1996 Annual Summary Report

FOR

White Oak Mining & Construction Co., Inc.

ACT/007/001

SUBMITTED BY

White Oak Mining & Construction Co., Inc.
Scofield Route
Helper, Utah 84526

March 1996

White Oak Mining & Construction Co., Inc.

Scofield Route, Helper, Utah 84526
(801) 448-9420 - Fax # (801) 448-9456

RECEIVED
MAR 29 1996
DIV OF OIL, GAS & MINING

March 25, 1996

Mr. Lowell P. Braxton
State of Utah
Department of Natural Resources
Division of Oil, Gas & Mining
3 Triad Center
355 West North Temple
Salt Lake City, Utah 84180-1203

Re: Annual Summary Report 1996, ACT/007/001

Dear Mr. Braxton:

Please find enclosed one copy of the Annual Summary Report 1996. Should you have any questions, please call Steve Tanner at (801) 448-9413.

Sincerely,

Mark Wayment

Mark Wayment
Mine Manager

By
Steve Tanner

Enclosure:

FILENAME: C:\FILES\WP\125\ANUALRPT.96\125COVER.95

COAL MINING AND RECLAMATION OPERATIONS FOR 1995

(Must be submitted to the Division by April 2, 1996)

State of Utah
Department of Natural Resources
Division of Oil, Gas and Mining
3 Triad Center, Suite 350
355 West North Temple
Salt Lake City, Utah 84180-1203
(801) 538-5340

RECEIVED
MAR 29 1996
DIV OF OIL, GAS & MINING

Permittee: White Oak Mining & Construction Co., Inc.

Mine Name: White Oak Complex/Loadout Facility

Mailing Address: Scofield Route, Helper, Utah 84526

Company Representative: Mr. Mark Wayment (801) 448-9420; Fax: (801) 448-9456

Resident Agent: Mark Wayment (801) 448-9420; and copies to: Denise Dragoo 532-3333

Permit Number: ACT/007/001

MSHA ID Number: White Oak No. 1 Mine (42-01279) & White Oak Mine No. 2/Loadout Facility (42-01280)

Date of Initial Permanent Program Permit: 1981

Date of Permit Renewal: August 24, 1999

Quantity of Coal Mined (tonnage) 1995: 1,076,255

Attach Updated Mine Sequence Map(s) showing mine development through March 1996. (Same as Lease Royalty Payment Map and/or MSHA Progress Map)

The updated mine map entitled "White Oak #2 Mine Wall Map" has been included within Appendix E.

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

A. General

1. Anomalies, missing data, monitoring changes.

N/A

2. **Summary of corrective actions and results.**

N/A

B. Water Monitoring Data - Groundwater Summary

1. Mine Discharge

a. Monthly Discharges.

One mine discharge was reported to have occurred during 1995. Pond 005A was monitored on December 6, 1995 to have a discharge of 1.875 gpm. The discharge that was reported for this event is spring flow issuing from a location just inside the fan portal. The flow was incorrectly reported as mine discharge on the DMR report. This error in reporting has been rectified. In summary, no reportable mine discharge occurred during 1995.

b. Discussion of Last 5 Years.

No mine discharges have been recorded over the last five years except as noted previously.

c. Discussion of Trends.

No trends exist.

2. Springs

The annual spring depletion analysis has been completed for springs S7-11, S24-12, S25-13, S31-13, S36-7, S36-17, S36-19, and S36-23 which we have monitored for White Oak Mining & Construction during 1995. The locations of these springs are shown on Map R614-301-722.100a in the mine permit. Flow data for 1981 through 1995 have been plotted to show flow variations as sequential time plots (see Figures 1 through 8 included within Appendix B). The plots were used in our analyses of flow changes over time as discussed herein.

Since it is likely that there is correlation between spring flows and precipitation we present available annual precipitation records for local gaging stations over the period of record. The National Weather Service rainfall gaging station closest to the White Oak mine area is located in Nephi which is about 34 miles west of the White Oak mines. Average annual precipitation for the Nephi station is 14.53 inches per year. Table 1 provides a summary of total annual and percent of average precipitation for the Salt Lake City and Nephi stations. The average precipitation for Salt Lake City is 16.18 inches per year. Precipitation values recorded at the Nephi gaging station have been plotted as dropped bars on Figures 1 through 8 (see Appendix B) in order to make a better correlation with recorded spring flows. The Nephi station was chosen for this comparison over other stations because of its regional acceptance as a certified station.

It must be remembered that although data from the Nephi station provides an overall understanding of rainfall patterns it does not represent true localized conditions.

TABLE 1. ANNUAL PRECIPITATION (INCHES)

Location	Recorded Precipitation (in) / Percent of Average													Average Precipitation (in)
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
Nephi	24.16 / 166	19.11 / 132	16.83 / 116	20.65 / 142	12.30 / 85	12.79 / 88	13.06 / 90	12.69 / 87	13.93 / 96	12.01 / 83	18.52 / 127	17.25 / 119	16.65 / 115	14.53*
Salt Lake	20.58 / 127	23.82 / 147	17.26 / 107	23.40 / 145	10.71 / 66	9.94 / 61	10.99 / 68	10.88 / 67	15.61 / 96	12.18 / 75	19.25 / 119	15.14 / 94	16.34 / 101	16.18*

The records summarized in Table 1 show above average precipitation for the period of record from 1983 through 1995. Beginning in 1987 the precipitation was generally below average through 1992 while the period beginning in 1993 once again may be showing a shift to above average precipitation. Below average precipitation in recent years can be used to explain decreases in spring flows which have been noted at some spring locations. However, dramatic decreases in spring flow over short time periods such as is noted for Spring S24-12 cannot be explained using precipitation data alone.

Spring S7-11

Spring S7-11 is located near Monument Peak at the south edge of the mine permit boundary. The flow measured in 1994 and 1995 for the month of July shows that there may have been a decrease over the 1993 corresponding flow measurement, although the difference is well within the range of normal flow variation. Previous flows during the month of June have been projected to range between 0.0002 cfs to 0.003 cfs. Figure 1 (Appendix B) shows the recorded spring flows wherein little significant change in flow over time is noted. The "dry" observation in 1995 is not unusual for this spring. Two "dry" measurements were made in 1981, flows of 0.00001 cfs were measured in 1989 and 1993, and a "seep" was monitored in 1994 at this spring. The location of Spring S7-11 is believed to be beyond impacts from mining.

Spring S24-12

Spring S24-12 is located in the South Fork of Eccles Creek along the northwestern mine permit boundary. Flow data for this spring are shown in Figure 2 (Appendix B). The spring has been dry since the 1992 monitoring period. It is possible that mining has impacted this spring. Figure 1 (Appendix B) illustrates a fairly rapid and dramatic decrease in spring flows beginning in 1989 with some initial decrease in flows being detected as early as 1987 or 1988. It is important to note that no mining by White Oak has taken place in the area of this spring in several years.

As stated in previous reports, if Spring S24-12 receives recharge from the west side of the Connelville Fault it is possible that mining west of White Oak could be impacting the spring. Additional data related to adjacent mining operations (currently unavailable to White Oak) would be required to investigate this possibility more thoroughly.

Spring S25-13

Flow variations shown on Figure 3 (Appendix B) 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 have been large, perhaps indicating a small and possibly shallow recharge area. This is reasonable since the spring is located at a relatively high elevation west of the White Oak mine portals. A small and shallow recharge area may explain the unusually high flow measurement in early 1993 and low flow measurement later that same year of 0.00001 cfs. The low flow measurement is the lowest recorded flow at this spring since 1981. Monitoring since 1993 suggests that the reported 1993 low flow measurement may be an irregularity in measurement. Based on available data, normal seasonal variations during 1994 and 1995 ranging from 0.09 cfs to 0.0001 cfs have been realized. The data for this spring do not appear to be trending.

Spring S31-13

Spring S31-13 is located in Finn Canyon along the eastern mine permit boundary near the old Black Diamond Mine. This spring exhibits only moderate annual or seasonal fluctuations in flow as shown in Figure 4 (Appendix B). Flows measured in 1995 show moderate to high flows based on the period of record. It continues to appear that this spring responds to local precipitation as can be seen on the figure. Note that flow generally has been recorded at their highest levels during corresponding years of high precipitation.

Spring S36-7

Flow data for Spring S36-7 are plotted in Figure 5 (Appendix B) and for the relatively short period of record show a moderately narrow band of seasonal fluctuations. This spring is located in the headwaters of Boardinghouse Canyon and lies roughly at the midpoint between Springs S36-17 and S36-19. There do not appear to be any significant changes indicating mining impacts since the spring was added to the monitoring program in 1992. It is noted however that the low flows have consistently increased since 1993. Figure 5 shows no mining impacts on this spring.

Spring S36-17

Flow data for Spring S36-17 are plotted in Figure 6 (Appendix B) and show moderately wide annual as well as seasonal fluctuations. This spring is located in Boardinghouse Canyon well within the mine permit boundary. There do not appear to be any long term changes in spring flows shown on Figure 6 and therefore do not appear to be any significant long term trends in these data to indicate that mining has impacted the spring.

Spring S36-19

Spring S36-19 is located in Coal Canyon near the southern permit boundary. As shown in Figure 7 (Appendix B), flows recorded in 1995 have rebounded from those recorded in 1994,

and are once again similar to generalized flows recorded throughout time. The flow data for this spring do not show any significant trend over the period of record.

Spring S36-23

Spring S36-23 is located in the Middle Fork of Burnout Canyon near the western permit boundary. The flow data measured at this spring in 1995 have rebounded from those slightly lower flows recorded in 1994 (see Figure 8 in Appendix B). No long term trend is evident on Figure 8.

Conclusion

The data gathered to date for the springs being monitored at White Oak Mining & Construction Company generally do not appear to have established definable trends of increasing or decreasing flows, with the exception of Spring S24-12. Lower than normal flows measured from springs S36-19 and S36-23 which were identified last year appear to have been temporary. Variations in the data appear, at this time, to be generally random with spring flows responding to natural flow factors, including 1) variations in precipitation and 2) the delayed effects of recharge areas. As indicated last year, additional data would be required from other mining operations before a more thorough analysis of Spring S24-12 could be made to determine the influence mining has had upon its flows.

a. Seasonal Trends/changes.

Water quality records for each spring monitoring station are included within Appendix A. Although not completed to date, White Oak has committed to entering water quality data on computer beginning this year. Computerized data will allow both the Operator and the Division to evaluate water quality trends more closely. No water quality trends are known to exist currently which are related to mining activities.

b. Changes in Flow.

Flow records have been plotted as shown within Appendix B for both surface and ground water sources. Noted changes in flow rate for surface sources are discussed below. Flow variations for spring sources are discussed and referenced in section B.2. of this annual report.

3. Surface Water

Water quality records for each surface water monitoring station are included within Appendix A. Although not completed to date, White Oak has committed to entering water quality data on computer beginning this year. Computerized data will allow both the Operator and the Division to evaluate water quality trends more closely. No water quality trends are known to exist currently which are related to mining activities.

a. Comparison of Upstream vs. Downstream Flows.

A comparison of upstream and downstream flows was made between stations VC-1 and VC-2, and VC-4 and VC-5. VC-1 and VC-2 are located downstream and upstream respectively from the White Oak Loadout Facility. The charts included within Appendix

B show no identifiable impact from the loadout operation. Stations VC-4 and VC-5 are located upstream and downstream respectively from the White Oak mine complex. Flows over time show an influx of water below the mine site between the years 1983 and 1989 but little impact since 1990. Since mine discharges ceased in 1982 the increased flows are likely the influence of local watershed influence. No negative impacts are noted on stream flows through mine areas.

b. Discussion of Subsidence Effects.

To date there have been no identifiable impacts of subsidence on either water quality or quantity.

C. Summarized Water Monitoring Data

1. Monitoring Locations/monitoring Frequencies

Monitoring locations and sampling frequencies have not changed from those identified within the current permit. Sampling stations are identified on Map R645-301-722.100a and sampling frequencies are identified on Table 731.211a of the MRP.

2. UPDES Permit Number, Discharge Points and Locations.

The UPDES permit number is UT0022985. Discharge points and locations are shown on Map R645-301-722.100a for the five pond discharge points 001A, 002A, 003A, 004A, and 005A.

3. Summary of Findings.

4. DOS Based Water Quality Files and Format Description.

Water quality data is not available at this time on computer disk. White Oak will commit to begin entering water quality data on computer beginning with the 1996 water sampling year. Water flow data is however available and a copy of the disk is submitted herewith in Quattro Pro format.

D. Precipitation and Climatological Data.

Precipitation data for the Nephi weather station is shown on the surface and ground water data plots and in table form in the discussion included herein regarding spring depletion.

E. Subsidence Monitoring.

A discussion related to subsidence and the results of the annual pedestrian survey are included later in Section E.6.

1. Monitoring System.

Current subsidence monitoring is conducted using two separate methodologies. The first utilizes surveyed baselines shown on Map R645-301-728.100b and the second employs a pedestrian survey which visually traverses the mine area annually and records differences or

variations. The surveyed baselines are monitored in preparation for the five year permit renewal.

2. **Monitoring Points.**

   Monitoring points are shown on Maps R645-301-728.100a and R645-301-728.100b.

3. **Mapping.**

   Mapping identifying mine related subsidence include Maps R645-301-728.100a and R645-301-728.100b.

4. **List of Notified Owners or Occupants.**

   No owners and/or occupants of surface property and structures were mailed notifications six months prior to mining.

5. **Mining Sequence Changes.**

   N/A

6. **Subsidence Pedestrian Survey.**

Please find included within Appendix C a copy of the revised Subsidence Base and Survey Location maps related to the White Oak Mining and Construction Company property. These maps were prepared based upon authorization by White Oak to complete the pedestrian survey completed on September 6th and 7th, 1995. As will be noted from the tables shown herein and on Map R645-301-728.100a, little overall change was found between the 1994 and 1995 subsidence surveys except for some additional weathering of the subsidence features and a few extensions of cracks at localized areas. Some corrections have been made to the mapping and one new feature (#50) was added south of the White Oak mines.

As with last year, the "Magellan NAV 5000 Pro's" were used where possible to help locate and further refine the locations of subsidence features. Locations of some features were not defined due to heavy ground cover which limits the ability of the locator to obtain an adequate satellite fix. Over time the satellite locators have been unable to obtain a "fix" for those subsidence stations with an "N/A" in the location column.

Comments relative to each subsidence location noted on Map R645-301-728.100a are summarized in the following tables. Note that the vast majority of subsidence appears to be continuing the healing process through erosional filling and/or natural re-vegetation.

