Docket 40-8905

Rio Algom Mining LLC

April 16, 2004

Mr. Kevin Myers
Groundwater Section
New Mexico Environment Department
P.O. Box 26110
Santa Fe, NM 87502

Re: **Discharge Plan - 169**
2003 Annual Report

Dear Mr. Myers,

Please find attached Rio Algom Mining LLC's 2003 annual groundwater monitoring report for the Ambrosia Lake facility for the above referenced discharge plan. This annual report was prepared pursuant to the New Mexico Environment Department (NMED) approved plan, Discharge Plan - 169, dated November 15, 1995.

This report reviews the remediation progress on the alluvium as a result of continued implementation of Discharge Plan - 169 and the U.S. Nuclear Regulatory Commission approved Corrective Action Plan.

Submittal of this information does not prejudice Rio Algom's contention that NMED may have no jurisdiction over activities associated with discharge permit DP-169 as a result of the federal Nuclear Regulatory Commission having primacy over 11e.(2) byproduct material.

If you have any questions or need additional information, please call me at 287-8851.

Regards,

Peter Luthiger
Supervisor, Radiation Safety
and Environmental Affairs

Attachment: As stated

xc: NRC (MD) – License SUA-1473, Docket No. 40-8905
file

NMSS01

RIO ALGOM MINING LLC
AMBROSIA LAKE FACILITY

DISCHARGE PERMIT
DP-169
2003
ANNUAL REPORT

bhpbilliton

RIO ALGOM MINING LLC
AMBROSIA LAKE FACILITY
DISCHARGE PLAN - 169
2003 ANNUAL REPORT

Submittal of this information does not prejudice Rio Algom's contention that NMED may have no jurisdiction over activities associated with discharge permit DP-169 as a result of the federal Nuclear Regulatory Commission having primacy over 11e.(2) byproduct material.

Review of Discharge Plan - 169

Progress towards remediation of the alluvium continued throughout 2003. The interceptor trench continues to function as designed and approved by the NMED in the 1983 Assurance of Discontinuance (AOD) and Discharge Plan - 169. The approved remedial action plan was designed to prevent further tailings solution seepage from entering the alluvium from the tailings impoundments. With a total length of approximately 6,200 feet and a maximum depth of 36 feet, the interceptor trench has effectively isolated the tailings impoundment and its solutions from the down dip alluvial material.

During 2003, the interceptor trench collected and pumped 32.2 million gallons of water to lined evaporation cells. The interceptor trench has been effective as a "collection and pump back system". The trench has created a reversed hydrologic gradient within the alluvium due to the dewatering action along the trench, thereby causing solutions east of the trench to flow back towards it where they are collected and pumped to lined evaporation ponds for disposal.

The collection and pump back system developed by the construction of the interceptor trench is assisted by the recharge of fresh water along the eastern mill perimeter. During 2003, a total volume of approximately 158 million gallons of fresh water infiltrated into the alluvium along the fresh water creek and was utilized in the ground water sweep in conjunction with the interceptor trench. The ground water sweep and reversed gradient caused by the interceptor trench has resulted in solutions

underlying the unlined evaporation ponds #4, #5, #6 and nearby areas to be flushed and swept to the interceptor trench for collection and removal from the alluvial system.

This reversed hydraulic gradient can be seen on the water level contour map contained in Appendix E. The water levels and groundwater flow patterns show that groundwater within the alluvium is controlled by the interceptor trench over a large area. Presented in Table 1 are the monthly concentrations for chloride, sulfate, and total dissolved solids (TDS) within the fresh water utilized for alluvial recharge.

TABLE 1

2003 ALLUVIAL RECHARGE WATER CONCENTRATION (mg/L)

Month	Chloride	Sulfate	TDS
January	390	1730	3220
February	197	1850	3490
March	374	1730	3440
April	391	1770	3400
May	340	1890	3480
June	410	1900	3540
July	410	2030	3720
August	410	2040	3830
September	406	1860	3760
October	407	2080	3770
November	407	2020	3740
December	415	2020	3690

In addition to the continued operation of the main interceptor trench, Rio Algom maintained and operated the three additional intercept trenches in the area southeast of tailings impoundment #1. Since pumping was initiated from these trenches in mid 1996, approximately 30 million gallons of ground water in the vicinity of impoundment #1 has been intercepted, collected, and disposed within lined evaporation ponds.

The 2003 monitoring results for the alluvium are contained in Appendix A. These results contain the required information as specified within the November 15, 1995

approved Discharge Plan - 169. Additionally, a computer diskette containing the 2003 data for the alluvial wells is included.

Presented within Appendix B are time versus concentration plots for the parameters chloride, sulfate, and total dissolved solids (TDS) for the alluvial monitoring wells.

Review of the data and charts indicates that initially, there was an increase in the concentrations of indicator parameters in the alluvium wells west of the discharge creek. However, the concentrations have subsequently continued to decrease with time as the fresh water, which is recharged into the alluvium, has flushed and transported the impacted solutions towards the interceptor trench for collection and removal. The initial higher levels were attributable to concentrated solutions from the unlined evaporation ponds #4, #5, and #6, being flushed and swept past the monitor wells on their way to collection in the interceptor trench.

Although the effect has not been to the same degree as wells located to the west of the fresh water creek; wells located to the east also have had a noticeable improvement in the indicator concentrations and remain within compliance of the established ground water standards for the alluvium. Specific requirement #10 of the approved discharge plan requires compliance with the ground water standards established in the 1983 AOD. These ground water standards are presented within Appendix C.

Contained in Appendix D is the current water level contour map for the alluvial unit. The water level map was developed using the depth to water measurements from the alluvial monitoring wells and the groundwater saturation limits. Appendix F contains the current TDS contour map for the alluvium as required by the Discharge Plan.

APPENDIX A

ANALYTICAL RESULTS - 2003

ALLUVIAL WELLS

RIO ALGOM MINING LLC
DISCHARGE PLAN DP-169 --- 2003 ANNUAL REPORT

	Well	Date	Depth to Water	Total Depth	Spec. Cond.	Temp (C)	pH	Chloride (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	TDS (mg/L)
*	30-03	25-Mar-03	18.50	18.68							
	30-04	31-Mar-03	33.51	88.61	3980	11.8	9.12	550	0.07	1300	2790
*	30-46	7-Feb-03		50.21							
	30-47	31-Mar-03	29.98	79.2	5150	12.3	7.26	760	-0.02	1840	4100
	30-48	31-Mar-03	29.40	79.25	5030	12.4	7.68	730	0.02	1960	3940
	30-49	31-Mar-03	42.55	68.55	5510	12.8	7.23	650	0.14	2410	4510
*	30-53	7-Feb-03		38.53							
*	30-68	7-Feb-03		62.73							
	31-05	25-Mar-03	28.05	74.35	5500	12.9	7.51	530	0.05	2380	4600
	31-61	18-Feb-03	17.52	27.06	7180	12.3	6.7	570	1.4	3800	6580
	31-63	25-Mar-03	19.20	30.7	14960	12.6	6.3	54	3.49	610	14300
	31-65	18-Mar-03	15.96	46.25	9820	11.3	7.12	970	7.5	4820	8820
	31-70	25-Mar-03	16.65	30.4	10160	12.3	6.45	790	1.18	4540	9020
	31-71	25-Mar-03	19.81	63.55	5190	12.9	7.19	570	0.09	1840	4150
	32-01	24-Mar-03	16.22	52.46	4660	11.9	9.06	530	0.33	1290	3060
	32-02	18-Mar-03	29.05	75.68	5380	12	8.33	680	0.07	2240	4110
	32-41	8-Apr-03	21.17	58.54	7000	12	7.63	1510	0.03	2250	5450
	32-42	29-Apr-03	23.82	28.75	4820	13	8.04	469	1.63	1830	3970
	32-43	24-Mar-03	15.53	75.65	8080	9.2	6.92	450	230	2480	7190
	32-50	18-Mar-03	33.55	91.2	4700	12.3	8.98	358	0.14	2190	3770
	32-51	18-Mar-03	23.30	75.65	5330	12.5	7.94	210	4.64	3010	4900
	32-52	18-Mar-03	25.20	66.87	3750	12.5	8.98	181	0.06	1930	2970
*	32-56	7-Feb-03		57.73							
	32-57	1-Apr-03	37.00	54.85	5910	13.8	8.15	810	1.95	2380	4710
	32-58	18-Mar-03	8.78	34.54	5200	10.2	6.93	420	0.02	2120	4100
	32-59	11-Feb-03	11.36	39.45	5070	11.7	7.13	530	0.09	1900	4000
	32-60	25-Mar-03	16.53	27.79	8020	11.6	6.92	690	5.53	3830	7440
	32-69	7-Apr-03	21.63	66.6	4010	11	7.41	400	0.2	1490	3110
	32-72	24-Mar-03	8.76	40.09	6070	10.5	6.78	690	16.9	1910	4630
	5-01	17-Mar-03	20.02	45.15	4660	12.8	8.71	450	0.05	2290	3880
	5-02	1-Apr-03	18.78	38.76	4370	14	7.23	460	0.09	1980	3610
	5-03	11-Feb-03	16.55	39.59	4730	12.3	8.86	397	-0.2	1920	3550
	5-04	17-Mar-03	14.82	69.89	2700	11.7	8.8	380	0.03	700	1600
	5-08	7-Apr-03			6020	13.5	7.41	760	0.1	2240	5360
	5-73	17-Mar-03	9.69	31.65	4870	11	7.46	500	0.03	1930	3810
	AW-1	25-Mar-03	33.65	81.38	4700	12	7.41	510	0.92	1620	3480
	AW-2	18-Mar-03	27.00	85.6	4570	12.5	7.43	254	0.026	2300	3980
*	C-3	25-Mar-03		12.22							
*	D--4	25-Mar-03	21.35	22.3							
	E-5	24-Mar-03	11.41	16.02	12980	10.9	6.69	2440	-0.2	3930	10600
*	MW-24	11-Feb-03	50.00	50.35							
	S-12	25-Mar-03	13.95	27.87	9230	11.9	6.64	900	0.13	4170	8780
	S-9	24-Mar-03	10.23	23.59	11640	10.9	8.88	2450	0.03	4070	10100

Notes:

* - well was dry or contained insufficient water for sample collection.

RIO ALGOM MINING LLC
DISCHARGE PLAN DP-169 --- 2003 ANNUAL REPORT

	Well	Date	Depth to Water	Total Depth	Spec. Cond.	Temp (C)	pH	Chloride (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)	TDS (mg/L)
*	30-03	30-Oct-03		18.55							
	30-04	20-Oct-03	34.43	88.52	3840	12.5	8.96	560	0.09	1460	2870
*	30-46	25-Oct-03		38.44							
	30-47	27-Oct-03	30.77	79	4610	12.6	7.11	860	<.02	2040	4430
	30-48	27-Oct-03	31.07	79.18	4710	12.3	7.4	860	0.02	1600	4310
	30-49	20-Oct-03	43.34	68.65	5000	13.4	7.32	570	0.22	2520	4550
*	30-53	25-Nov-03		50.17							
*	30-68	25-Nov-03		63.33							
	31-05	21-Oct-03	29.04	74.26	4900	11.4	7.64	460	0.02	2660	4680
	31-61	22-Sep-03	17.50	27.02	6400	15.6	6.9	364	1.3	3410	6570
	31-63	20-Oct-03	19.10	30.6	12680	13.9	6.37	2720	3.15	5730	13500
	31-65	27-Oct-03	16.93	46.15	7920	12.4	7.4	950	3.52	5040	9320
	31-70	20-Oct-03	17.24	31.4	10490	13.8	6.34	1120	0.37	6590	11500
	31-71	20-Oct-03	19.92	63.54	4740	14.3	7.03	670	0.1	2080	4070
	32-01	28-Oct-03	16.88	52.53	4120	13.6	7.94	390	0.26	1620	3290
	32-02	28-Oct-03	31.34	76.76	4630	13.2	7.6	660	0.02	2200	4120
	32-41	21-Oct-03	22.96	58.34	6480	12.2	7.21	1470	0.06	2260	5640
	32-42	21-Oct-03	22.10	28.68	4600	12.4	7.79	580	0.11	2170	4140
	32-43	29-Dec-03	16.98	76.8	6320	11	7.2	360	328	3170	6740
	32-50	21-Oct-03	33.53	91.2	4130	12.6	8.35	353	0.04	1820	3680
	32-51	21-Oct-03	24.61	75.72	4720	12.5	8.34	253	4.18	3170	4830
	32-52	21-Oct-03	26.34	66.8	3470	13.3	9.54	185	0.04	2060	3150
*	32-56	28-Oct-03		57.6							
	32-57	28-Oct-03	37.22	54	5500	13.8	8.79	900	3.95	2220	4650
	32-58	27-Oct-03	10.70	34.45	4390	13.8	7.11	530	<.02	2130	4230
	32-59	22-Sep-03	12.84	39.32	4510	14.7	7.34	445	0.07	2110	4100
	32-60	28-Oct-03	16.57	27.65	6640	13.8	6.94	770	7	3990	7240
	32-69	21-Oct-03	22.60	66.55	3810	11.3	7.52	434	0.24	1770	3290
	32-72	27-Oct-03	10.86	40.13	4830	16.4	7.21	810	5.2	2050	4520
	5-01	21-Oct-03	21.41	45.06	3930	14.2	8.5	261	0.02	2630	3970
	5-02	28-Oct-03	20.04	38.67	4090	14.6	7.26	610	<.02	1890	3550
	5-03	23-Sep-03	17.72	40.34	4380	14.6	8.71	422	0.06	2020	3630
	5-04	21-Oct-03	15.45	64.65	3090	14.9	8.83	470	0.03	996	2160
	5-08	21-Oct-03	27.85	87.83	5010	14.1	7.24	760	<.02	2490	4670
	5-73	21-Oct-03	11.65	31.57	4260	14.6	7.43	493	<.02	1910	3840
	AW-1	20-Oct-03	34.57	81.29	4290	12.1	7.25	490	0.8	1840	3510
	AW-2	28-Oct-03	27.87	82.45	3970	12.5	7.46	257	<.02	2300	4030
*	C-3	25-Oct-03		12.14							
*	D--4	25-Oct-03	20.73	22.15							
	E-5	28-Oct-03	11.06	15.99	10520	15	6.87	2850	0.61	4270	10900
*	MW-24	30-Oct-03	50.08	50.29							
	S-12	28-Oct-03	14.06	28.67	7720	13.9	6.77	870	0.07	4520	8690
	S-9	28-Oct-03	10.46	23.45	8820	14.8	8.94	2590	0.04	2330	10300

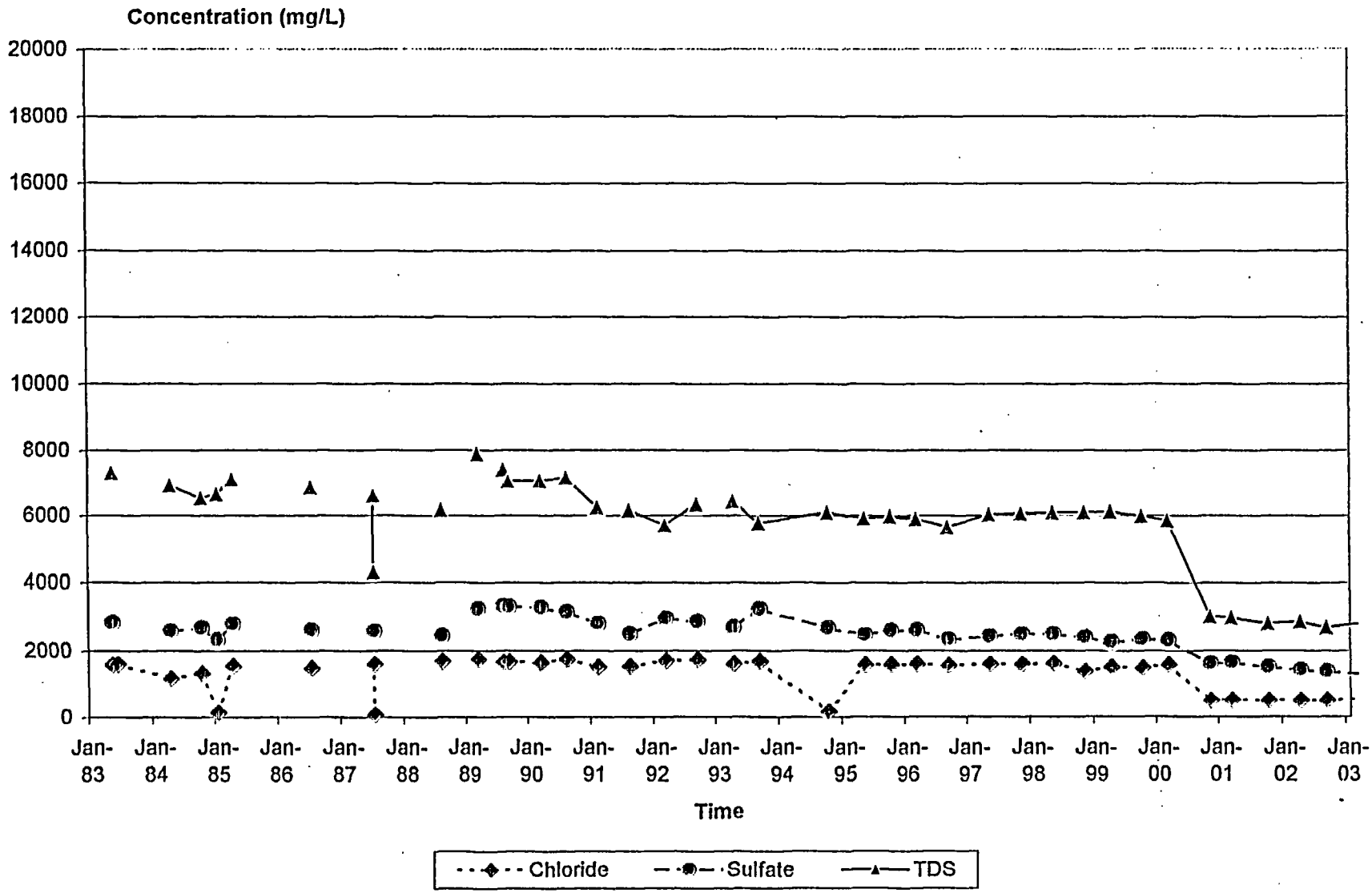
Notes:

* - well was dry or contained insufficient water for sample collection.

