9-23-91 EPA 310.1
Calcium as Ca, mg/l	69	AR 9-30-91 EPA 215.1
Chloride as Cl, mg/l	3.8	TM 9-23-91 EPA 325.3
Flouride as F, mg/l	0.17	TM 9-23-91 EPA 340.1
Hardness as $CaCO_3$, mg/l	280	TM 9-23-91 EPA 130.2
Magnesium as Mg, mg/l	22.2	AR 9-30-91 EPA 242.1
Potassium as K, mg/l	1.5	AR 9-30-91 EPA 258.1
Sodium as Na, mg/l	3.8	AR 9-30-91 EPA 273.1
Sulfate as SO_4, mg/l	27.5	TM 9-24-91 EPA 375.4
TDS, mg/l	285	RG 9-23-91 EPA 160.1
Ammonia as NH_3-N, mg/l	<.2	TM 9-23-91 EPA 350.3
Nitrate as NO_3-N, mg/l	0.12	JO 9-25-91 EPA 352.1
Nitrite as NO_2-N, mg/l	<.005	TM 9-23-91 EPA 354.1
Phosphate as PO_4-P (T), mg/l	0.026	TM 9-24-91 EPA 365.2
Sulfide as S, mg/l	<1	RG 9-24-91 EPA 376.1

Rex Henderson

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-11
Location Boardinghouse Creek above Spring houses

DATE	TIME	FLOW CFS	TEMPERATURE AIR °C	TEMPERATURE WATER °C	pH	COLIFORM TOTAL MPN	COLIFORM FECAL MPN	FECAL STREP MPN	C.O.D. MG/L	B.O.D. MG/L	T.O.C. MG/L	DISSOLVED OXYGEN MG/L	OIL & GREASE MG/L	PHENOL MG/L	NITROGEN AMMONIA as NH_4-N MG/L	NITROGEN NITRATE as NO_3-N MG/L	NITROGEN NITRITE as NO_2-N MG/L	NITROGEN TOTAL KJELDAHL MG/L	NITROGEN ORGANIC MG/L	PHOSPHATE TOTAL as PO_4-P MG/L	PHOSPHATE ORTHO as PO_4-P MG/L	SULFATE as SO_4 MG/L	CHLORIDE as CH MG/L	SURFACTANT as MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS ML/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL SOLIDS MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SPECIFIC CONDUCTANCE µmhos/cm	TURBIDITY FTU	CARBONATE ALK. CO_3 MG/L	BI-CARBONATE ALK. as HCO_3 MG/L	TOTAL ALK. as $CaCO_3$ MG/L	TOTAL HARDNESS as $CaCO_3$ MG/L	ACIDITY as $CaCO_3$ MG/L	ALPHA RADIO-ACTIVITY pCi/L	BETA RADIO-ACTIVITY pCi/L
4-25-89	10:37	1.24	6	3	7.4							9.4			<0.2	0.243	<0.01			0.059		18.3			15		196		59	525			188		178			
5-23-89	10:26	1.30	17	7	7.3							8.5										130			7.0		164			438		0	177					
6-21-89	10:40	0.63	5	6	7.1							8.9	<0.5									29.0			8.0	<0.1	234			602		0	258			<10		
7-19-89	8:55	0.33	13	9	7.5																	76					300			695		0	307					
8-25-89	12:25	0.226	20	8	7.6							10.5	<0.5									33			2.5	<0.1	276			729		0	317		269	<10		
4-16-90	09:28	0.64	15	9	7.5																	28			11		217			792		0	214					
5-22-90	12:20	1.60	18	13	7.4																	<0.5			7.5		164			319		0	158					
6-14-90	13:10	1.00	20	13	7.4							7.4										21.2			19	<0.1	222			347		0	190		170	<10		
7-23-90	11:35	0.184	22	13	7.3							12.0										28.6			14	<0.1	261			479		0	257		221			
8-14-90	14:54	0.27	23	15	7.4							9.8										36			28	<0.1	278			0.5		4.9	290					
10-11-90	09:45	0.11	3	4	7.5							11.4			<0.1	0.05	<0.01			0.015		26.6			8.4	<0.1	289			743		11.1	307		279	<10		
4-24-91	08:45	0.84	1.5	3.5	7.5							16																				0	298		288	<10		
5-30-91	09:38	2.98	11	5	7.5							11.0			<0.2	0.372	0.007			0.037		3.8			54	<0.1	121			197		0	128		109	<10		
6-24-91	08:35	1.19	18.5	10	7.4							14.4										21			9.6	<0.1	186			290		0	199					
7-18-91	14:20	.2728	27.5	18	7.6							8.8										24			11	<0.1	239					7.4	252					
9-10-91	14:30	0.125	25	11	7.8							9.2			<0.2	0.12	<0.005			0.026		27.5					285			446		0	289		260	<10		