1995 SUBSIDENCE SURVEY LOG
TAGGED SITES

TAG NUMBER	DATE	COMMENT	LOCATION[1]	
			LAT	LONG
1	9/6/95	SLOPE FAILURE. CONTINUES TO WEATHER. WELL VEGETATED.	39'52.726"	11'54.631"
2	9/6/95	CONTINUES TO WEATHER. NO APPRECIABLE CHANGE	40'01.650"	11'54.159"
3	9/6/95	NO APPRECIABLE CHANGE	39'43"	11'20"
4	9/6/95	NO APPRECIABLE CHANGE	39'42.616"	11'10.749"
5	9/6/95	HEALING CONTINUES WITH SOME POSSIBLE EROSION.	39'47"	11'22"
6	9/7/95	NO FRESH MOVEMENT OBSERVED.	39'22.445"	11'20.087"
7	9/6/95	NO APPRECIABLE CHANGE	N/A	N/A
8	9/7/95	HOLE CONTINUES TO HEAL. SIMILAR TO LAST YEAR.	38'58"	11'26"
12	9/6/95	NO APPRECIABLE CHANGE	39'39.38	111'11.19"
13	9/6/95	CRACKS APPEAR TO HAVE WIDENED WITH STEEP SIDES.	39'42.539	11'25.167"
16	9/6/95	LITTLE CHANGE FROM 1994.	39'46.527"	11'46.804"
17	9/6/95	CONTINUES TO WEATHER AND HEAL AT FLAG.	39'47.441"	11'48.210"
18	9/6/95	CRACKS OBSERVED RUNNING PERPENDICULAR TO CONTOUR. WATCH DURING 1996.	40'00"	11'50"
19	9/6/95	SOME 6 IN DEEP, 8 FT LONG PARALLEL CRACKS 50 FT NORTH OF MARKED TREE, AND 15 FT DOWN HILL.	39'05.618"	11'46.506"
20	9/6/95	CONTINUES TO WEATHER. NO APPRECIABLE CHANGE	39'49"	11'15"
21	9/6/95	NO APPRECIABLE CHANGE	39'47"	11'15"
22	9/7/95	NO APPRECIABLE CHANGE	39'08"	11'48"
23	9/6/95	NO APPRECIABLE CHANGE	39'03.614"	11'32.964"
24	9/7/95	HOLE NOW APPROXIMATELY 3' DEEP.	39'02.788"	11'14.970"
25	9/7/95	POSSIBLE NEW EXTENSION TO WEST.	39'35.307"	11'10.981"
26	9/6/95	NO APPRECIABLE CHANGE	39'35.794"	11'17.138"
27	9/6/95	NO APPRECIABLE CHANGE	39'40.614"	11'24.120"
28	9/6/95	NO SUBSIDENCE LOCATED.	39'39.304"	11'09.672"
29	9/6/95	NO APPRECIABLE CHANGE	39'42.356"	11'09.083"
30	9/6/95	CONTINUES TO WEATHER. NO APPRECIABLE CHANGE	39'45"	11'09"
31	9/6/95	NO APPRECIABLE CHANGE	39'47"	11'09"
32	9/6/95	APPEARS TO BE HEALING WITH NO NEW MOVEMENT.	39'47.184"	11'25.196"
33	9/6/95	NO APPRECIABLE CHANGE	39'42.539"	11'25.167"
34	9/6/95	NO APPRECIABLE CHANGE	39'39.189"	11'21.319"
35	9/6/95	NO APPRECIABLE CHANGE	39'44"	11'11"
36	9/6/95	CRACK SHOWS SIGNIFICANT WEATHERING AND FILLING. NOW ONLY 3 FT DEEP.	39'44"	11'09"
37	9/6/95	CONTINUES TO WEATHER. NO APPRECIABLE CHANGE	39'48"	11'17"
38	9/6/95	HEALING VERY WELL.	39'49.256"	11'21.361"
39	9/6/95	CRACKS NOW ONLY 3 FT. DEEP.	39'27.855"	11'22.084"
40	9/7/95	WASH REMAINS ACTIVE DUE TO CONTINUED EROSION, SOURCE OF WHICH IS FROM UPPER ROADWAY.	39'11.679"	11'32.604"

TAG NUMBER	DATE	COMMENT	LOCATION[1]	
			LAT	LONG
41	9/7/95	HEALING WELL WITH GOOD VEGETATIVE COVER.	39'03"	12'23"
42	9/6/95	SOME HEALING. EROSION KEEPING SOME OF CRACK OPEN.	40'01"	11'52"
43	9/6/95	CRACK CONTINUES TO WEATHER.	39'55.119"	11'49.401"
44	9/6/95	CONTINUES TO WEATHER. KEPT OPEN BY ANIMAL ACTIVITY.	39'52.959"	11'48.144"
45	9/6/95	NO APPRECIABLE CHANGE	39'41"	11'09"
47	9/6/95	CRACK BECOMING DIFFICULT TO LOCATE.	39'40.00"	111'11.44"
49	9/6/95	100 FT NW OF TAG IDENTIFIED A CRACK 7 FT DEEP, 2 FT WIDE.	39'48"	11'08"
50	9/7/95	NEW EXTENSION APPROXIMATELY 3 FT DEEP, 2 TO 5 FEET WIDE, AND 100 YARDS LONG.	39'35"	11'15"
51	9/7/95	HOLE CONTINUES TO FILL WITH DEBRIS.	N/A	N/A
52	9/6/95	NO APPRECIABLE CHANGE	39'38"	11'22"
53	9/7/95	CONTINUES TO HEAL. LARGE ANIMAL BURROWS ARE KEEPING SOME SECTIONS OPEN.	39'15"	11'39"
54	9/6/95	WELL HEALED.	39'40"	11'13"
60	9/7/95	CONTINUES TO HEAL. VEGETATION CONTINUES TO GROW IN HOLE.	38'51"	11'17"

N/A - NOT AVAILABLE.
1 - LATITUDES ARE ALL AT 39°, LONGITUDES ARE ALL AT 111°.

SUBSIDENCE SURVEY LOG
NONTAGGED SITES

SITE NUMBER	DATE	COMMENT	LOCATION[1]	
			LAT	LONG
A	9/6/95	COULD NOT LOCATE	N/A	N/A
B	9/6/95	COULD NOT LOCATE	N/A	N/A
G	9/6/95	COULD NOT LOCATE	N/A	N/A
J	9/6/95	COULD NOT LOCATE	N/A	N/A
M	9/7/95	COULD NOT LOCATE	N/A	N/A
P	9/6/95	COULD NOT LOCATE	N/A	N/A

N/A - NOT AVAILABLE.
1 - LATITUDES ARE ALL AT 39°, LONGITUDES ARE ALL AT 111°.

F. Vegetation Test Plot Data

Vegetative test plots have been completed. No additional test plots are planned.

1. Test Plot Monitoring Data.

N/A

2. **Results of Seeding Efforts.**

N/A

3. **Qualitative Description of Interim or Final Vegetation.**

N/A

4. **Description of Seeding.**

N/A

G. Annual Impoundment Certification.

A pond certification report completed by Hansen, Allen & Luce, Inc. discussing items G.1., G.2. and G.6. is included within Appendix D. Other issues are as discussed.

1. **Appearances in Instability**

See Appendix D.

2. **Structural Weakness or Hazardous Conditions.**

See Appendix D.

3. **Depth and Elevation of Impoundment Waters.**

The depth and elevation of each impoundment was not completed as part of the annual Pond Certification report prepared by Hansen, Allen & Luce, Inc.. Ponds 001A, 002A and 003A are scheduled to be surveyed during the summer of 1996 at which time the information will be made available upon request to the Division. Pond 004A will be cleaned and resurveyed during the summer of 1996.

4. **Existing Storage Capacity.**

Storage capacities of each structure will be made available to the Division subsequent to cleaning during 1996 as indicated above.

5. **Existing or Required Monitoring Procedures and Instrumentation.**

No changes to existing or required monitoring procedures have been made subsequent to the preparation and submittal of the MRP, nor is any instrumentation required at any pond facility.

6. **Other Structural Stability Concerns.**

See Appendix D.

H. Annual Overburden.

N/A

1. **Location of Sample Site, Interval, Matrix.**

N/A

2. **Sampling Technique.**

N/A

3. **Laboratory Analysis.**

N/A

a. **Sample Date and Time.**

N/A

b. **Date and Time of Lab Analysis**

N/A

c. **Analytical Methods Employed.**

N/A

4. Summary of Findings.

N/A

I. Annual Report of Officers Submitted to Department of Commerce.

No change during 1995.

J. Other Information Required by Permit.

No other information is known to be required by the permit which is applicable to this section.

Appendix A
Water Quality Data

HI[illegible]EN & [illegible]CE inc
SALT LAKE CITY, UTAH

Location Mud creek below Ute mine

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 CONDUCTANCE (µMHOS/CM)	TURBIDITY (FTU)	CARBONATE ALK. as CO_3 (MG/L)	BICARBONATE 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)
4-26-95	12:00	6.33	12	8	8.6							11.0	<5		<0.4	0.263	0.018			0.061		230			37.2	<2	726			1030		<1	337		454			
5-25-95	11:40	26.91	7.5	4	8.2							9.4	7.68									72.6			365	1.0	377			630		4	252					
6-22-95	10:45	34.75	12	7	8.5							8.2										41			103	<0.2	280			407		2.0	197					
7-13-95	17:30	6.43	21	15	8.4							8.1	<5									93			62	<0.2	386			580		3	236					
10-18-95	14:25	6.78	13	11	8.5							10.4	<5		<0.4	0.42	0.014			0.05		246			15	<0.2	634			1034		<1	344		387			

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)	MANGANESE DISS. (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
4-26-95	0.199	<0.01				0.191	<0.01	97.2	74		<0.01					0.057	0.728	0.010	46.4	0.098	0.076	0.011		7.03	<0.04			87.1	0.026			12.680	12.404	1.101	
5-25-95								99.6	36.5								5.19		24.4	0.285				3.68				33.7				8.827	6.805	12.957*	*Does not balance due to high TSS. Raining
6-22-95								58	12.2								1.7		16	0.083				2.0				13				4.922	4.493	9.552	
7-13-95								67	21								1.0		26	0.079				3.4				27				6.801	6.497	2.288	
10-18-95	0.10		<0.02			0.4	<0.005	65.8	20			<0.01				<0.04	0.32	<0.01	43.0	0.03	0.03	0.03		6.6	<0.04			72.7	<0.02			10.18	11.33	5.30	

R-7-87

& EN Inc
SALT LAKE CITY, UTAH

Location Mud Creek above Ut 2 mine

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 KJELDHL 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	PHOSPHATE 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	BICARBONATE 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
4-26-95	11:10	6.77	11	7	8.4							10.0	<5		<0.4	0.306	0.020			0.035		243			20	<2	722			1184		<1	331		454			
5-25-95	11:00	24.66	6	5	8.1							8.6	7.32									75.4			435	1.25	383			605		3	261					
6-22-95	10:20	34.17	7	5	8.5							8.6										36			77	0.25	228			387		2.0	189					
7-13-95	16:50	13.44	18	14	8.4							8.8										106			62	<0.2	403			617		3	238					
10-18-95	13:45	5.84	13	10	8.2							10.2			<0.4	0.48	0.019			0.08		251			23	<0.2	670			1104		<1	377		402			

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 HEXas 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	MANGANESE DISS. 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
4-26-95	0.142	<0.01				0.178	<0.01	99.9	73.6		<0.01					0.057	0.504	<0.01	49.0	0.089	0.072	<0.01		7.46	<0.04			91.4	0.024			13.214	12.546	2.516	
5-25-95								102	34.5								5.68		25.4	0.30				3.89				33.5				9.053	6.921	13.346	* Raining * Does not balance due to high TSS
6-22-95								53	11.7								1.3		15	0.065				1.8				12				4.519	4.244	3.142	
7-13-95								69	19								0.97		27	0.076				3.6				30				7.117	6.744	2.692	
10-18-95	0.21		<0.02			0.4	0.006	74.8	19			<0.01				<0.04	0.49	<0.01	45.5	0.05	0.03	<0.01		7.1	<0.04			79.3	<0.02			11.16	11.95	3.40	

R-7-87

HA[illegible]EN & [illegible] Inc
SALT LAKE CITY, UTAH

Location Whiskey Gar[illegible] Creek above Bu[illegible] line

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	FLUORIDE as F	SOLIDS TSS	SOLIDS TOTAL SETTLEABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPEC. 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	MG/L	MG/L	MG/L	MG/L	µMHOS/CM	FTU	MG/L	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
4-26-95	09:10		Inaccessible																																				
5-25-95	14:45	0.167	5	3	8.2							10.6	6.22									5.1			15	<0.2	98			213		<1	95		96.3			
6-22-95	12:20	0.167	12	9	8.4							8.4										<1			11	<0.2	60			104		<1	66					
7-13-95	15:50	0.039	15	10	8.0							7.3										<5			19	<0.2	96			142		<1	83					
10-18-95	12:30	0.001	10	6	7.8							10.4			<0.4	<0.02	0.007			0.13		7			<2.5	<0.2	186			332		<1	215		180			

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	MANGANESE DISS.	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		
4-26-95																																			Covered with Snow
5-25-95								27.5	1.01							0.211	0.941		5.21	0.019	<0.01			1.15				0.995				1.925	1.692	6.448	Rain & Snow
6-22-95								18	1.5								0.44		3.3	0.010				<1				<1				1.194	1.124	3.007	
7-13-95								24	4								0.64		4.3	0.017				0.72				0.88				1.643	1.473	5.453	
10-18-95	0.03		<0.02			<0.1	<0.005	53.9	1			<0.01				<0.04	<0.04	<0.01	10.6	<0.01	<0.01	0.02		1.2	<0.04			1.2	<0.02			3.65	3.70	0.70	

R-7-87

SALT LAKE CITY, UTAH

Location Whiskey Creek below 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
		CFS	°C	°C		MPN	MPN	MPN	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
4-26-95	09:20	-0-												
5-25-95	14:00	1.24	4	2	8.1							9.4	7.71	
6-22-95	13:25	0.58	13	12	8.9							7.4	<5	
7-13-95	16:30	0.10	15	15	8.8							8.1	<5	
10-18-95	13:05	0.003	9	2	8.4							11.6	<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	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
	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
4-26-95																								
5-25-95								50.6			139	0.2	426			765		1	183		237			
6-22-95								29			25	<0.2	322			456		5	153					
7-13-95								71			4.0	<0.2	529			769		5	194					
10-18-95	<0.4	0.21	0.010			0.11		117			3.0	<0.2	758			1326		4	267		410			

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
4-26-95														
5-25-95								74.1	119					
6-22-95								49	49					
7-13-95								85	103					
10-18-95	0.06		<0.02			0.1	<0.005	96.5	221			<0.01		

DATE	GERMANIUM TOTAL	IRON DISS.	IRON TOTAL	LEAD TOTAL	MAGNESIUM TOTAL	MANGANESE TOTAL	MANGANESE DISS.	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	$\frac{C-A}{C+A} \times 100$
	MG/L	MG/L	MG/L	MG/L	MG/L	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	
4-26-95																				
5-25-95		0.103	2.42		18.3	0.100	0.013			2.37				61.4				8.069	7.443	4.032
6-22-95			0.16		13	0.011				1.3				23				4.558	4.660	-1.115
7-13-95			0.14		23	<0.01				2.1				53				8.501	7.730	4.749
10-18-95		<0.04	0.08	<0.01	31.7	<0.01	<0.01	<0.01		2.4	<0.04			99.3	<0.02			11.82	13.18	5.50

COMMENTS

R-7-87

LEN & CE Inc
SALT LAKE CITY, UTAH

Location South Fo Eccles Creek
above Ec 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
4-26-95	09:10	-0-												
5-25-95	13:35	2.68	7	2	8.1							8.5	<5	
6-22-95	11:15	3.32	9	5	8.7							8.2		
7-13-95	16:10	0.96	16	16	8.3							8.1		
10-18-95	15:25	0.12	13	4	8.1							10.9		

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
	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L	MG/L
4-26-95										
5-25-95	<0.4	0.11	0.008			0.07		50		
6-22-95								17.1		
7-13-95								12		
10-18-95								2.6		

