

COMPLIANCE MONITORING FOR THE CENTRALIA LANDFILL

1st HALF 2017

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JUN 13 2017

WA State Department
of Ecology (SWRO)



Lewis County Department of Public Works

Erik P. Martin, PE, Director / County Engineer

Tim D. Fife, PE, Assistant County Engineer

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JUN 19 2017

WA State Department
of Ecology (SWRO)

May 9, 2017

Bill Teitzel
Lewis County Environmental Services
2025 N.E. Kresky Avenue
Chehalis, WA 98532

Dear Bill;

Subject: COMPLIANCE MONITORING REPORT FOR THE CENTRALIA LANDFILL

Please find enclosed one copy of the Compliance Monitoring Report from the Centralia Landfill. Sampling for this event occurred in February, 2017. Sampling is done biannually, first in February during the wet season and then again in September during the dry season. Amtest Labs in Redmond, Washington performed laboratory analysis. Bill Norwood and I completed the sampling.

Please call me if you have questions or concerns.

Sincerely,

John Hanson
Lewis County Solid Waste

Cc: Mohsen Kourehdar, WA. State Dept. of Ecology

Road Maintenance

476 West Main St
Chehalis, WA 98531
☎ 360.740.3380
☎ 360.740.2741

Administration, Engineering, Utilities & Real Estate Services

2025 NE Kresky Ave.
Chehalis, WA 98532
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Centralia, WA 98531
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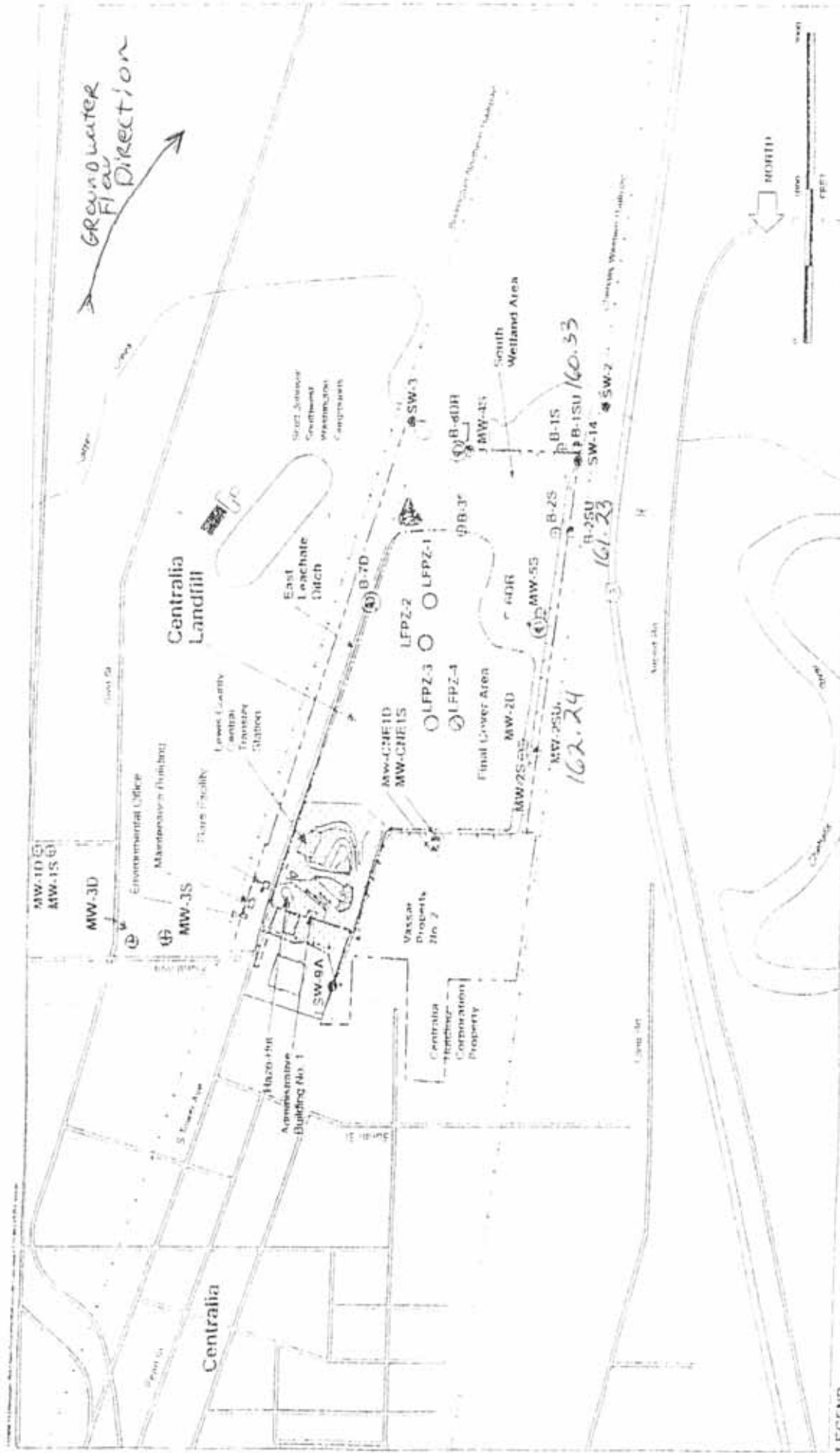
Appendix C - Landfill Gas Monitoring Narrative and Data Presentation

REPORT NARRATIVE

This Biannual Compliance Monitoring report summarizes the results from the wet season sampling done at the Centralia Landfill in February 2017. This report was prepared in accordance with the Cleanup Action Plan Consent Decree (signed May, 2001) and two periodic reviews from the Department of Ecology Toxics Cleanup Program completed in 2010 and 2015. This report presents data and graphical analysis of selected parameters | groundwater, surface water and landfill gas. Collection and reporting of groundwater and surface water data occur biannually. Gas sampling occurs quarterly and results are included in this report. 17 groundwater monitoring wells were sampled February 21, 2017. Data from this sampling event and from quarterly gas probe sampling events are presented in Appendix B and C. Locations of groundwater monitoring wells, surface water stations, and gas probes are shown on the site maps provided. On February 21, 2017 depth to groundwater was measured in all wells.