DATE	ALUMINUM TOTAL MG/L	ANTIMONY TOTAL MG/L	ARSENIC TOTAL MG/L	BARIUM TOTAL MG/L	BERYLLIUM TOTAL MG/L	BORON TOTAL MG/L	CADMIUM TOTAL MG/L	CALCIUM TOTAL MG/L	CHLORIDE DISS. MG/L	CHROMIUM HEX as CR MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE as CN MG/L	FLUORIDE DISS. MG/L	GERMANIUM TOTAL MG/L	IRON DISS. MG/L	IRON TOTAL MG/L	LEAD TOTAL MG/L	MAGNESIUM TOTAL MG/L	MANGANESE TOTAL MG/L	MERCURY TOTAL MG/L	MOLYBDENUM TOTAL MG/L	NICKEL TOTAL MG/L	POTASSIUM TOTAL MG/L	SELENIUM TOTAL MG/L	SILICA as SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	SULFIDE as S MG/L	MAJOR CATIONS MEQ/L	MAJOR ANIONS MEQ/L	$\frac{C-A}{C+A}$ 100	COMMENTS
4-25-89	<0.1						<0.01	46.9	8.1			<0.01					0.76	0.030	12.0	0.085		<0.01	<0.01	1.2	<0.002			5.8	0.255		<0.1	3.61	3.69	1.10	
5-23-89								40.2	5.4										42.2					0.7				1.8				5.57	5.76	1.63	
6-21-89								47.1	11.3										28.5					0.8				2.0				4.80	5.15	3.50	
7-19-89								51.9	7.3										47.9					0.9				3.2				6.69	6.82	0.93	
8-25-89								70.2	8.2								0.310		35.4	<0.01				1.1				4.0				6.62	6.11	3.96	
4-16-90								39.5	4.8										21.6					1.2				10.6				4.24	4.23	0.17	
5-22-90								32.8	1.4										11.0					0.7				1.8				2.64	2.64	0.03	
6-14-90								50.2	3.6							<0.01	0.456		14.3	<0.01				1.2				3.1				3.85	3.66	2.53	
7-23-90								44.4	1.73										27.2					1.1				22.9				5.48	5.35	1.20	
8-14-90								48.2	2.47										30.6					1.6				3.2				5.10	5.74	5.83	
10-11-90	<0.1		<0.01	<0.01		0.12	<0.01	75.2	3.3	<0.01		<0.01		<0.1		<0.01	0.220	<0.01	30.1	0.013	<0.0002	<0.01	<0.01	1.3	<0.002			2.9	<0.01		<0.1	6.38	6.03	2.65	
4-24-91								64.9	27.6					<0.1					33.4													5.99	5.66	2.78	
5-30-91	<0.1		<0.01	0.030		0.028	<0.01	33.8	1.9	<0.01		<0.01		0.135			0.91	<0.01	16.9	0.025	<0.0002	<0.01	<0.01	0.5	<0.002			3.2	0.016		<0.1	2.41	2.23	3.79	
6-24-91								44.0	<2										10.1					0.5				3.8				3.21	3.70	7.16	
7-18-91								60.6	2.8										17.9					1.0				6.1				4.79	4.79	0.01	
9-10-91	<0.1		<0.01	<0.01		<0.05	<0.01	69	3.8	<0.01		<0.01		0.17			0.062	<0.01	22.2	<0.01	<0.0002	<0.01	<0.01	1.5	<0.005			3.8	<0.01		<1	5.48	5.43	0.46	

R-7-87

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-11
Location Boardinghouse Creek (above Spring houses)

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	TOC	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS TDS	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	µMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
5-30-91	09:38	2.98	11	5	7.5																									197							
9-10-91	14:30	0.125																												446							

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT DISS.	COPPER DISS.	CYANIDE as CN	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE - NITRITE		COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L		
5-30-91	<0.1		<0.01	<0.01		<0.02	<0.01			<0.01		<0.01				<0.01		<0.01			<0.0002	<0.01	<0.01		<0.002				<0.01					
9-10-91	<0.1		<0.01	<0.01		<0.05	<0.01			<0.01		<0.01				0.05		<0.01			<0.0002	<0.01	<0.01		<0.005				<0.01					

CHEMTECH
ANALYTICAL LABORATORY
6100 S. STRATLER
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PHONE (801) 262-7299
FAX (801) 262-7378

DATE: 10-15-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID: / LAB #:	VC-10 U068529	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (D), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (D), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (D), mg/l	0.020	AR 9-30-91 EPA 236.1
Lead as Pb (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (D), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (D), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (D), mg/l	<.01	ICP 10-15-91 EPA 200.7

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DATE: 10-15-91

TO: Hansen, Allen & Luce
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DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID: / LAB #:	VC-10 U068529	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (T), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (T), mg/l	0.040	ICP 10-15-91 EPA 200.7
Boron as B (T), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (T), mg/l	0.048	AR 9-30-91 EPA 236.1
Lead as Pb (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (T), mg/l	0.019	ICP 10-15-91 EPA 200.7
Mercury as Hg (T), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (T), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (T), mg/l	<.01	ICP 10-15-91 EPA 200.7

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DATE: 10-15-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID: / LAB #:	VC-10 U068529	ANALYST/DATE/METHOD
PARAMETER		
Acidity as $CaCO_3$, mg/l	<10	RG 9-12-91 EPA 310.1
Bicarbonate as HCO_3, mg/l	266	RG 9-10-91 EPA 310.1
Carbonate as CO_3, mg/l	2.4	RG 9-16-91 EPA 310.1
Calcium as Ca, mg/l	85	AR 9-30-91 EPA 215.1
Chloride as Cl, mg/l	5.2	TM 9-12-91 EPA 325.3
Flouride as F, mg/l	0.26	TM 9-12-91 EPA 340.1
Hardness as $CaCO_3$, mg/l	333	TM 9-12-91 EPA 130.2
Magnesium as Mg, mg/l	29.5	AR 9-30-91 EPA 242.1
Potassium as K, mg/l	2.1	AR 9-30-91 EPA 258.1
Sodium as Na, mg/l	5.0	AR 9-30-91 EPA 273.1
Sulfate as SO_4, mg/l	83	TM 9-13-91 EPA 375.4
TDS, mg/l	423	RG 9-12-91 EPA 160.1
Ammonia as NH_3-N, mg/l	<.2	TM 9-12-91 EPA 350.3
Nitrate as NO_3-N, mg/l	0.017	JO 9-16-91 EPA 352.1
Nitrite as NO_2-N, mg/l	<.005	TM 9-12-91 EPA 354.1
Phosphate as PO_4-P (T), mg/l	0.020	TM 9-13-91 EPA 365.2
Oil & Grease, mg/l	<.5	RG 9-12-91 EPA 413.1
TSS, mg/l	9.0	RG 9-12-91 EPA 160.2
Sulfide as S, mg/l	<.2	RG 9-16-91 EPA 376.1
Settleable Solids, ml/l	<.1	RG 9-11-91 SM 208-F

Rex Henderson

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-10
Location South Fork Eccles Creek above Eccles Creek

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP.	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
4-25-89	11:30	0.73	6	4	7.0							9.8		
5-23-89	14:[illegible]	1.17	20	7	7.4							8.3		
6-21-89	16:18	0.32	15	14	7.5							7.9	<0.5	
7-19-89	13:40	0.13	26	18	7.7									
9-25-89	10:55	0.03	13	8	7.5							10.6	<0.5	
4-16-90	11:06	0.38	16	9	7.6									
5-22-90	09:56	1.24	16	6	7.4									
6-14-90	10:45	0.83	16	7	7.5							9.1		
7-23-90	14:30	0.13	19	18	7.4							11.5		
8-14-90	15:40	0.058	21	17	7.4							9.3		
10-11-90	14:50	0.03	10	3	7.3							15.1		
4-24-91	10:10	0.08	10	1.75	7.6							16.0	<0.5	
5-30-91	12:35	1.31	12	5.3	7.							13.0		
6-24-91	13:30	0.76	24	14	7.6							10.6		
7-18-91	07:59	0.54	21	13.5	7.4							10.0		
9-10-91	07:30	0.115	6.5	6.5	7.5							11.6	<0.5	