DATE	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
	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
4-26-95														
5-25-95	32	<0.2	230			383		2	216		205			
6-22-95	23	<0.2	188			333		1.0	196					
7-13-95	27	<0.2	278			266		3	238					
10-18-95	6.5	<0.2	292			530		<1	279		281			

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
4-26-95														
5-25-95								63.3	2.03					
6-22-95								54	7.6					
7-13-95								70	6.5					
10-18-95	0.09		<0.02			<0.1	<0.005	77.5	3			<0.01		

DATE	GERMANIUM TOTAL	IRON DISS.	IRON TOTAL	LEAD TOTAL	MAGNESIUM TOTAL	MANGANESE TOTAL	MANGANESE DISS	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	C-A / C+A ×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		
4-26-95																					
5-25-95		0.060	0.574		14.6	0.025	<0.01			1.30				1.83				4.505	4.020	5.684	Snowing
6-22-95			0.36		11	0.015				<1				1.8				3.698	3.710	-0.162	
7-13-95			0.12		17	0.013				1.2				2.2				5.025	4.725	3.074	
10-18-95		<0.04	0.29	<0.01	25.2	0.05	0.04	<0.01		1.4	<0.04			2.5	<0.02			6.11	5.70	-3.50	

R-7-87

HALGREN & ASSOCIATES INC
SALT LAKE CITY, UTAH

WAT QUA DA

STATIC

Location Boarding Creek above houses

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
4-26-95	09:00		Inaccessible											
5-25-95	12:15	2.14	6	4	8.2							10.2	5.3	
6-22-95	08:25	5.48	7	4	8.3							11.2		
7-13-95	08:55	1.38	12	7	7.7							9.6		
10-18-95	10:30	0.27	12	3	7.6							10		

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	SPECIFIC COND.	TURBIDITY	CARBONATE ALK. as CO_3	BICARBONATE 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
4-26-95																								
5-25-95	<0.4	0.05	0.007			0.04		23			<2.5	<0.2	262			292		<1	173		146			
6-22-95								12.9			22	<.2	154			234		<1	144					
7-13-95								9.1			14	<0.2	138			234		<1	198					
10-18-95								14			19	<0.2	224			330		<1	198					

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	MANGANESE DISS.	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	C-A / C+A × 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		
4-26-95																																			Covered with Snow
5-25-95								49.7	2.53							0.049	0.466		10.6	0.021	<0.01			1.11				2.05				3.495	3.175	4.797	
6-22-95								40	1.5								0.33		8.1	0.013				1.1				1.8				2.787	2.582	3.630	
7-13-95								54	12								0.32		12	0.017				0.94				2.1				3.815	3.875	-0.779	
10-18-95	<0.02		<0.02			<0.1	<0.005	69.5	4			<0.01				<0.04	0.29	<0.01	22.5	<0.01	<0.01	0.02		1.4	<0.04			2.8	<0.01			5.49	5.44	-0.40	

R-7-87

HANSEN & LOVE Inc
SALT LAKE CITY, UTAH

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tion VC-

Location Finn Cany 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	NITRATE as NO_3-N	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 RETRIEVABLE SOLIDS	SOLIDS T.D.S.	SOLIDS TOTAL SOLIDS	SOLIDS TOTAL VOLATILE SOLIDS	SPECIFIC COND.	TURBIDITY	CARBONATE ALK. as CO_3	BICARBONATE 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	MG/L	MG/L	MG/L	MG/L	µMHOS/CM	FTU	MG/L	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
4-26-95	08:55		In-accessible																																			
5-25-95	10:10	0.88	5	4	7.6							10.0	5.35									10.2			16	<0.2	197			296		1	192		198			
6-22-95	09:20	2.78	7	5	8.4							10.1										6.7			27	<0.2	130			194		<1	120					
7-13-95	08:20	0.26	11	7	6.2							9.2										8.8			63	<0.2	164			255		<1	158					
10-18-95	09:22	-0-																																				

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	MANGANESE DISS.	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		
4-26-95																																			Covered with Snow
5-25-95								52.9	1.01							0.063	0.405		12.4	0.012	<0.01			0.821				1.80				3.782	3.421	5.006	
6-22-95								34	1.0								0.81		7.1	0.027				<1				1.5				2.391	2.135	5.660	
7-13-95								45	<1								0.77		9.6	0.028				0.86				1.8				3.178	2.773	6.811	
10-18-95																																			

R-7-87

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	PHOSPHORE TOTAL as PO_4-P	PHOSPHORE ORTHO as PO_4-P	SULFATE as SO_4	CHLORIDE as Cl	FLUORIDE as F	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
4-26-95	09:00		In-accessible																																				
5-25-95	13:00		In-accessible																																				
6-22-95	09:00		In-accessible																																				
7-13-95	11:00	0.037	12	4	8.0										<0.4	0.595	<0.005			0.345		5					78			136		<1	65		65			
10-18-95	17:55	-0-																																					

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	MANGANESE DISS.	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		
4-26-95																																			Road Impassible
5-25-95																																			Road Impassible
6-22-95																																			Road Impassible
7-13-95	0.404		<0.04			<0.05	<0.01	20.7	7			<0.01				0.087	0.285	<0.2	3.13	<0.01	<0.01	<0.01		0.36	<0.04			1.43	<0.01			1.37	1.38	-0.372	
10-18-95																																			

R-7-87

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SALT LAKE CITY, UTAH

VATE QUAI DAI

Station [illegible]

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	NITRATE as NO_3-N	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 $CaCO_3$	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
4-26-95	09:00		In-Accessible																																			
5-25-95	13:00		In-accessible																																			
6-22-95	12:00	-0-																																				
7-13-95	16:25	-0-																																				
10-18-95	15:40	-0-																																				

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	MANGANESE DISS.	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		
4-26-95																																			Road Impassible
5-25-95																																			Road Impassible
6-22-95																																			
7-13-95																																			
10-18-95																																			

R-7-87

[illegible] LEN & [illegible]CE Inc
SALT LAKE CITY, UTAH

VATE QUAL DAI

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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 $CaCO_3$	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
4-26-95	09:00		In-Accessible																																			
5-25-95			In-accessible																																			
6-22-95	12:25	0.033	12	6	7.5																	<5					102			59		<1	36		57.9			
7-13-95	15:15	0.037	16	6	7.3										<0.4	0.150	<0.005			0.099		<5					50			86		<1	46					
10-18-95	11:50	0.002	6	7	7.5										<0.4	0.24	0.007			0.11		7					120			280		<1	154		132			

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	MANGANESE DISS.	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		
4-26-95																																			Road Impossible
5-25-95																																			Covered with Snow
6-22-95								12	1.0							0.16	1.4		1.7	0.042	<0.01			<1				0.62				0.774	0.618	11.203	Snow bank Runoff
7-13-95	0.496	<0.04				<0.05	<0.01	13.9	3			<0.01				0.066	0.466	<0.02	1.8	0.013	<0.01	<0.01		0.62	<0.04			0.58	0.013			0.886	0.841	2.627	
10-18-95	0.09		<0.02			<0.1	<0.005	39.5	2			<0.01				<0.04	0.18	<0.01	5	0.02	<0.01	<0.01		0.5	<0.04			1.1	<0.02			2.46	2.73	5.10	

R-7-87

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SALT LAKE CITY, UTAH

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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	NITRATE as NO_3-N	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. CO_3	BICARBONATE 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	FTU	MG/L	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
4-26-95	09:00		In Accessible																																			
5-25-95	13:00		In Accessible																																			
6-22-95	08:50	0.094	0	5	7.4																	5.6					262			307		<1	241		195			
7-13-95	11:50	0.026	16	5	7.2										<0.4	0.435	<0.005			0.024		22					212			403		<1	214					
10-18-95	17:18	0.002	7	7	7.0										<0.4	0.64	<0.005			0.03		30					276			491		<1	293		274			

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	MANGANESE DISS.	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		
4-26-95																																			Road Impassible
5-25-95																																			Road Impassible
6-22-95								65	5.6							0.089	0.15		9.2	<0.01	<0.01			<1				1.8				4.084	4.225	-1.696	
7-13-95	0.047		<0.04			<0.05	<0.01	61.6	<1			<0.01				0.027	0.031	<0.02	15.2	<0.01	<0.01	<0.01		1.08	<0.04			1.39	0.012			4.414	3.973	5.266	
10-18-95	<0.02		<0.02			<0.1	<0.005	80.2	2			<0.01				<0.04	<0.04	<0.01	21.5	<0.01	<0.01	0.03		1.0	<0.04			1.7	<0.02			5.87	5.49	-3.30	

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SALT LAKE CITY, UTAH

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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 $CaCO_3$	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	FTU	MG/L	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
4-26-95	09:00		In-Accessible																																				
5-25-95	13:00		In-Accessible																																				
6-27-95	08:00		In-Accessible																																				
7-13-95	13:27	0.045	14	5	7.3										<0.4	0.103	<0.005			0.050		7.2					92			170		<1	92		88			
10-19-95	16:05	0.004	6	3	7.7										<0.4	0.39	0.006			0.10		7					192			376		<1	218		185			

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	MANGANESE DISS.	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		
4-26-95																																			Road Impassible
5-25-95																																			Road Impassible
6-27-95																																			Road Impassible
7-13-95	0.218		<0.04			<0.05	<0.01	29.4	10			<0.01				0.096	0.184	<0.02	3.46	<0.01	<0.01	<0.01		0.86	<0.04			1.83	0.011			1.859	1.942	-2.184	
10-19-95	<0.02		<0.02			0.1	<0.005	53.7	3			<0.01				<0.04	0.05	0.010	8.0	<0.01	<0.01	<0.01		0.6	<0.04			2.1	<0.02			3.45	3.81	5.00	

R-7-87

WATT QUAI DA

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Location

SALT LAKE CITY, UTAH

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	NITRATE as NO_3-N	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 $CaCO_3$	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	FTU	MG/L	MG/L	MG/L	MG/L	MG/L	pCi/L	pCi/L
4-26-95	09:00		In-Accessible																																			
5-26-95	13:00		In-Accessible																																			
6-22-95	08:00		In-Accessible																																			
7-13-95	09:50	0.044	13	5	7.7										<0.4	0.375	<0.005			0.032		7.3					225			450		<1	269		246			
10-18-95	11:05	0.006	17	7	7.8										<0.4	0.45	0.008			0.18		8					224			491		<1	311		265			

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	MANGANESE DISS.	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		
4-26-95																																			Road Impassible
5-26-95																																			Road Impassible
6-22-95																																			Road Impassible
7-13-95	0.036		<0.04			<0.05	<0.01	78.9	7			<0.01				0.052	0.068	<0.02	11.8	<0.01	<0.01	<0.01		0.51	<0.04			1.96	0.018			5.009	4.764	2.505	
10-18-95	0.25		<0.02			0.1	<0.005	70.9	2			<0.01				<0.04	0.52	<0.01	11.2	<0.01	<0.01	<0.01		0.6	<0.04			1.7	<0.02			4.61	5.33	7.30	

R-7-87

LEN & CE Inc
SALT LAKE CITY, UTAH

WATER QUALITY DATA

Station 3 27
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 $CaCO_3$	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
4-26-95	09:00		In-Accessible																																			
5-25-95	13:00		In-Accessible																																			
6-22-95	08:00		In-Accessible																																			
7-13-95	12:40	0.020	15	3	6.7										<0.4	0.219	<0.005			0.063		5.9					80			157		<1	83		77			
10-18-95	16:45	0.002	6	4	7.8										<0.4	0.35	0.010			0.10		<5					142			281		<1	174		141			

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	MANGANESE DISS.	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		
4-26-95																																			Road Impassible
5-25-95																																			Road Impassible
6-22-95																																			Road Impassible
7-13-95	0.265		<0.04			<0.05	<0.01	26.9	<1			<0.01				0.075	0.162	<0.02	2.39	<0.01	<0.01	<0.01		0.39	<0.04			0.98	0.010			1.596	1.487	3.532	
10-18-95	0.15		<0.02			<0.1	<0.005	49.3	2			<0.01				<0.04	0.19	<0.01	4.9	0.01	<0.01	<0.01		0.6	<0.04			1.3	<0.02			2.96	2.91	-0.80	

R-7-87

SALT LAKE CITY, UTAH

WEEKLY SALT DATA

Station 33 B

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)
4-26-95	09:00		In-Accessible																																			
5-25-95	13:00		In-Accessible																																			
6-27-95	08:00		In-Accessible																																			
7-13-95	14:00	0.008	12	4	6.5										<0.4	0.560	<0.005			0.030		6.5					185			304		<1	205		180			
10-18-95	13:20	0.005	7	5	6.7										<0.4	0.57	0.009			0.05		6					224			392		<1	262		216			

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)	MANGANESE DISS. (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
4-26-95																																				Road Impassible
5-25-95																																				Road Impassible
6-27-95																																				Road Impassible
7-13-95	0.070		<0.04			0.050	<0.01	59.9	<2			<0.01				0.040	0.049	0.021	7.36	<0.01	<0.01	<0.01		0.52	<0.04			1.81	<0.01			3.689	3.504	2.565	Spring damage over Winter
10-18-95	0.02		<0.02			<0.1	<0.005	73.3	2			<0.01				<0.04	<0.04	<0.01	9.0	<0.01	<0.01	<0.01		0.5	<0.04			1.8	<0.02			4.49	4.49	0.00	Spring Repaired - Flow From pipe only - Seepage Around pipe not measured