Weather during the sampling period was mostly sunny. Water was present at SW 14, the Weyerhaeuser Ditch (the point of compliance for surface water), and samples were collected.

Depth to water levels were recorded for all wells on the day sampling commenced. Depth to water was also measured on the day of sampling before the pumps were turned on at each well. The submersible pumps were adjusted to the lowest possible purge rate (usually about 3 l/min). Parameters were taken in a stainless steel pitcher in which purge water passed through. PH, temperature, and conductivity were measured. This was repeated every 3 to 5 min. Water level was repeatedly checked to insure minimal drawdown. If drawdown was observed, the flow rate was adjusted if possible. When 3 successive readings were achieved within plus or minus 0.1 for PH and plus or minus 3% for conductivity, sample bottle filling began. Generally, field filtered samples (dissolved metals) were collected last at each well, and disposable inline filters were used.



Site Map
Shallow Upper Aquifer
2-21-17
wet season, 2017

LEGEND

- Approximate Edge of Federal and State Lands of Source Area
- Source
- Abandoned and New Investigation Monitoring Wells
- Abandoned Monitoring Wells
- Property Line
- Surface Water Monitoring Station
- Investigation Flow Direction
- New Monitoring Wells
- Pre-RI Monitoring Wells
- Closed Northern Landfill
- Perimeters
- Abandoned Investigation Wells

CENTRALIA LANDFILL SURFACE WATER DATA

Wet Season, 2017 Feb 2, 2017

Parameters	Units	SW-14
Dissolved Alkalinity (as CaCO ₃)	mg/l	40
Total Organic Carbon	mg/l	7.1
Chemical Oxygen Demand	mg/l	25
Chloride	mg/l	4.3
Hardness (CaCO ₃)	mg/l	35
Ammonia Nitrogen	mg/l	0.015
Nitrate + Nitrite Nitrogen	mg/l	<0.01
Total Dissolved Solids	mg/l	49
Sulfate	mg/l	1.6
pH		6.52
Temperature	degrees C	8.58
Conductivity	umhos/cm	98
Dissolved Oxygen	mg/l	9.4
Dissolved Metals		
Arsenic	mg/l	0.00041
Calcium	mg/l	7.29
Iron	mg/l	0.551
Mercury	mg/l	< 0.00002
Potassium	mg/l	0.98
Magnesium	mg/l	4.15
Manganese	mg/l	0.0767
Sodium	mg/l	4.13
Zinc	mg/l	0.007
Total Metals		
Arsenic	mg/l	0.000585
Calcium	mg/l	9.2
Iron	mg/l	1.3
Mercury	mg/l	< 0.00005
Potassium	mg/l	2.1
Magnesium	mg/l	4.3
Manganese	mg/l	0.0904
Sodium	mg/l	5.3
Zinc	mg/l	0.0176

Exceedences of Primary and Secondary Standards in Groundwater Wells

	pH	Conductivity	TDS	Chloride	Sulfate	Nitrate + Nitrite	Arsenic	Iron	Mercury	Manganese	Zinc
Primary Drinking Water Standard											
Secondary Standard	6.5 - 8.5	CAP cleanup levels	500 mg/l	250 mg/l	250 mg/l	10 mg/l	0.01 mg/l	0.3 mg/l	0.02 mg/l	0.05 mg/l	5 mg/l
Groundwater Standard	6.5 - 8.5	700 umhos/cm	500 mg/l	250 mg/l	250 mg/l		0.0005 mg/l	0.3 mg/l	0.02 mg/l	0.05 mg/l	5 mg/l
MW1D	5.6	141	120	2.5	0.63	0.027	0.00289	0.092	<0.00002	0.1827	0.005
MW1S	5.16	158	150	2	13.2	1.3	0.000135	0.012	<0.00002	<0.0009	<0.002
MW3S	5.04	192	190	5.9	28.1	1.2	0.000133	0.009	<0.00002	0.0031	0.002
MW3D	6.34	244	220	6.1	0.14	<0.01	0.00127	0.043	<0.00002	1.202	0.003
CNE1S	6.09	920	660	61.9	0.81	<0.01	0.00298	8.39	<0.00002	2.846	0.003
CNE1D	7.14	309	200	6.6	0.1	<0.01	0.000107	0.373	<0.00002	0.2654	<0.002
MW2D	7.11	353	220	9.7	0.21	<0.01	0.00514	1.17	<0.00002	1.027	<0.002
MW2S	6.47	1250	790	170	1.8	<0.01	0.0166	3.11	<0.00002	8.545	0.003
MW2SU	6.55	1170	720	157	1.9	0.028	0.0017	2.94	<0.00002	7.752	0.013
MW5S	6.33	75	180	3.25	3	0.2	0.000622	0.339	<0.00002	0.0521	0.003
BBDR	6.68	115	110	3.8	2.4	0.013	0.000915	0.298	<0.00002	0.2053	0.003
B2SU	6.36	224	140	2.7	3.1	0.84	0.00145	0.025	<0.00002	0.0014	0.002
B2S	6.02	156	160	7.2	2	0.067	0.00206	0.026	<0.00002	0.4112	0.004
B1SU	6.9	182	180	15.6	1.2	<0.01	0.00383	0.371	<0.00002	1.076	0.009
B1S	6.88	180	190	7.6	0.13	0.013	0.0147	0.357	<0.00002	0.9604	0.004
MW4S	6.28	86	13	2.5	3.2	1	0.000343	0.384	<0.00002	0.0082	0.005
BBDR	6.99	436	190	5	24.2	<0.01	0.0002089	0.01	<0.00002	0.2304	<0.002

