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State of Utah

DEPARTMENT OF NATURAL RESOURCES
DIVISION OF OIL, GAS AND MINING

Norman H. Bangerter
Governor
Dee C. Hansen
Executive Director
Dianne R. Nielson, Ph.D.
Division Director

355 West North Temple
3 Triad Center, Suite 350
Salt Lake City, Utah 84180-1203
801-538-5340

September 25, 1991

Mr. Blake Webster
PacifiCorp Electric Operations
Fuel Resources
One Utah Center; Suite 2100
210 South Main
Salt Lake City, Utah 84140-2100

Dear Mr. Webster:

Re: Cottonwood Spring Citizen's Complaint, PacifiCorp Electric Operations, Deer Creek Mine, ACT/015/018, Folder #2, Emery County, Utah

Enclosed please find the memorandum that was prepared as a result of Mr. Jim Peacock's citizen complaint filed August 1, 1991 and the subsequent field visit August 20, 1991.

If you have any questions, please call me.

Sincerely,

Pamela Grubaugh-Littig
Permit Supervisor

PGL/jbe
Enclosure
cc: Carly Burton, PEO
Val Payne, PEO
AT015018C

Mr. Eugene Johansen
Cottonwood Creek Consolidated Irrigation Co.
290 East Main
Castle Dale, Utah 84513

Mr. Jay Humphrey
Emery Water Conservancy District
50 South 1 East
Castle Dale, Utah 84513

Ms. Denise Dragoo, Esq.
Fabinan and Clendenin
215 S State; Suite 1200
Salt Lake City, Utah 84111

Mr. Bill Warmack
Utah Division of Water Rights
453 S. Carbon Avenue
Price, Utah 84501

Mr. Jim Peacock
150 East 7060 South
Midvale, Utah 84047

Mr. Paul Peacock

Orangeville, Utah 84537



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September 11, 1991

TO: Pamela Grubaugh-Littig, Permit Supervisor
FROM: Ken Wyatt, ^{Ken Tim} Tom Munson, Reclamation Hydrologists
RE: Cottonwood Spring Citizen's Complaint, Deer Creek Mine,
PacifiCorp Electric Operations, ACT/015/018, Folder # 2
and Citizen's Complaint File, Emery County, Utah

SYNOPSIS

On August 1, 1991, the Division received a letter from Mr. Jim Peacock stating that a spring located in Cottonwood Creek had ceased flowing over the last several years. He had heard about the increased flows from the Deer Creek Mine and requested the Division to investigate whether these increased flows from the mine had any relation to this spring. Mr. Peacock has water rights along Cottonwood Creek.

In response to the citizen complaint from Jim Peacock received by the Division on August 1, 1991, a meeting was held on August 20, in the Cottonwood Creek area. The following persons were in attendance.

NAME	AGENCY/AFFILIATION	ADDRESS, PHONE #
Eugene Johansen	Cottonwood Creek Consolidated Irrigation Co.	Castledale
Jay Humphrey	Emery Water Conservancy District	Castledale
Rodger Fry	PacifiCorp	SLC, 220-4610
Chuck Semborski	PacifiCorp	Huntington, 653-2312
Carly Burton	PacifiCorp	SLC, 220-2174
Val Payne	PacifiCorp	Huntington, 653-2312
Denise Dragoo	Attorney for PacifiCorp	215 S. State, Suite 1200 SLC, 84111; 531-8900
Ken Wyatt	Utah Div. Oil, Gas & Mining	SLC, 538-5266
Tom Munson	Utah Div. Oil, Gas & Mining	SLC, 538-5288
Bill Warmack	Utah Div. Water Rights	Price, 637-1303
Jim Peacock	Ranch Owner	150 E 7060 S, Midvale, 84047; 255-2221
Paul Peacock	Ranch Operator	Orangeville

ANALYSIS

The meeting commenced at 11:00 a.m. at the junction of Straight Canyons and Cottonwood Canyons. Mr Jim Peacock began by describing his properties in the area, the history of these properties and the agricultural practices used on this land. The land being affected by the loss of this spring water is located in Section 7 and 8 of T18S R7E. (See attachment 1)

The tour then went up Cottonwood Canyon to the point of diversion from Cottonwood Creek. At this time approximately .23 CFS flow was observed entering this canal. (Approx. .25 feet in a 6" flume)

Following this observation, we visited the site of the spring. No water was observed in the creek channel or from the spring discharge pipe. The spring previously surfaced from the Northeast hillside slightly above creek level. Discussions were held concerning the flow of this spring. Eugene Johansen indicated that this spring has been diminishing for 8 - 10 years. U.S. Geological Survey records from 1977 - 1982 indicated that the spring flowed between 40 and 110 GPM continuously from the Blackhawk Formation. Cottonwood Creek between Mountain Coal Mine to the Spring was wet with very limited surface water.

The tour then proceeded to the culvert outlet at Mountain Coal Mine where it was observed that the majority of Cottonwood Creek flow was from the mine water discharge pipe below the sediment pond. The stream flow as measured at the USGS monitoring station was .32 CFS (.19 feet through a 12" flume).

Examination of map No.3 (partial copy as attachment 2) included in the Deer Creek Mine UPDES Permit Application shows that the area of major water production within the mine is located just south of the Roans Canyon Fault. The spring is located just south of the Roans Canyon Fault on the down-dipped side of the canyon near the axis of the Straight Canyon Syncline. The mine water discharge at the Deer Creek Mine averaged 6.75 CFS from December 1990, to July 1991.

Using water chemistry data from the Trail Mountain Mine 1986 water monitoring program, Stiff diagrams were generated for this spring and Cottonwood Creek. Pacificorp FAXed the Division data for two springs adjacent to the one in question that they monitored this year. Additionally, I plotted Stiff diagrams for some of the Deer Creek mine inflows and the adjacent springs in Cottonwood Creek. The Stiff diagrams are attached.

The Stiff diagrams did show that the spring water quality was very consistent throughout 1986. The diagrams can be superimposed over the others and they show very little difference. This indicates that the source of the water is groundwater from a formation and probably not from the alluvial stream channel. If it were the stream channel one would expect the diagrams to change over the year from periods of peak flow to base flow in late summer and fall.

After reviewing stiff diagrams, the mine permit application, flow records, and the geologic information presented in the PAP, it is possible that the Deer Creek Mine has intercepted significant groundwater quantities which may have caused the decreased flow at the spring. The last six years have been drought years which presents the possibility that the loss of this spring may have been drought related.