R-7-87

Appendix B
Stream and Spring Flow Data

Figure 1

S7-11 Flow History

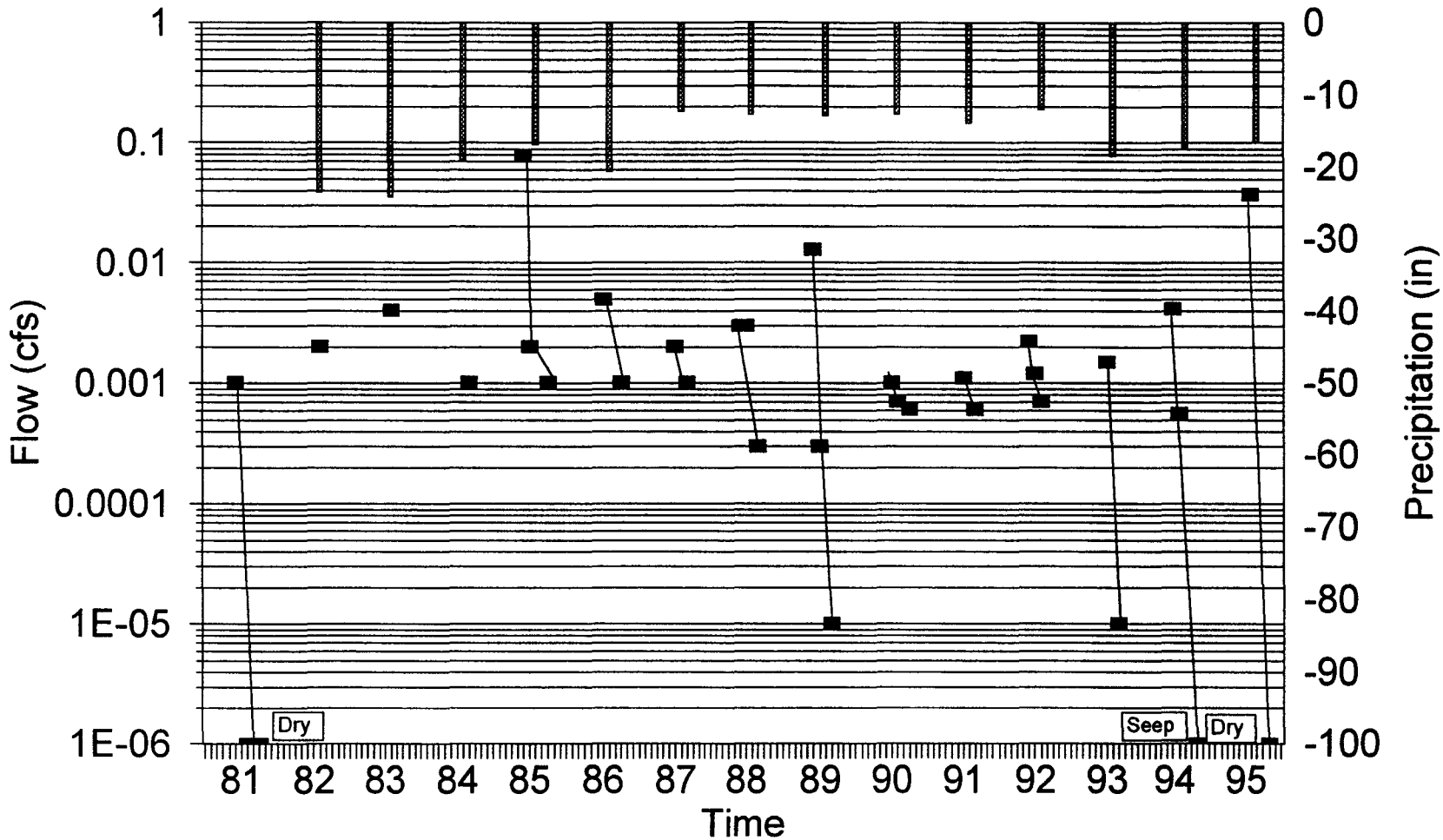


Figure 2

S24-12 Flow History

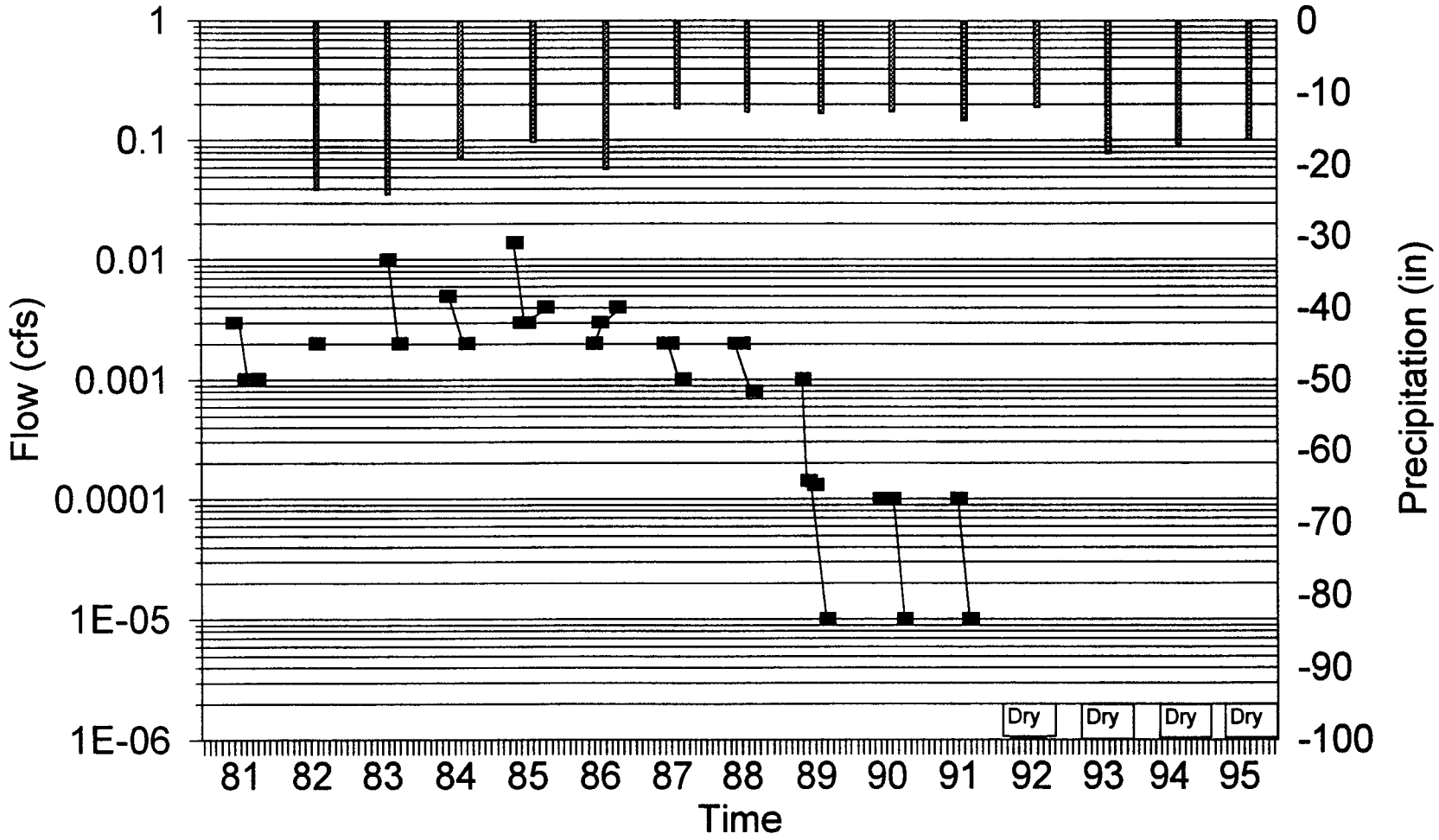


Figure 3

S25-13 Flow History

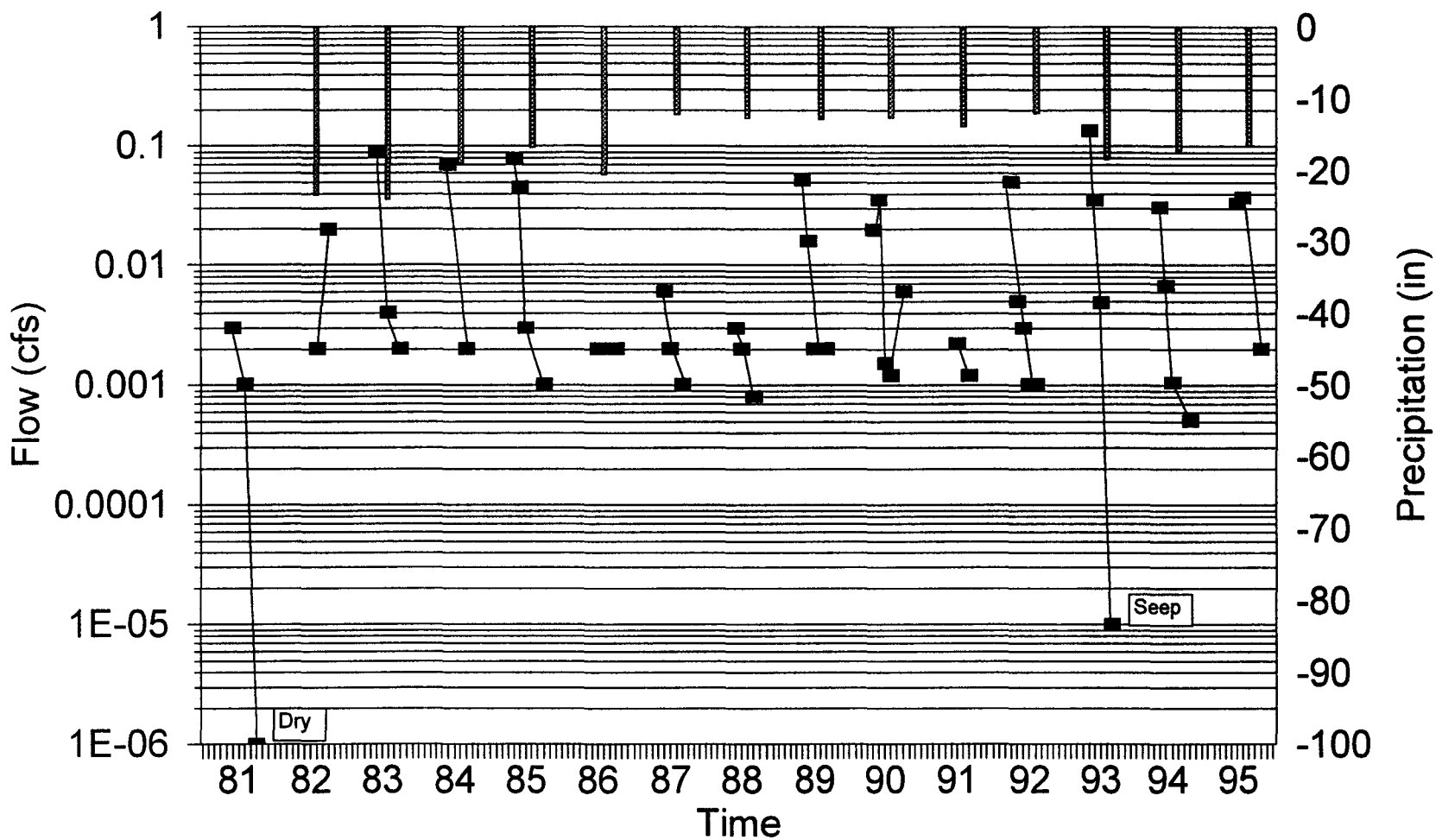


Figure 4

S31-13 Flow History

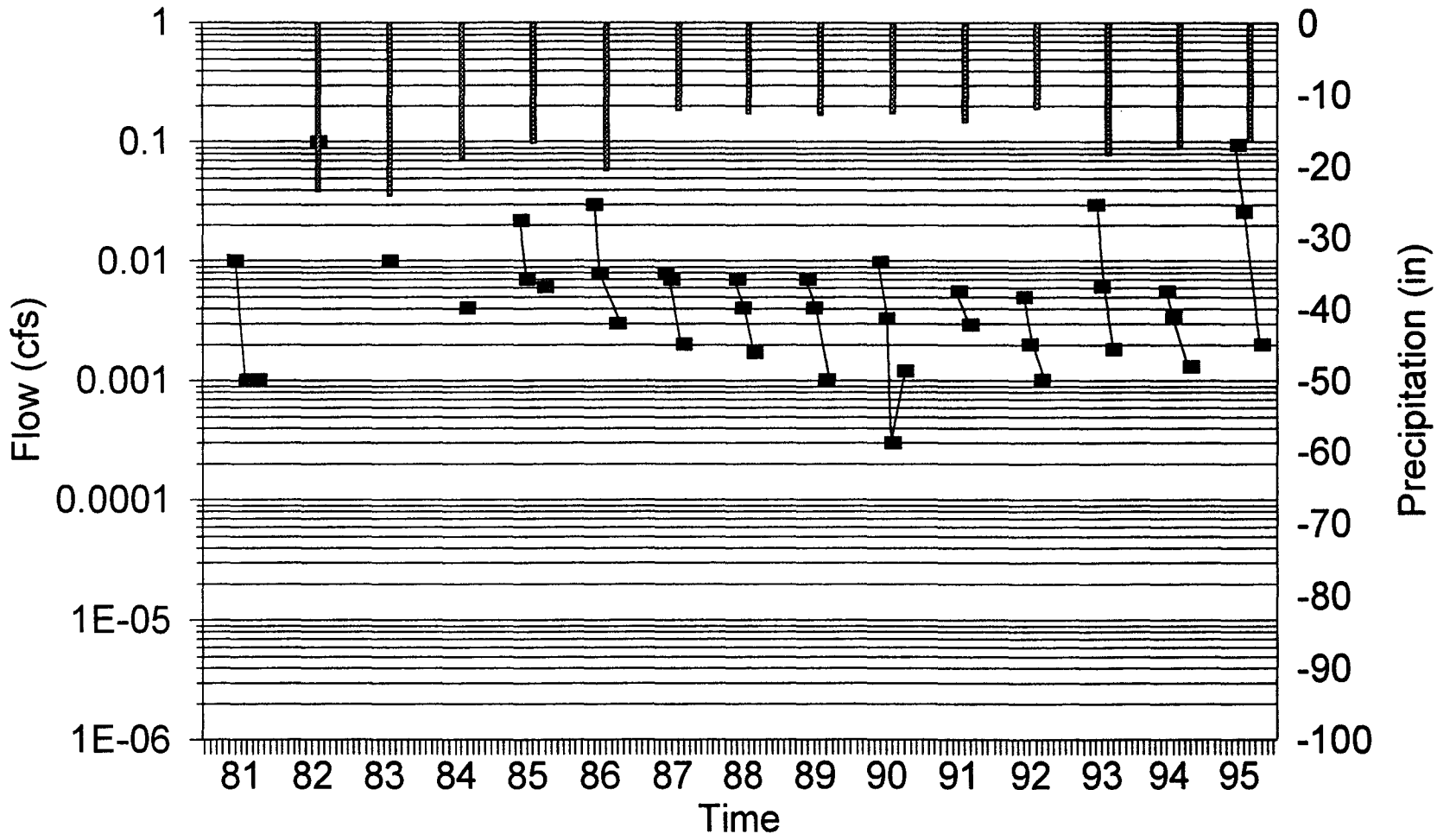