ANALYTICAL METHODS AND DETECTION LIMITS				
ANALYTE	UNITS	METHOD NUMBER	REFERENCE	DETECTION LIMIT
Alkalinity (as CaCO ₃)	mg/l	2320B	EPA	1.0
Chemical Oxygen Demand	mg/l	410.4	EPA	10.
Total Organic Carbon	mg/l	415.1	EPA	1.0
Chloride	mg/l	325.2	EPA	1.0
Hardness (as CaCO ₃)	mg/l	130.2	EPA	1.0
Ammonia Nitrogen	mg/l	350.1	EPA	0.005
Nitrate+Nitrite	mg/l	353.2	EPA	0.010
Total Dissolved Solids	mg/l	2540C	EPA	1.0
Sulfate	mg/l	375.4	EPA	1.0
Arsenic	mg/l	200.8	EPA	0.0005
Calcium	mg/l	200.7	EPA	0.10
Iron	mg/l	200.7	EPA	0.01
Mercury	mg/l	245.1	EPA	0.0001
Potassium	mg/l	200.7	EPA	1.0
Magnesium	mg/l	200.7	EPA	0.10
Manganese	mg/l	200.7	EPA	0.002
Sodium	mg/l	200.7	EPA	0.1
Zinc	mg/l	200.7	EPA	0.002

APPENDIX A DISCUSSION OF GROUNDWATER MONITORING DATA CENTRALIA LANDFILL

The following discussion summarizes results of the wet season groundwater monitoring for 2016. The analysis consists of a comparison of groundwater monitoring data to Washington State groundwater and drinking water standards, and an evaluation of trends in monitoring parameter values over time (time series plots).

Time series plots were generated for the current monitoring parameters and for each sampling event since June, 1996. These are included in Attachment B of this appendix.

Analysis for each monitoring parameter is discussed below, organized by regulatory criteria. Results for parameters with primary drinking water standards and/or state groundwater standards are presented first (arsenic, mercury, and nitrate), followed by results for parameters with secondary drinking water standards (chloride, iron, manganese, pH, sulfate, TDS and zinc).

Additionally, a discussion of sampling results compared to Cleanup Levels established at the point of compliance for groundwater and surface waters is included.

Parameters with Primary Standards:

Arsenic has two standards: a primary drinking water standard of 0.01 mg/l and a state groundwater quality standard of 0.0005 mg/l. No wells exceeded the drinking water standard. Thirteen wells exceeded the groundwater standard. Arsenic was detected in all wells.

Mercury has a primary standard of 0.002 mg/l. Mercury was not detected in any wells this quarter.

Nitrate has a primary standard of 10 mg/l. Nitrate was detected in all but four wells this round. All wells were below the standard. MW1S had the highest value with 2.7 mg/l.

Parameters with Secondary Standards:

Chloride has a secondary standard of 250 mg/l. No wells exceeded the standard. MW2SU had the highest value with a measurement of 216 mg/l.

Iron has a secondary standard of 0.3 mg/l. Iron was detected in all but one well this season. Only two wells exceeded the standard. CNE1S had the highest value with 4.55 mg/l compared to 26.7 last quarter.

Manganese has a secondary standard of 0.05 mg/l. Manganese was detected in all but one well and fourteen wells exceeded the standard.

PH has a regulatory range of 6.5 to 8.5. Ten of the 17 wells exceeded the standard. All exceedences were values below 6.5.

Sulfate has a secondary standard of 250 mg/l. All wells were far below the standard.

TDS has a secondary standard of 500 mg/l. This value was exceeded in three wells; CNE1S, MW2S and MW2SU. The highest value was 1200 mg/l in MW2SU.

Zinc has a secondary standard of 5 mg/l. Zinc was detected in eleven wells this quarter, all below the standard.

Comparisons of monitoring results to Cleanup Levels established in the Cleanup Action Plan

Ground Water cleanup levels for the shallow upper/upper unit:

Soluble Arsenic has a cleanup level of 0.27 µg/L with a compliance level of 0.50 µg/L. MW1S and MW3S are below both cleanup and compliance levels. MW4S was below the compliance level standard with a value of 0.3 µg/L. All other wells in the unit exceeded both standards.

Conductivity has a cleanup level of 700 umhos/cm. Three of the wells exceeded this value; one of the wells in the shallow upper aquifer (MW2SU), the cross gradient well CNE1S, and the down gradient shallow well MW2S.

Chloride has a cleanup level of 250 mg/l. All wells were below the cleanup level this quarter.

Soluble Iron has a cleanup level of 0.3 mg/L. Three wells exceeded the cleanup level this season. CNE1S had the highest value with 8.39 mg/l.

Soluble Manganese has a cleanup level of 50 µg/L. MW1S, MW3S, B2SU and MW4S were under this value. All other wells exceeded the cleanup level.

Ground Water Cleanup Levels for the Lower Unit:

The Soluble Arsenic cleanup level is 5 µg/L. Only MW2D exceeded the cleanup level with a value of 5.1 µg/L.

Soluble Iron has a cleanup level of 300 µg/L. All wells were below the cleanup level this sampling round.