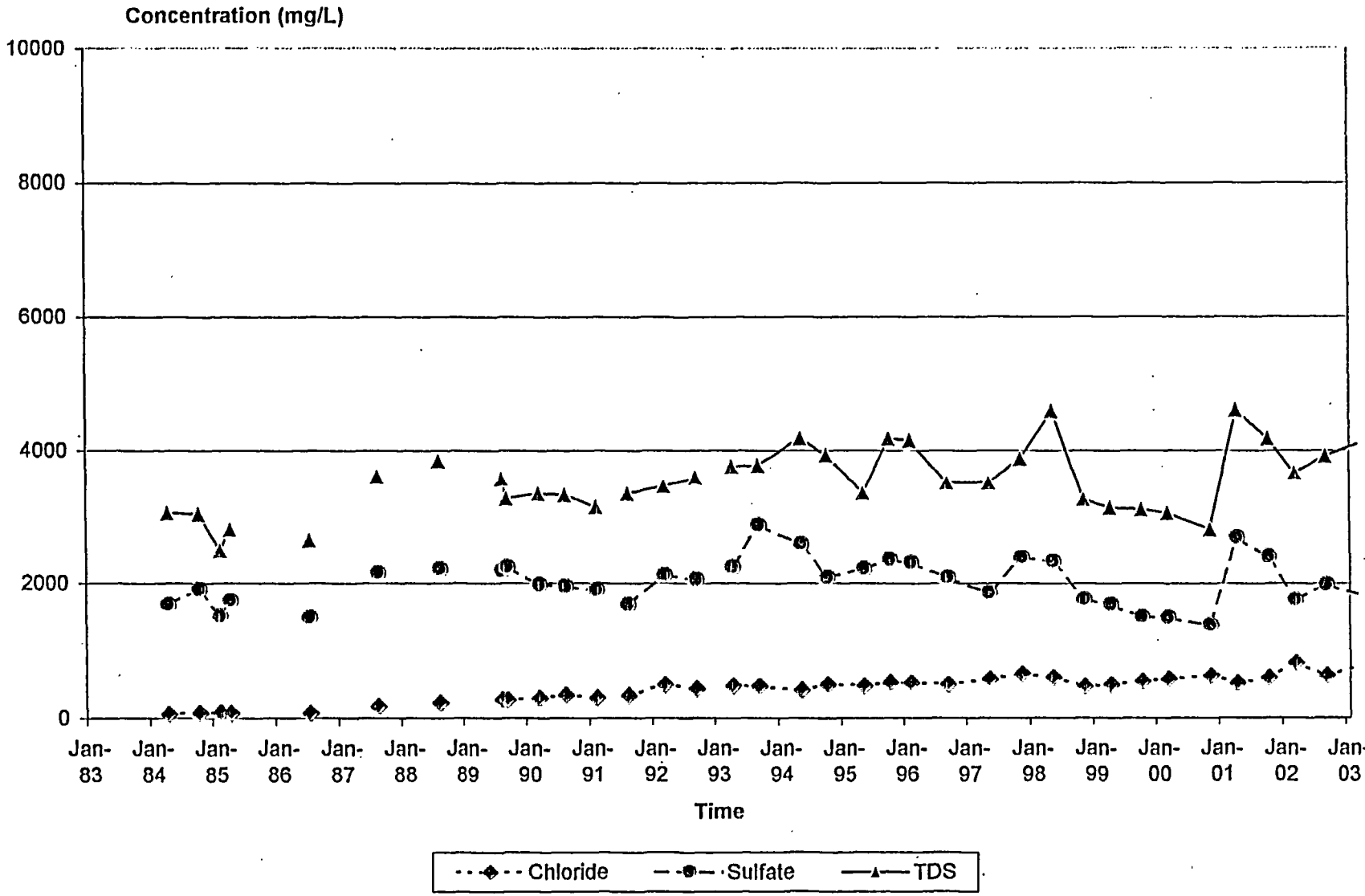
APPENDIX B

TIME vs CONCENTRATION PLOTS
ALLUVIAL WELLS

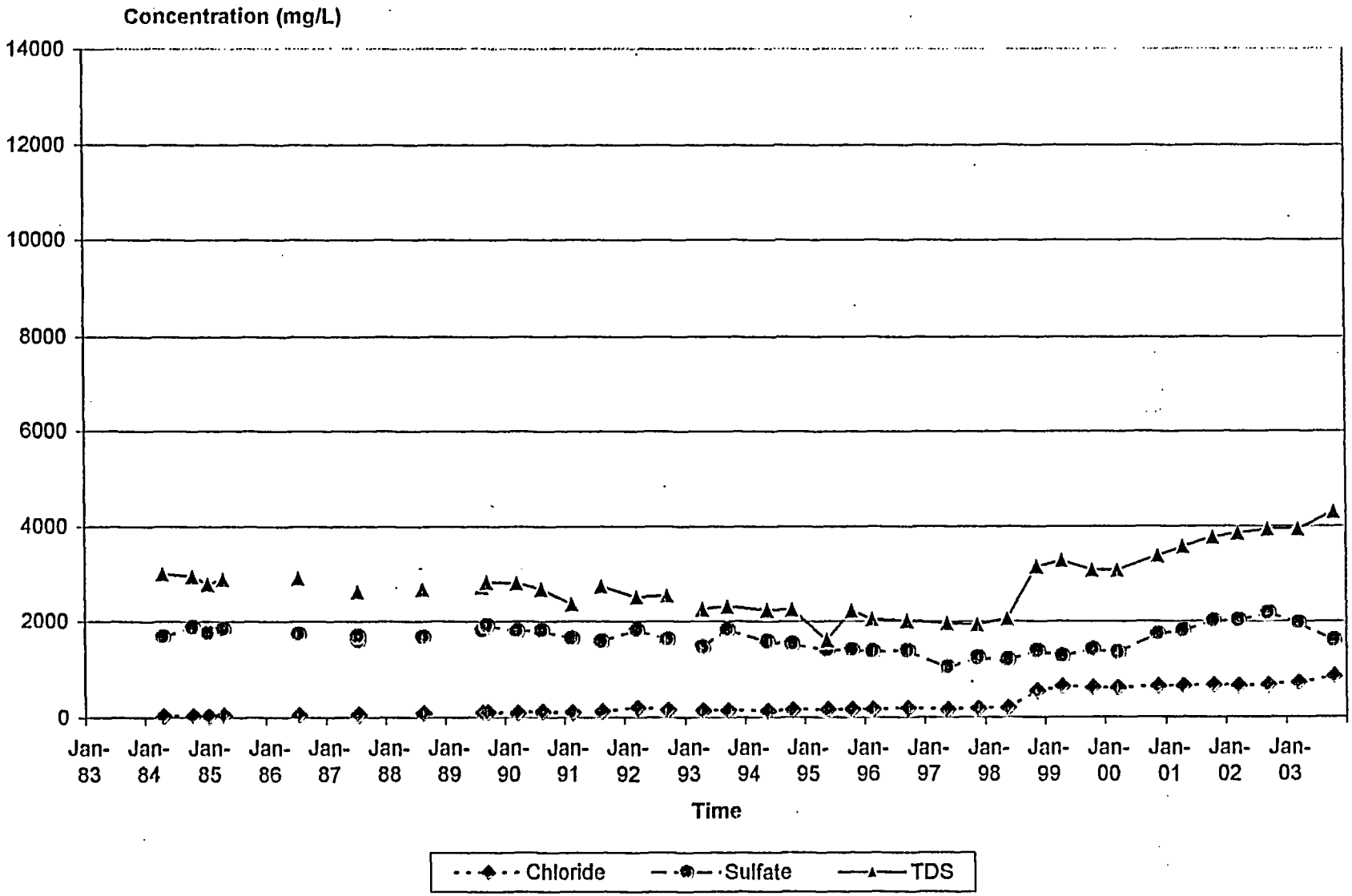
Monitor Well 30-04



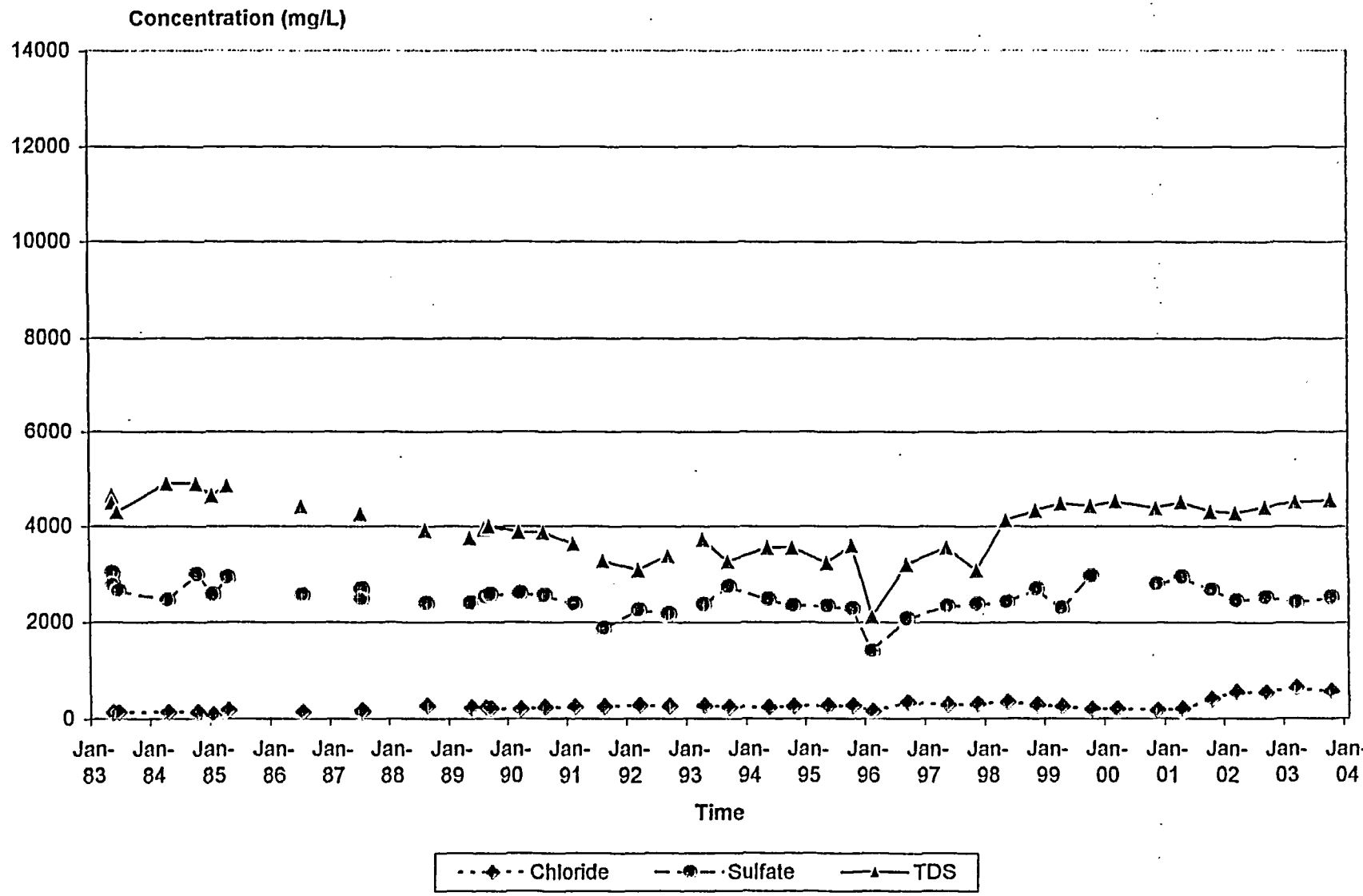
Monitor Well 30-47

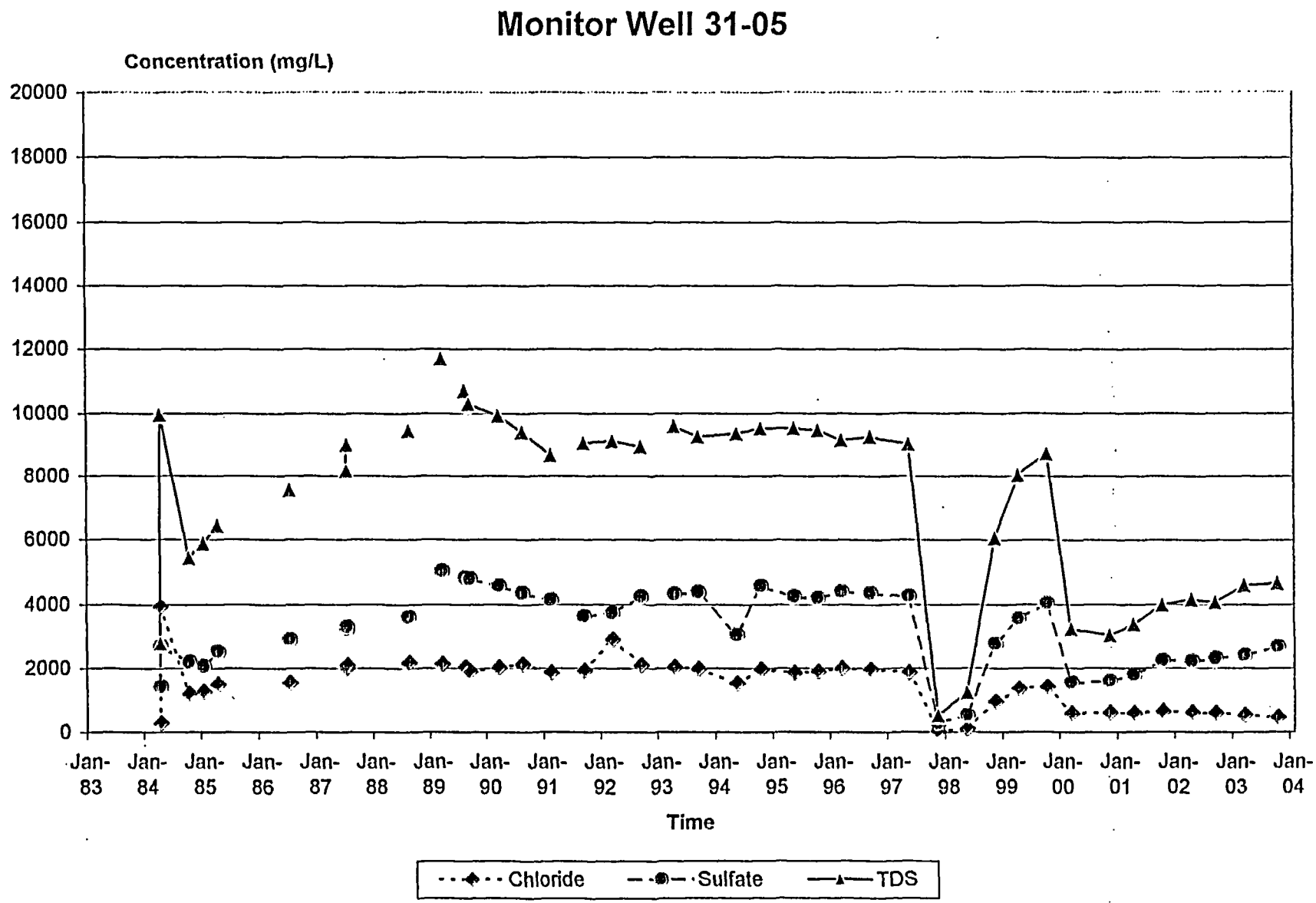


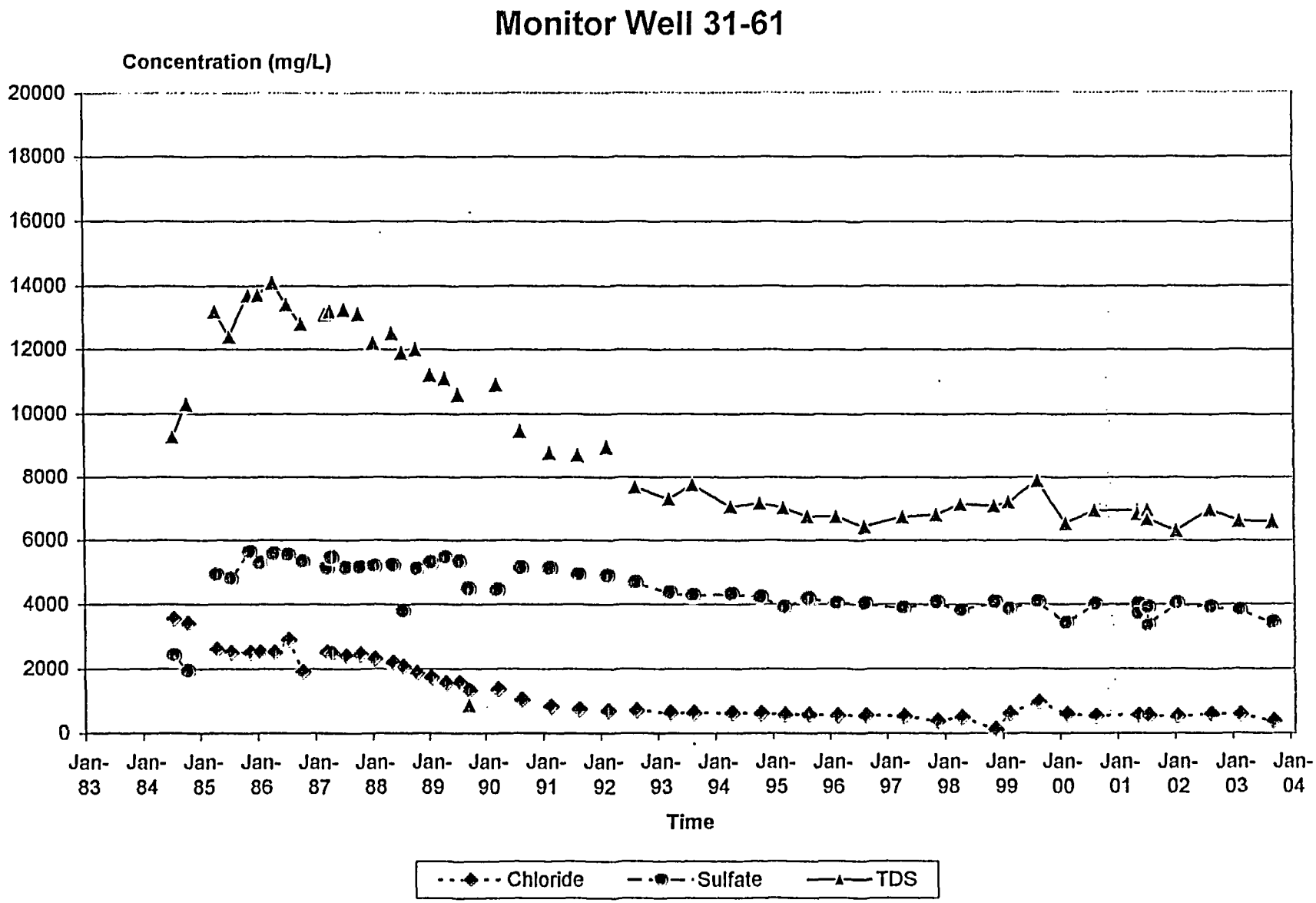
Monitor Well 30-48



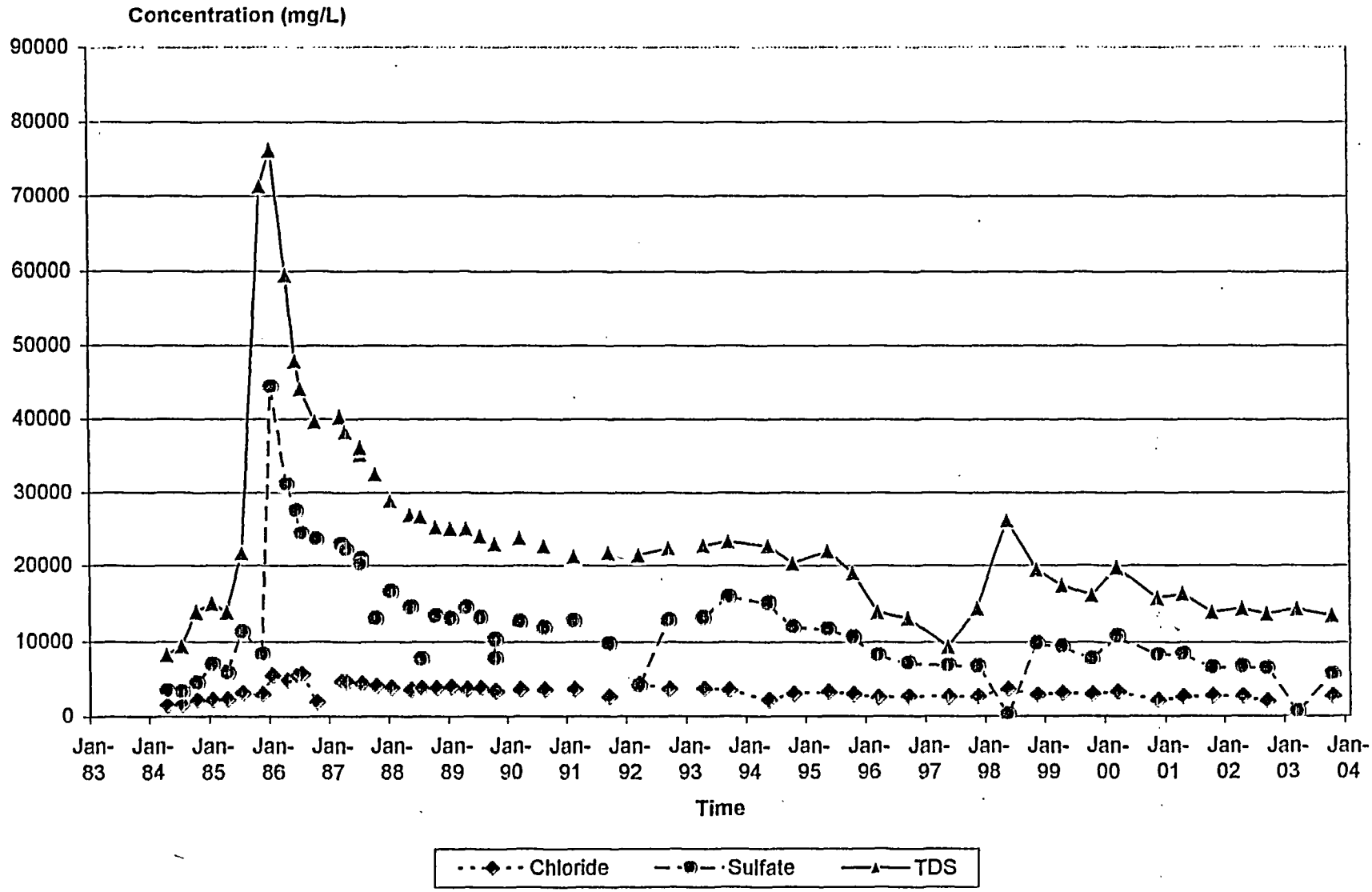
Monitor Well 30-49



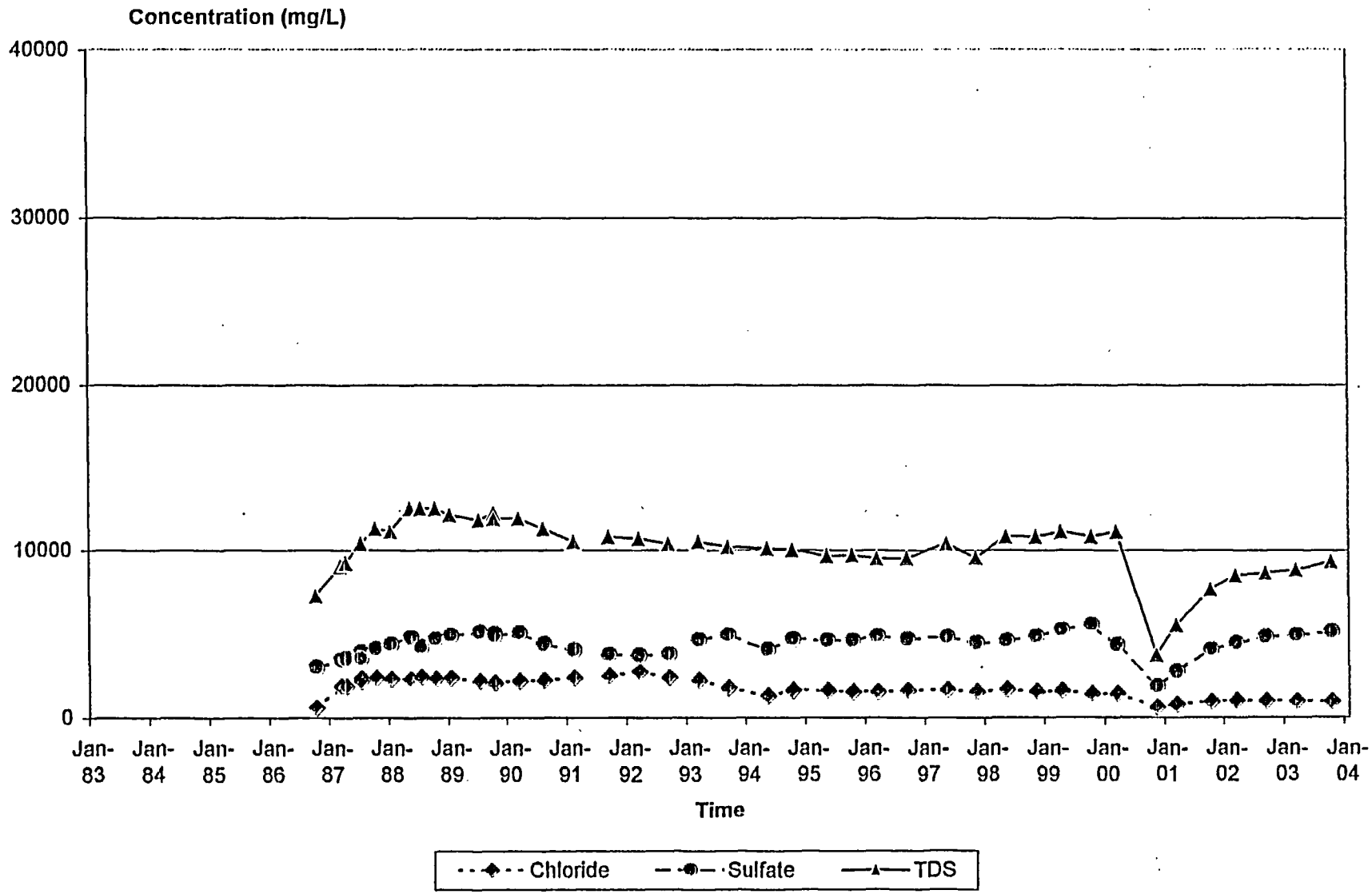

Monitor Well 31-05
Concentration (mg/L)