Figure 5

S36-7 Flow History

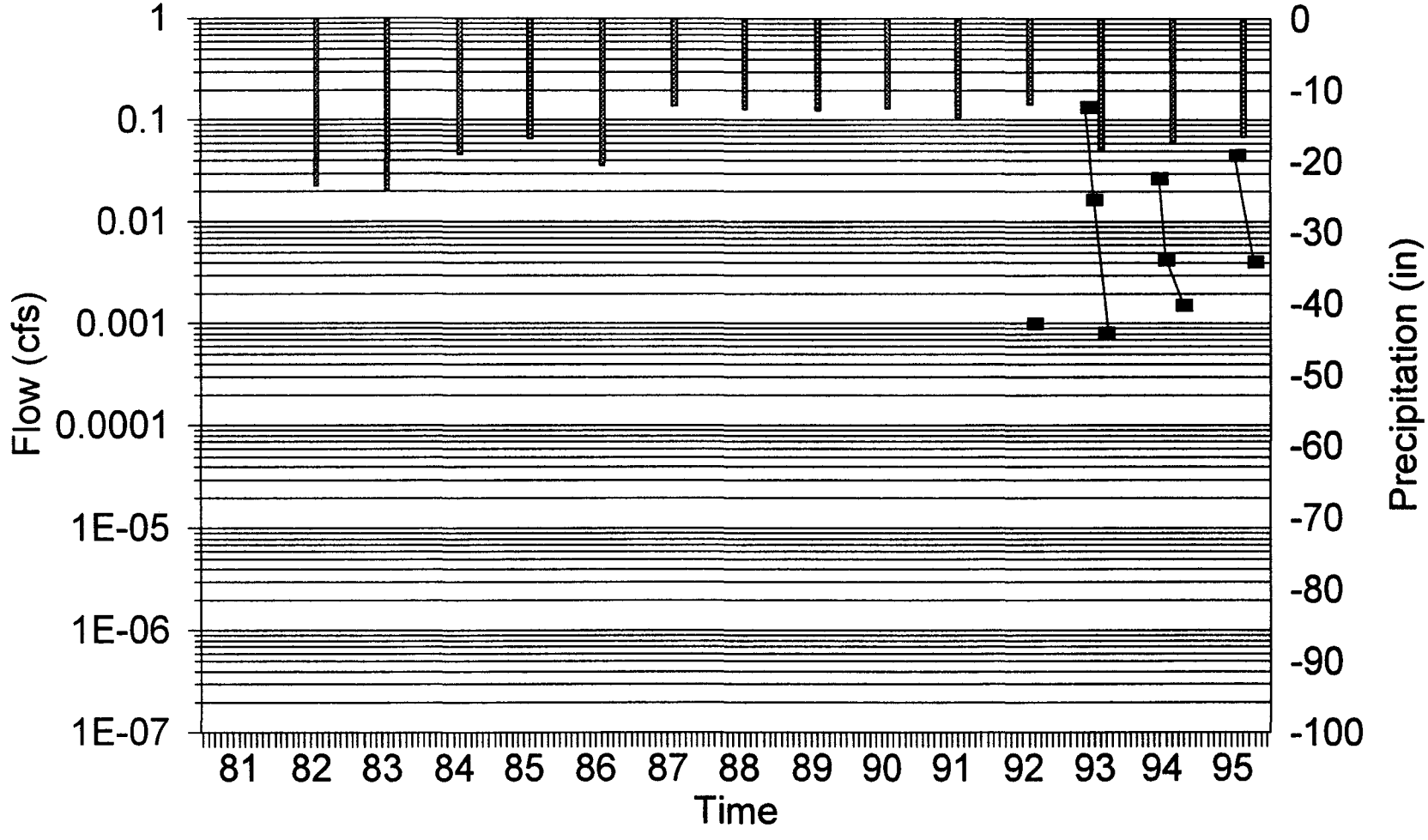


Figure 6

S36-17 Flow History

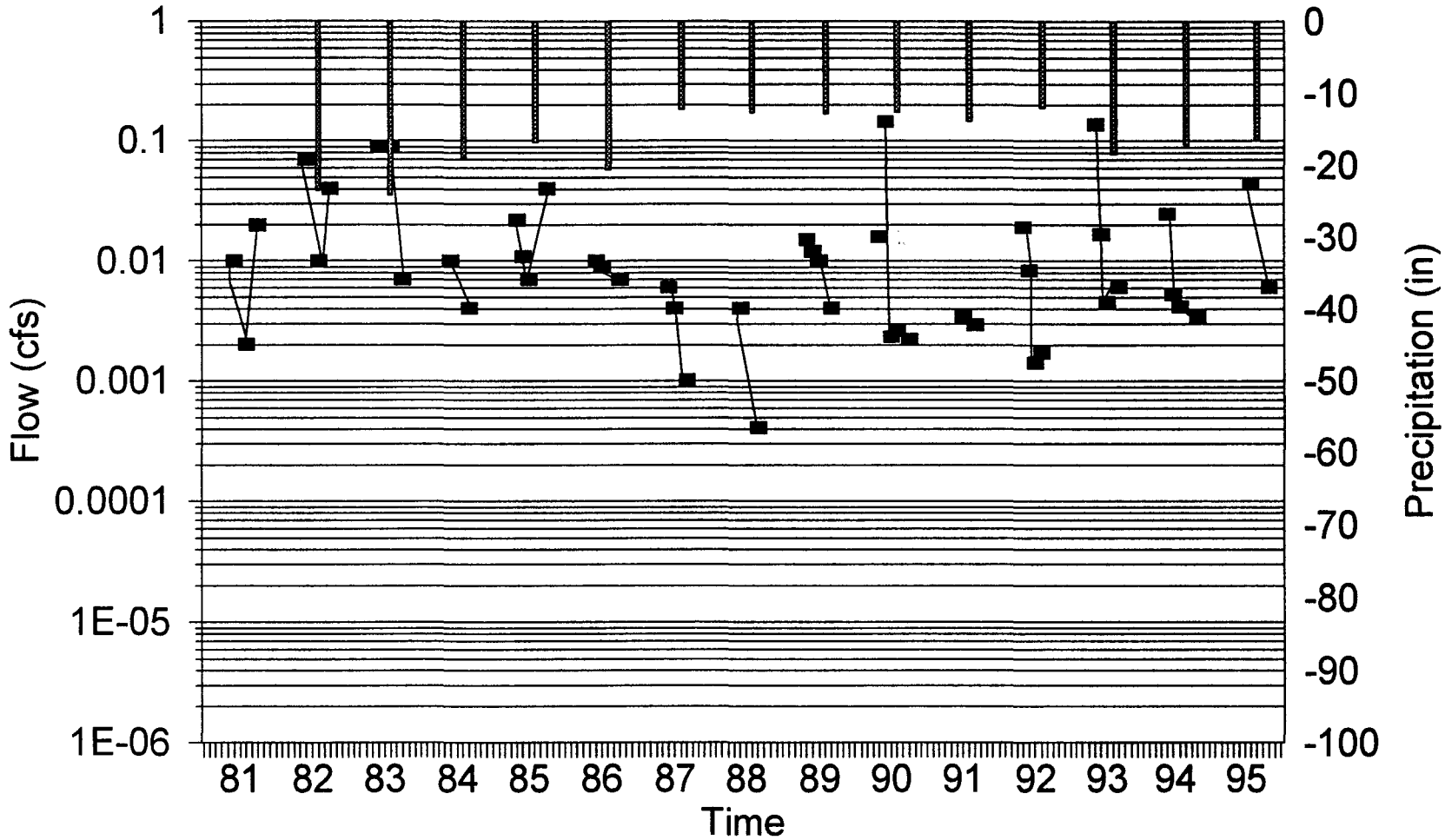


Figure 7

S36-19 Flow History

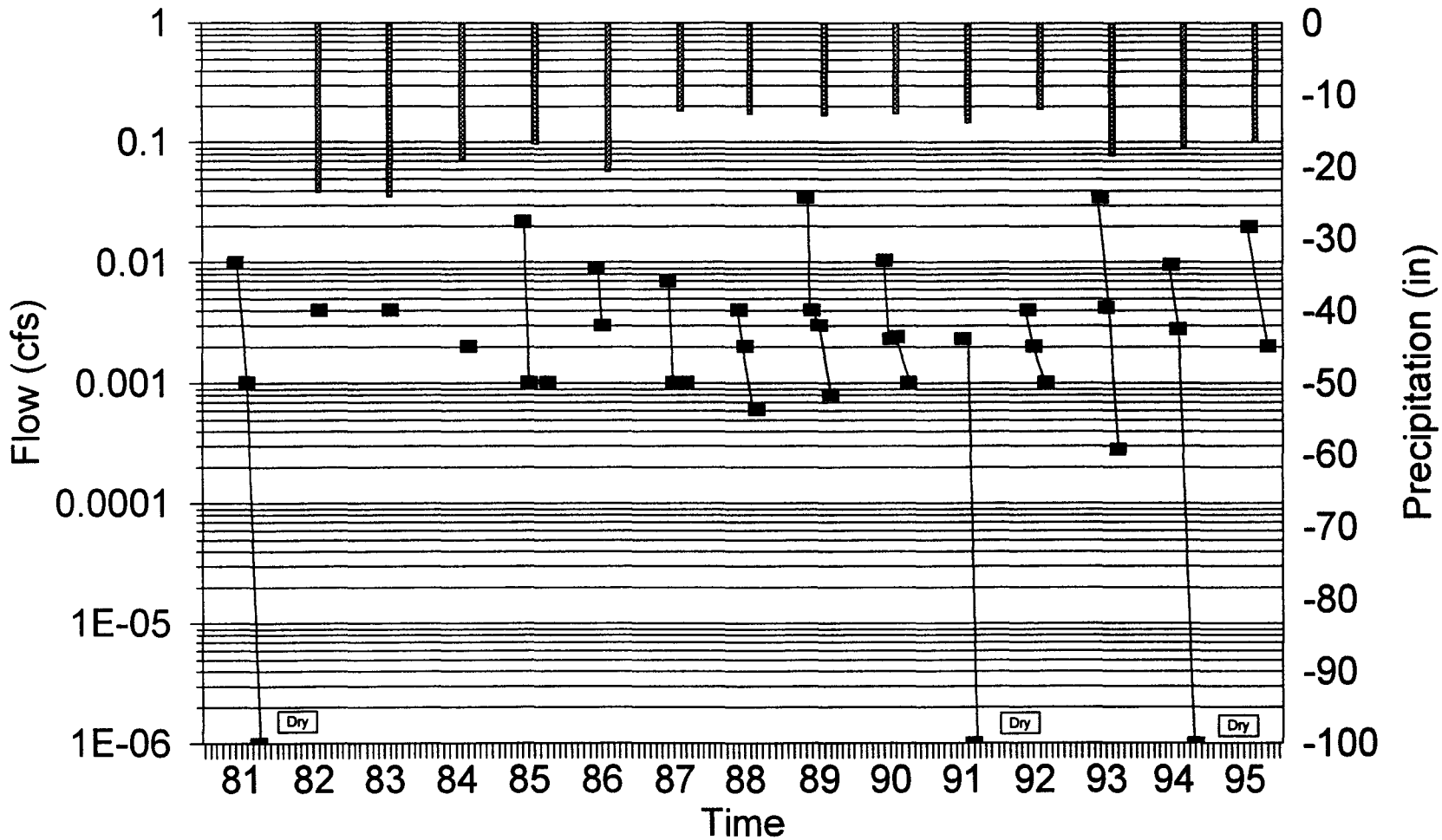
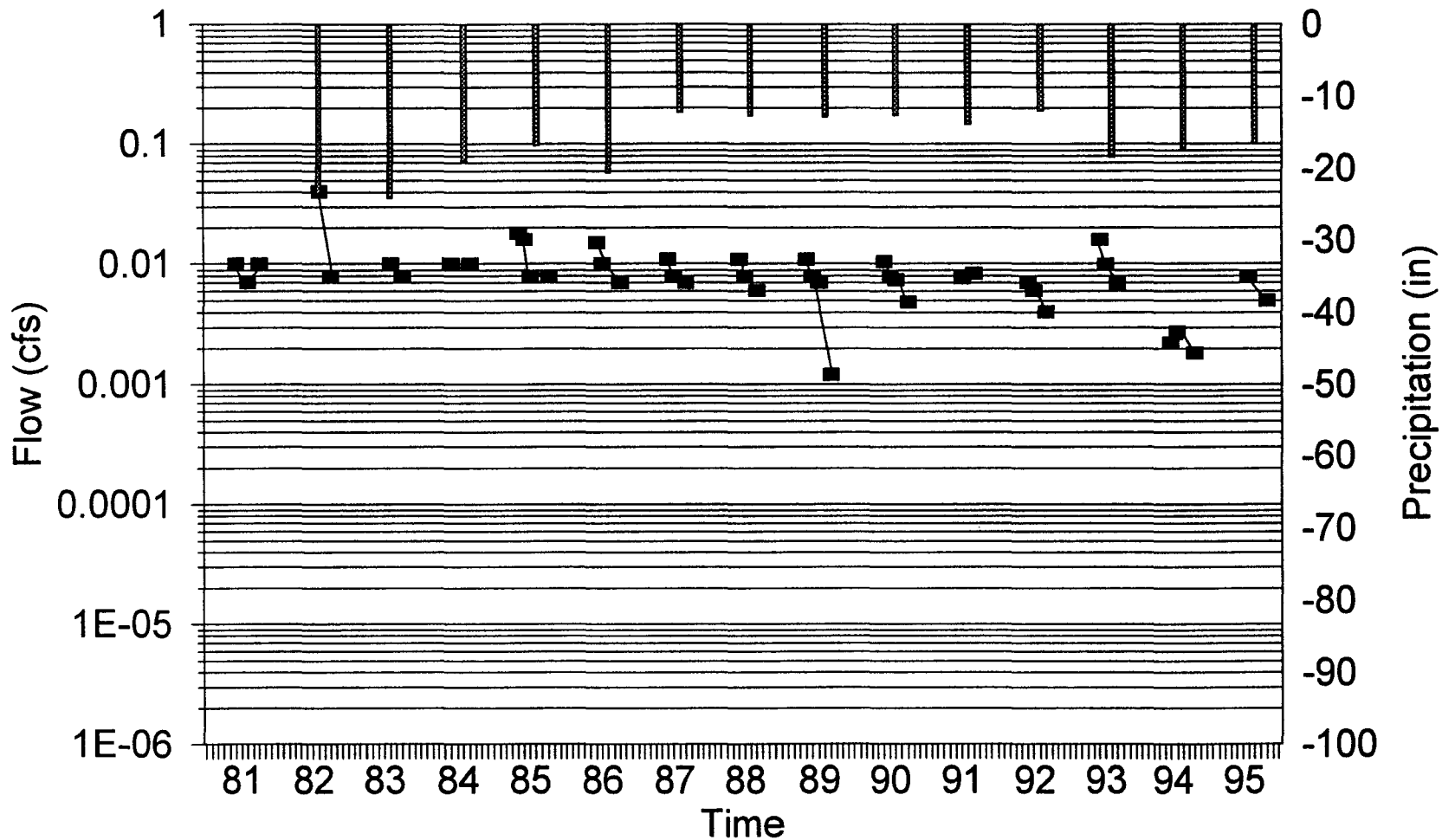
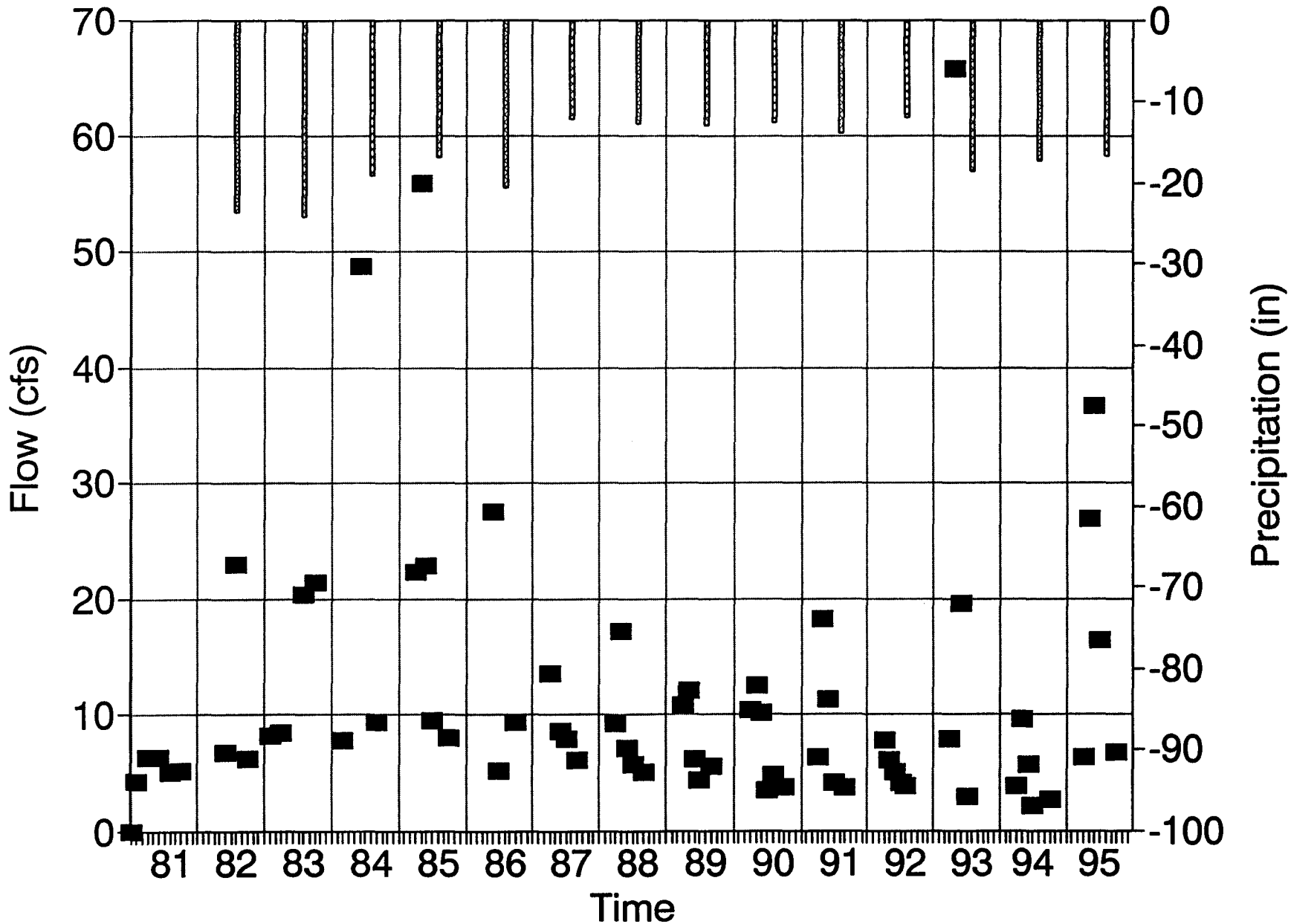