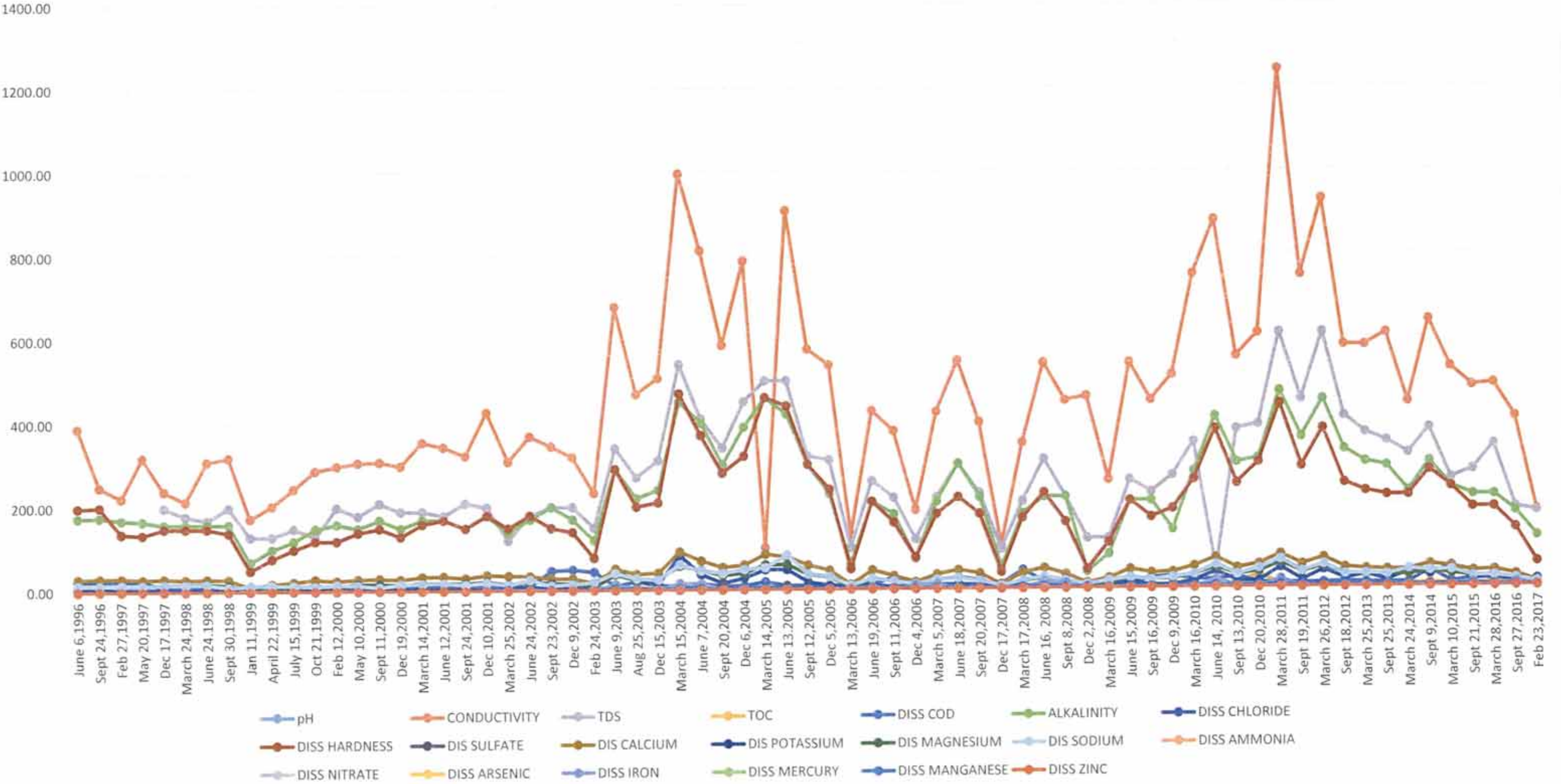
Soluble Manganese has a cleanup level of 50 µg/L. All wells in the lower unit exceeded this value.

Surface Water Standards:

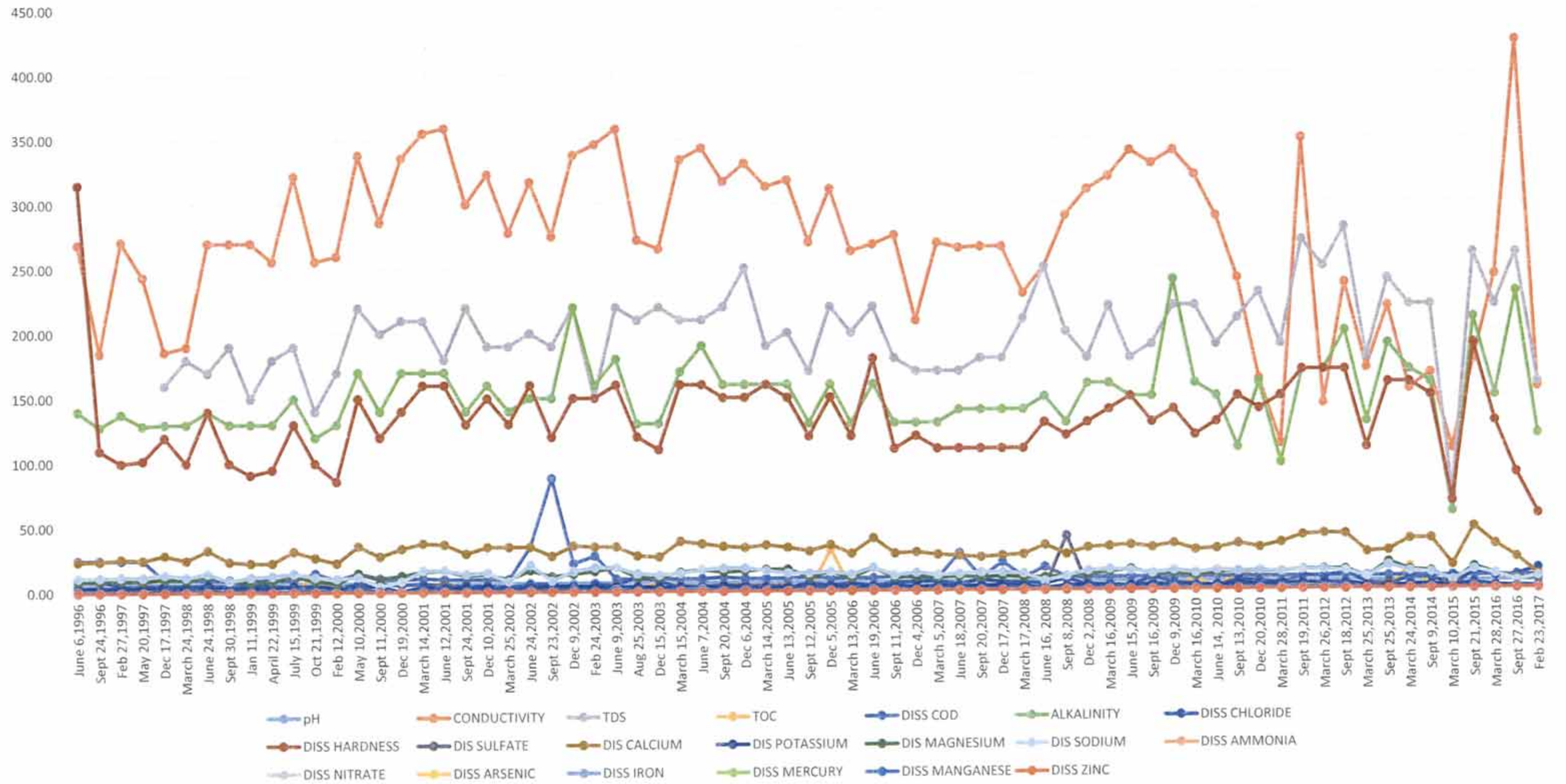
Surface water was present at SW14, the point of compliance. Soluble Arsenic has a cleanup level of 0.27 µg/L with a compliance level of 0.50 µg/L. SW14 exceeded both standards with a value of 0.58 µg/L.