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Time
Chloride
Sulfate
TDS

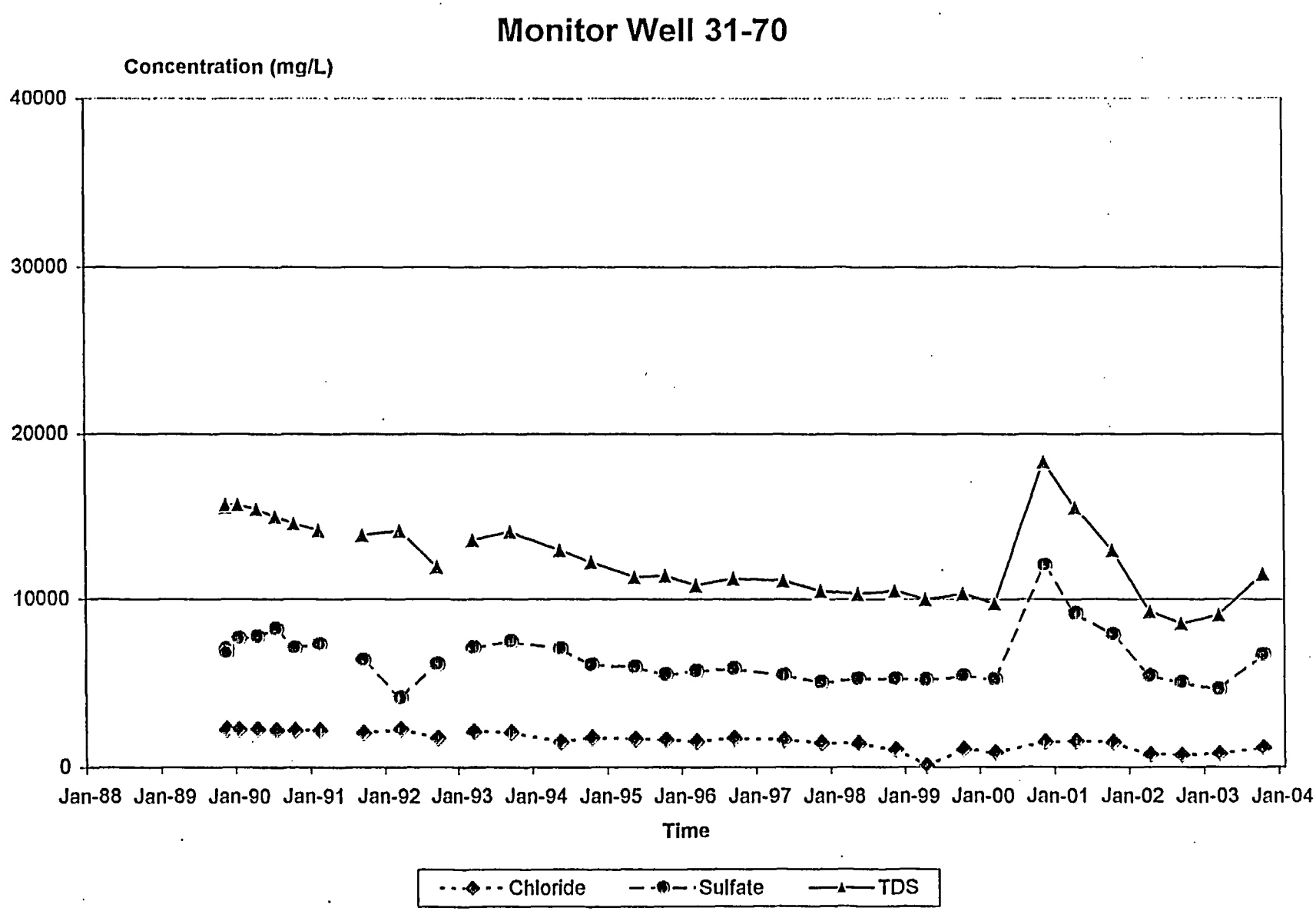

Monitor Well 31-61
Concentration (mg/L)
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Time
Chloride
Sulfate
TDS

Monitor Well 31-63

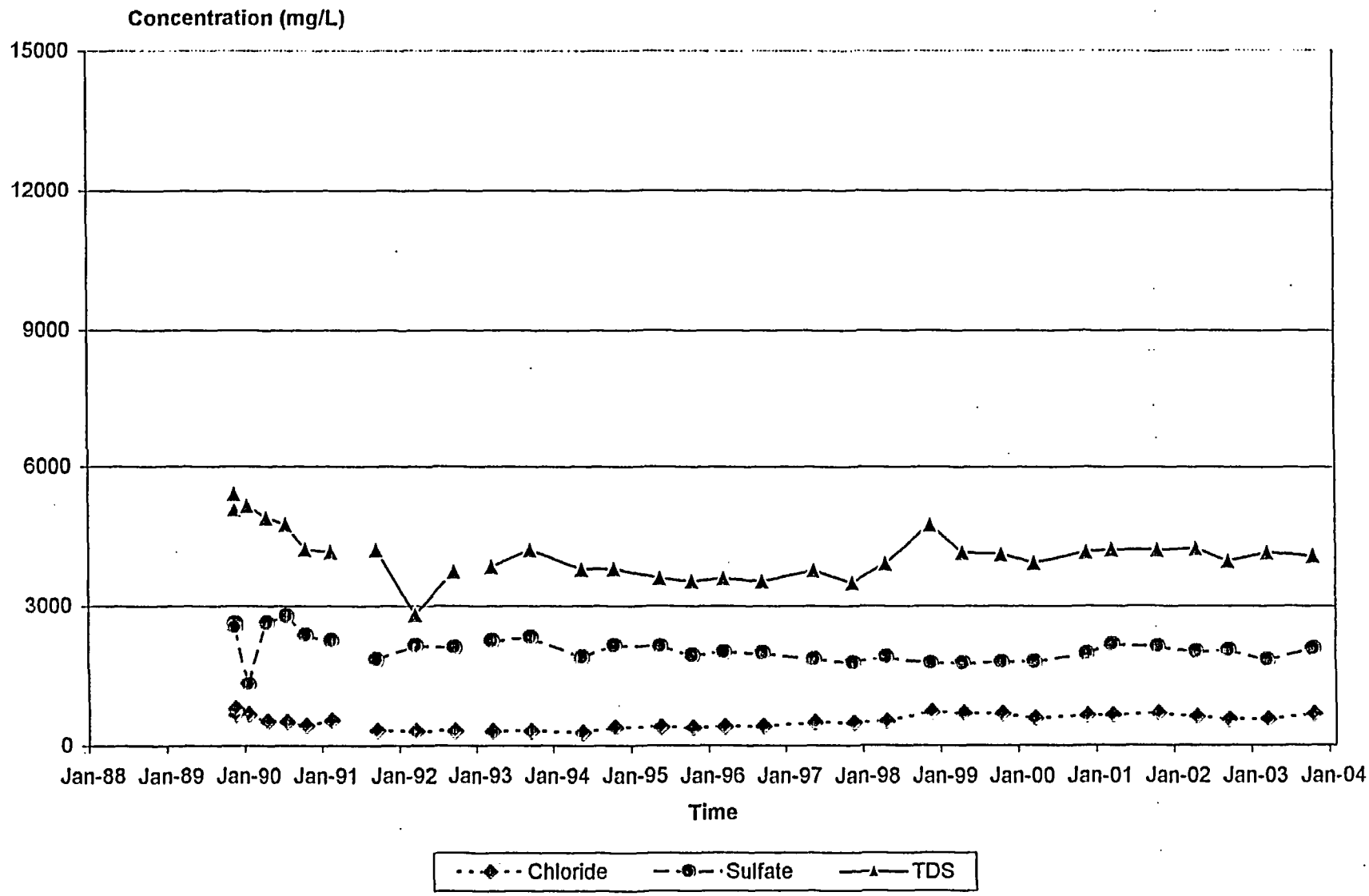


Monitor Well 31-65

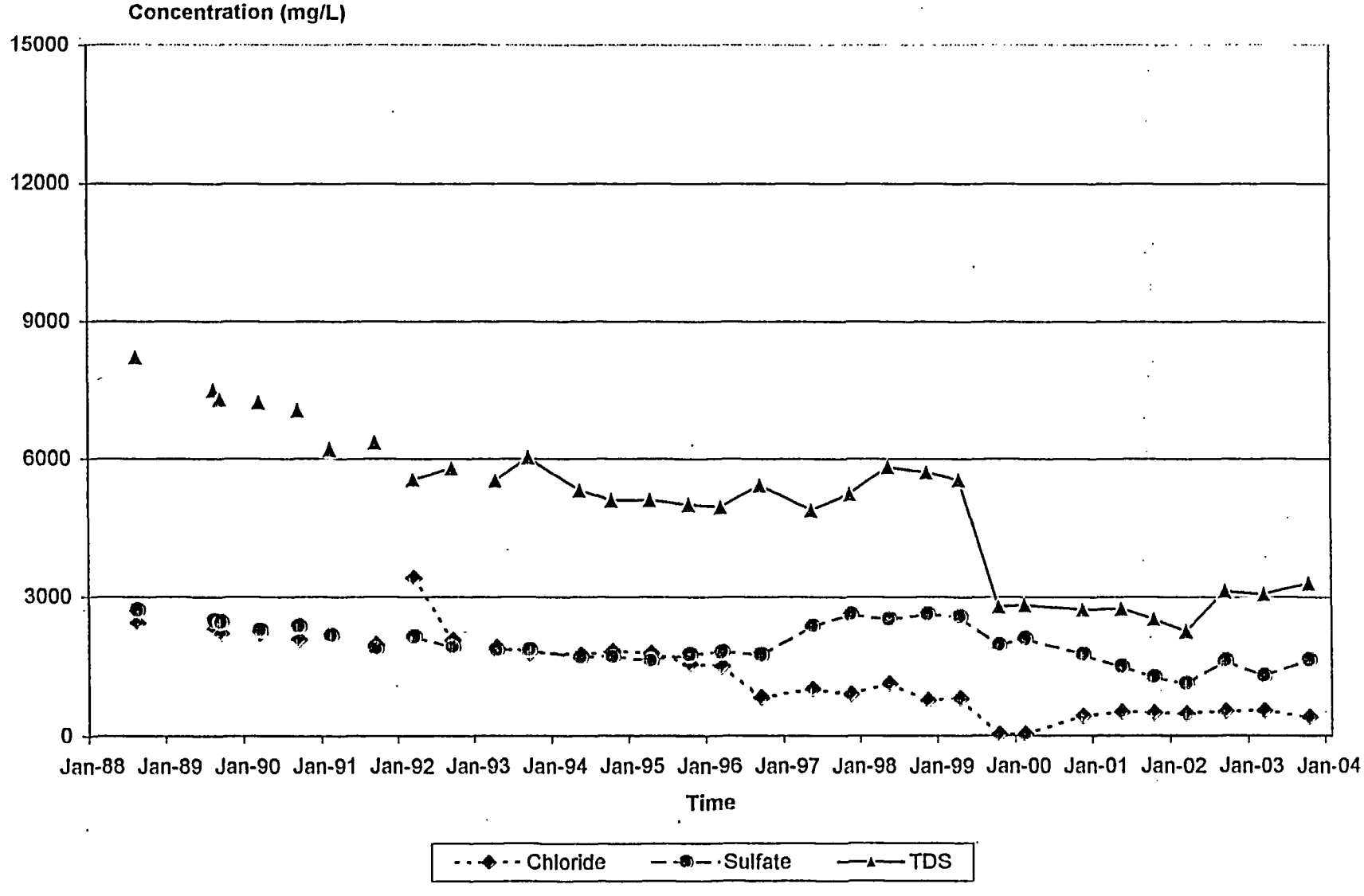



Monitor Well 31-70
Concentration (mg/L)
40000
30000
20000
10000
0
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Time
Chloride
Sulfate
TDS