Figure 8

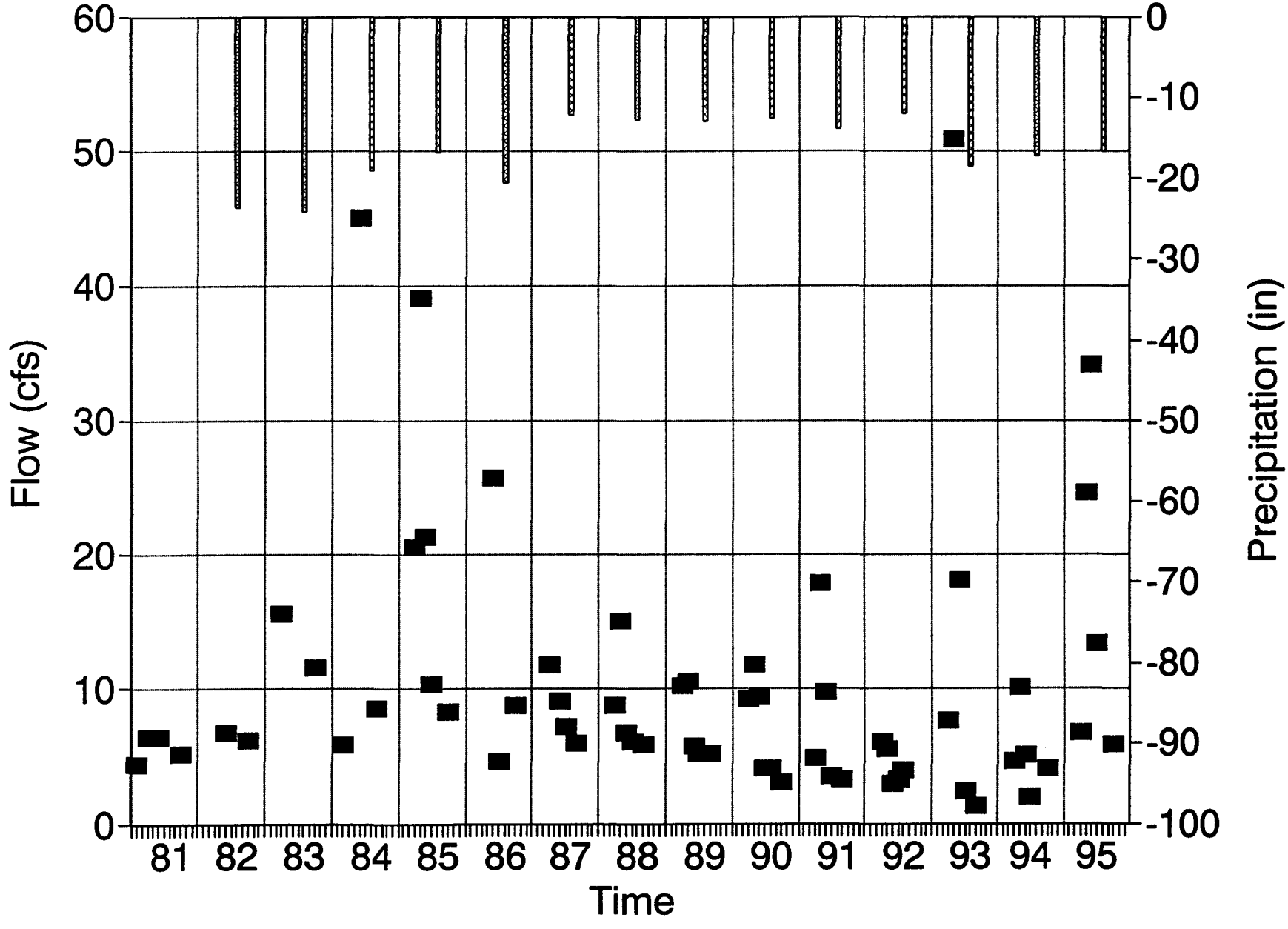
S36-23 Flow History



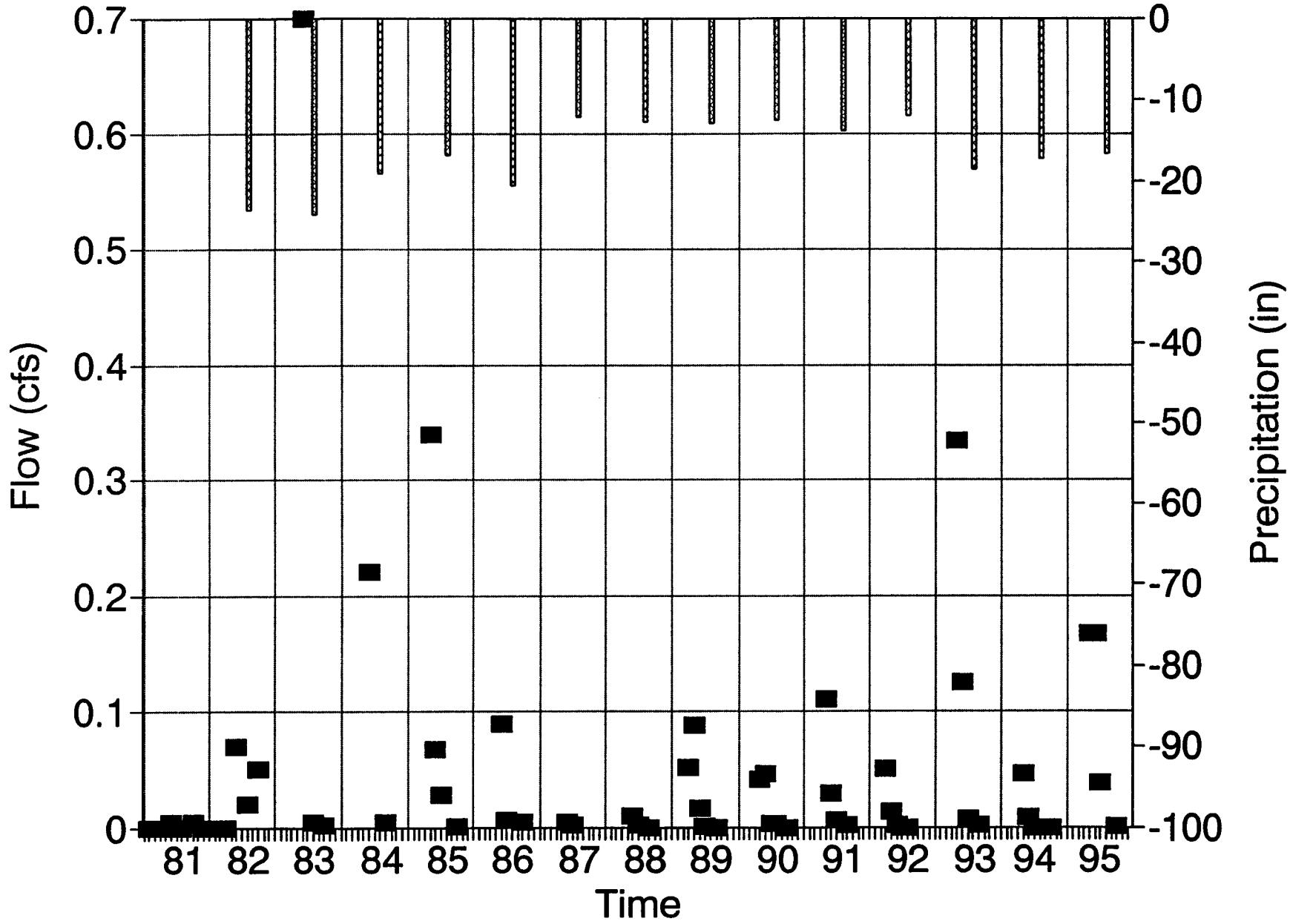
VC-1 Flow History



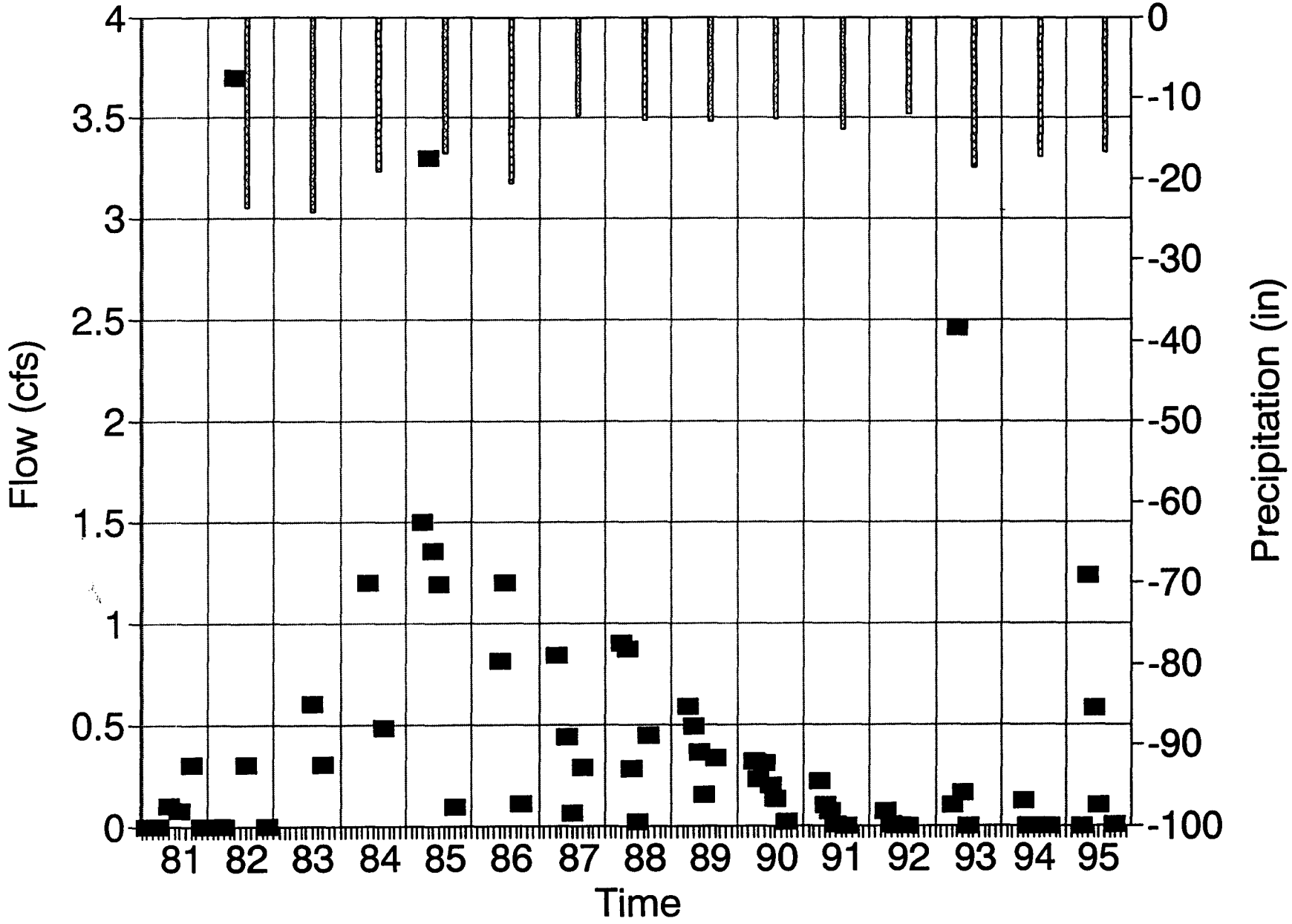
VC-2 Flow History



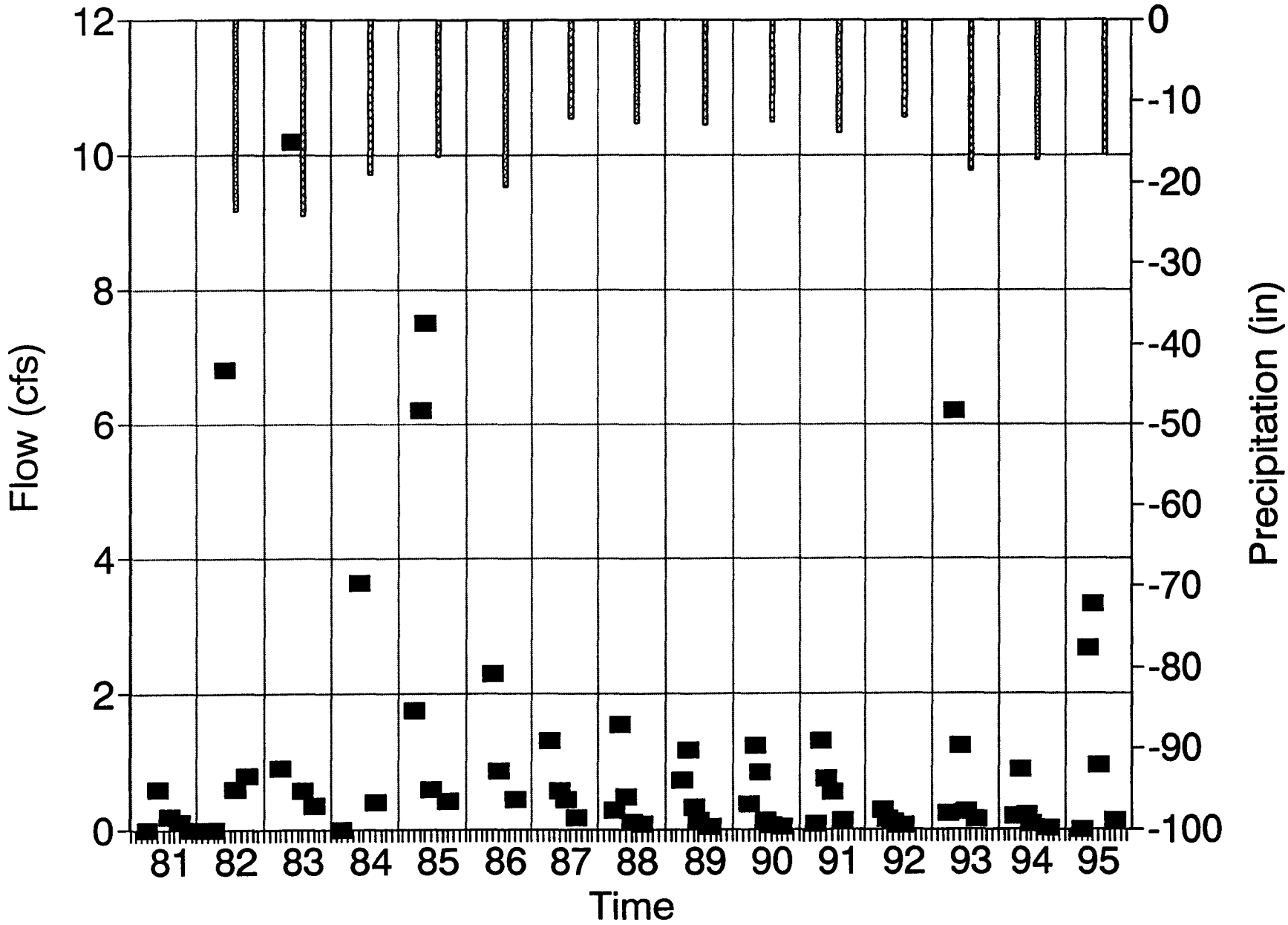
VC-4 Flow History



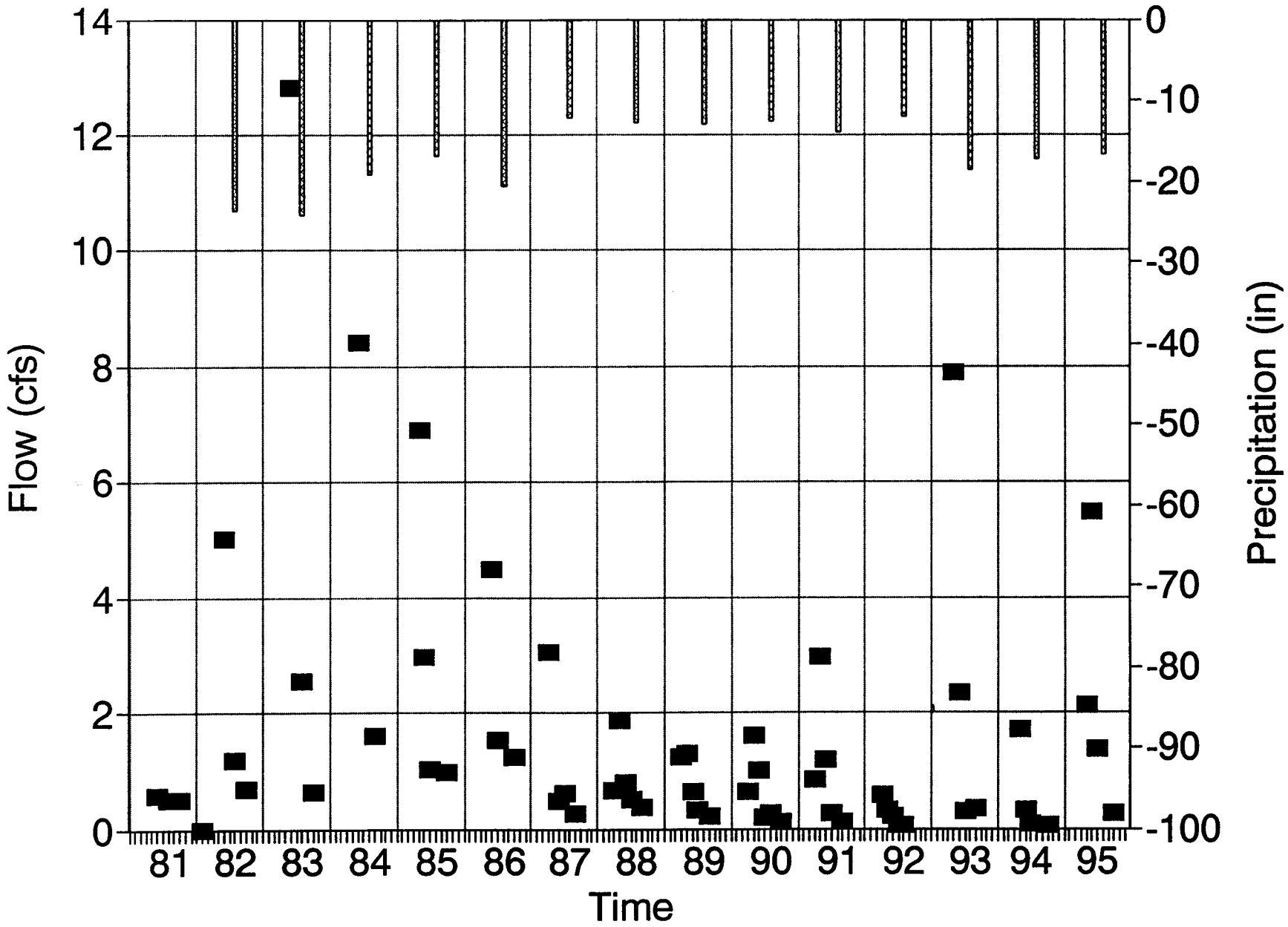
VC-5 Flow History



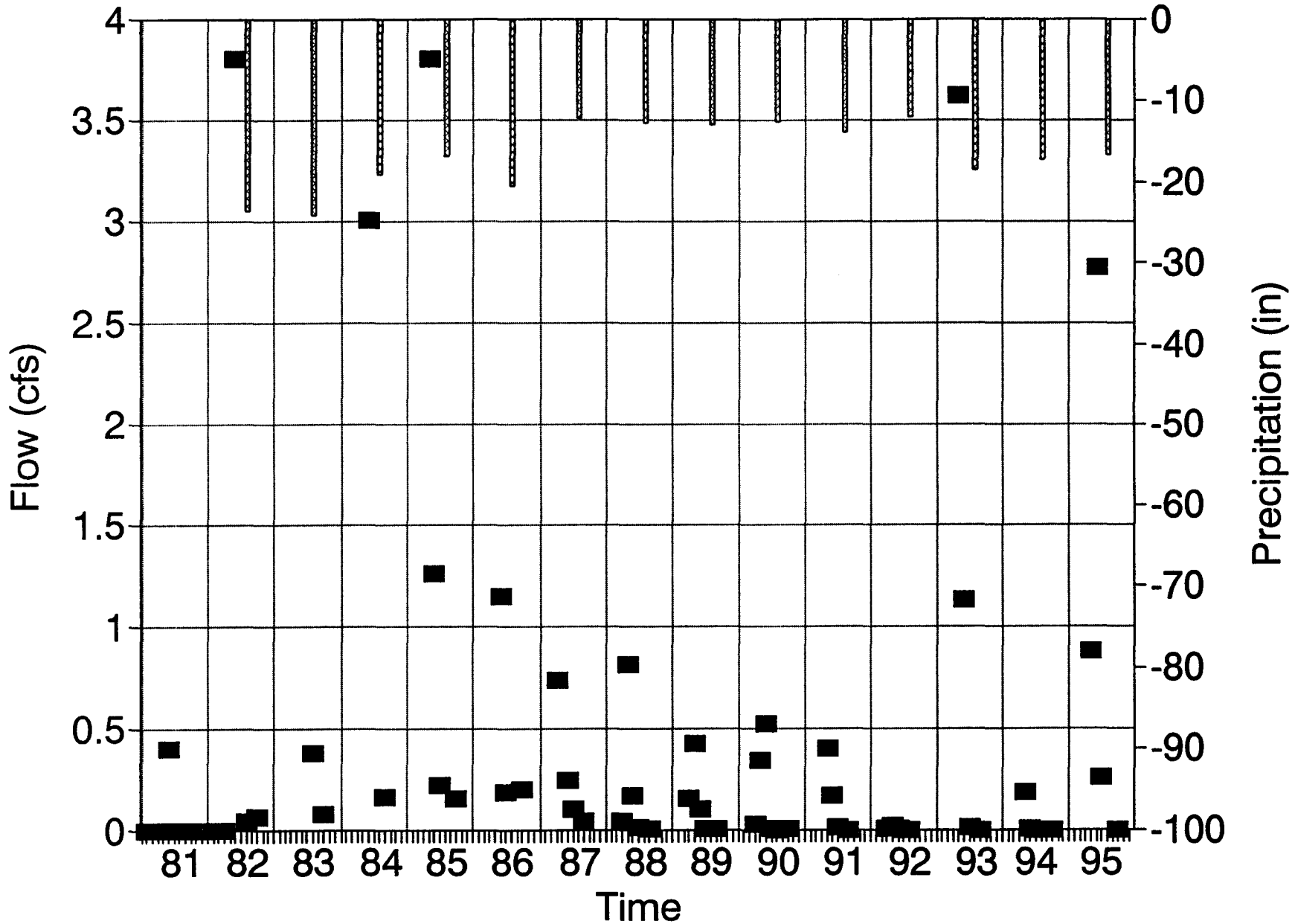
VC-10 Flow History