DATE	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L
4-25-89	<0.2	0.304	<0.01			0.034		18.8			7.5		215		34
5-23-89								100			6.5		166		
6-21-89								102			6.4	<0.1	323		
7-19-89								138					344		
9-25-89								368			22	<0.1	721		
4-16-90								22			17		236		
5-22-90								<0.5			7.0		176		
6-14-90								22.7			3.0	<0.1	237		
7-23-90								18.1			75	<0.1	203		
8-14-90								24			7	<0.1	237		
10-11-90	<0.1	0.06	<0.01			0.025		16.4			1.6	<0.1	228		
4-24-91	<0.2	0.27	0.006			0.083		29			5.6	<0.1	265		
5-30-91	<0.2	0.444	0.006			0.110		15.9			133	<0.1	174		
6-24-91								22			4.8	<0.1	209		
7-18-91								52			4.0	<0.1	277		
9-10-91	<0.2	0.017	<0.005			0.02		83			9.0	<0.1	423		

DATE	SPECIFIC COND.	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK. as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ACIDITY as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
	µMHOS/CM	FTU	MG/L	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
4-25-89	491			216		170			
5-23-89	414		0	172					
6-21-89	414		0	228			<10		
7-19-89	409		8.8	232					
9-25-89	1554		0	241		414	<10		
4-16-90	474		0	228					
5-22-90	430		0	173					
6-14-90	448		0	207		177	<10		
7-23-90	420		87.4	0		195			
8-14-90	406		6.1	212					
10-11-90	782		6.1	216		220	<10		
4-24-91			0	265		239	<10		
5-30-91	287		0	193		158	<10		
6-24-91	340		6.0	218					
7-18-91			3.6	259					
9-10-91	577		2.4	266		333	<10		

DATE	ALUMINUM TOTAL	ANTIMONY TOTAL	ARSENIC TOTAL	BARIUM TOTAL	BERYLLIUM TOTAL	BORON TOTAL	CADMIUM TOTAL	CALCIUM TOTAL	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT TOTAL	COPPER TOTAL	CYANIDE as CN	FLUORIDE DISS.
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
4-25-89	<0.1						<0.01	55.7	6.9			<0.01		
5-23-89								40.9	4.5					
6-21-89								61.0	8.6					
7-19-89								43.8	4.9					
9-25-89								71.5	15.1					
4-16-90								43.7	6.0					
5-22-90								36.9	1.2					
6-14-90								55.2	3.2					
7-23-90								38.4	0.41					
8-14-90								44.2	0.86					
10-11-90	<0.1		<0.01	<0.01		0.12	<0.01	64.2	2.2	<0.01		<0.01		<0.1
4-24-91	<0.1		<0.01	0.025		0.12	<0.01	57.8	3.1	<0.01		<0.01		<0.1
5-30-91	<0.1		<0.01	0.032		0.036	<0.01	20.4	1.9	<0.01		<0.01		0.159
6-24-91								50.9	<2					
7-18-91								68.0	2.8					
9-10-91	<0.1		<0.01	0.04		<0.05	<0.01	85	5.2	<0.01		<0.01		0.26

DATE	GERMANIUM TOTAL	IRON DISS.	IRON TOTAL	LEAD TOTAL	MAGNESIUM TOTAL	MANGANESE TOTAL	MERCURY TOTAL	MOLYBDENUM TOTAL	NICKEL TOTAL	POTASSIUM TOTAL	SELENIUM TOTAL	SILICA as SiO_2	SILVER TOTAL	SODIUM TOTAL	ZINC TOTAL
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
4-25-89			0.32	<0.01	12.9	0.055		<0.01	<0.01	0.2	<0.005			4.7	0.235
5-23-89					34.1					0.6				0.8	
6-21-89					34.9					0.7				1.4	
7-19-89					58.6					0.7				1.2	
9-25-89			0.255		60.3	0.053				12.1				583	
4-16-90					20.6					1.2				12.1	
5-22-90					11.6					0.6				2.2	
6-14-90		<0.01	0.230		14.2	<0.01				1.0				3.1	
7-23-90					18.9					0.8				2.2	
8-14-90					20.5					1.0				3.0	
10-11-90		<0.01	0.160	<0.01	19.8	0.023	<0.0002	<0.01	<0.01	0.7	<0.002			2.2	<0.01
4-24-91		0.088	0.185	<0.01	21.5	0.014	<0.0002	<0.01	<0.01	0.7	0.004			1.6	0.016
5-30-91			1.11	<0.01	28.1	0.049	<0.0002	<0.01	0.011	0.8	<0.002			0.8	0.016
6-24-91					11.8					0.5				2.9	
7-18-91										0.8				3.3	
9-10-91			0.048	<0.01	29.5	0.019	<0.0002	<0.01	<0.01	2.1	<0.005			5.0	<0.01

DATE	VANADIUM TOTAL	SULFIDE as S	MAJOR CATIONS	MAJOR ANIONS	C-A / C+A ×100	COMMENTS
	MG/L	MG/L	MEQ/L	MEQ/L		
4-25-89		<0.1	4.05	4.13	0.93	
5-23-89			4.90	5.03	1.32	
6-21-89			5.99	6.10	0.90	
7-19-89			7.08	7.11	0.21	
9-25-89			11.38	12.04	2.83	
4-16-90			4.49	4.36	0.78	
5-22-90			2.91	2.88	0.47	
6-14-90			4.08	3.96	1.59	
7-23-90			3.59	3.30	4.15	
8-14-90			4.05	4.20	1.86	
10-11-90		<0.1	4.94	4.94	0.00	
4-24-91		<0.5	4.72	5.03	3.18	
5-30-91		<0.1	3.39	3.55	2.34	
6-24-91			3.65	4.02	7.37	
7-18-91			3.56	5.53	21.68	
9-10-91		<0.2	6.94	6.33	4.64	

R-7-87

HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-10
Location So. Fork Eccles Creek (above Eccles Creek)