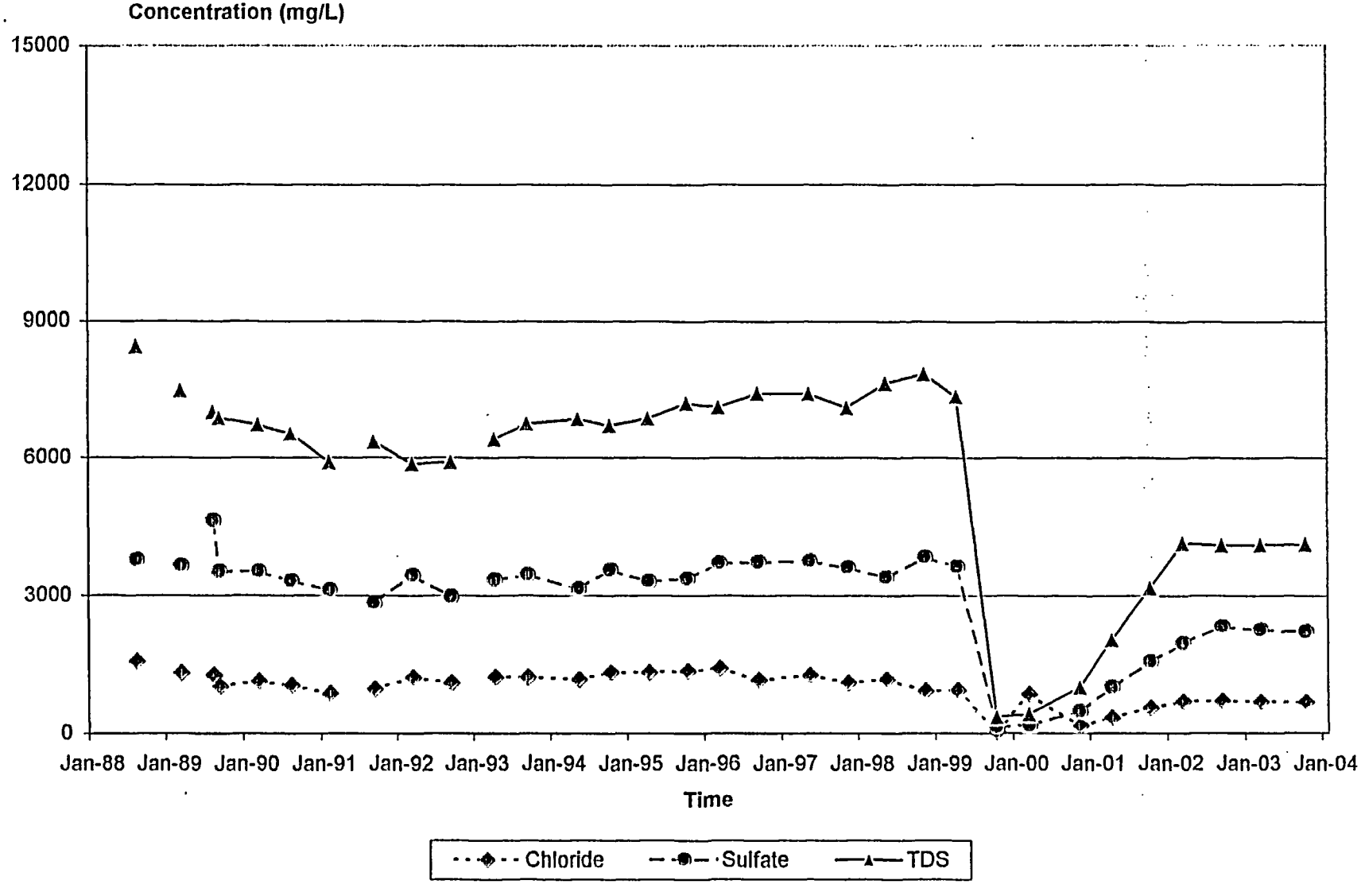
Monitor Well 31-71



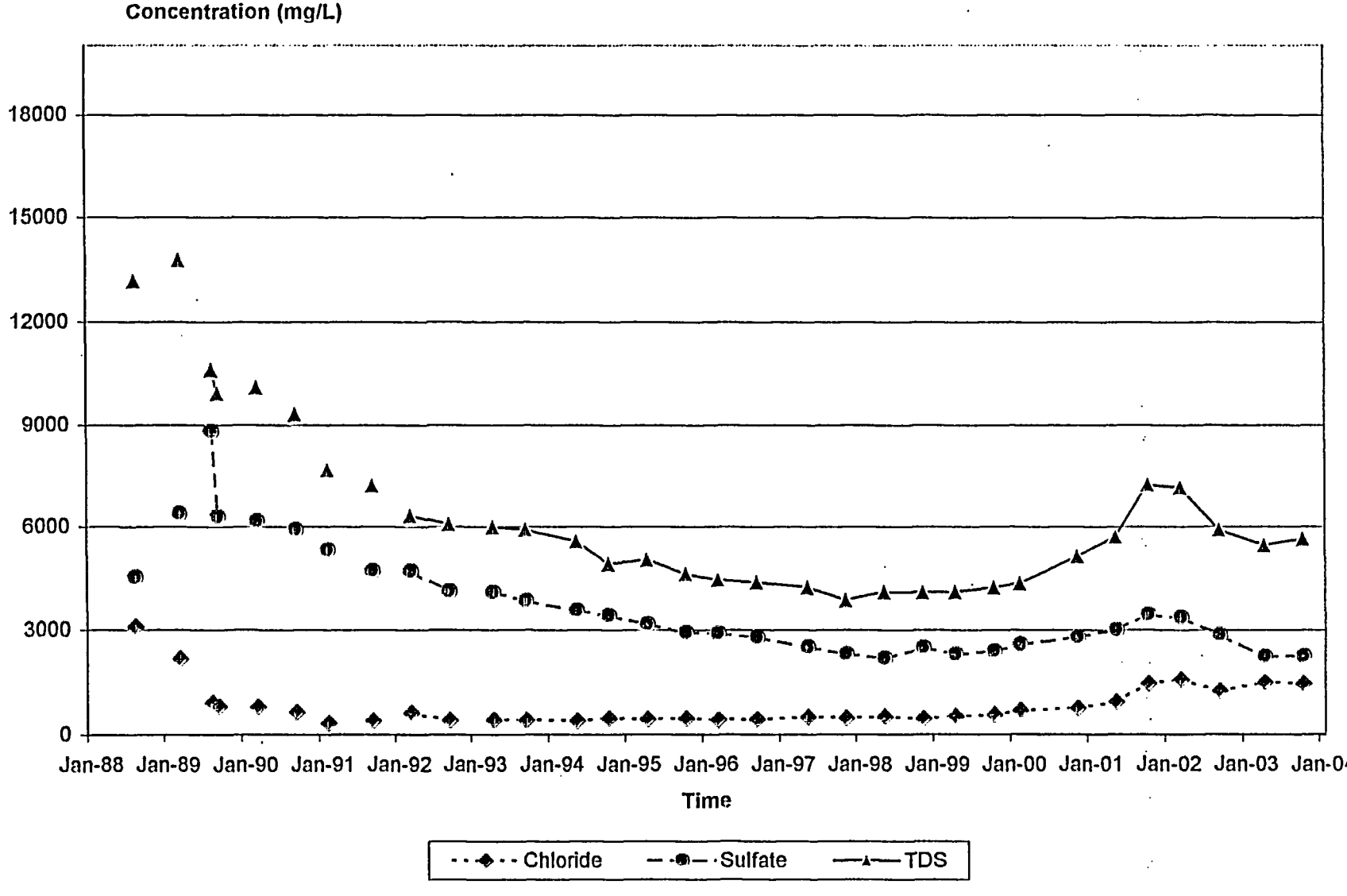
Monitor Well 32-01



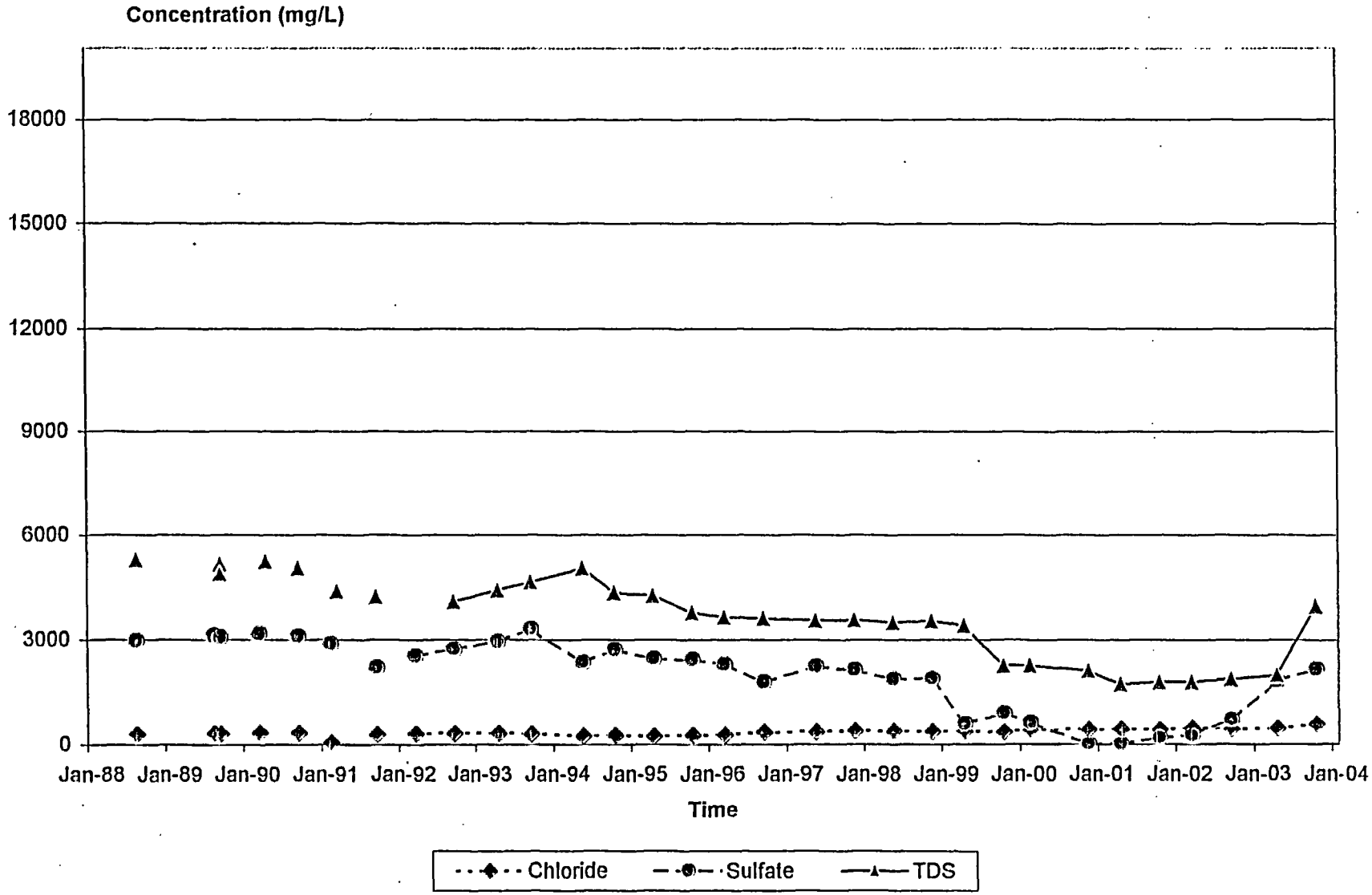
Monitor Well 32-02



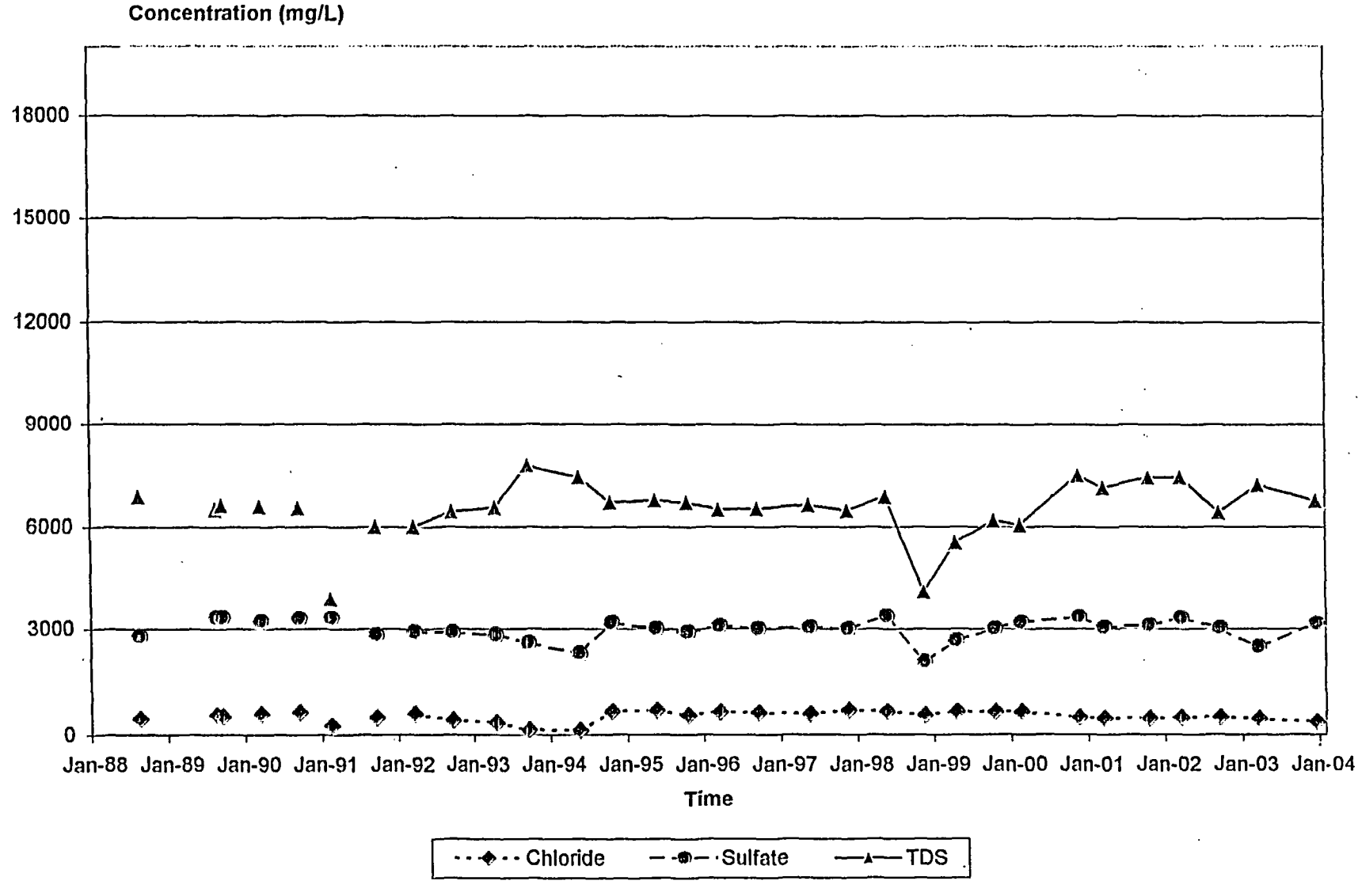
Monitor Well 32-41



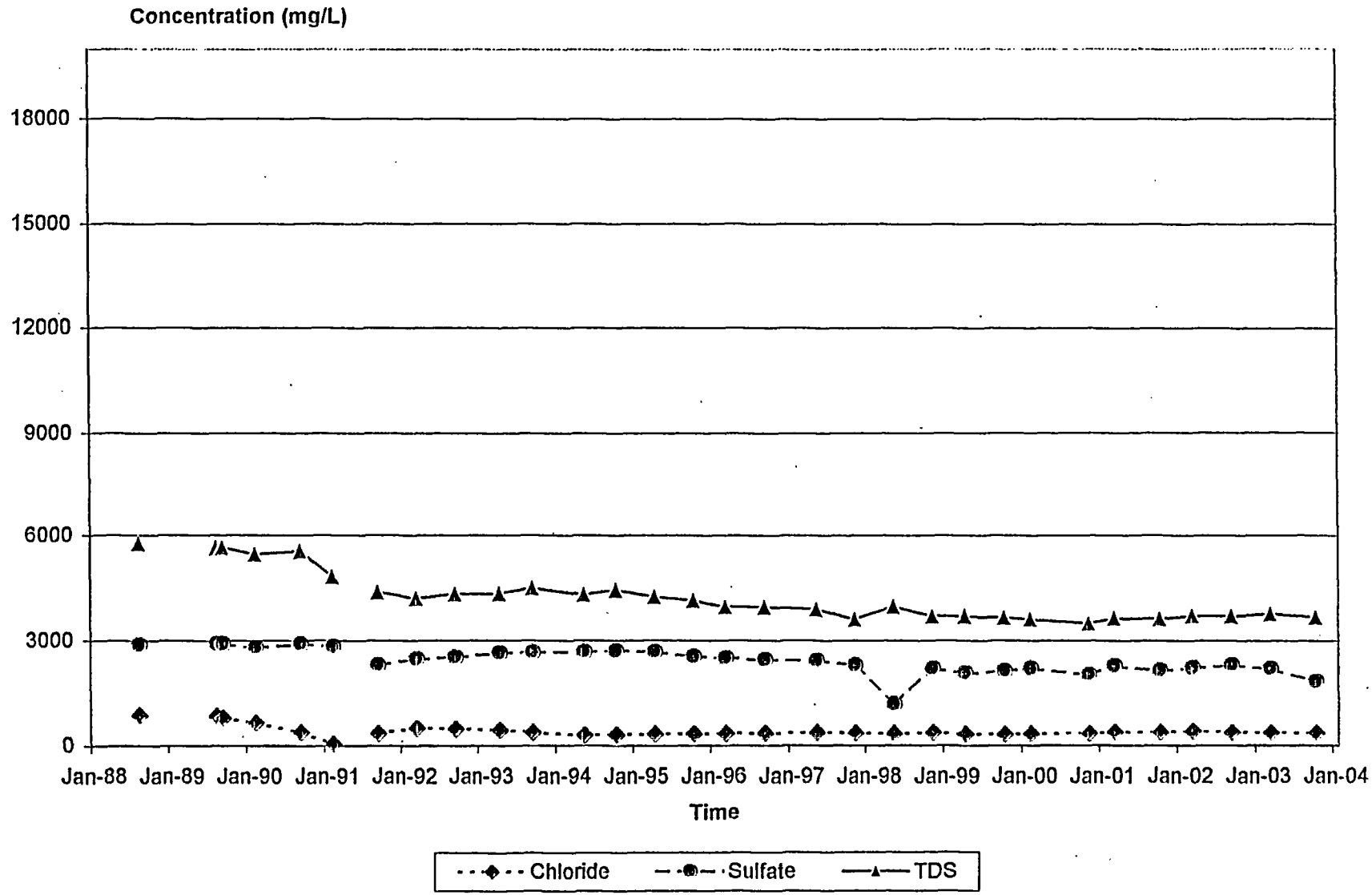
Monitor Well 32-42



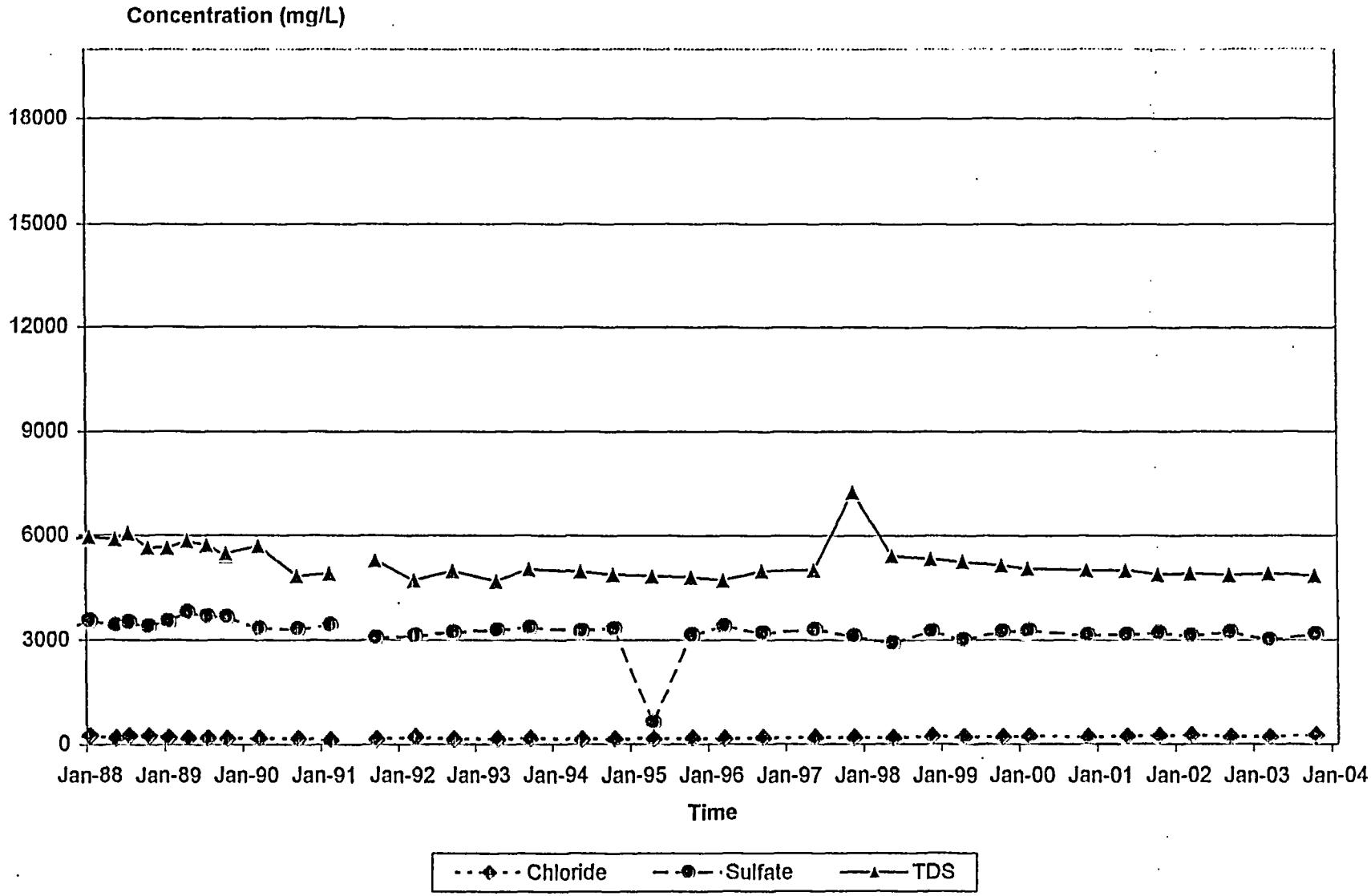
Monitor Well 32-43



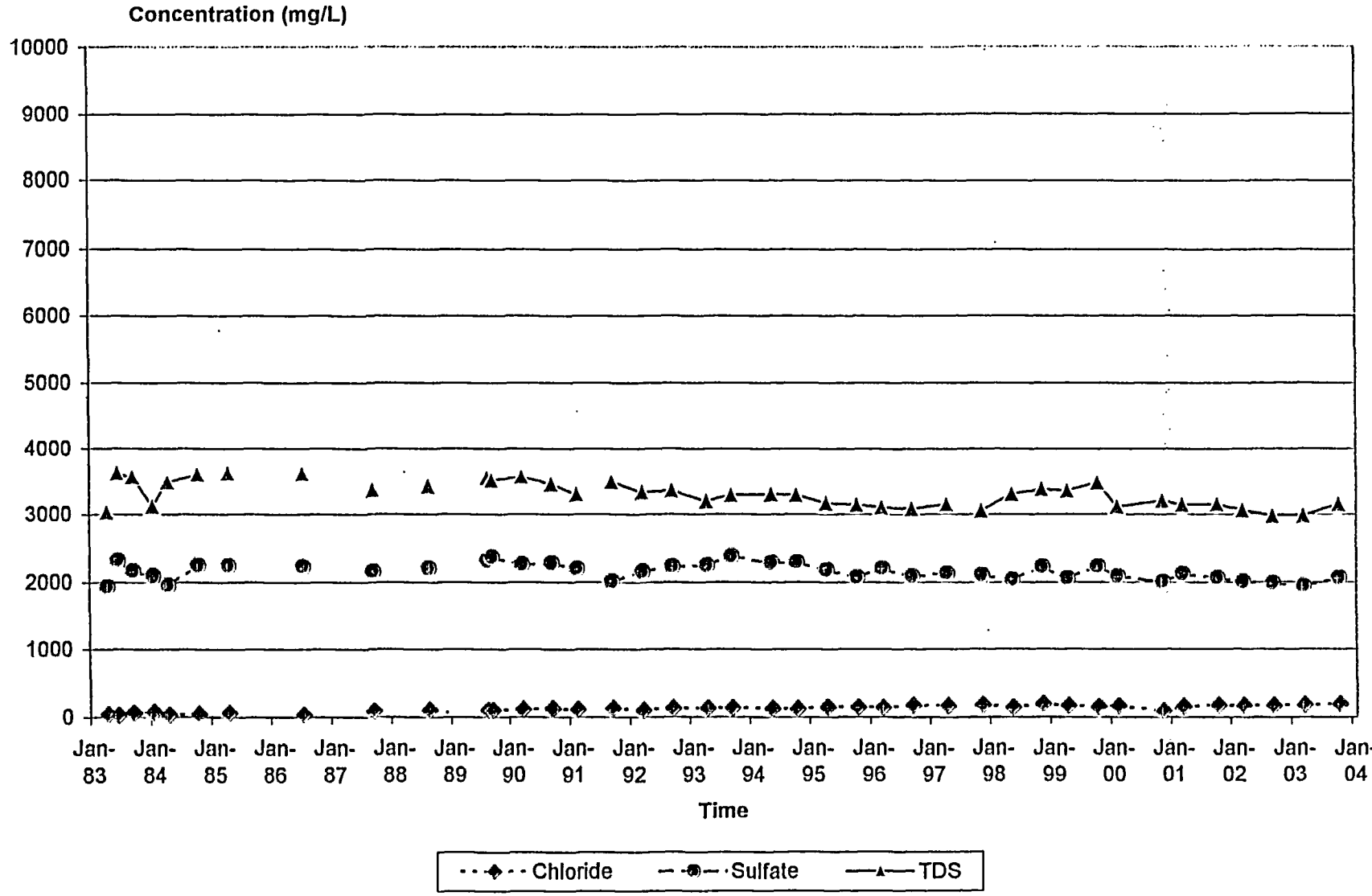