Other theories are that the spring flow originates from stream water present in the alluvial material in the canyon floor and that this water is surfacing at the spring site since the canyon narrows considerably in this area. Based on the conditions present there is insufficient evidence to indicate that the mine has intercepted the entire flow of this spring. More research would be required to collect additional information.

RECOMMENDATION

The Division requested that Pacificorp revise their Probable Hydrologic Consequences (PHC) after the large amount of water was intercepted. This revised document was received on May 1, 1991 and is currently being reviewed. Information in the revised PHC may help answer some of these questions. Sufficient information is not available at this time to confirm or negate the impacts of the Deer Creek Mine on this spring and others. These questions will be addressed in the revised PHC review.

KW/jbe
ATCOTTSPR.MEM

HC - GRAM

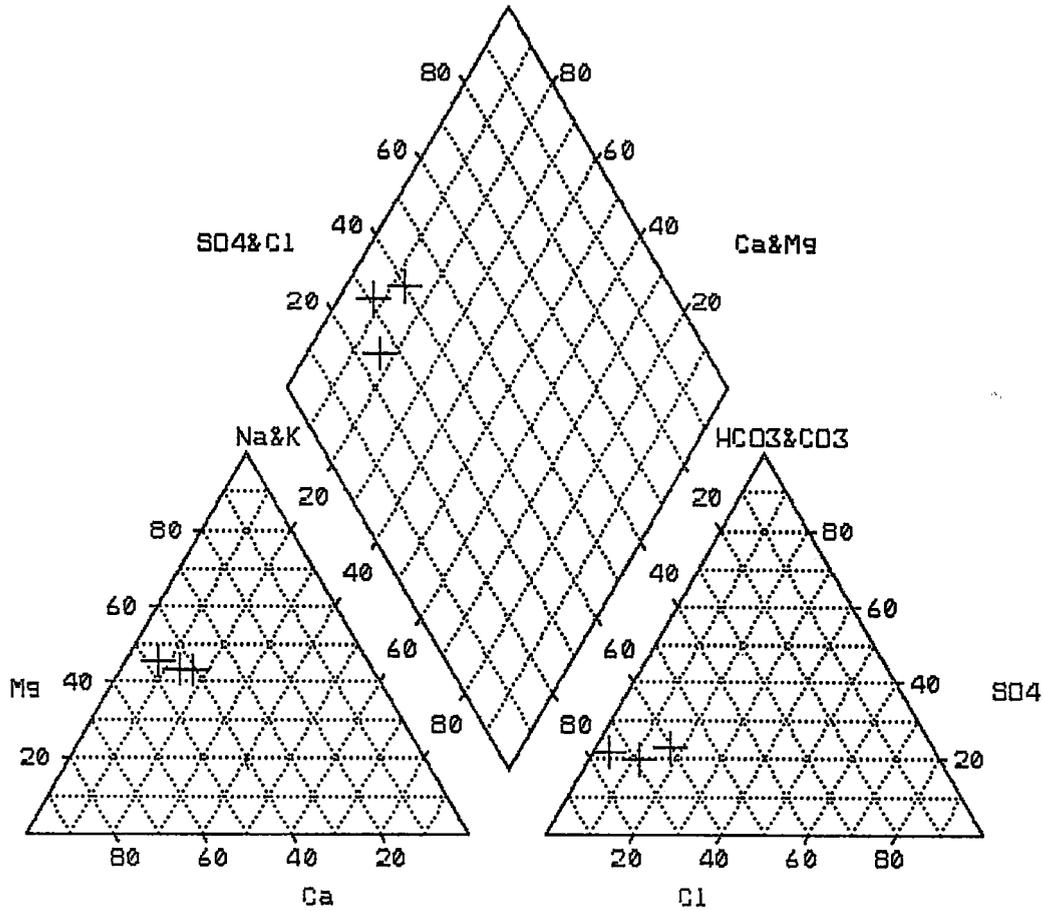
HydroChemical Graphic Representation Analysis Methods

Version: HC-GRAM 1.42

25-Sep-1991

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Project: Cottonwood Canyons Springs



Report: Cottonwood Canyon Springs

25-Sep-1991

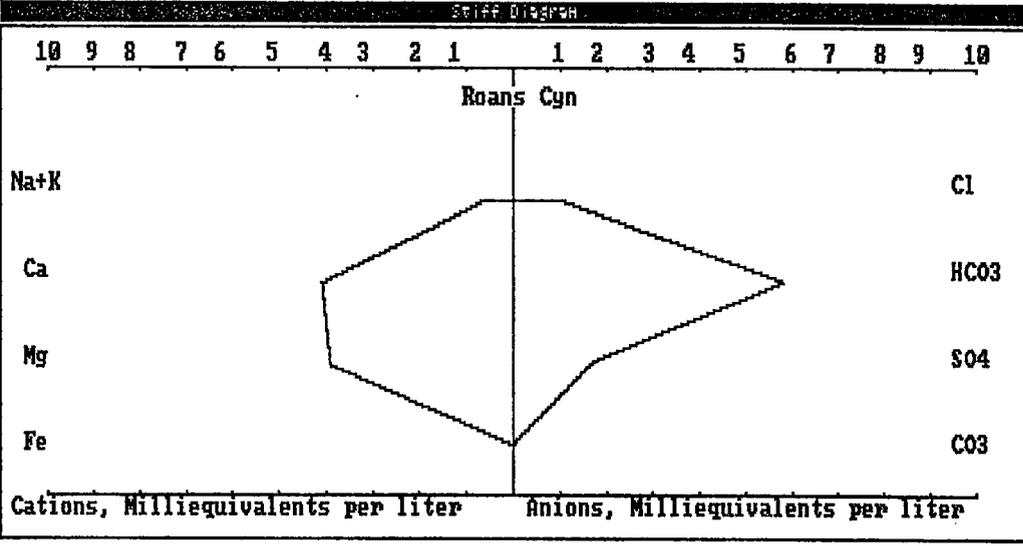
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Chemical Constituents in ppm

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
Roans Cyn	5-22-91	81.90	47.90	14.22	1.79	355.00	0.00	80.00	35.00	0.00	0.00	0.00	0.00

Chemical Constituents in Equivalents per Million

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
Roans Cyn	5-22-91	4.09	3.94	0.62	0.05	5.82	0.00	1.67	0.99	0.00	0.00	0.00	0.00