VC-11 Flow History

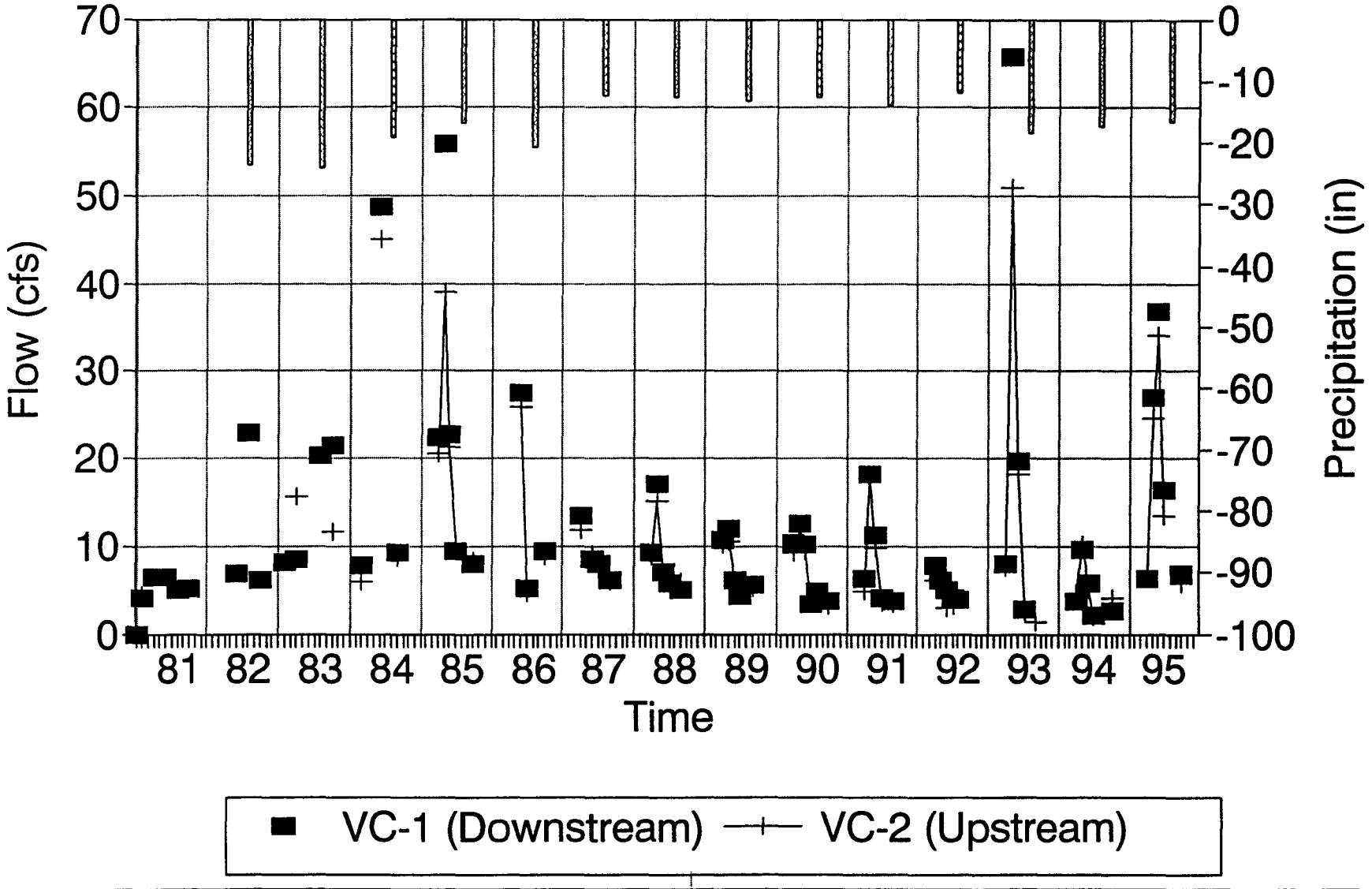


VC-12 Flow History



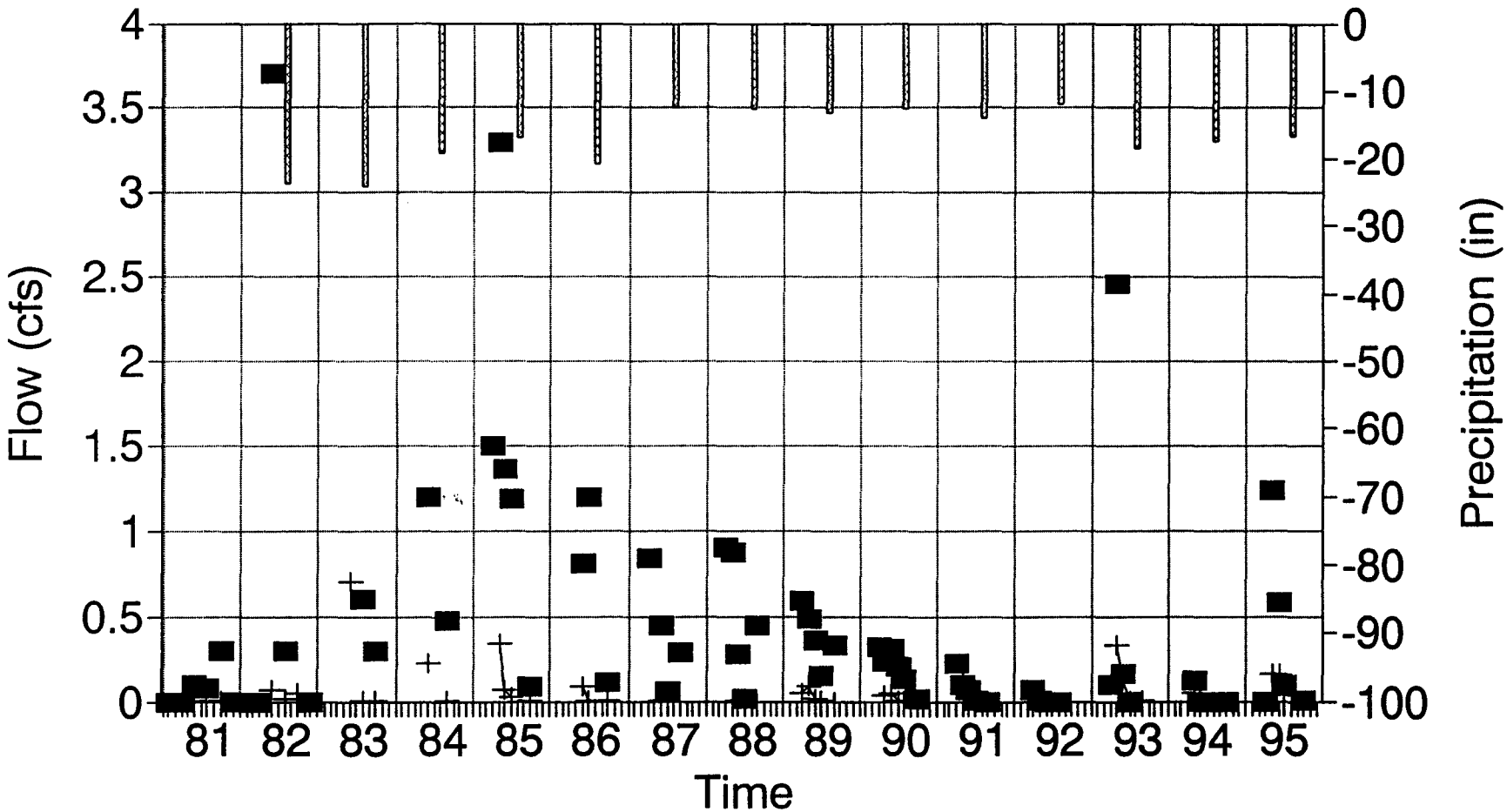
Flow History

VC-1 vs VC-2



Flow History

VC-4 vs VC-5



VC-5 (Downstream) — VC-4 (Upstream)

Appendix C
Subsidence Base Map
Subsidence Survey Location Map

Appendix D
1995 Pond Certification Report

WHITE OAK MINING & CONSTRUCTION CO. INC.