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	TOC	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH_4-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS TDS	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND.	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK. as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	µMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
5-30-91	12:35	1.31	12	5.3	7.35																									287							
9-10-91	07:30	0.115	6.5	6.5	7.5																									577							

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX. as CR	COBALT DISS.	COPPER DISS.	CYANIDE as CN	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE + NITRITE	COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L	
5-30-91	<0.1		<0.01	<0.01		<0.02	<0.01			<0.01		<0.01				<0.01		<0.01			<0.0002	<0.01	<0.01		<0.002				<0.01				
9-10-91	<0.1		<0.01	<0.01		<0.05	<0.01			<0.01		<0.01				0.02		<0.01			<0.0002	<0.01	<0.01		<0.005				<0.01				

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-5
Location Whiskey Canyon Creek
below Belina Mine

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	CHLORIDE as Cl	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND.	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK. as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ACIDITY as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	μMHOS/CM	FTU	MG/L	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
4-25-89	13:15	0.59	6	4	7.7							9.4			<0.2	0.067	<0.01			0.055		97.2			36		457		47	1103			218		308			
5-23-89	16:05	0.49	17	8	7.4							8.4										85			7.0		387			889		0	232					
6-21-89	16:35	0.36	16	13	7.6							8.2	<0.5									77			39	<0.1	379			742		0	237			<10		
7-19-89	14:40	0.15	25	19	7.8																	123					425			690		10.5	221					
9-25-89	11:25	0.33	20	4	7.6							10.1	<0.5									129			14	<0.1	423			998		0	268		324	214		
4-16-90	11:50	0.32	16	5	7.5																	70			57		462			1297		0	221					
5-22-90	18:20	0.23	16	9	7.4																	41			10		327			694		0	176					
6-14-90	12:15	0.31	18	10	7.4							8.1	<0.5									63			81	<0.1	379			720		12.2	216		273	<10		
7-23-90	14:55	0.20	18	18	7.6							11.8										105			42	<0.1	352			676		19.8	210		286			
8-14-90	16:15	0.13	24	18	7.5							9.3	<0.5									94			22	<0.1	338			725		9.8	223					
10-11-90	15:10	0.02	9	4	7.3							12.8	6.6		<0.1	0.06	<0.01			0.017		183			12	<0.1	528			1181		8.6	256		417	<10		
4-24-91	11:00	0.22	13	1.5	7.1							10	<0.5		<0.2	0.60	0.007			0.102		286			16	<0.1	785					2.4	222		333	<10		
5-30-91	13:40	0.10	8	7.5	7.2							12.2	<0.5		<0.2	0.079	0.008			0.107		44.8			63	<0.1	263			426		0	148		156	<10		
6-24-91	11:34	0.07	20	12	7.5							11.4										55			2.4	<0.1	350			596		9.6	184					
7-18-91	10:40	.0063	20	14	7.5							8.4										84			115	0.15	535					8.2	254					
9-10-91	10:45	NO	FLOW																																				

DATE	ALUMINUM TOTAL	ANTIMONY TOTAL	ARSENIC TOTAL	BARIUM TOTAL	BERYLLIUM TOTAL	BORON TOTAL	CADMIUM TOTAL	CALCIUM TOTAL	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT TOTAL	COPPER TOTAL	CYANIDE as CN	FLUORIDE DISS.	GERMANIUM TOTAL	IRON DISS	IRON TOTAL	LEAD TOTAL	MAGNESIUM TOTAL	MANGANESE TOTAL	MERCURY TOTAL	MOLYBDENUM TOTAL	NICKEL TOTAL	POTASSIUM TOTAL	SELENIUM TOTAL	SILICA as SiO_2	SILVER TOTAL	SODIUM TOTAL	ZINC TOTAL	VANADIUM TOTAL	SULFIDE as S	MAJOR CATIONS	MAJOR ANIONS	$\frac{C-A}{C+A} \times 100$	COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MEQ/L	MEQ/L		
4-25-89	<0.1						<0.01	74.8	73.0			<0.01					0.57	<0.01	31.2	0.060		<0.01	<0.01	3.2	0.0048			31.6	0.707		<0.1	7.76	7.66	0.65	
5-23-89								42.4	33.2										42.1					2.8				17.9				5.43	6.51	0.61	
6-21-89								35.3	23.7										44.6					3.9				9.6				5.95	6.16	1.71	
7-19-89								46.4	26.1										42.4					4.7				13.8				6.53	7.27	5.40	
9-25-89								71.4	16.3								0.050		43.9	<0.01				4.2				8.4				7.65	7.54	0.73	
4-16-90								58.1	116										36.7					2.8				52.9				8.29	8.35	0.36	
5-22-90								47.4	56.3										19.8					1.8				32.2				5.44	5.33	1.07	
6-14-90								59.2	26.6							<0.01	0.648		33.2	<0.01				3.3				14.9				6.44	6.00	3.55	
7-23-90								47.1	18.6										46.2					4.3				12.9				6.57	6.81	1.78	
8-14-90								45.1	23.3										47.3					4.6				16.6				6.98	6.60	2.85	
10-11-90	<0.1	<0.01		<0.01		0.23	<0.01	55.8	18.2	<0.01		<0.01		0.21		<0.01	0.130	<0.01	60.9	<0.01	<0.002	<0.01	<0.01	5.1	<0.002			15.1	<0.01		<0.1	8.58	8.52	1.38	
4-24-91	<0.1		<0.01	0.052		0.15	<0.01	69.7	252	<0.01		<0.01		0.20		0.033	0.405	<0.01	30.1	0.034	<0.0002	<0.01	<0.01	2.6	0.006			298	0.014		<0.5	18.98	16.78	6.15	CHANNEL COVERED IN SNOW SAMPLE TAKEN
5-30-91	<0.1		<0.01	0.037		0.039	<0.01	45.2	58.3	<0.01		<0.01		0.150		0.86		<0.01	10.8	0.024	<0.0002	<0.01	<0.01	0.9	<0.002			79.4	0.010		<0.1	6.62	5.00	13.92	
6-24-91								54.3	80.4										15.7					1.3				58.9				6.60	6.75	1.14	
7-18-91								82.2	118										25.0					2.3				101				10.61	9.51	5.45	
9-10-91																																			

R-7-87

HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-5
Location Whiskey Canyon Creek (below Belina Mine)