Report: Cottonwood Canyon Springs

25-Sep-1991

11:27:50.02

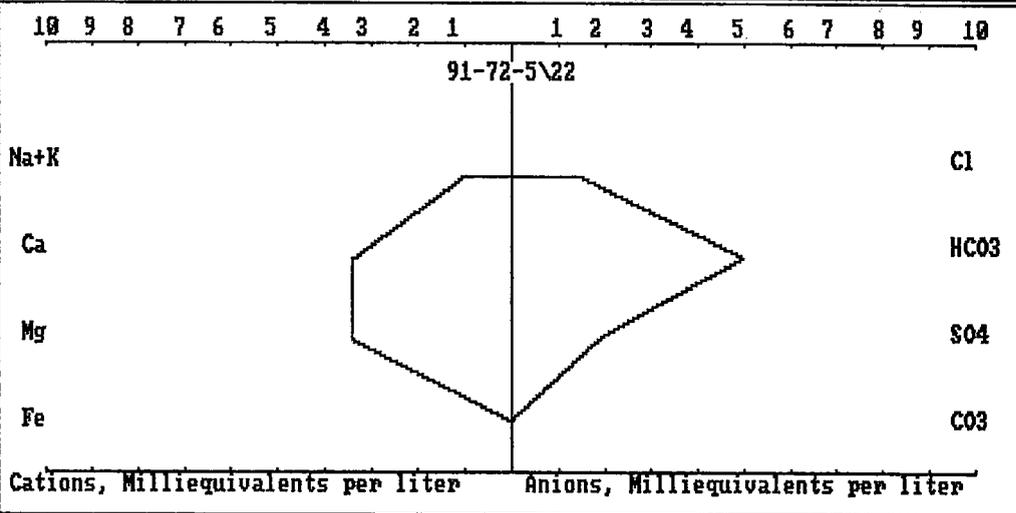
Chemical Constituents in ppm

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
91-72-5\22	5-22-91	67.90	41.40	22.20	2.40	303.00	0.00	90.00	50.00	0.00	0.00	0.00	0.00

Chemical Constituents in Equivalents per Million

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
91-72-5\22	5-22-91	3.39	3.41	0.97	0.06	4.97	0.00	1.87	1.41	0.00	0.00	0.00	0.00

Stiff Diagram



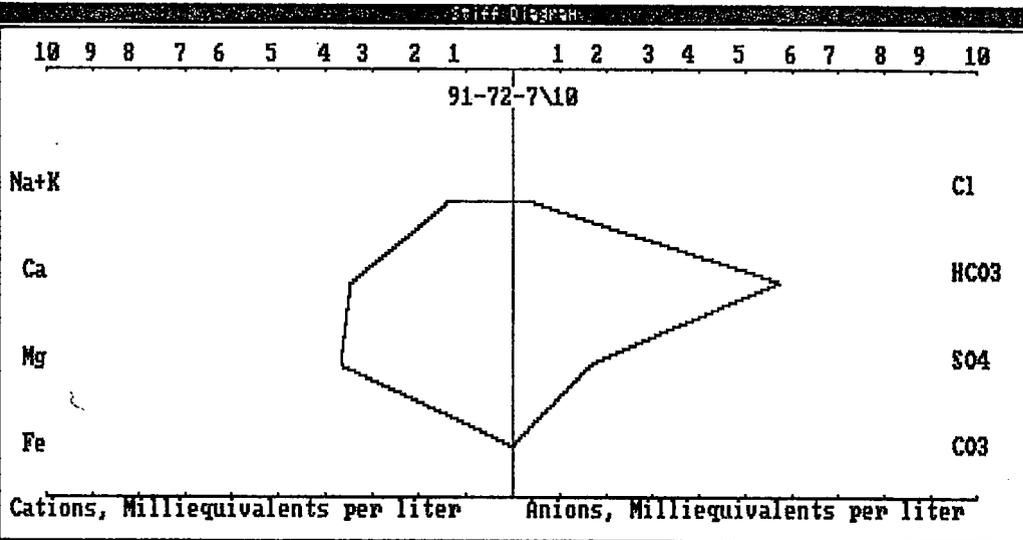
Report: Cottonwood Canyon Springs

25-Sep-1991

11:28:15.29

Sample	Date	Chemical Constituents in ppm											
		Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
91-72-7\10	7-10-91	69.10	44.60	31.40	0.66	351.00	0.00	80.00	10.00	0.00	0.00	0.00	0.00

Sample	Date	Chemical Constituents in Equivalents per Million											
		Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
91-72-7\10	7-10-91	3.45	3.67	1.37	0.02	5.75	0.00	1.67	0.28	0.00	0.00	0.00	0.00



HC - GRAM

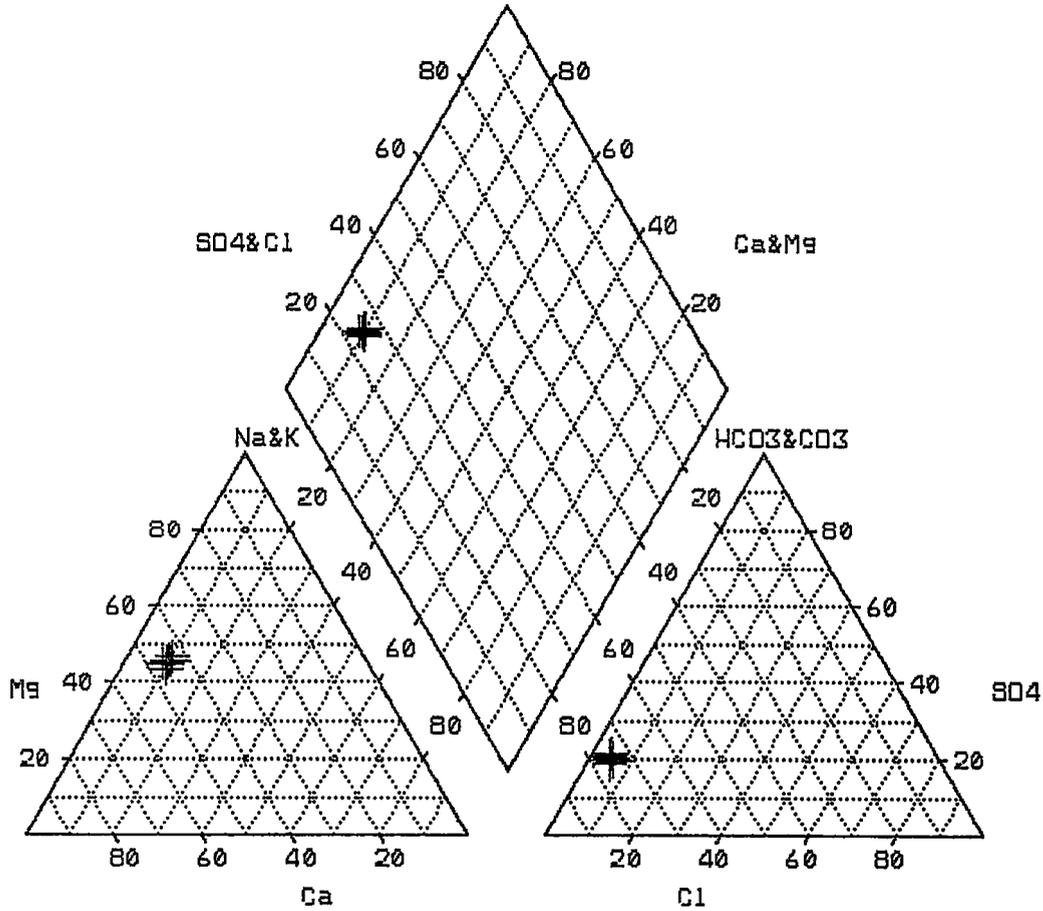
HydroChemical Graphic Representation Analysis Methods