Monitor Well 32-50



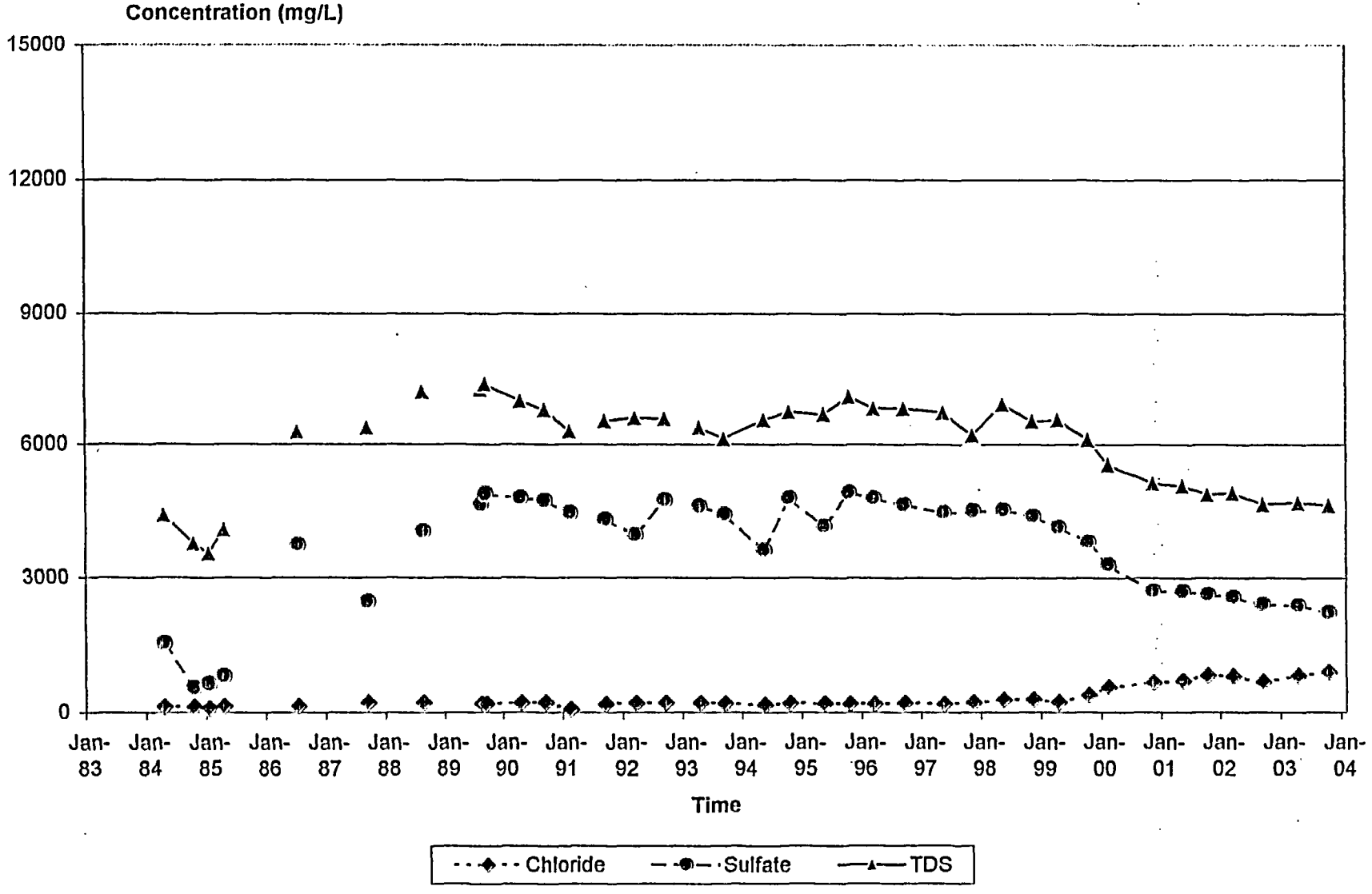
Monitor Well 32-51



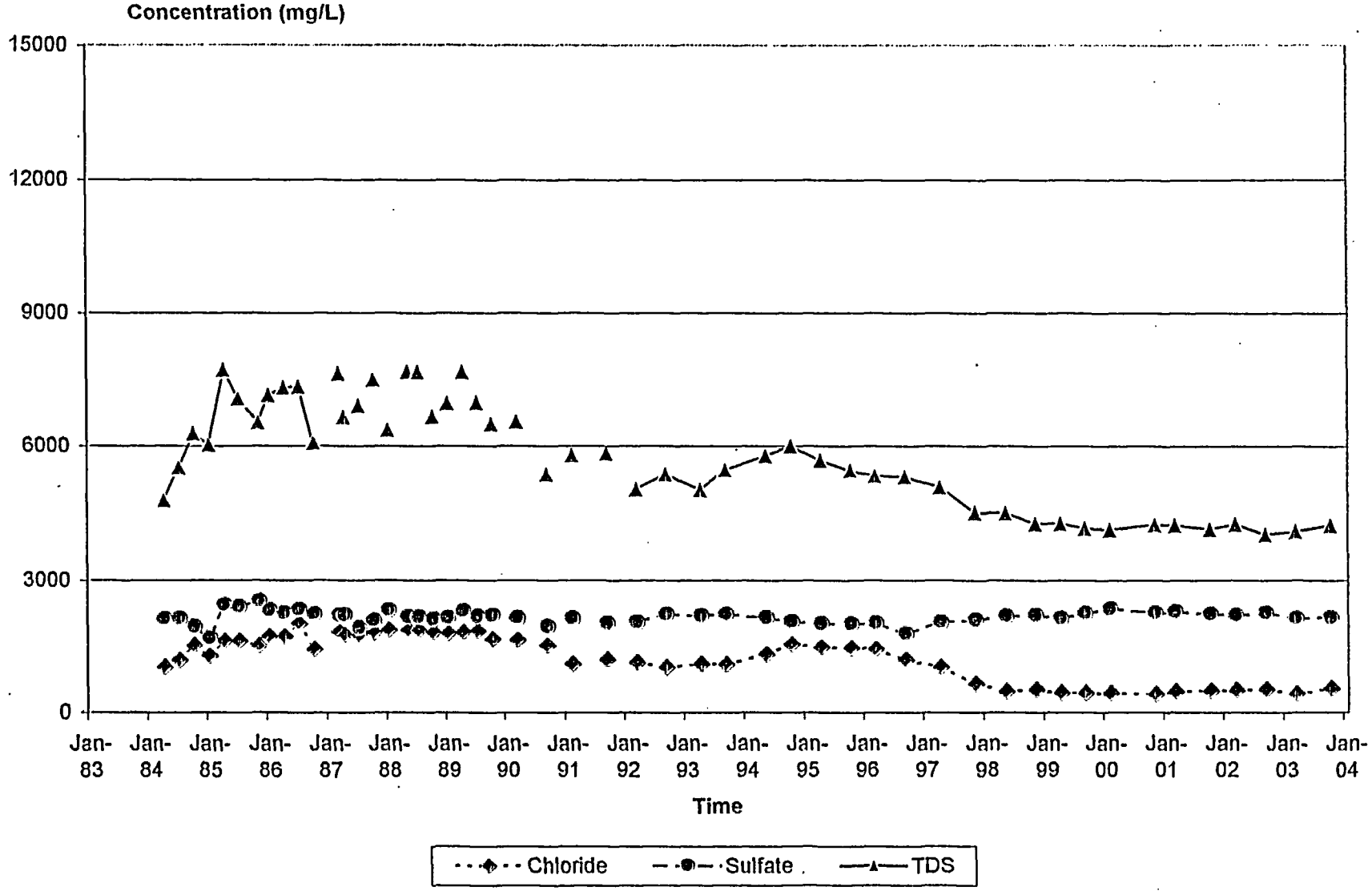
Monitor Well 32-52

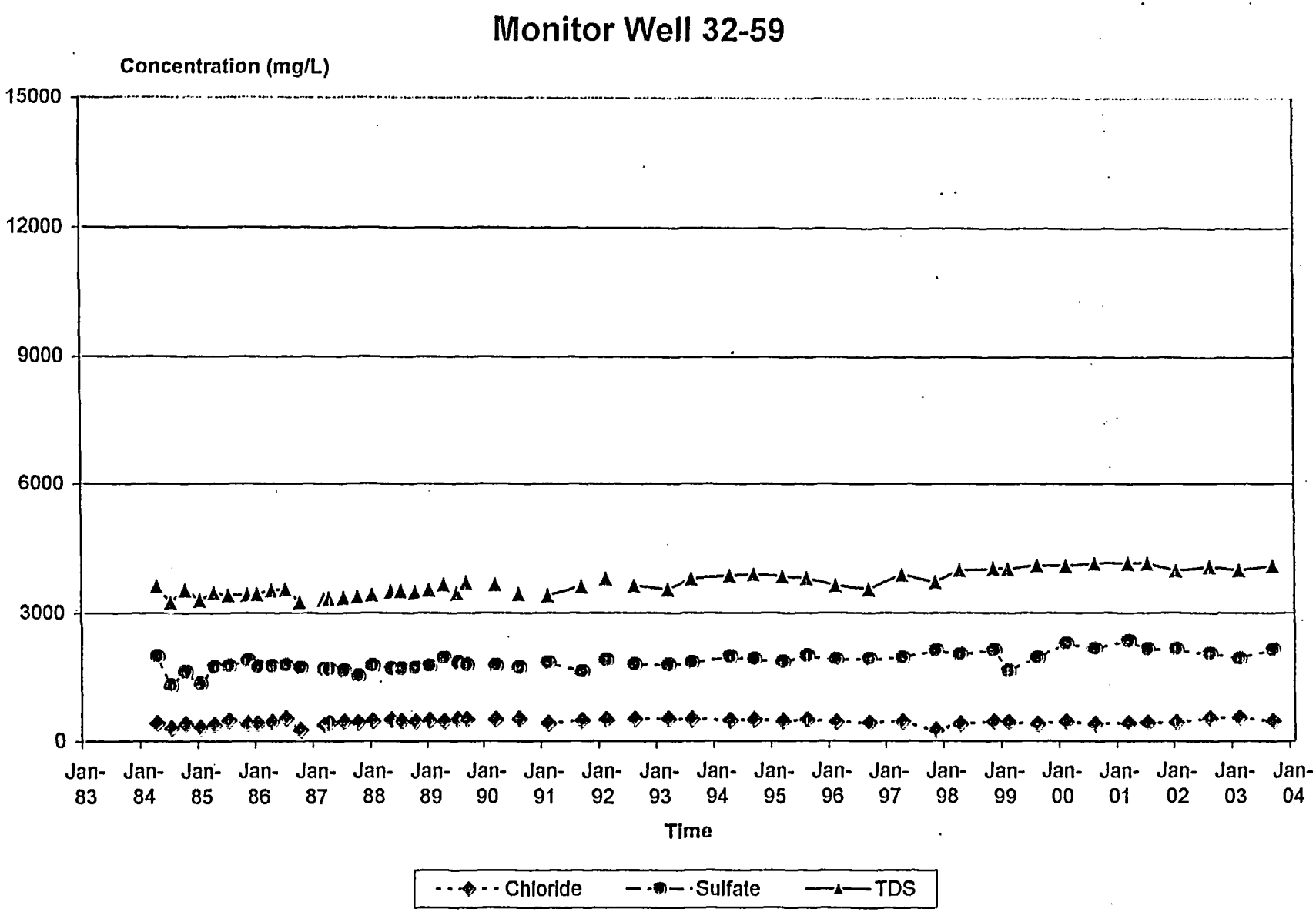


Monitor Well 32-57

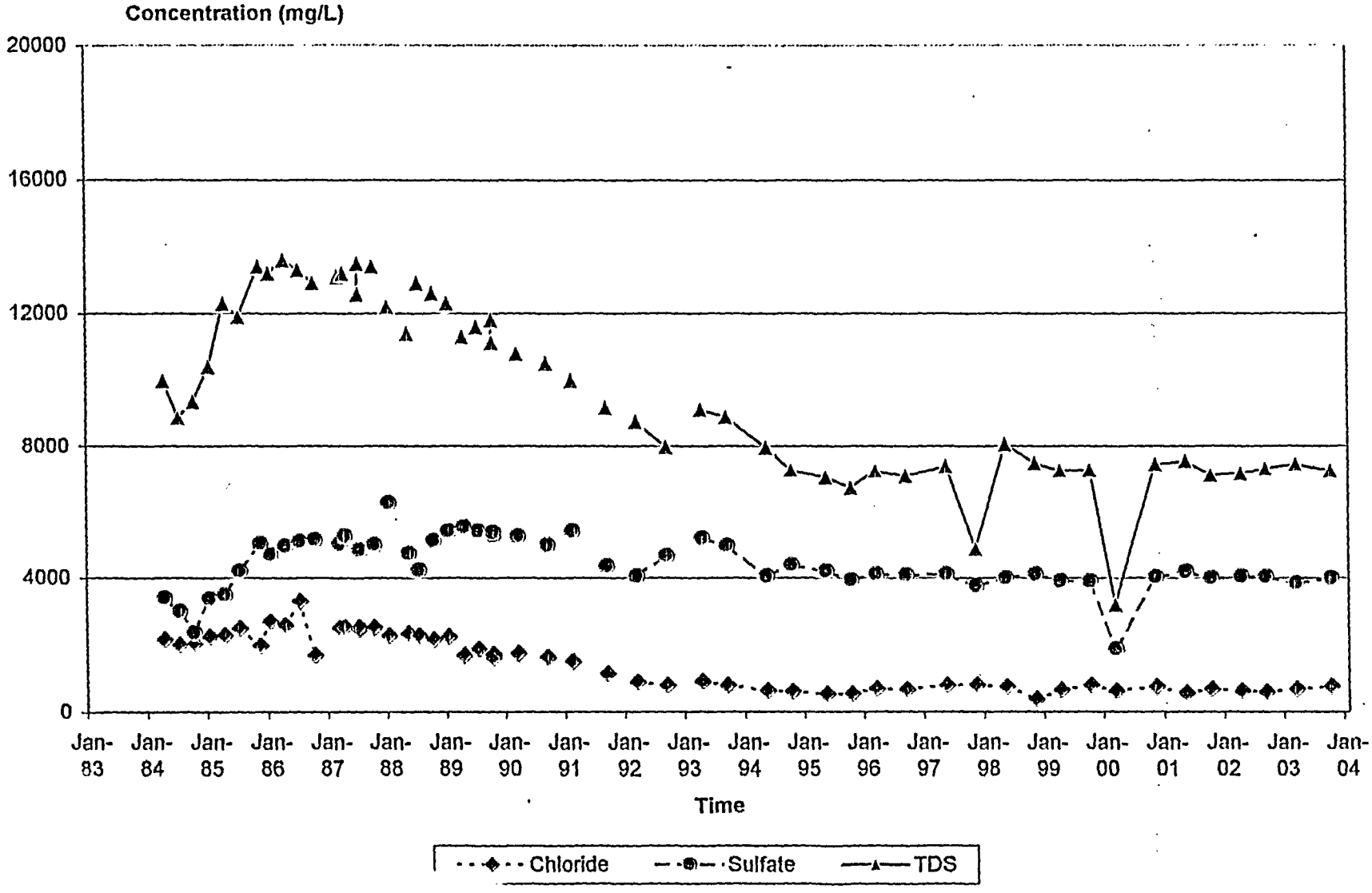


Monitor Well 32-58

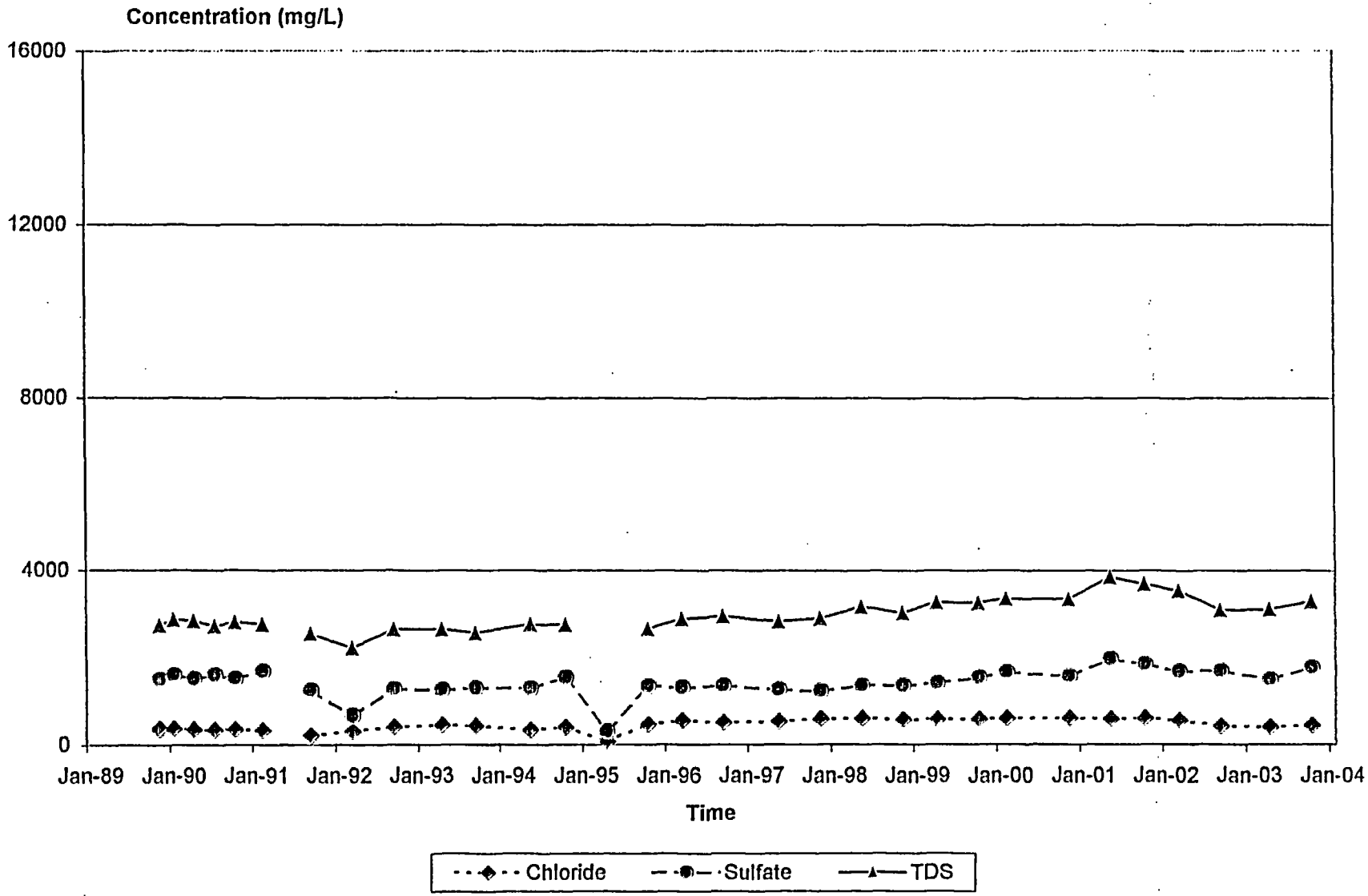



Monitor Well 32-59
Concentration (mg/L)
15000
12000
9000
6000
3000
0
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Time