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	TOC	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY	
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	µMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L	
5-30-91	1340		8	7.5	7.2																									426								
6-10-91	10:45	NO	FLOW																																			

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT DISS.	COPPER DISS.	CYANIDE as Cn	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE — NITRITE		COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L		
5-30-91	<0.1		<0.01	<0.01		<0.02	<0.01			<0.01		<0.01				<0.01		<0.01			<0.0002	<0.01	<0.01		<0.002				<0.01					

CHEMTECH
ANALYTICAL LABORATORY
6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 10-15-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID: / LAB #:	VC-4 U068528	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (D), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (D), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (D), mg/l	0.015	AR 9-30-91 EPA 236.1
Lead as Pb (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (D), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (D), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (D), mg/l	0.018	ICP 10-15-91 EPA 200.7

Rex Henderson

CHEMTECH
ANALYTICAL LABORATORY
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DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID: / LAB #:	VC-4 U068528	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (T), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (T), mg/l	<.05	ICP 10-15-91 EPA 200.7
Cadmium as Cd (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (T), mg/l	0.020	AR 9-30-91 EPA 236.1
Lead as Pb (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (T), mg/l	0.020	ICP 10-15-91 EPA 200.7
Mercury as Hg (T), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (T), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (T), mg/l	0.011	ICP 10-15-91 EPA 200.7

Rex Henderson

CHEMTECH
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DATE: 10-15-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID: / LAB #:	VC-4 U068528	ANALYST/DATE/METHOD
PARAMETER		
Acidity as $CaCO_3$, mg/l	<10	RG 9-12-91 EPA 310.1
Bicarbonate as HCO_3, mg/l	232	RG 9-10-91 EPA 310.1
Carbonate as CO_3, mg/l	0	RG 9-16-91 EPA 310.1
Calcium as Ca, mg/l	51	AR 9-30-91 EPA 215.1
Chloride as Cl, mg/l	3.1	TM 9-12-91 EPA 325.3
Flouride as F, mg/l	0.18	TM 9-12-91 EPA 340.1
Hardness as $CaCO_3$, mg/l	199	TM 9-12-91 EPA 130.2
Magnesium as Mg, mg/l	13.3	AR 9-30-91 EPA 242.1
Potassium as K, mg/l	1.1	AR 9-30-91 EPA 258.1
Sodium as Na, mg/l	2.1	AR 9-30-91 EPA 273.1
Sulfate as SO_4, mg/l	2.4	TM 9-13-91 EPA 375.4
TDS, mg/l	213	RG 9-12-91 EPA 160.1
Ammonia as NH_3-N, mg/l	<.2	TM 9-12-91 EPA 350.3
Nitrate as NO_3-N, mg/l	0.056	JO 9-16-91 EPA 352.1
Nitrite as NO_2-N, mg/l	<.005	TM 9-12-91 EPA 354.1
Phosphate as PO_4-P (T), mg/l	0.050	TM 9-13-91 EPA 365.2
Oil & Grease, mg/l	<.5	RG 9-12-91 EPA 413.1
TSS, mg/l	2.8	RG 9-12-91 EPA 160.2
Sulfide as S, mg/l	<.2	RG 9-16-91 EPA 376.1
Settleable Solids, ml/l	<.1	RG 9-11-91 SM 208-F

Rex Henderson

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE INC
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-4
Location Whiskey Canyon Creek above Belina Mine

DATE	TIME	FLOW	TEMPERATURE AIR °C	TEMPERATURE WATER °C	pH	COLIFORM TOTAL MPN	COLIFORM FECAL MPN	FECAL STREP MPN	C.O.D. MG/L	B.O.D. MG/L	T.O.C. MG/L	DISSOLVED OXYGEN MG/L	OIL & GREASE MG/L	PHENOL MG/L
4-25-89	12:40	0.052	6	4	7.7							9.6		
5-23-89	15:50	0.088	15	6	7.4							8.6		
6-21-89	15:45	0.016	10	11	7.9							7.9	<0.5	
7-19-89	14:20	0.0004	25	17	7.8									
9-25-89	12:00	-0-												
4-16-90	11:30		Inaccessible											
5-22-90	09:20	0.041	17	9	8.0									
6-14-90	12:00	0.046	14	11	7.7							7.6	<0.5	
7-23-90	13:02	0.003	22	15	7.3							11.0		
8-14-90	16:00	0.0009	19	14	7.4							7.1	<0.5	
10-11-90	14:00	-0-												
4-24-91	11:50		INACCESSIBLE			SNOW	COVERED							
5-30-91	10:55	0.11	12	6.75								12.4	<0.5	
6-24-91	8:48	0.03	11	5.8	7.3							10.4		
7-18-91	9:38	.0063	17.5	13.2	7.1							10.2	<0.5	
9-10-91	9:20	0.0015	11	7	7.5							7.8	<0.5	

DATE	NITROGEN AMMONIA as NH3-N MG/L	NITRATE as NO3-N MG/L	NITRITE as NO2-N MG/L	NITROGEN TOTAL KJELDAHL MG/L	NITROGEN ORGANIC MG/L	PHOSPHATE TOTAL as PO4-P MG/L	PHOSPHATE ORTHO as PO4-P MG/L	SULFATE as SO4 MG/L	HYDROXIDE as OH MG/L	SURFACTANT as MBAS MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS ML/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL SOLIDS MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SPECIFIC COND. µMHOS/CM	TURBIDITY FTU	CARBONATE ALK. as CO3 MG/L	BI-CARBONATE ALK. as HCO3 MG/L	TOTAL ALK. as CaCO3 MG/L	TOTAL HARDNESS as CaCO3 MG/L	ACIDITY as CaCO3 MG/L	ALPHA RADIO-ACTIVITY pCi/L	BETA RADIO-ACTIVITY pCi/L
4-25-89	<0.2	0.125	<0.1			0.083		2.9			13		96		42	178			69.9		8.1			
5-23-89								8.5			74		86			148		0	62.9					
6-21-89								45.6			14	<0.1	147			201		0	243			29.8		
7-19-89								71					215			343		0	217					
9-25-89																								
4-16-90																108								
5-22-90								0.8			27		75			153		0	62.1					
6-14-90								<0.5			44	<0.1	118			144		0	67.2		54	<10		
7-23-90								10.5			33	<0.1	188			423		2.5	208		173			
8-14-90								<1.0			6.0	<0.1	190			441		4.9	232					
10-11-90																								
4-24-91																								
5-30-91	<0.2	0.140	0.011			0.100		7.0			34	<0.1	80					0	71.5		59.6	<10		
6-24-91								<5			42	<0.1	78			159		0	78.2					
7-18-91								18			43	<0.1	168					0	180					
9-10-91	<0.2	0.056	<0.005			0.050		2.4			2.8	<0.1	213					0	232		199	<10		