Version: HC-GRAM 1.42

25-Sep-1991

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Project: Cottonwood Spring Water Quality



Report: Cottonwood Spring Water Quality

25-Sep-1991

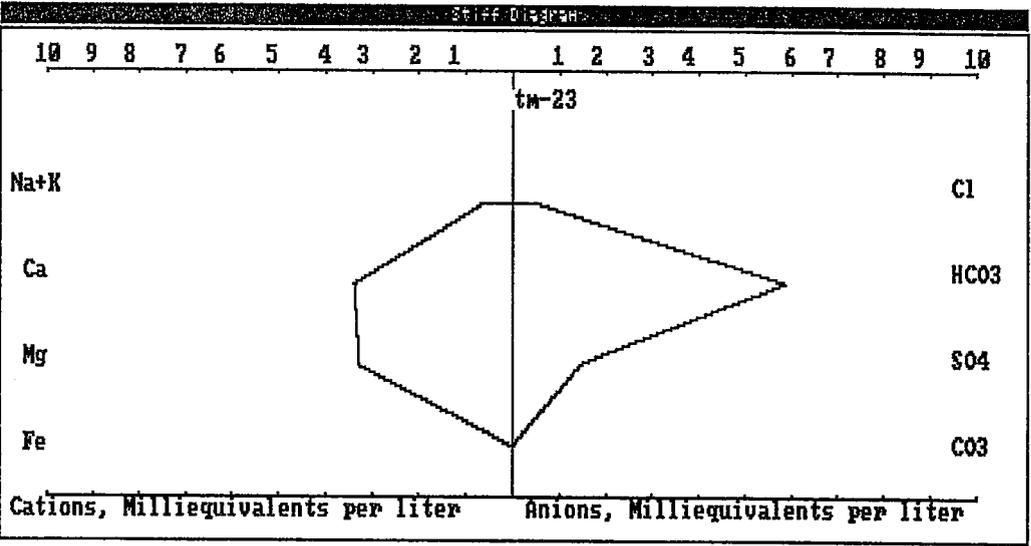
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Chemical Constituents in ppm

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
tm-23	9-30-86	68.00	40.00	14.00	2.00	359.00	0.00	70.00	14.80	0.00	0.00	0.00	0.00

Chemical Constituents in Equivalents per Million

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
tm-23	9-30-86	3.39	3.29	0.61	0.05	5.88	0.00	1.46	0.42	0.00	0.00	0.00	0.00



Report: Cottonwood Spring Water Quality

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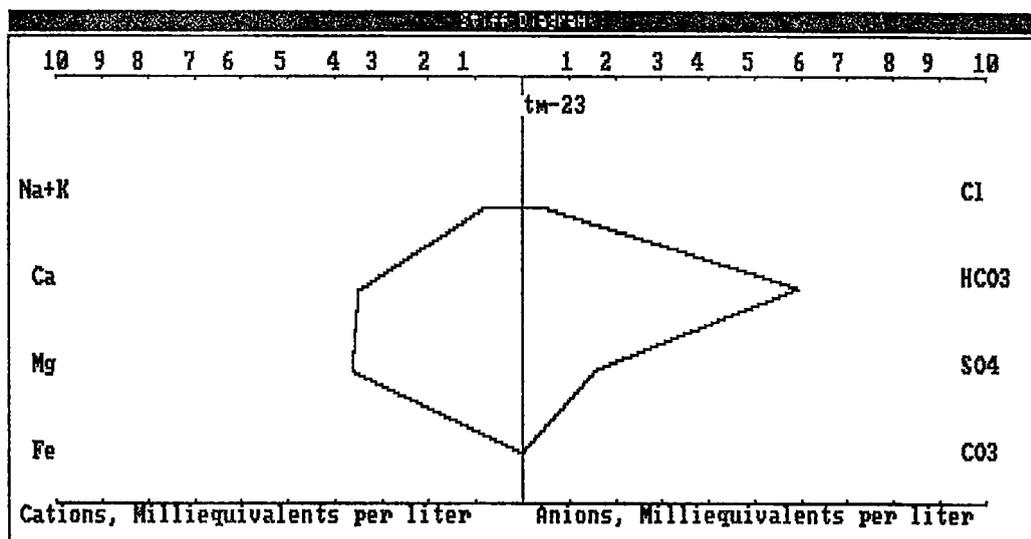
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Chemical Constituents in ppm

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
tm-23	2-28-86	70.00	44.00	18.00	2.00	362.00	0.00	75.00	13.00	0.20	0.03	0.00	0.00

Chemical Constituents in Equivalents per Million

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
tm-23	2-28-86	3.49	3.62	0.78	0.05	5.93	0.00	1.56	0.37	0.00	0.00	0.00	0.00