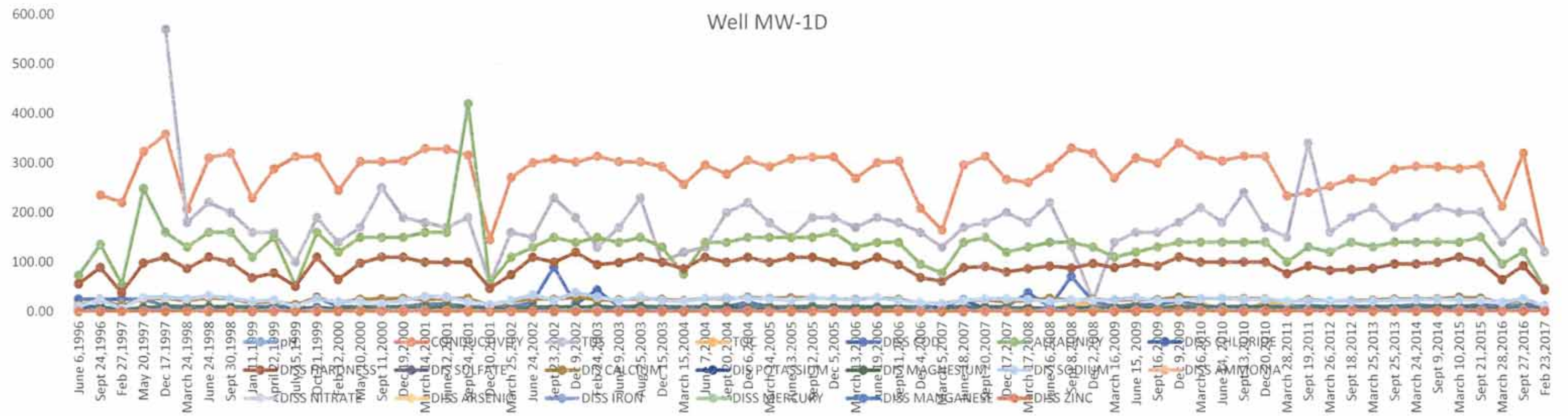
Appendix B - Groundwater Time Series Graphs