DATE	ALUMINUM TOTAL MG/L	ANTIMONY TOTAL MG/L	ARSENIC TOTAL MG/L	BARIUM TOTAL MG/L	BERYLLIUM TOTAL MG/L	BORON TOTAL MG/L	CADMIUM TOTAL MG/L	CALCIUM TOTAL MG/L	CHLORIDE DISS. MG/L	CHROMIUM HEX as CR MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE as CN MG/L	FLUORIDE DISS. MG/L
4-25-89	<0.1						<0.01	19.2	3.8			<0.01		
5-23-89								15.7	1.9					
6-21-89								22.6	7.6					
7-19-89								46.5	5.2					
9-25-89														
4-16-90														
5-22-90								15.2	0.65					
6-14-90								16.4	2.2					
7-23-90								45.2	0.33					
8-14-90								52.7	<0.5					
10-11-90														
4-24-91														
5-30-91	<0.1		<0.01	0.033		0.025	<0.01	19.4	1.5	<0.01		<0.01		<0.1
6-24-91								15.9	<2					
7-18-91								44.8	1.7					
9-10-91	<0.1		<0.01	<0.01		<0.05	<0.01	51	3.1	<0.01		<0.01		0.18

DATE	GERMANIUM TOTAL MG/L	IRON DISS. MG/L	IRON TOTAL MG/L	LEAD TOTAL MG/L	MAGNESIUM TOTAL MG/L	MANGANESE TOTAL MG/L	MERCURY TOTAL MG/L	MOLYBDENUM TOTAL MG/L	NICKEL TOTAL MG/L	POTASSIUM TOTAL MG/L	SELENIUM TOTAL MG/L	SILICA as SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	SULFIDE as S MG/L	MAJOR CATIONS MEQ/L	MAJOR ANIONS MEQ/L	$\frac{C-A}{C+A}$ 100	COMMENTS
4-25-89			0.85	<0.01	3.5	0.020		<0.01	<0.01	0.2	<0.002			3.8	0.215		<0.1	1.42	1.31	3.78	
5-23-89					4.9					0.6				1.2				1.25	1.26	0.29	
6-21-89					4.4					0.4				0.4				1.52	1.56	1.45	
7-19-89					31.7					0.3				0.9				4.97	5.18	2.03	
9-25-89																					
4-16-90																					Covered with Snow
5-22-90					3.2					0.5				1.4				1.10	1.05	1.99	
6-14-90		<0.01	1.59		4.2	<0.01				0.7				2.4				1.29	1.17	4.75	
7-23-90					14.3					0.7				1.8				3.53	3.72	2.65	
8-14-90					13.6					1.0				2.0				3.86	3.99	1.61	
10-11-90																					
4-24-91																					
5-30-91			0.90	<0.01	3.2	0.016	<0.0005	<0.01	<0.01	0.1	<0.002			0.2	0.014		<0.1	1.24	1.36	4.51	
6-24-91					3.0					0.5				1.4				1.11	1.28	7.00	
7-18-91					8.6					0.5				1.4				3.02	3.37	5.57	
9-10-91			0.02	<0.01	13.3	0.02	<0.002	<0.01	<0.01	1.1	<0.005			2.1	0.011		<0.2	3.76	3.95	2.46	

R-7-87

HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-4
Location Whiskey Canyon Creek (above Belina Mine)

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	TOC	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH3-N	NITROGEN NITRATE as NO3-N	NITROGEN NITRITE as NO2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO4-P	PHOSPHATE ORTHO as PO4-P	SULFATE as SO4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND	TURBIDITY	CARBONATE ALK. as CO3	BI-CARBONATE ALK as HCO3	TOTAL ALK. as CaCO3	TOTAL HARDNESS as CaCO3	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	µMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
5-30-91	10:55	0.11	12	6.75	7.6																									92							
9-10-91	9:20	0.0015	11	7	7.5																									339							

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT DISS.	COPPER DISS.	CYANIDE as CN	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE - NITRITE		COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L		
5-30-91	<0.1		<0.01	<0.01		<0.02	<0.01			<0.01		<0.01				<0.01		<0.01			<0.0002	<0.01	<0.01		<0.002				<0.01					
9-10-91	<0.1		<0.01	<0.01		<0.05	<0.01			<0.01		<0.01				0.015		<0.01			<0.0002	<0.01	<0.01		<0.005				0.018					

CHEMTECH
ANALYTICAL LABORATORY
6100 S. STRATLER
MURRAY, UTAH 84107
PHONE: (801) 262-7299
FAX: (801) 262-7378

DATE: 10-15-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	VC-2	
LAB #:	U068527	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (D), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (D), mg/l	0.080	ICP 10-15-91 EPA 200.7
Cadmium as Cd (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (D), mg/l	0.012	AR 9-30-91 EPA 236.1
Lead as Pb (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Mercury as Hg (D), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (D), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (D), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (D), mg/l	0.014	ICP 10-15-91 EPA 200.7

Rex Henderson

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DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	VC-2	
LAB #:	U068527	ANALYST/DATE/METHOD
PARAMETER		
Aluminum as Al (T), mg/l	<.1	ICP 10-15-91 EPA 200.7
Arsenic as As (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Barium as Ba (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Boron as B (T), mg/l	0.082	ICP 10-15-91 EPA 200.7
Cadmium as Cd (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Chromium as Cr (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Copper as Cu (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Iron as Fe (T), mg/l	0.075	AR 9-30-91 EPA 236.1
Lead as Pb (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Manganese as Mn (T), mg/l	0.049	ICP 10-15-91 EPA 200.7
Mercury as Hg (T), mg/l	<.0002	AR 10-15-91 EPA 245.1
Molybdenum as Mo (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Nickel as Ni (T), mg/l	<.01	ICP 10-15-91 EPA 200.7
Selenium as Se (T), mg/l	<.005	ICP 10-15-91 EPA 200.7
Zinc as Zn (T), mg/l	<.01	ICP 10-15-91 EPA 200.7