Report: Cottonwood Spring Water Quality

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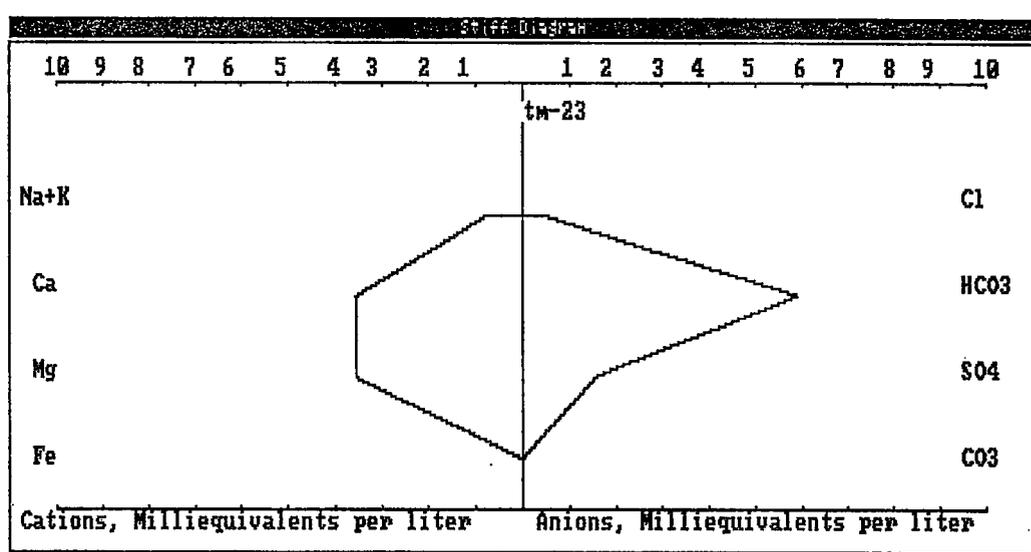
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Chemical Constituents in ppm

Sample	Date	Ca	Mg	Na	K	HC03	C03	S04	Cl	N03	P04	Si	Fe
tm-23	3-13-86	72.00	43.00	17.00	2.00	361.00	0.00	75.00	13.00	0.22	0.06	0.00	0.00

Chemical Constituents in Equivalents per Million

Sample	Date	Ca	Mg	Na	K	HC03	C03	S04	Cl	N03	P04	Si	Fe
tm-23	3-13-86	3.59	3.54	0.74	0.05	5.92	0.00	1.56	0.37	0.00	0.00	0.00	0.00



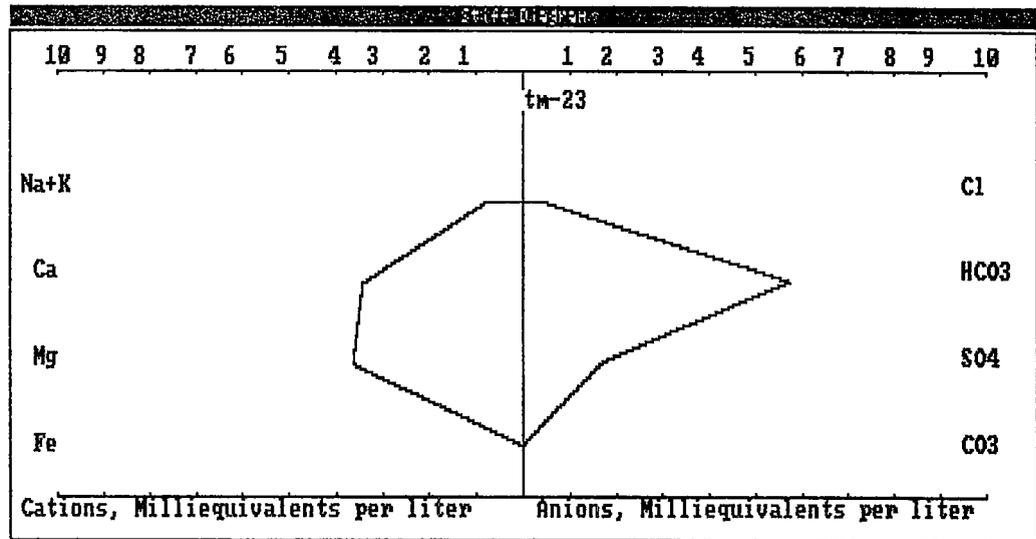
Report: Cottonwood Spring Water Quality

25-Sep-1991

10:35:17.74

Sample	Date	Chemical Constituents in ppm											
		Ca	Mg	Na	K	HC03	C03	S04	Cl	N03	P04	Si	Fe
tm-23	4-7-86	68.00	44.00	17.00	2.00	351.00	0.00	80.00	12.00	0.25	0.06	0.00	0.00

Sample	Date	Chemical Constituents in Equivalents per Million											
		Ca	Mg	Na	K	HC03	C03	S04	Cl	N03	P04	Si	Fe
tm-23	4-7-86	3.39	3.62	0.74	0.05	5.75	0.00	1.67	0.34	0.00	0.00	0.00	0.00



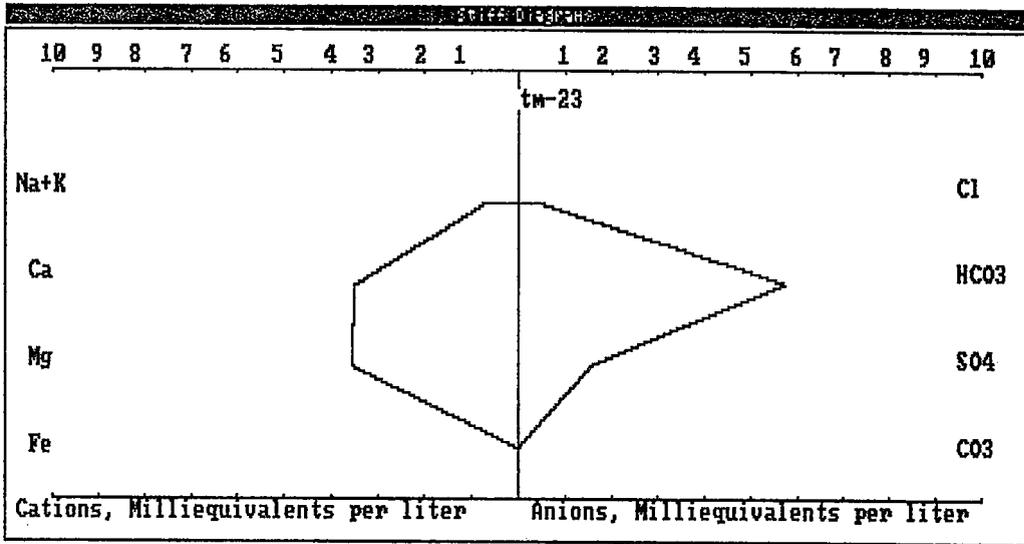
Report: Cottonwood Spring Water Quality

25-Sep-1991

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Sample	Date	Chemical Constituents in ppm											
		Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
tm-23	5-5-86	70.00	43.00	16.00	2.00	350.00	0.00	75.00	14.00	0.25	0.02	0.00	0.00