Chloride
Sulfate
TDS

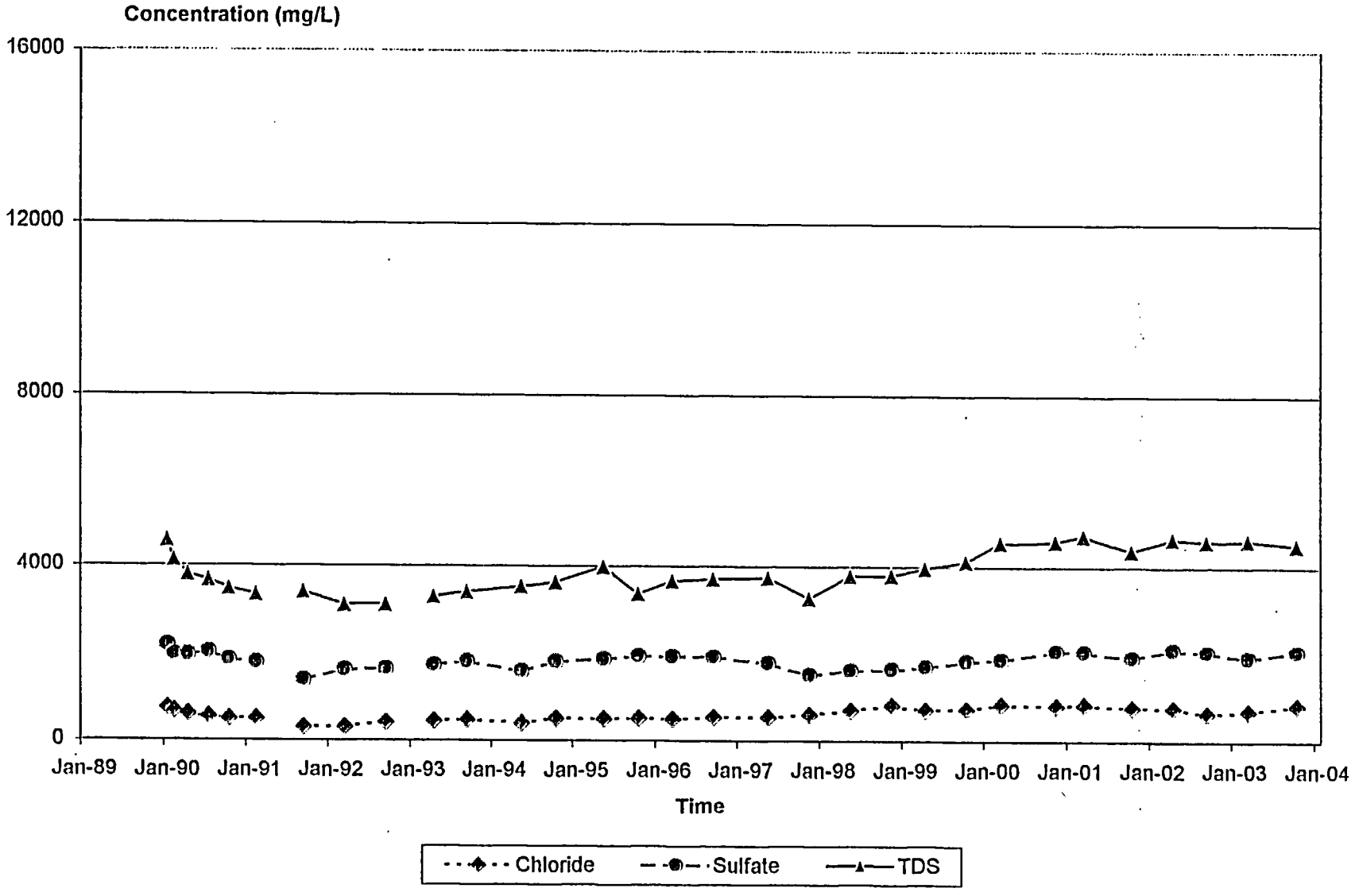
Monitor Well 32-60

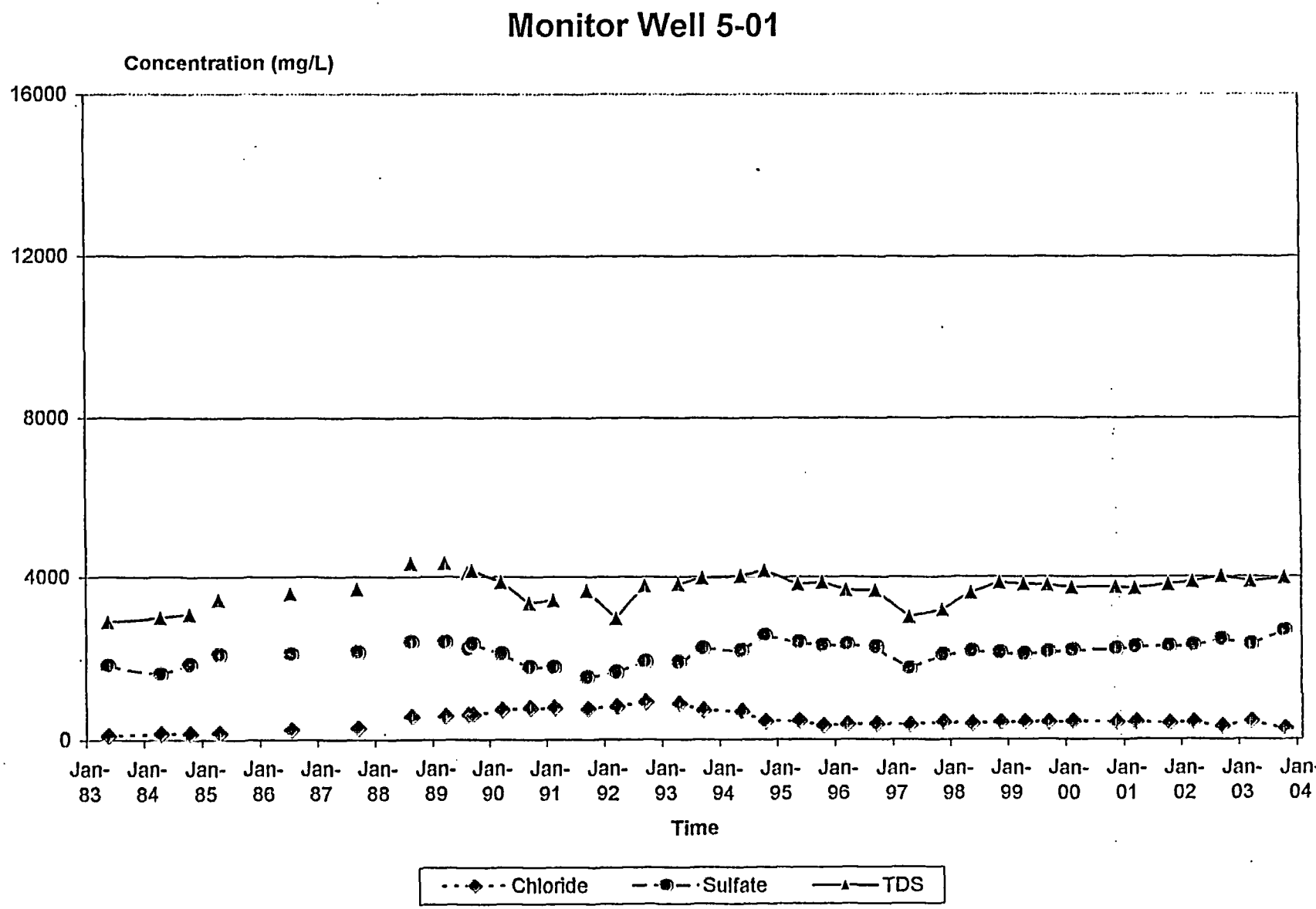


Monitor Well 32-69

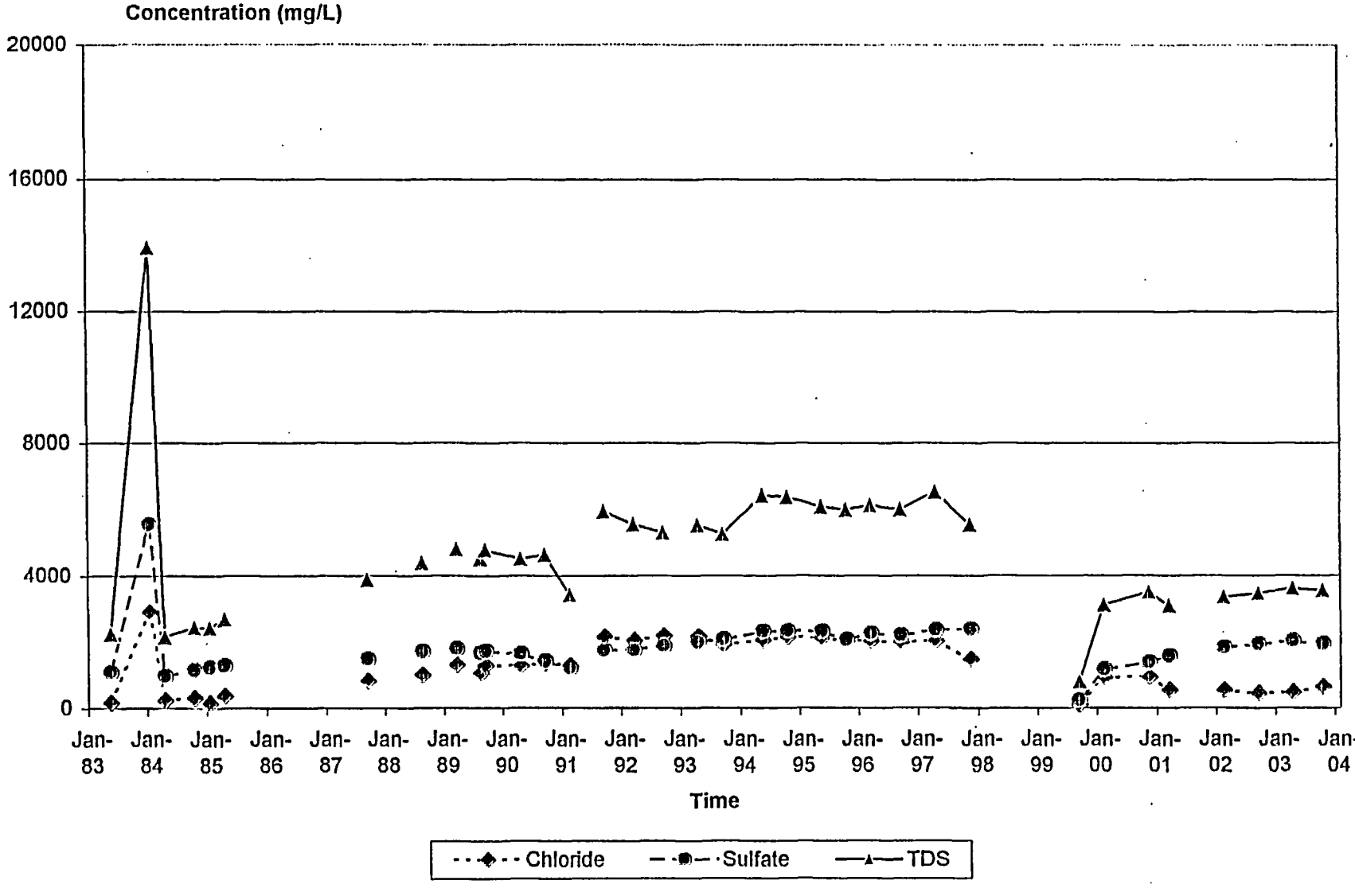


Monitor Well 32-72

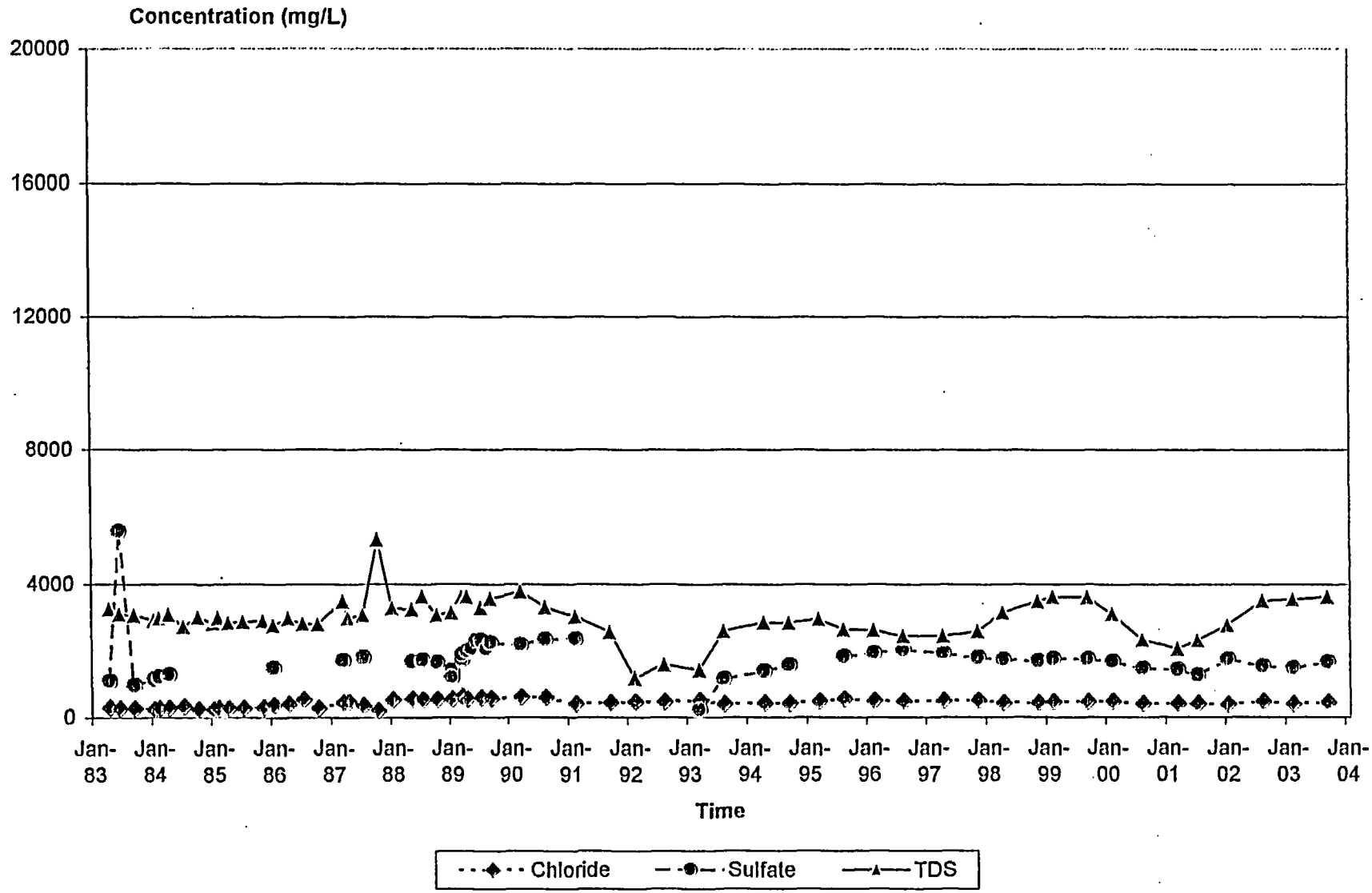



Monitor Well 5-01
Concentration (mg/L)
16000
12000
8000
4000
0
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Time
Chloride
Sulfate
TDS