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DATE: 10-15-91

TO: Hansen, Allen & Luce
6771 South 900 East
Midvale, UT 84047

DATE SUBMITTED: 9-11-91 - Valley Camp Stream

DATE SAMPLED: 9-10-91

CERTIFICATE OF ANALYSIS

SAMPLE ID:	VC-2	
LAB #:	U068527	ANALYST/DATE/METHOD
PARAMETER		
Acidity as $CaCO_3$, mg/l	<10	RG 9-12-91 EPA 310.1
Bicarbonate as HCO_3, mg/l	316	RG 9-10-91 EPA 310.1
Carbonate as CO_3, mg/l	0	RG 9-16-91 EPA 310.1
Calcium as Ca, mg/l	86	AR 9-30-91 EPA 215.1
Chloride as Cl, mg/l	19.8	TM 9-12-91 EPA 325.3
Flouride as F, mg/l	0.41	TM 9-12-91 EPA 340.1
Hardness as $CaCO_3$, mg/l	386	TM 9-12-91 EPA 130.2
Magnesium as Mg, mg/l	41.8	AR 9-30-91 EPA 242.1
Potassium as K, mg/l	5.8	AR 9-30-91 EPA 258.1
Sodium as Na, mg/l	49	AR 9-30-91 EPA 273.1
Sulfate as SO_4, mg/l	196	TM 9-13-91 EPA 375.4
TDS, mg/l	558	RG 9-12-91 EPA 160.1
Ammonia as NH_3-N, mg/l	<.2	TM 9-12-91 EPA 350.3
Nitrate as NO_3-N, mg/l	0.27	JO 9-16-91 EPA 352.1
Nitrite as NO_2-N, mg/l	0.023	TM 9-12-91 EPA 354.1
Phosphate as PO_4-P (T), mg/l	0.028	TM 9-13-91 EPA 365.2
Oil & Grease, mg/l	<.5	RG 9-12-91 EPA 413.1
TSS, mg/l	21	RG 9-12-91 EPA 160.2
Sulfide as S, mg/l	<.2	RG 9-16-91 EPA 376.1
Settleable Solids, ml/l	<.1	RG 9-11-91 SM 208-F

Rex Henderson

CONSULTANTS/ENGINEERS
HANSEN ALLEN & LUCE inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-2
Location Mud Creek above Utah #2 mine

DATE	TIME	FLOW CFS	TEMPERATURE AIR °F	TEMPERATURE WATER °F	pH	COLIFORM TOTAL MPN	COLIFORM FECAL MPN	FECAL STREP MPN	C.O.D. MG/L	B.O.D. MG/L	T.O.C. MG/L	DISSOLVED OXYGEN MG/L	OIL & GREASE MG/L	PHENOL MG/L	NITROGEN AMMONIA as NH_3-N MG/L	NITROGEN NITRATE as NO_3-N MG/L	NITROGEN NITRITE as NO_2-N MG/L	NITROGEN TOTAL KJELDAHL MG/L	NITROGEN ORGANIC MG/L	PHOSPHATE TOTAL as PO_4-P MG/L	PHOSPHATE ORTHO as PO_4-P MG/L	SULFATE as SO_4 MG/L	CHLORIDE as Cl MG/L	FLUORIDE as MG/L	SOLIDS TSS MG/L	SOLIDS TOTAL SETTLEABLE SOLIDS ML/L	SOLIDS T.D.S. MG/L	SOLIDS TOTAL SOLIDS MG/L	SOLIDS TOTAL VOLATILE SOLIDS MG/L	SPECIFIC COND µMHOS/CM	TURBIDITY FTU	CARBONATE ALK. as CO_3 MG/L	BI-CARBONATE ALK. as HCO_3 MG/L	TOTAL ALK. as $CaCO_3$ MG/L	TOTAL HARDNESS as $CaCO_3$ MG/L	ACIDITY as $CaCO_3$ MG/L	ALPHA RADIO-ACTIVITY pCi/L	BETA RADIO-ACTIVITY pCi/L
4-25-89	13:35	10.23	6	6	7.6							10.2			<0.2	0.098	<0.01			0.047		49.8			32		292		64	729			214		226			
5-23-89	16:35	10.58	15	10	7.6							8.3										110			29		[illegible]			627		0	220					
6-7-89	17:00	5.74	15	15	7.6							9.0	<0.5									97.9			27	<0.1	373			709		0	234			<10		
7-19-89	15:10	5.18	27	21	7.4																	105					401			654		0	273					
9-25-89	13:55	5.23	22	13	7.5							11.9	0.94									158			20	<0.1	441			734		0	288		334	<10		
4-16-90	12:33	9.30	19	11	7.5																	91			26		411			651		0	241					
5-22-90	10:50	11.88	18	10	7.5																	76			49		307			646		0	221					
6-14-90	17:15	9.46	18	14	7.8							6.3										43			68	<0.1	344			654		0	236		245	<10		
7-23-90	18:15	4.05	18	16	7.8							13.0										84			44		385			755		1.2	268		276			
8-14-90	16:45	4.13	22	19	7.5							10.1										125			21	<0.1	447			739		4.4	232					
10-11-90	15:30	3.14	10	8	7.3							13.5			<0.1	0.15	<0.01			0.012		96			5.6	<0.1	379			828		6.1	268		309	<10		
4-24-91	12:25	4.83	13	8	7.8							16	<0.5		<0.2	0.34	0.010			0.052		188			8.0	<0.1	588					0	270		397	<10		
5-30-91	14:30	17.91	9	10.5	7.5							12.4	0.94		<0.2	0.346	0.011			0.102		54.6			61	<0.1	245			392		4.7	187		196	<10		
6-24-91	09:30	9.79	25	18	7.5							10.4										60			19	<0.1	297			377		4.8	234					
7-18-91	17:00	3.54	26	22	7.3							11.4										110			10	<0.1	395			648		5.8	271					
9-10-91	11:00	3.33	13	12	7.6							12.4	<0.5		<0.2	0.27	0.023			0.028		196			21	<0.1	550			918		0	316		386	<10		