Sample	Date	Chemical Constituents in Equivalents per Million											
		Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
tm-23	5-5-86	3.49	3.54	0.70	0.05	5.74	0.00	1.56	0.39	0.00	0.00	0.00	0.00



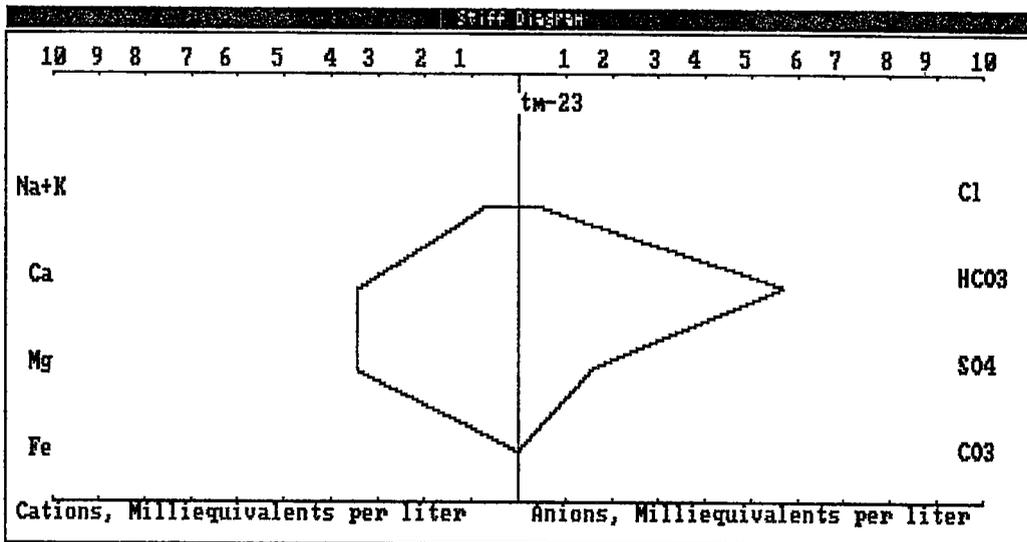
Report: Cottonwood Spring Water Quality

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10:36:08.38

Sample	Date	Chemical Constituents in ppm											
		Ca	Mg	Na	K	HC03	C03	S04	Cl	N03	P04	Si	Fe
tm-23	6-30-86	68.00	42.00	16.00	2.00	348.00	0.00	75.00	12.00	0.44	0.07	0.00	0.00

Sample	Date	Chemical Constituents in Equivalents per Million											
		Ca	Mg	Na	K	HC03	C03	S04	Cl	N03	P04	Si	Fe
tm-23	6-30-86	3.39	3.45	0.70	0.05	5.70	0.00	1.56	0.34	0.01	0.00	0.00	0.00



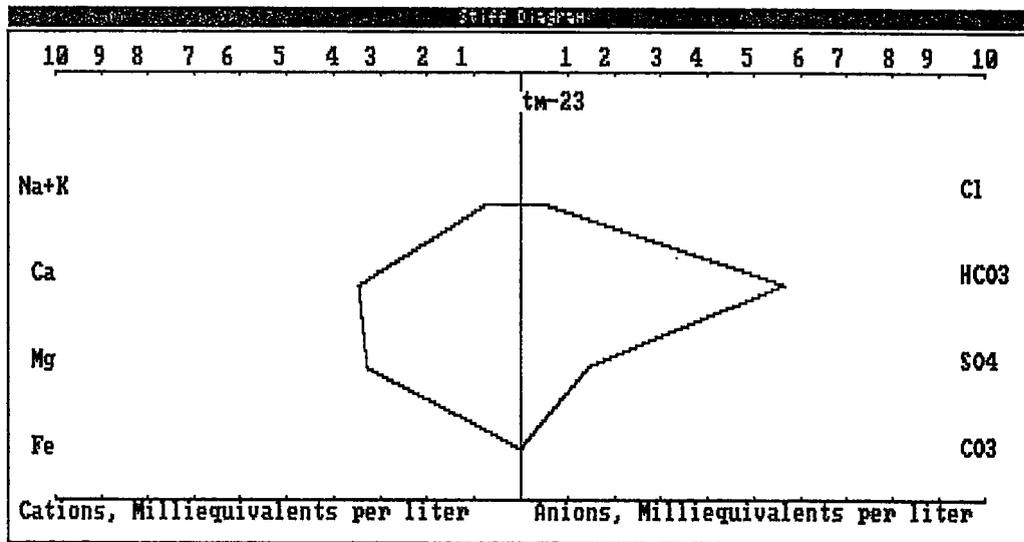
Report: Cottonwood Spring Water Quality

25-Sep-1991

10:36:33.70

Sample	Date	Chemical Constituents in ppm											
		Ca	Mg	Na	K	HC03	C03	S04	Cl	N03	P04	Si	Fe
tm-23	7-30-86	70.00	40.00	16.00	3.00	345.00	0.00	70.00	15.00	0.00	0.00	0.00	0.00

Sample	Date	Chemical Constituents in Equivalents per Million											
		Ca	Mg	Na	K	HC03	C03	S04	Cl	N03	P04	Si	Fe
tm-23	7-30-86	3.49	3.29	0.70	0.08	5.65	0.00	1.46	0.42	0.00	0.00	0.00	0.00