Well B-1SU

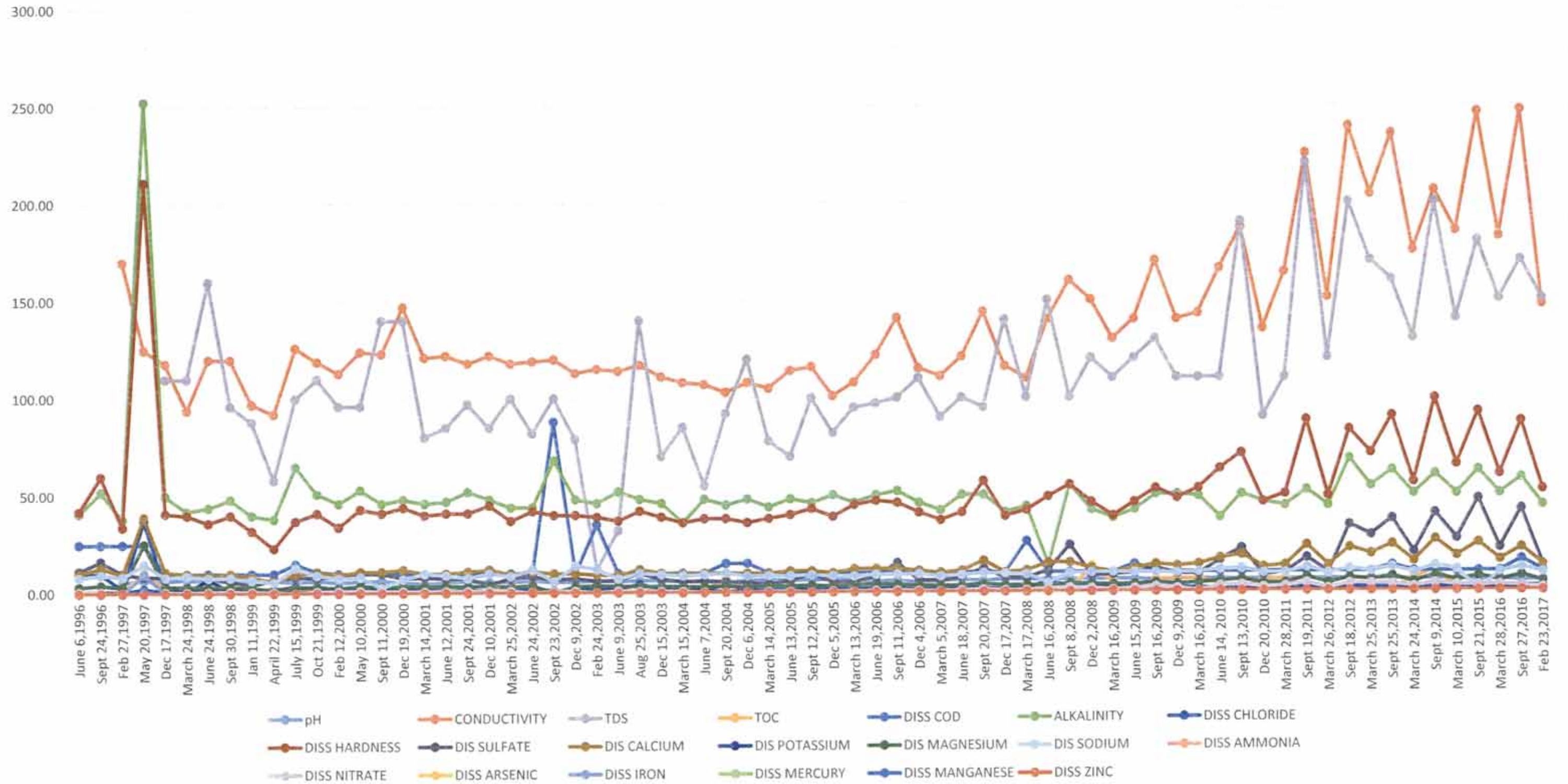


Well B-2S

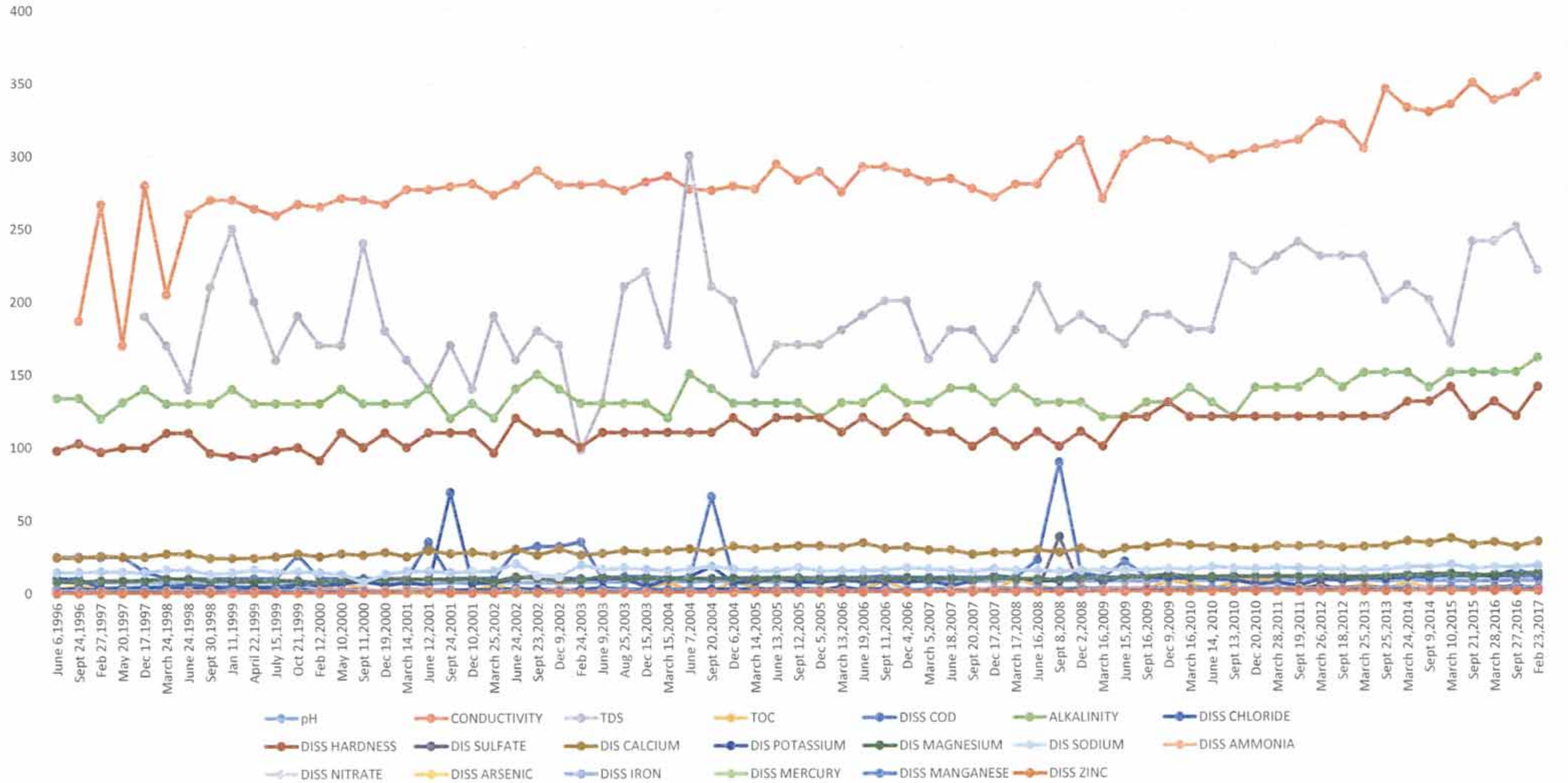