1995 Pond Certification

Sediment Ponds 001A, 002A, 003A, and 004A

September 1995

HANSEN ALLEN & LUCE INC
SALT LAKE CITY, UTAH

HANSEN ALLEN & LUCE inc

SALT LAKE AREA OFFICE
6771 South 900 East
Midvale, Utah 84047
Phone: (801) 566-5599

Mr. Steve Tanner - Environmental Coordinator
White Oak Mining Company
Scofield Route
Helper, Utah 84526

March 25, 1996

Re: 1995 Pond Certification

Dear Steve:

On September 6, 1995, a site investigation and Pond Certification was performed by Hansen, Allen & Luce, Inc. for Sediment Ponds 001A, 002A, 003A, and 004A which are located within the White Oak permit boundary. The purpose of our site investigation was to evaluate the current condition of each of the four existing sediment ponds in terms of embankment and/or channel erosion, integrity of the pond outlets and emergency spillways, and their overall hydraulic condition. Although the weather was clear at the time of our visit, it is our understanding that some precipitation had fallen during the previous evening. We provide the following comments regarding our field observation:

POND 001A

Observations

Pond 001A was not discharging at the time of our observation, as the water level within the pond was below the intake to the pond outlet pipes. A visual observation was conducted on both the interior and exterior portions of the pond. One animal burrow was identified near the inside top of the southwest corner of the pond. It appears that this burrow is actively being used. In addition to this burrow, 11 animal burrows were located along the north and west exterior slopes of the pond. Observation of the animal burrows was difficult due to heavy vegetative cover on the exterior and interior side slopes of the pond. As the pond is mostly excavated, it is anticipated that the majority of the burrows would not adversely affect pond performance. Based upon tracks observed at the pond, it is apparent that the pond is also used by livestock and wildlife as a source of water. This use of the pond does not appear to have adversely affected pond performance.

No inflow into Pond 001A was observed at the time of our visit. Coal fines have accumulated near the inlet to the pond. It is assumed that these fines have washed into the pond during moderate regional storms. Eutrophic conditions were observed within the pond water with moderate algal bloom observed at the north of the pond.

The outlet works were also observed and found to be capable of performing as intended. Eight photographs were taken of Pond 001A at the time of our visit, and are hereby submitted for use by White Oak. The photographs taken and included herein show the following features:

Photo #1	View South Towards the Inlet to Pond 001A
Photo #2	View Northwest Towards the Pond Outlet
Photo #3	View North Towards the Pond of the Inlet Riprap Protection
Photo #4	View of the Pond Inlet and Build-up of Coal Deposition
Photo #5	Outlet Discharge Pipes
Photo #6	Panoramic View South to North (1 of 3)
Photo #7	Panoramic View South to North (2 of 3)
Photo #8	Panoramic View South to North (3 of 3)

Recommendations

It is recommended that the animal burrows be located and filled in the embankment slopes to protect against "piping".

POND 002A

Observations

Pond 002A was not discharging at the time of our observation. However, it is apparent that the outlet works are leaking in that seepage was observed flowing through the outlet pipes. The water level within the pond was below the intake to the pond outlet pipes. A visual observation was conducted on both the interior and exterior portions of the pond. Five animal burrows were identified near the inside top of the west embankment and the southwest corner of the pond. An additional animal burrow was also identified near the top of the exterior west slope. As with the other ponds, observation of the animal burrows was made more difficult due to heavy vegetative cover on the exterior and interior side slopes of the pond. As the pond is mostly excavated, it is anticipated that the majority of the burrows would not adversely affect pond performance. Based upon tracks observed at the pond, it is apparent that the pond is also used by livestock and wildlife as a source of water. This use of the pond does not appear to have adversely affected pond performance.

No inflow into Pond 002A was observed at the time of our visit. It was observed that the eastern inlet pipe into Pond 002A has experienced significant erosion around the lower 10-foot section of pipe. Due to the fact that the east slope of pond 002A is a cut slope, erosion around the inlet pipe will not lead to pond failure. However, it is recommended that the erosion be repaired to maintain the integrity of the inlet pipe. Coal fines were observed to have accumulated near both of the inlets to the pond. It is assumed that these fines have washed into the pond during moderate regional storms.

The outlet works were also observed and found to be capable of performing as intended. Photographs 9 thru 13 were taken of Pond 002A at the time of our visit, and are hereby submitted for use by White Oak. The photographs taken and included herein show the following features:

Photo #9	View South Towards the South Inlet to Pond 002A
Photo #10	View Northwest Towards the Pond Outlet
Photo #11	View East Towards the Washed Out Section of the East Inlet
Photo #12	View of the South Pond Inlet and Build-up of Coal Deposition
Photo #13	Outlet Discharge Pipes with Seepage

Recommendations

It is recommended that the animal burrows be located and filled in the embankment slopes to protect against "piping", and that the erosion be repaired at the east inlet pipe.

POND 003A

Observations

Pond 003A was observed to be dry at the time of our observation. A visual observation was conducted on both the interior and exterior portions of the pond. A single animal burrow was identified near the toe of the west exterior embankment. This burrow hole is located in what may be natural soils, and is not anticipated to adversely affect pond performance.

The outlet works were also observed and found to be capable of performing as intended. Photographs 14 thru 20 were taken of Pond 003A at the time of our visit, and are hereby submitted for use by White Oak. The photographs taken and included herein show the following features:

Photo #14	Panoramic View South to North (1 of 3)
Photo #15	Panoramic View South to North (2 of 3)
Photo #16	Panoramic View South to North (3 of 3)
Photo #17	Panoramic View From Near Outlet, West to East (1 of 3)
Photo #18	Panoramic View from Near Outlet, West to East (2 of 3)
Photo #19	Panoramic View from Near Outlet, West to East (3 of 3)
Photo #20	Outlet Discharge Pipes

Recommendations

Because the animal burrow is likely located in natural soils, no firm recommendations are made at this time. If desired, the identified burrow could be located and repaired to protect against "piping".

POND 004A

Observations

Pond 004A was not discharging at the time of our observation, however it was observed that the water level in the pond was at the elevation of the outlet intake. A small amount of inflow was entering the pond from the south pond inlet. A visual observation was conducted on both the visible portions of the interior and exterior portions of the pond. No animal burrows were identified at the time of our observation. A small erosion channel was identified near the outlet of the bypass culvert. The erosion channel had a depth of approximately 1-foot at the time of our observation. The downstream toe rock appears to be in good condition, and the exterior dam slope is well vegetated. The mancos shale channel rocks continue to show signs of surface weathering. Although not a problem at this time, the condition of the channel rocks should be monitored over time.

The primary spillway, emergency spillway, and downstream channel were also observed, and found to be in generally good condition. The straw bales at the emergency spillway were found to be coated with an oil product and in a moderately deteriorated state. It is our understanding that White Oak intends to replace the straw bales located near the emergency spillway.

An oil product was also observed along the shoreline near the emergency spillway. Three oil skimmers were observed to be located against the bank near the emergency spillway. These oil skimmers are intended to absorb oil products accidently discharged into the pond. However, their location does not allow for the interception of oil products at either the emergency spillway or the pond outfall. It is our understanding that White Oak intends to reposition and/or replace the oil skimmers to be more effective.

Coal fines were observed to have accumulated near the inlet to the pond. It would appear that these fines have washed into the pond during moderate regional storms. It is our understanding that White Oak intends to remove sediment from Pond 004A. The outlet works were also observed and found to be capable of performing as intended. Photographs 21 thru 34 were taken of Pond 004A at the time of our visit, and are hereby submitted for use by White Oak. The photographs taken and included herein show the following features:

Photo #21	Panoramic View From the Northeast Corner, South to North (1 of 3)
Photo #22	Panoramic View From the Northeast Corner, South to North (2 of 3)
Photo #23	Panoramic View From the Northeast Corner, South to North (3 of 3)
Photo #24	View Towards the Pond Outlet Riser
Photo #25	View Towards the Pond Overflow
Photo #26	View Southeast of the 2 Pond Inlets and Deposition of Coal
Photo #27	Emergency Spillway Looking Upstream with Deterioration of Straw Bales
Photo #28	Panoramic View From the Base of the Exterior Toe, South to North (1 of 3)
Photo #29	Panoramic View From the Base of the Exterior Toe, South to North (2 of 3)
Photo #30	Panoramic View From the Base of the Exterior Toe, South to North (3 of 3)
Photo #31	Erosion Channel Near Outfall of Bypass Culvert Outfall

Photo #32	Erosion Channel Near Outfall of Bypass Culvert Outfall
Photo #33	View Looking Upstream at Emergency Spillway Channel
Photo #34	View from the Overflow Towards the Emergency Spillway

Recommendations

It is recommended that the small erosion channel located near the bypass culvert outfall be repaired and monitored.

In general, our evaluation of the condition of the four sediment ponds indicates that they are in relatively good condition. Although specific recommendations are noted above, no conditions were identified at this time which would suggest that the ponds are incapable of performing as intended. However, in order to minimize future adverse effects, it is our recommendation that White Oak proceed with the minor repairs which include filling of animal burrows and the repair of erosion channels on each of the four ponds. In addition, White Oak should proceed with their plans to replace the straw bales at the emergency spillway, reposition and/or replace the oil skimmers, and clean sediment from Pond 004A.

We appreciate the opportunity of working with you on this important project. Please call if you have any questions, or if we can be of further assistance.

Sincerely,

HANSEN, ALLEN & LUCE, INC.

Paul G. Hansen, P.E.
Project Engineer

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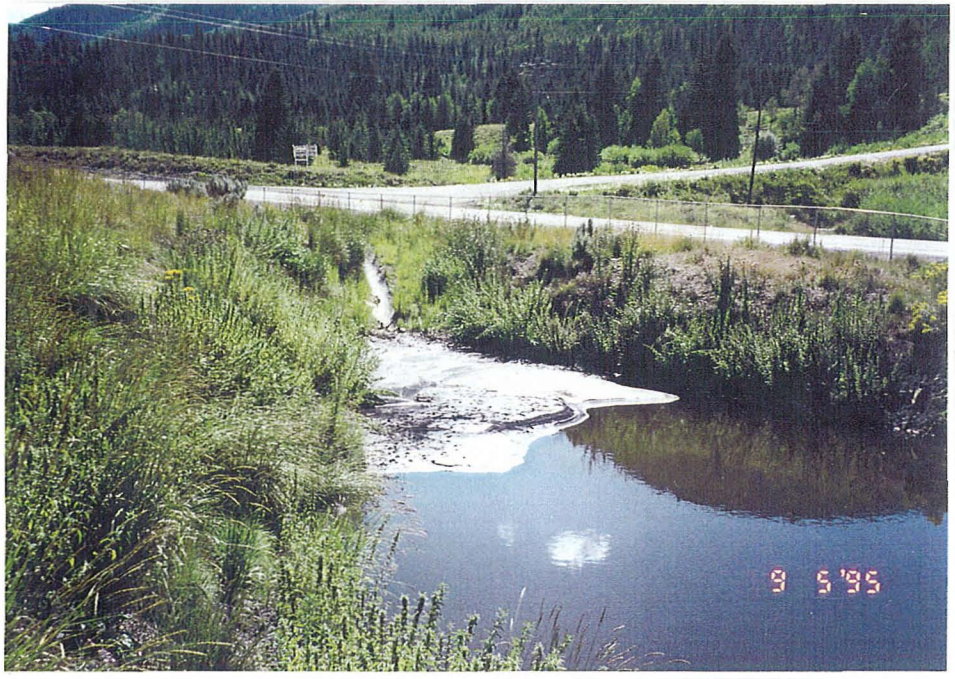
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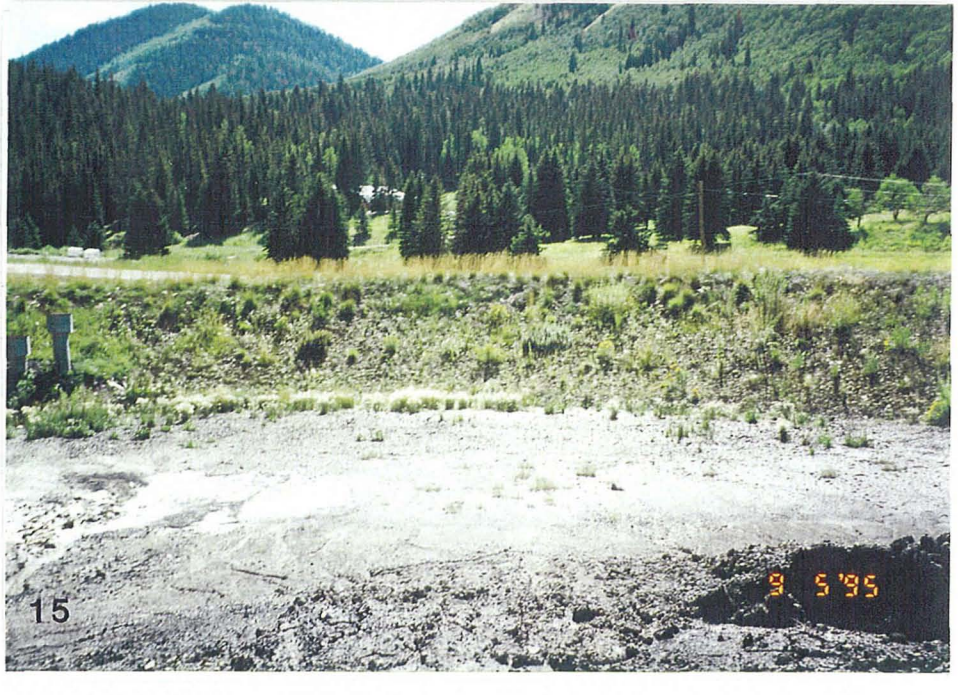
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