HC - GRAM

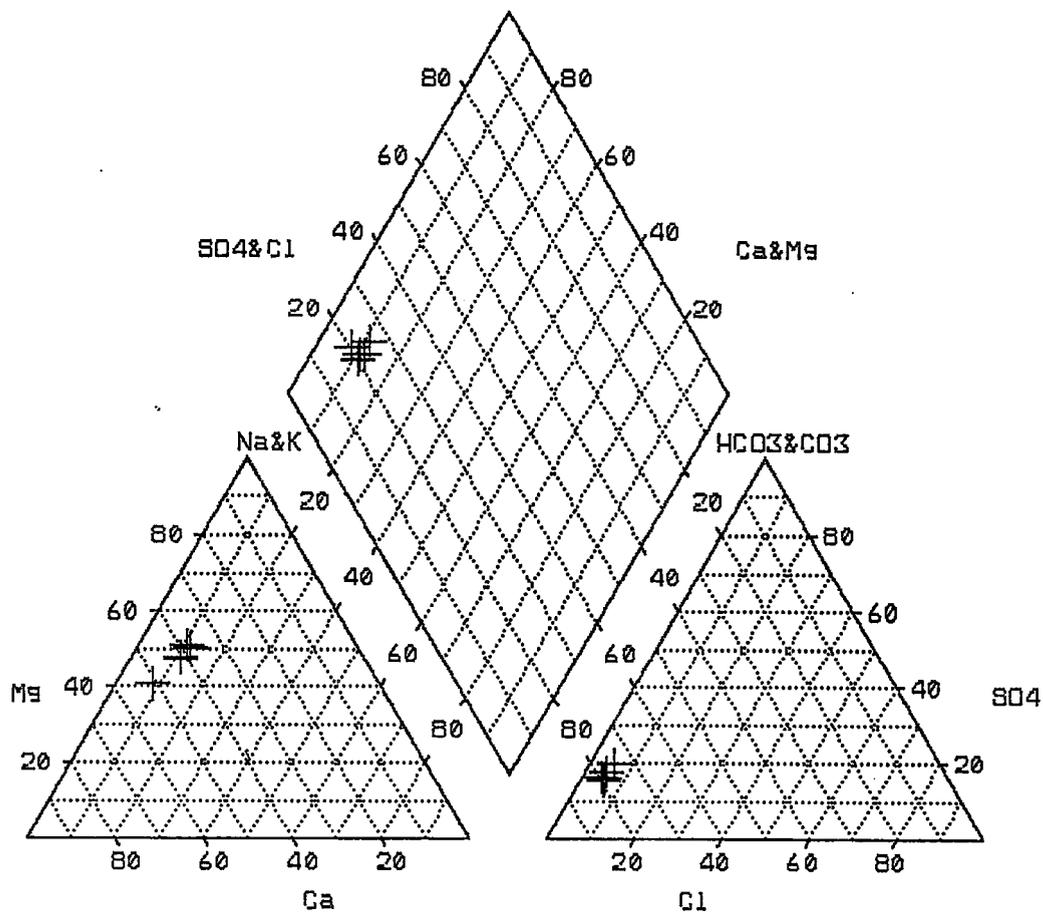
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Version: HC-GRAM 1.42

25-Sep-1991

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Project: Cottonwood Creek Water Quality



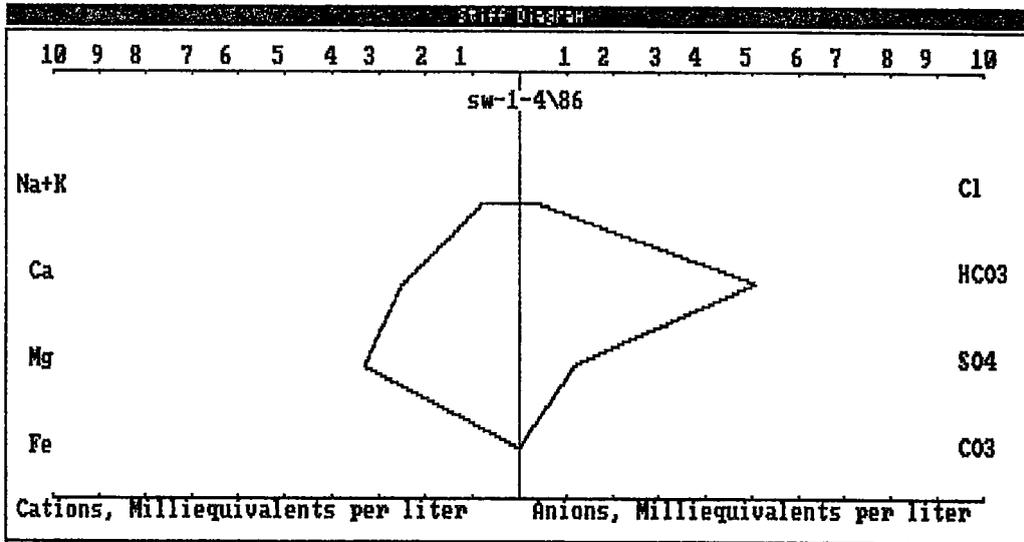
Report: Cottonwood Creek Water Quality

25-Sep-1991

11:09:38.32

Sample	Date	Chemical Constituents in ppm											
		Ca	Mg	Na	K	HC03	C03	S04	Cl	N03	P04	Si	Fe
sw-1-4\86	4-7-86	50.00	40.00	17.00	2.00	310.00	0.00	56.00	11.00	0.25	0.04	0.00	0.08

Sample	Date	Chemical Constituents in Equivalents per Million											
		Ca	Mg	Na	K	HC03	C03	S04	Cl	N03	P04	Si	Fe
sw-1-4\86	4-7-86	2.49	3.29	0.74	0.05	5.08	0.00	1.17	0.31	0.00	0.00	0.00	0.00



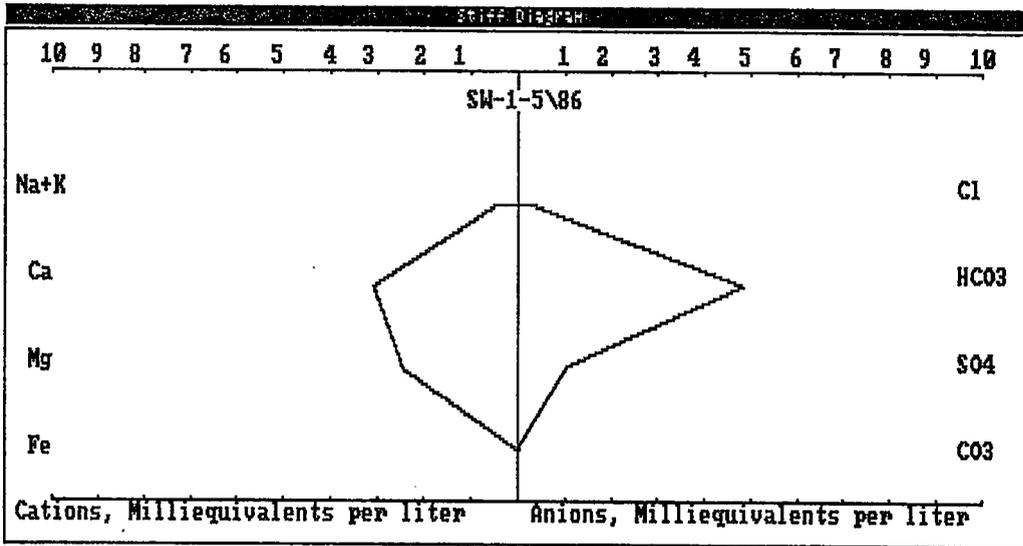
Report: Cott Wood Creek Water Quality

25-Sep-1991

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Sample	Date	Chemical Constituents in ppm											
		Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
SW-1-5\86	5-5-86	62.00	30.00	11.00	1.00	295.00	0.00	48.00	9.00	0.22	0.06	0.00	0.28