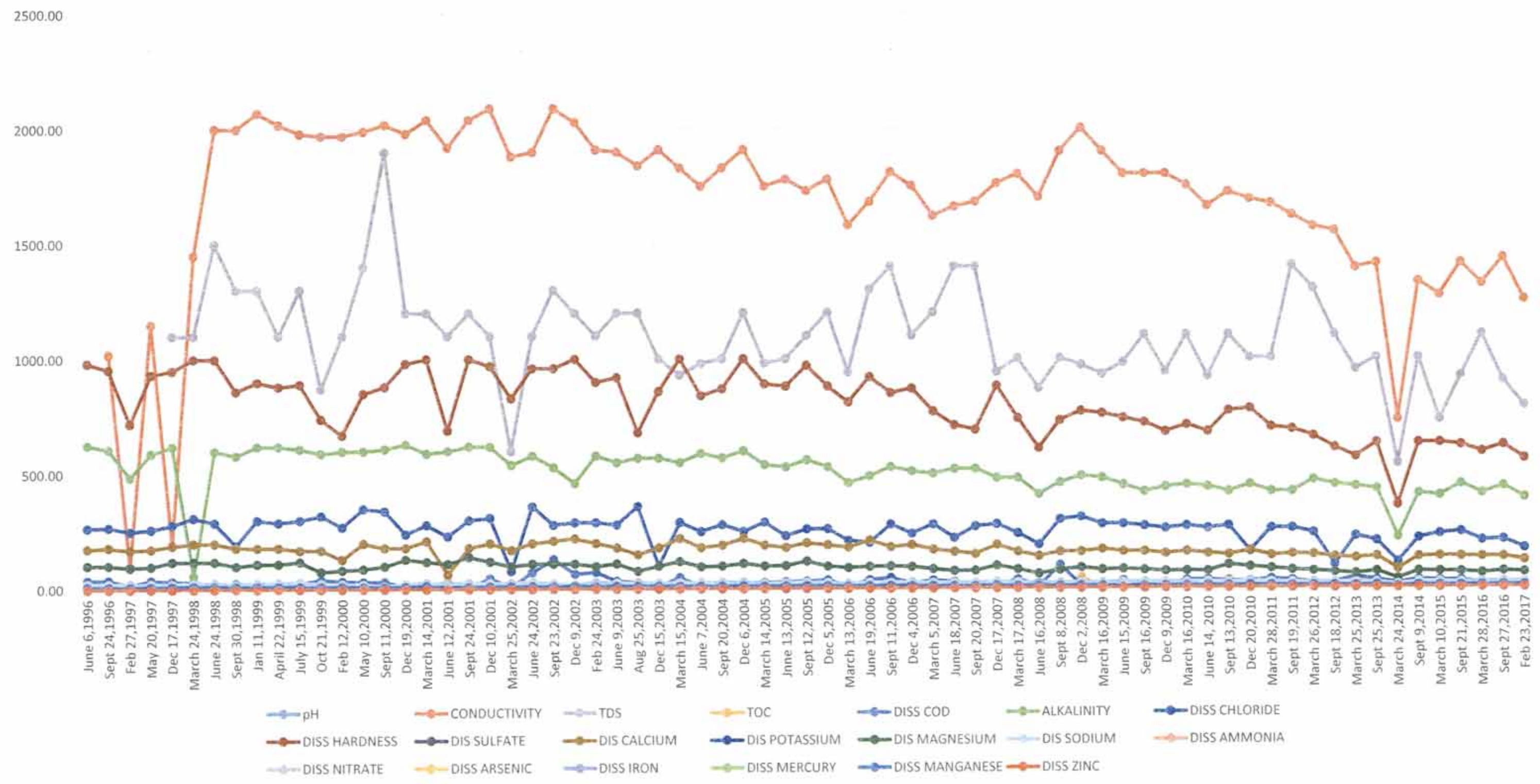
Well MW-1S