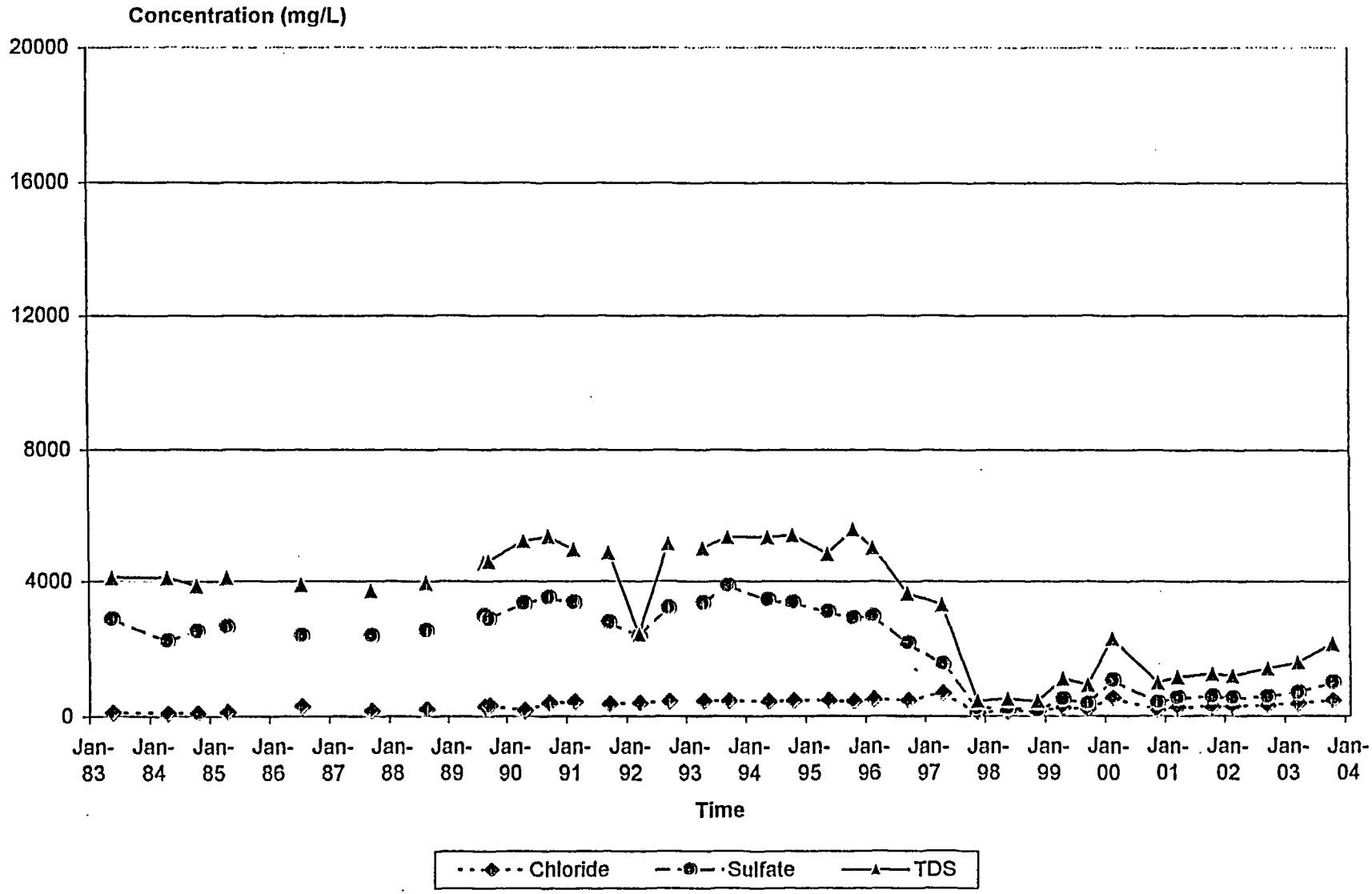
Monitor Well 5-02

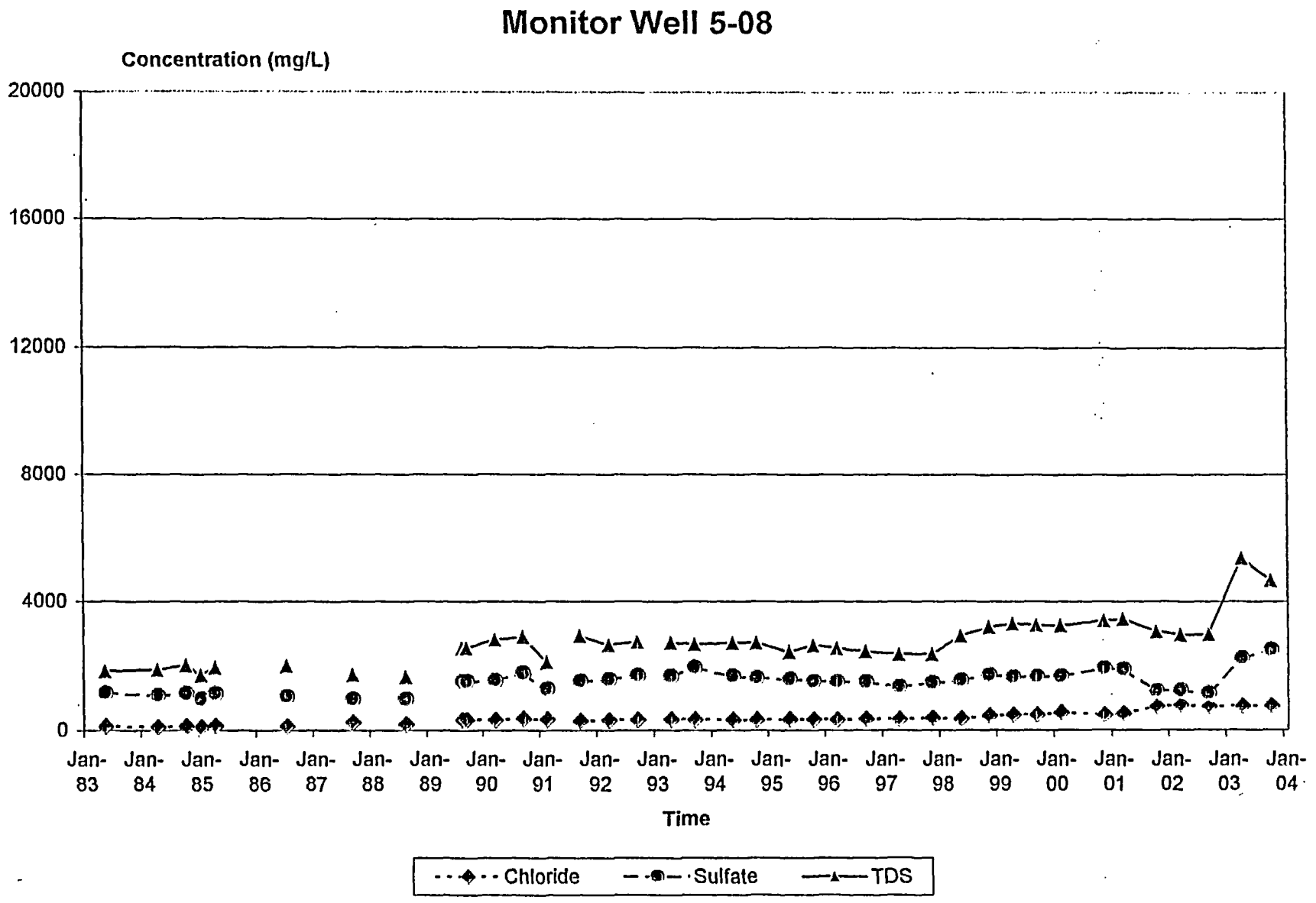


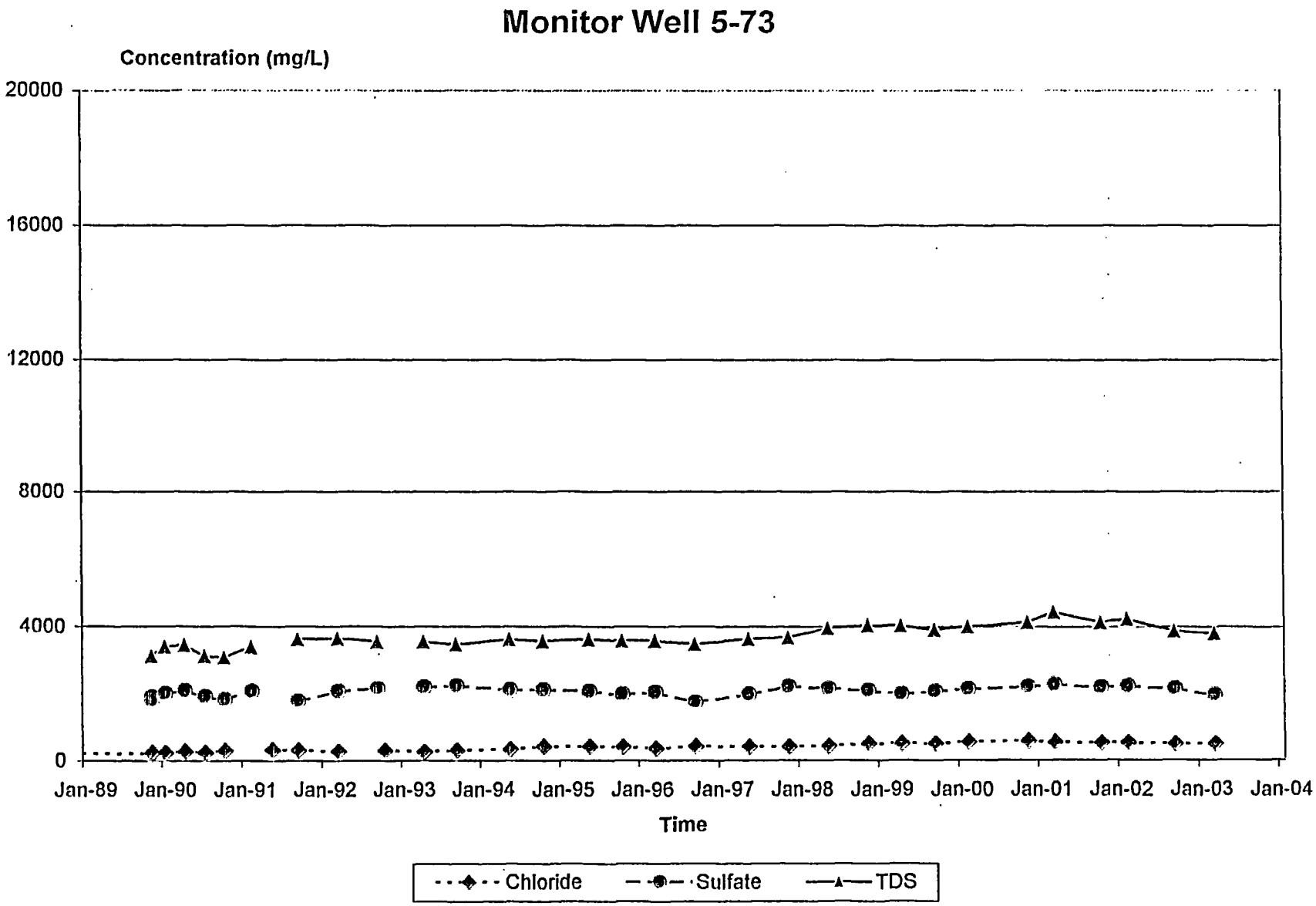
Monitor Well 5-03

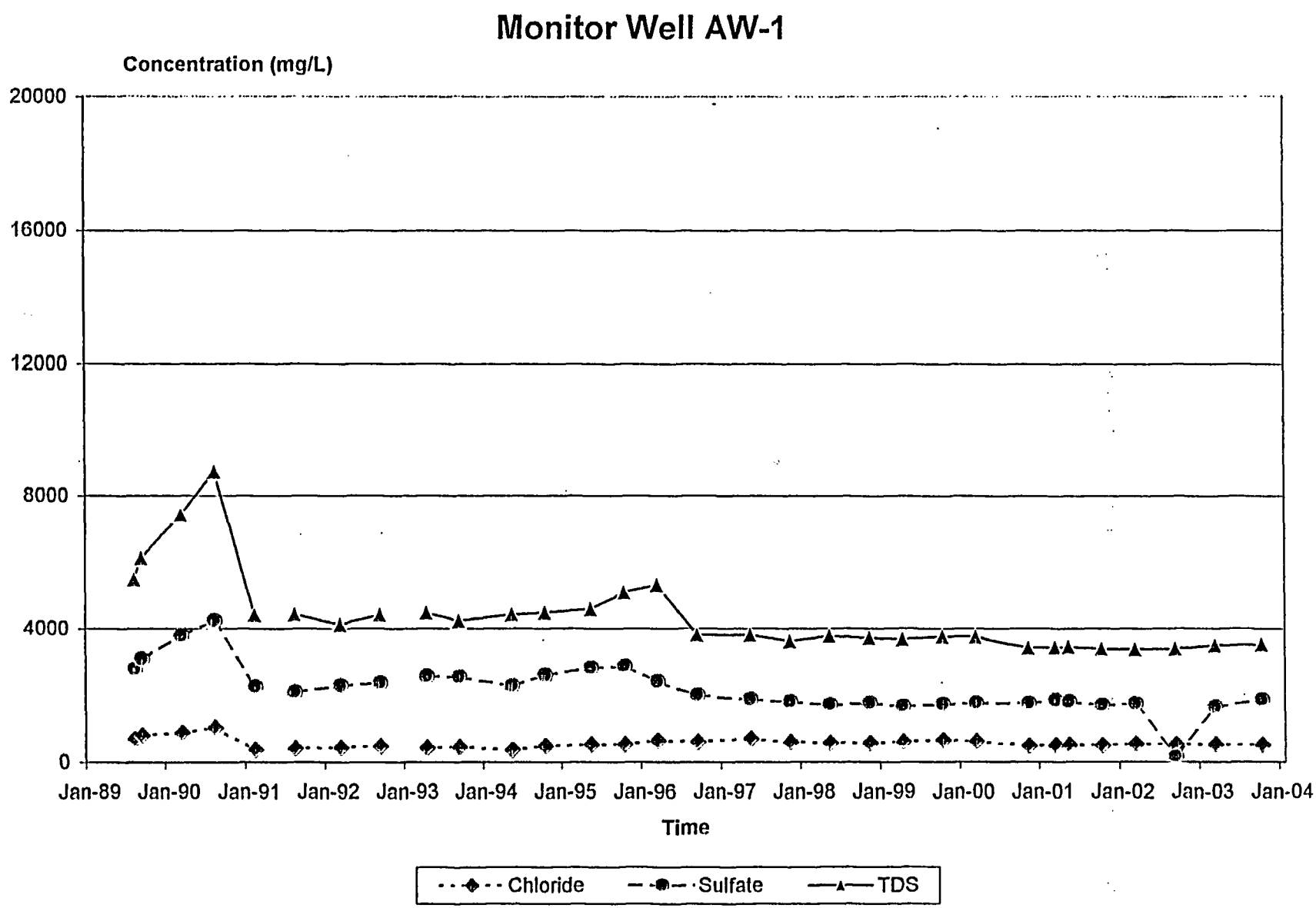


Monitor Well 5-04

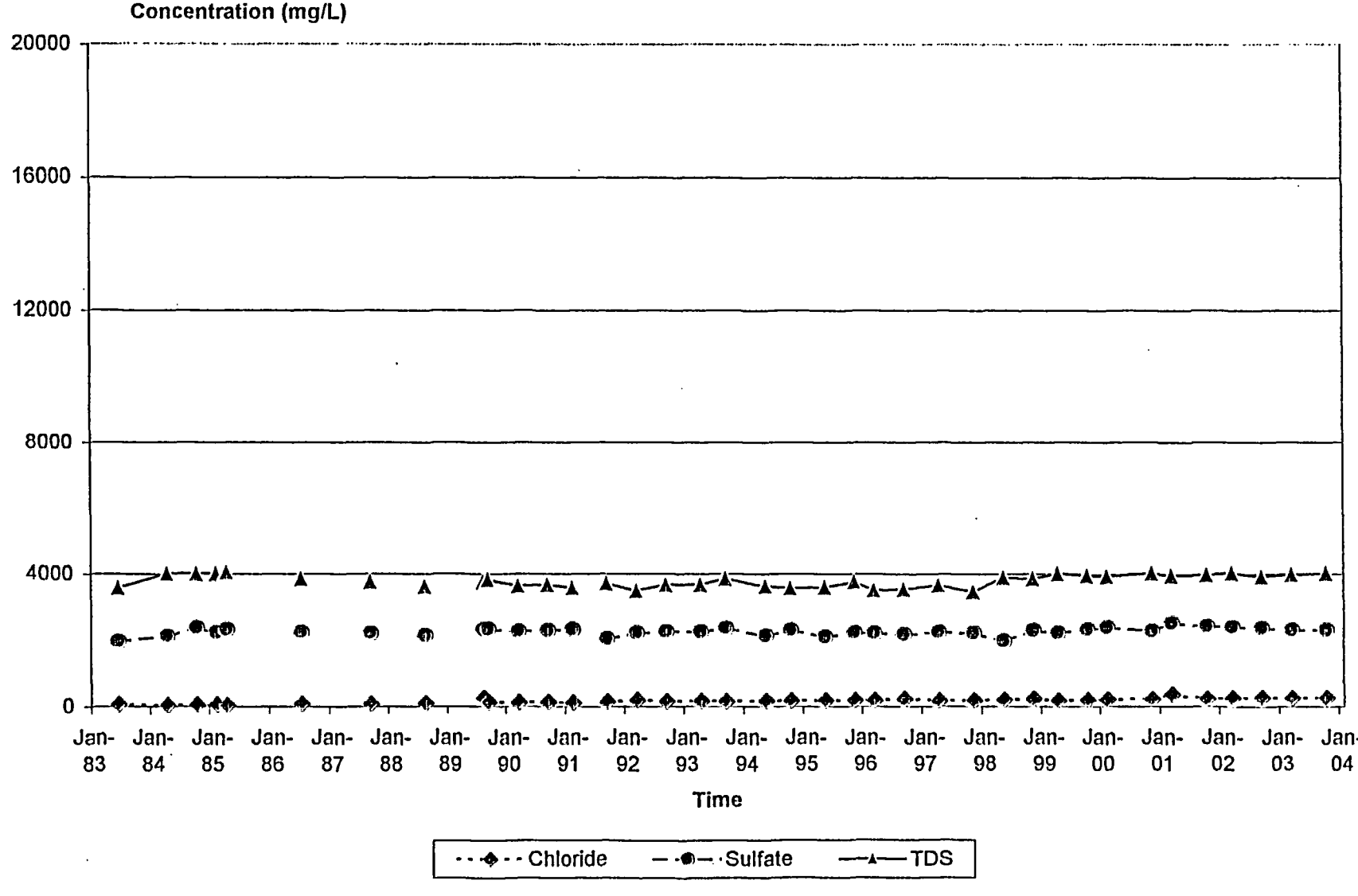



Monitor Well 5-08
Concentration (mg/L)
20000
16000
12000
8000
4000
0
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Time
Chloride
Sulfate
TDS