DATE	ALUMINUM TOTAL MG/L	ANTIMONY TOTAL MG/L	ARSENIC TOTAL MG/L	BARIUM TOTAL MG/L	BERYLLIUM TOTAL MG/L	BORON TOTAL MG/L	CADMIUM TOTAL MG/L	CALCIUM TOTAL MG/L	CHLORIDE DISS. MG/L	CHROMIUM HEX. as CR MG/L	COBALT TOTAL MG/L	COPPER TOTAL MG/L	CYANIDE as CN MG/L	FLUORIDE DISS. MG/L	GERMANIUM TOTAL MG/L	IRON DISS. MG/L	IRON TOTAL MG/L	LEAD TOTAL MG/L	MAGNESIUM TOTAL MG/L	MANGANESE TOTAL MG/L	MERCURY TOTAL MG/L	MOLYBDENUM TOTAL MG/L	NICKEL TOTAL MG/L	POTASSIUM TOTAL MG/L	SELENIUM TOTAL MG/L	SILICA as SiO_2 MG/L	SILVER TOTAL MG/L	SODIUM TOTAL MG/L	ZINC TOTAL MG/L	VANADIUM TOTAL MG/L	SULFIDE as S MG/L	MAJOR CATIONS MEQ/L	MAJOR ANIONS MEQ/L	$\frac{C-A}{C+A} \times 100$	COMMENTS
4-25-89	<0.1						<0.01	66.4	25.9			<0.01					0.82	<0.01	29.4	0.022		<0.01	<0.01	1.4	0.0029			12.1	0.252		<0.1	6.29	5.27	8.82	
5-23-89								42.9	13.7										44.9					1.8				12.4				6.42	6.28	1.09	
6-7-89								38.6	18.3										45.1					3.1				15.6				6.40	6.39	0.04	
7-19-89								50.1	20.8										34.8					3.9				36.2				7.04	7.24	1.46	
9-25-89								69.9	24.2								0.503		50.2	0.040				5.2				24.1				8.80	8.69	0.62	
4-16-90								40.2	44										38.8					3.4				26.8				6.45	7.09	4.69	
5-22-90								49.2	11.8										25.1					2.0				11.8				5.09	5.54	4.26	
6-14-90								60.4	16.3							<0.01	1.17		24.6	0.050				2.4				10.3				5.55	5.22	3.01	
7-23-90								50.4	17.2										46.1					3.4				13.4				6.98	6.67	2.29	
8-14-90								55.1	18.0										47.9					4.3				14.8				7.44	7.06	2.66	
10-11-90	<0.1		<0.01	<0.01		0.17	<0.01	73.3	17.6	<0.01		<0.01		0.24		<0.01	0.175	<0.01	40.9	0.030	<0.0002	<0.01	<0.01	2.9	<0.002			12.9	<0.01		<0.1	7.66	7.11	4.13	
4-24-91	<0.1		<0.01	0.071		0.18	<0.01	70.8	86.7	<0.01		<0.01		0.23		0.044	0.532	<0.01	48.9	0.074	<0.0002	<0.01	<0.01	4.7	0.003			78.8	0.048		<0.5	11.10	10.78	1.46	
5-30-91	<0.1		<0.01	0.046		0.045	<0.01	54.2	15.4	<0.01		<0.01		0.139			1.27	<0.01	15.3	0.070	<0.0002	<0.01	<0.01	1.2	<0.002			21.4	0.015		<0.1	5.07	4.79	2.77	
6-24-91								54.0	14.8										17.5					1.6				23.6				5.20	5.66	4.23	
7-18-91								66.7	18.5										27.2					2.3				35.2				7.16	7.45	1.99	
9-10-91	<0.1		<0.01	<0.01		0.082	<0.01	86	19.8	<0.01		<0.01		0.14		0.012	0.075	<0.01	41.8	0.049	<0.0002	<0.01	<0.01	5.8	<0.005			49	<0.01		<0.2	10.02	9.84	0.87	

R-7-87

HANSEN ALLEN & LUCE INC
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station VC-2
Location Mud Creek (above Utah #2 Mine)

DATE	TIME	FLOW	TEMPERATURE AIR	TEMPERATURE WATER	pH	COLIFORM TOTAL	COLIFORM FECAL	FECAL STREP	C.O.D.	B.O.D.	T.O.C.	DISSOLVED OXYGEN	OIL & GREASE	PHENOL	NITROGEN AMMONIA as NH_3-N	NITROGEN NITRATE as NO_3-N	NITROGEN NITRITE as NO_2-N	NITROGEN TOTAL KJELDAHL	NITROGEN ORGANIC	PHOSPHATE TOTAL as PO_4-P	PHOSPHATE ORTHO as PO_4-P	SULFATE as SO_4	HYDROXIDE as OH	SURFACTANT as MBAS	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND.	TURBIDITY	CARBONATE ALK. as CO_3	BI-CARBONATE ALK. as HCO_3	TOTAL ALK. as $CaCO_3$	TOTAL HARDNESS as $CaCO_3$	ALPHA RADIO-ACTIVITY	BETA RADIO-ACTIVITY
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	ML/L	MG/L	MG/L	MG/L	μMHOS/CM	NTU	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
5-30-91	1530	17.91	9	10.5	7.5																									392								
9-10-91	11:00	3.33	13	12	7.6																									558								

DATE	ALUMINUM DISS.	ANTIMONY DISS.	ARSENIC DISS.	BARIUM DISS.	BERYLLIUM DISS.	BORON DISS.	CADMIUM DISS.	CALCIUM DISS.	CHLORIDE DISS.	CHROMIUM HEX as CR	COBALT DISS.	COPPER DISS.	CYANIDE as CN	FLUORIDE DISS.	GERMANIUM DISS.	IRON DISS.	IRON TOTAL	LEAD DISS.	MAGNESIUM DISS.	MANGANESE DISS.	MERCURY DISS.	MOLYBDENUM DISS.	NICKEL DISS.	POTASSIUM DISS.	SELENIUM DISS.	SILICA as SiO_2	SILVER DISS.	SODIUM DISS.	ZINC DISS.	VANADIUM DISS.	S.A.R.	NITRATE - NITRITE	COMMENTS
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L		MG/L	
5-30-91	<0.1		<0.01	<0.01		<0.02	<0.01			<0.01		<0.01				<0.01		<0.01			<0.0002	<0.01	<0.01		<0.002				<0.01				
9-10-91	<0.1		<0.01	<0.01		0.080	<0.01			<0.01		<0.01				0.012		<0.01			<0.0002	<0.01	<0.01		<0.005				0.014				