Sample	Date	Chemical Constituents in Equivalents per Million											
		Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
SW-1-5\86	5-5-86	3.09	2.47	0.48	0.03	4.84	0.00	1.00	0.25	0.00	0.00	0.00	0.01



Report: Cott Wood Creek Water Quality

25-Sep-1991

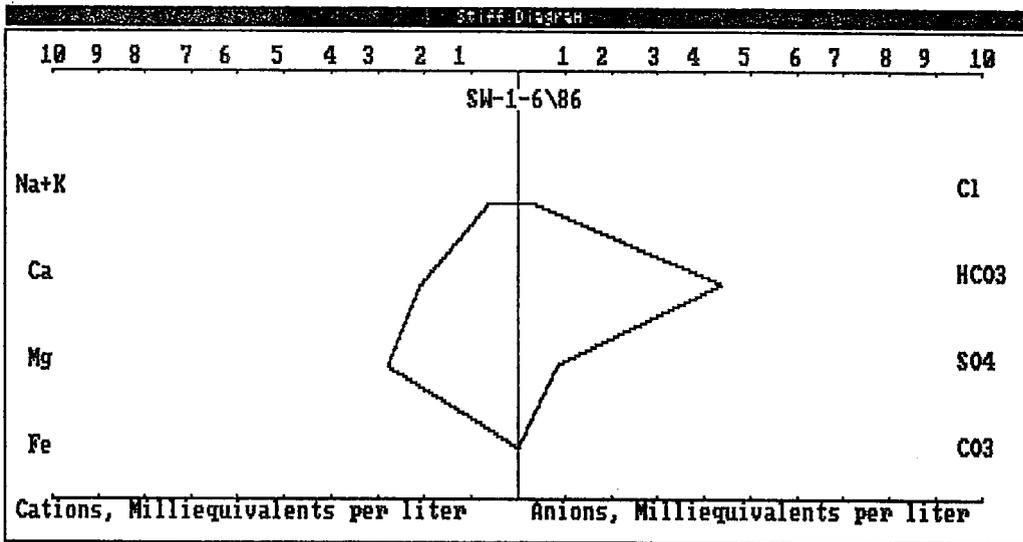
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Chemical Constituents in ppm

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
SW-1-6\86	6-30-86	42.00	34.00	13.00	2.00	267.00	0.00	40.00	10.00	0.25	0.08	0.00	0.15

Chemical Constituents in Equivalents per Million

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
SW-1-6\86	6-30-86	2.10	2.80	0.57	0.05	4.38	0.00	0.83	0.28	0.00	0.00	0.00	0.01



Report: Cottonwood Creek Water Quality

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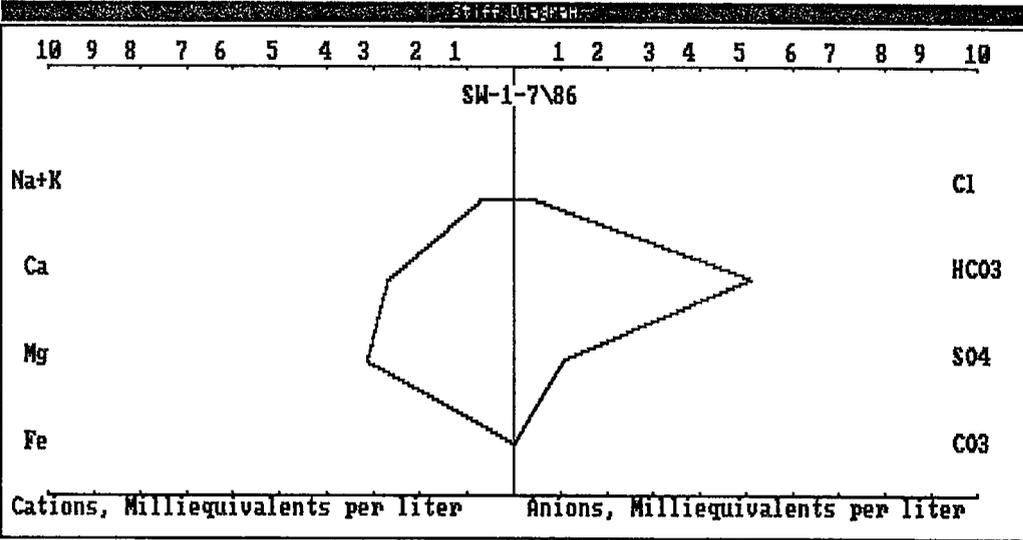
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Chemical Constituents in ppm

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
SW-1-7\86	7-30-86	54.00	38.00	14.00	4.00	312.00	0.00	50.00	12.00	0.00	0.00	0.00	0.20

Chemical Constituents in Equivalents per Million

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
SW-1-7\86	7-30-86	2.69	3.13	0.61	0.10	5.11	0.00	1.04	0.34	0.00	0.00	0.00	0.01



Report: Cottonwood Creek Water Quality

25-Sep-1991

11:11:19.55

Chemical Constituents in ppm

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
SW-1-9\86	9-29-86	54.00	38.00	13.00	7.00	298.00	0.00	62.00	13.00	0.00	0.00	0.00	0.00

Chemical Constituents in Equivalents per Million

Sample	Date	Ca	Mg	Na	K	HCO3	CO3	SO4	Cl	NO3	PO4	Si	Fe
SW-1-9\86	9-29-86	2.69	3.13	0.57	0.18	4.88	0.00	1.29	0.37	0.00	0.00	0.00	0.00