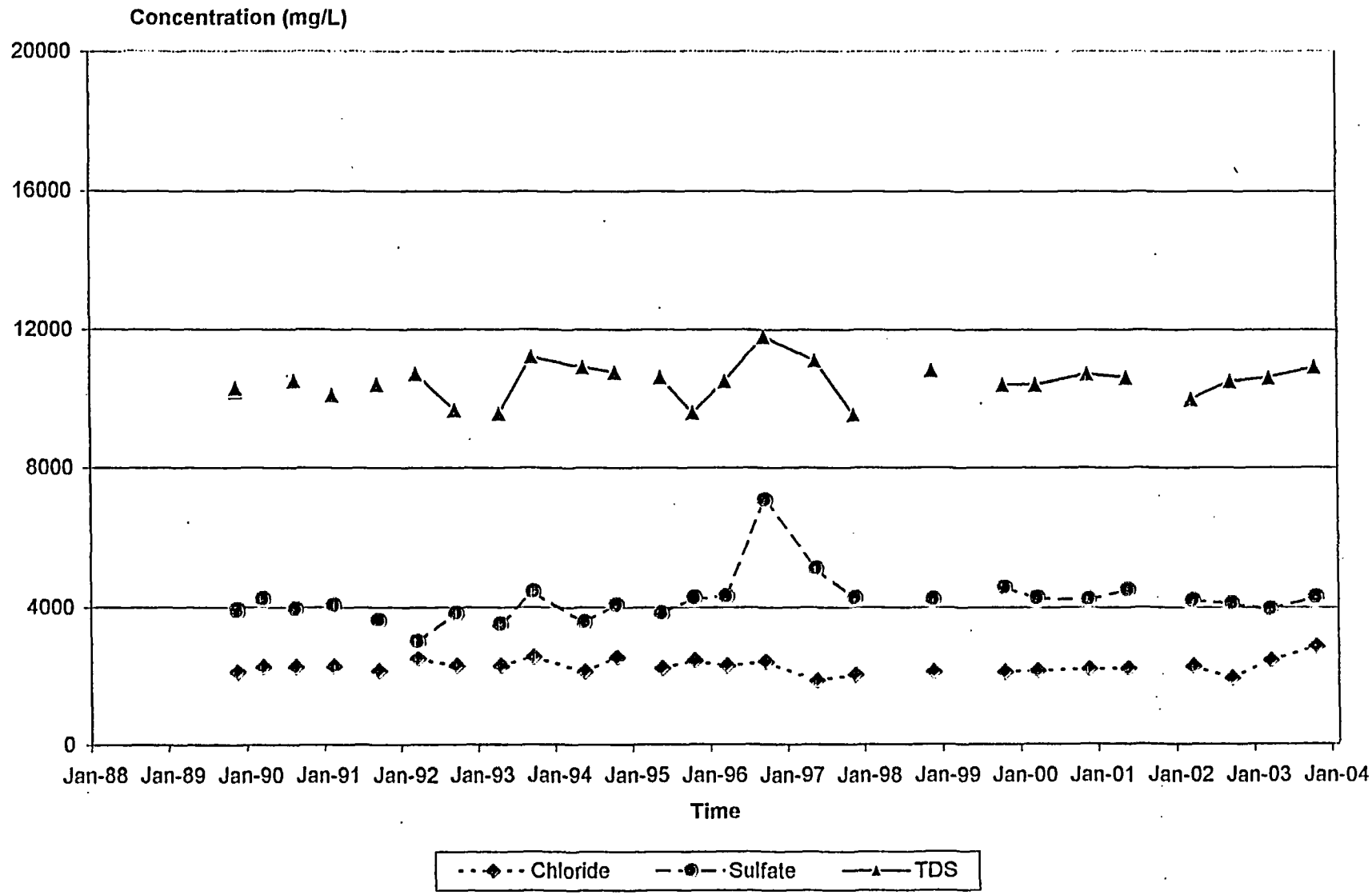

Monitor Well 5-73
Concentration (mg/L)
20000
16000
12000
8000
4000
0
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Time
Chloride
Sulfate
TDS


Monitor Well AW-1
Concentration (mg/L)
20000
16000
12000
8000
4000
0
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Time
Chloride
Sulfate
TDS

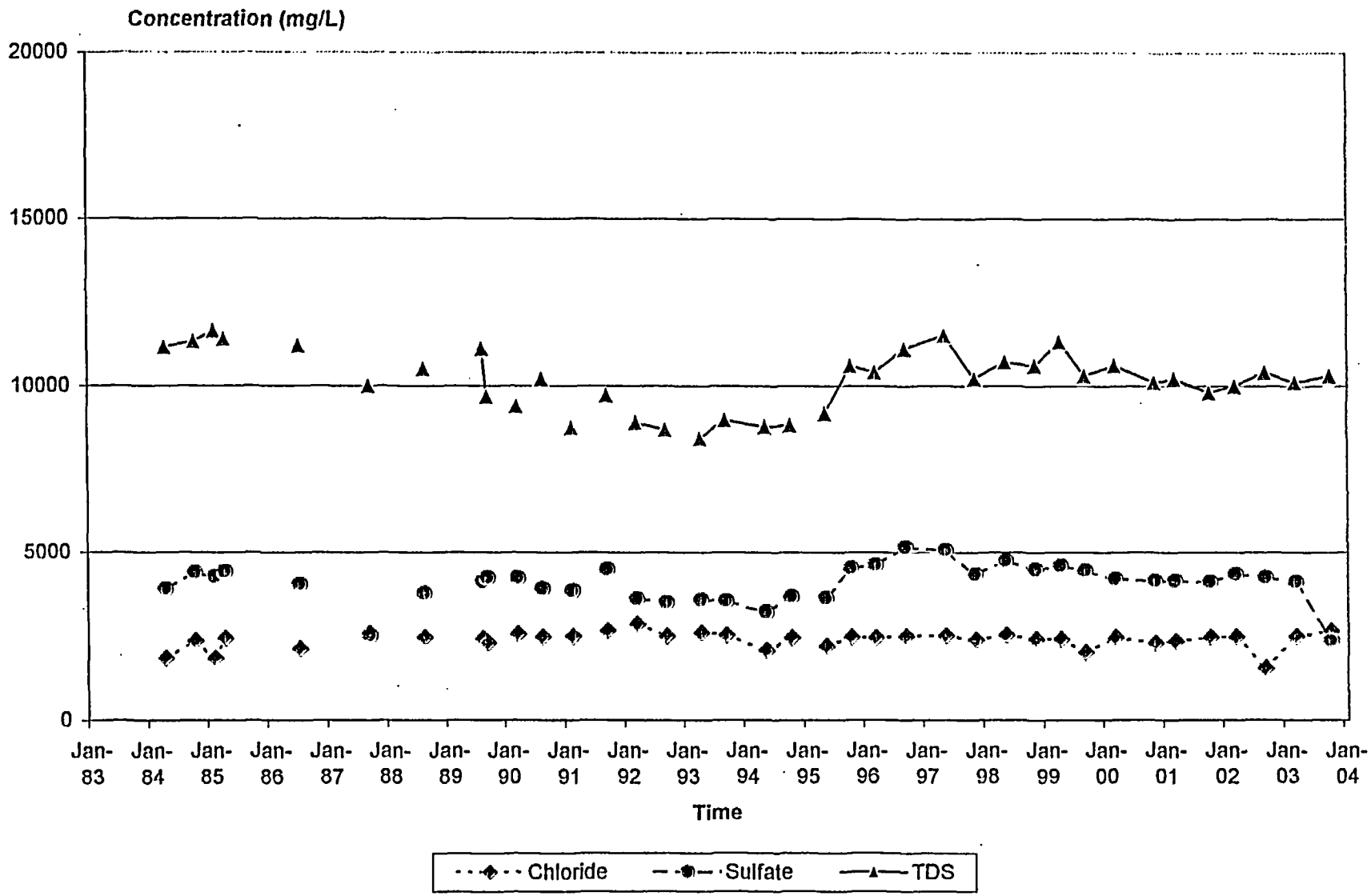
Monitor Well AW-2

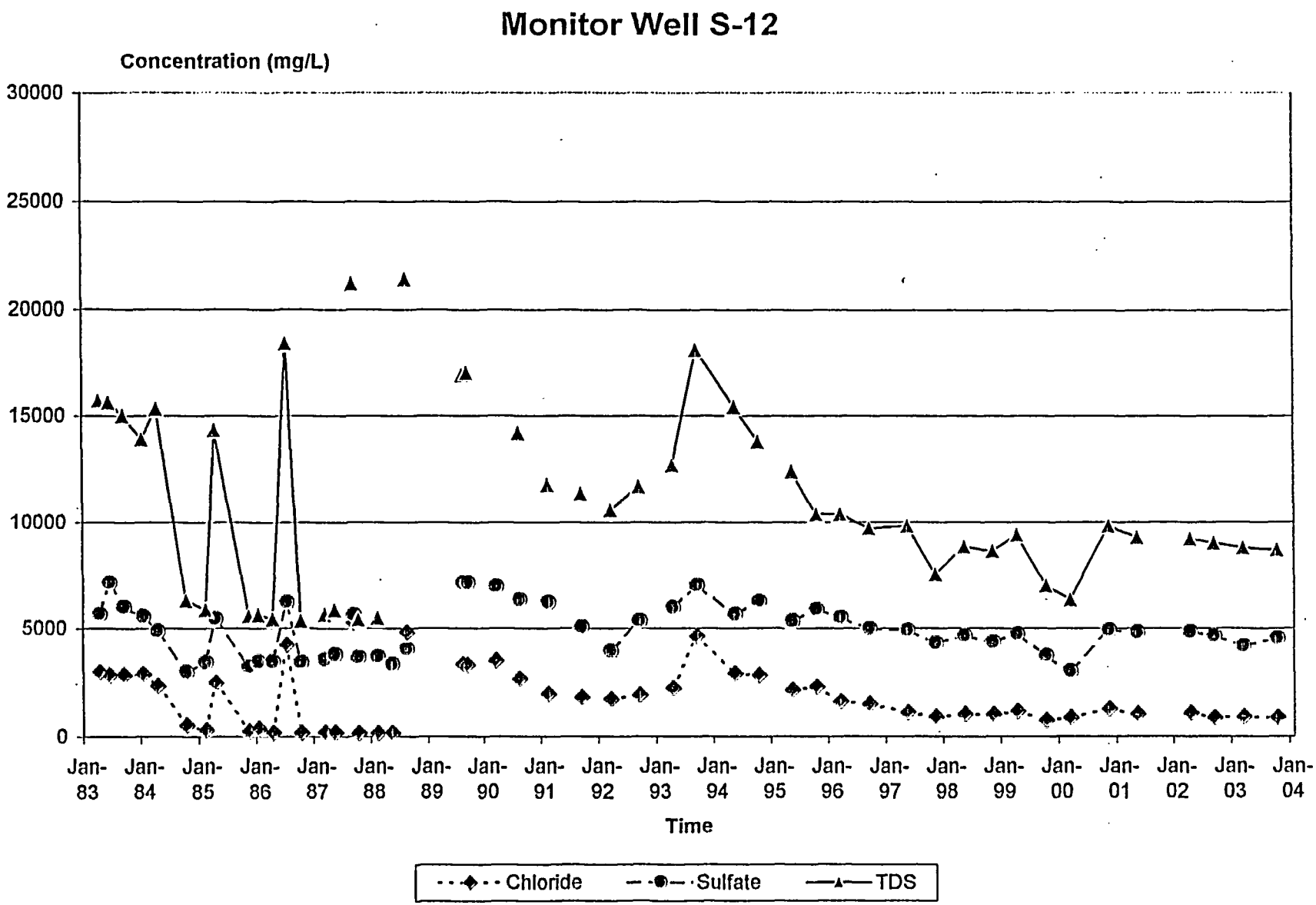


Monitor Well E-5



Monitor Well S-9




Monitor Well S-12
Concentration (mg/L)
30000
25000
20000
15000
10000
5000
0
Jan-83
Jan-84
Jan-85
Jan-86
Jan-87
Jan-88
Jan-89
Jan-90
Jan-91
Jan-92
Jan-93
Jan-94
Jan-95
Jan-96
Jan-97
Jan-98
Jan-99
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Time
Chloride
Sulfate
TDS

APPENDIX C

SITE GROUND WATER STANDARDS

ALLUVIUM

AMBROSIA LAKE

ALLUVIAL UNIT - GROUNDWATER PROTECTION STANDARDS (mg/l)

Parameter	Existing Baseline	WQCC Numeric Standard	Site GW Protection Standard
Ag	0.04	0.05	0.05
Al	0.17	5.0	5.0
As	0.18	0.1	0.18
B	0.48	0.75	0.75
Ba	0.02	1.0	1.0
Cd	0.02	0.01	0.02
CN	1	0.2	1.0
Co	0.04	0.05	0.05
Cr	0.06	0.05	0.06
Cu	0.04	1.0	1.0
Fe	40	1.0	40
Hg	0.002	0.002	0.002
Mn	2.6	0.2	2.6
Mo	0.04	1.0	1.0
Ni	0.06	0.2	0.2
Pb	0.16	0.05	0.16
Se	0.29	0.05	0.29
V	0.03	10.0	10.0
Zn	0.4	10.0	10.0
F	1.5	1.6	1.6
Cl	1343	250	1343
CN	<1	0.2	<1
NH_3	46	10.0	46
NO_3	54	10.0	54
SO_4	3865	600	3865
TDS	8322	1000	8322
pH	7.4	6-9	6-9
Ra226/228	3.2	30	30 pCi/l
U	0.09	5.0	5.0
Benzene	<0.001	0.01	0.01

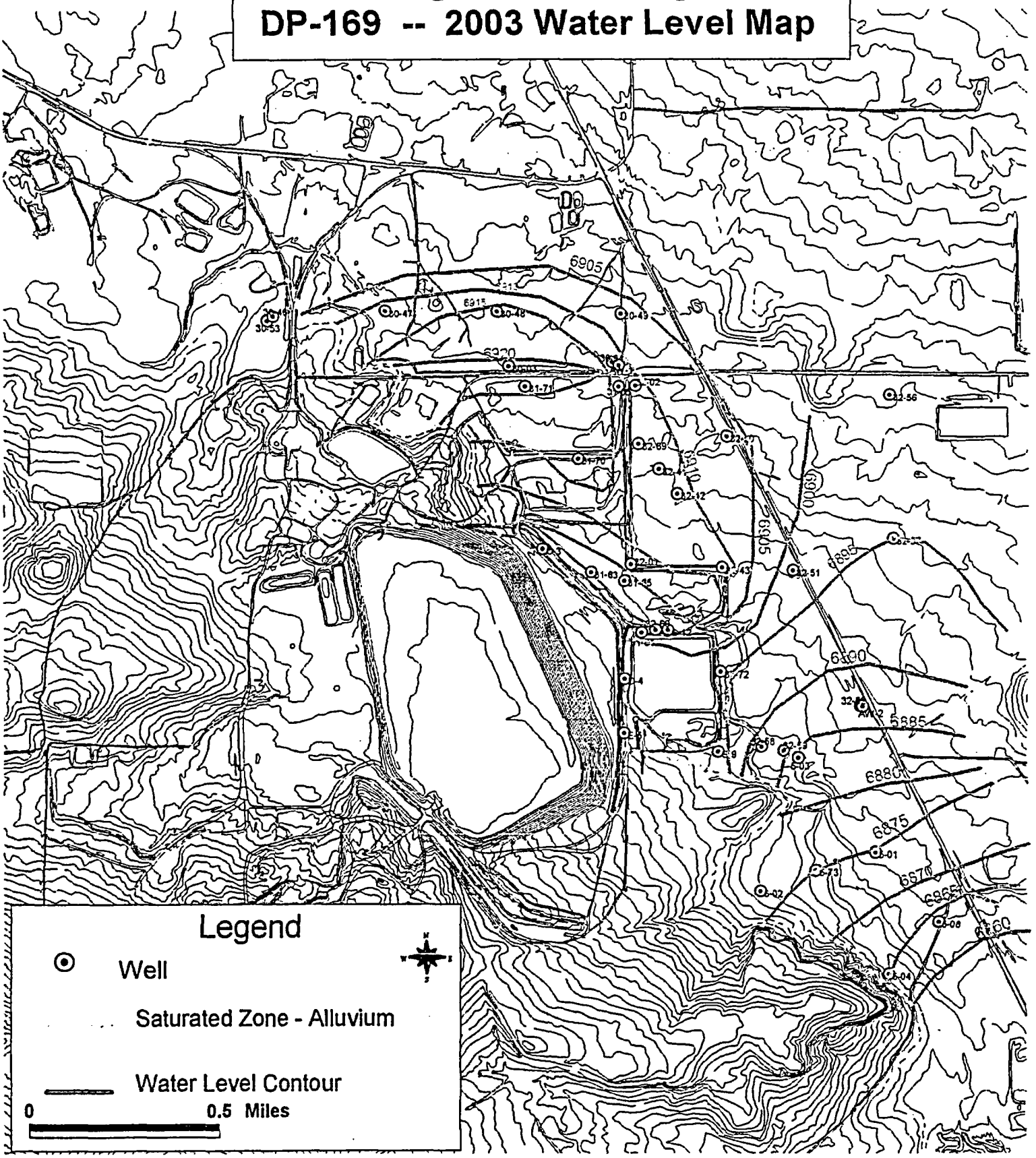
APPENDIX D

WATER LEVEL ELEVATION MAP

ALLUVIUM

Rio Algom Mining LLC

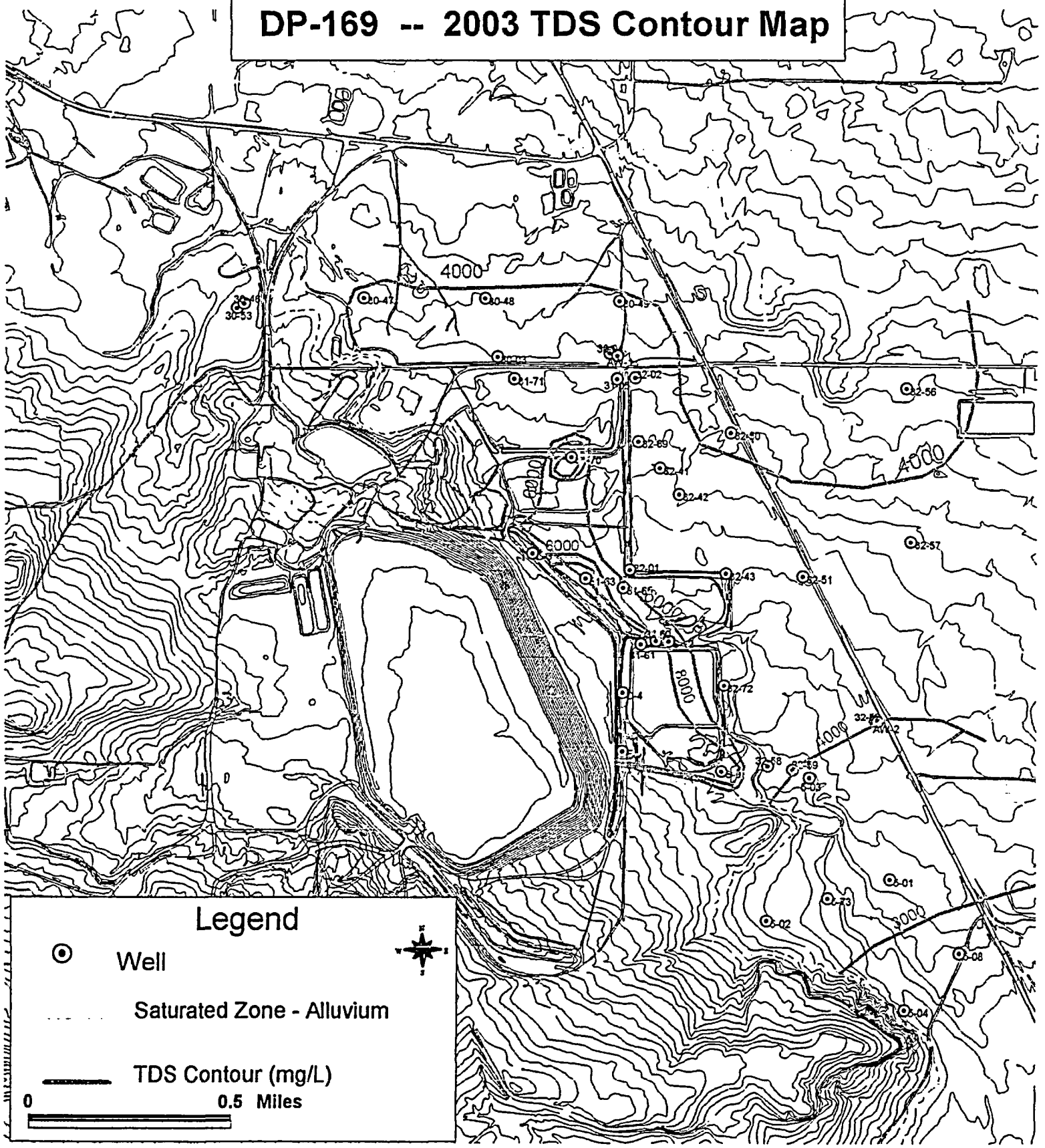
DP-169 -- 2003 Water Level Map



APPENDIX E

TDS CONTOUR MAP

ALLUVIUM

Rio Algom Mining LLC

DP-169 -- 2003 TDS Contour Map