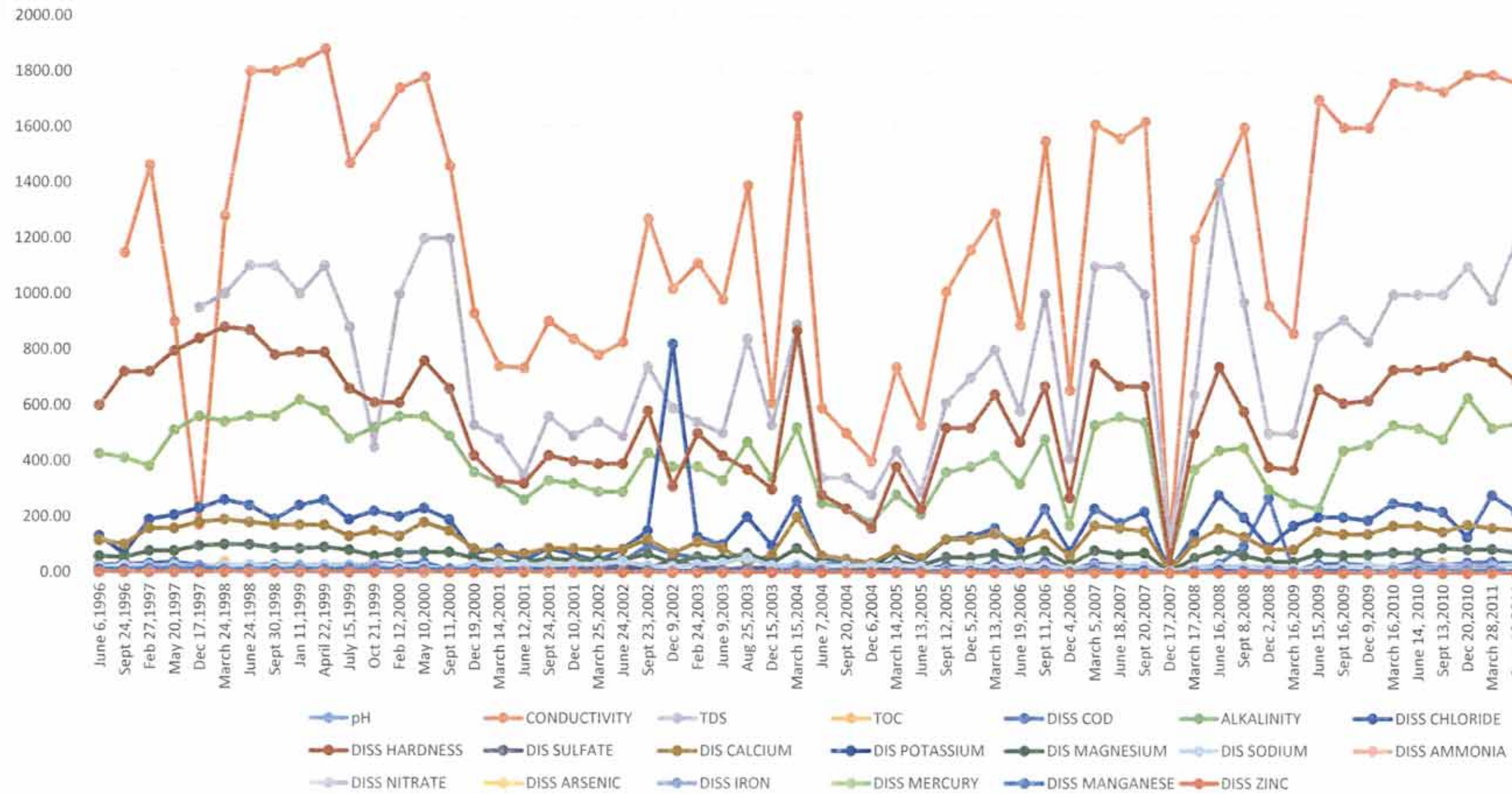
Well MW-2D



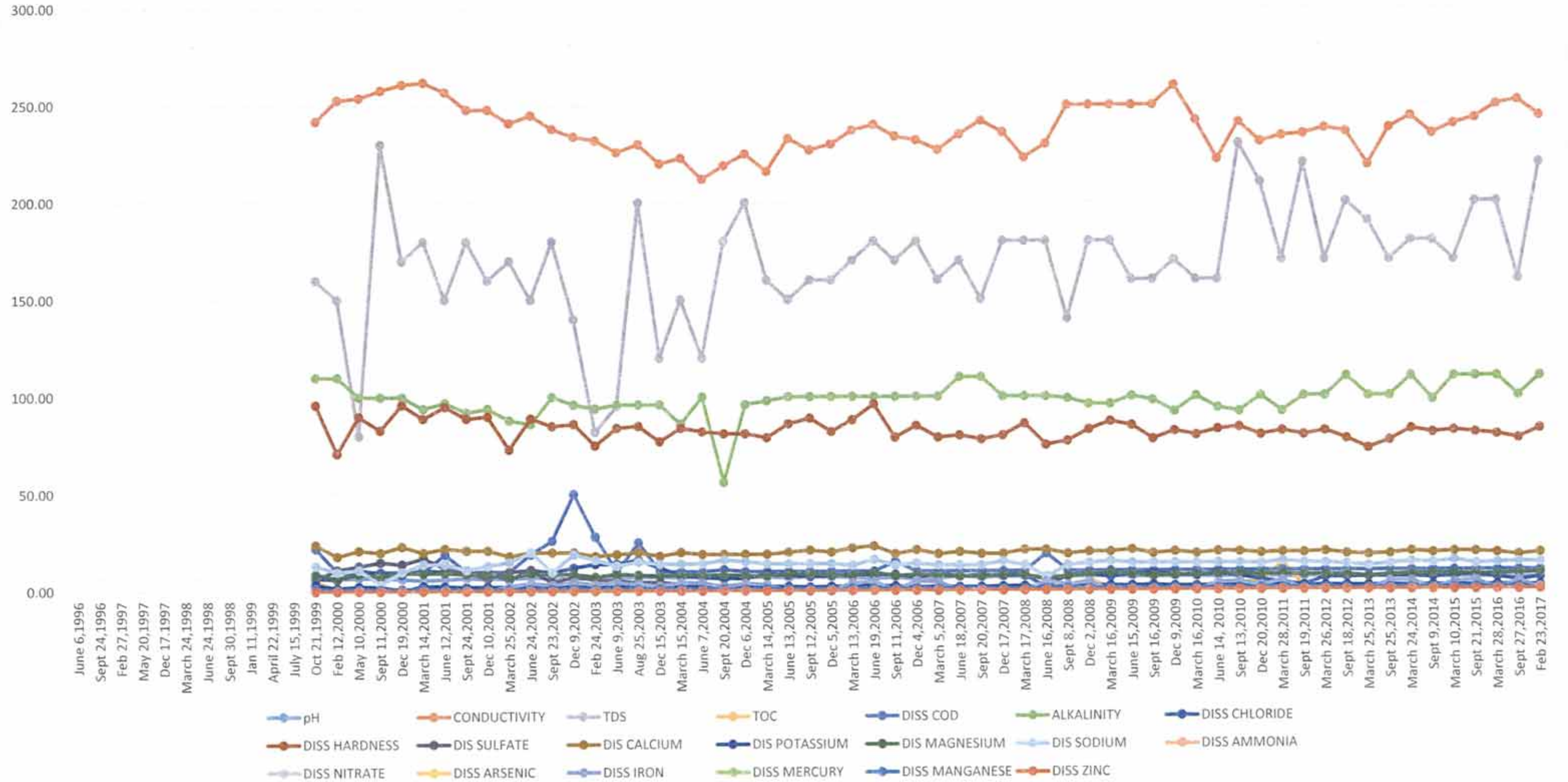
Well MW-25



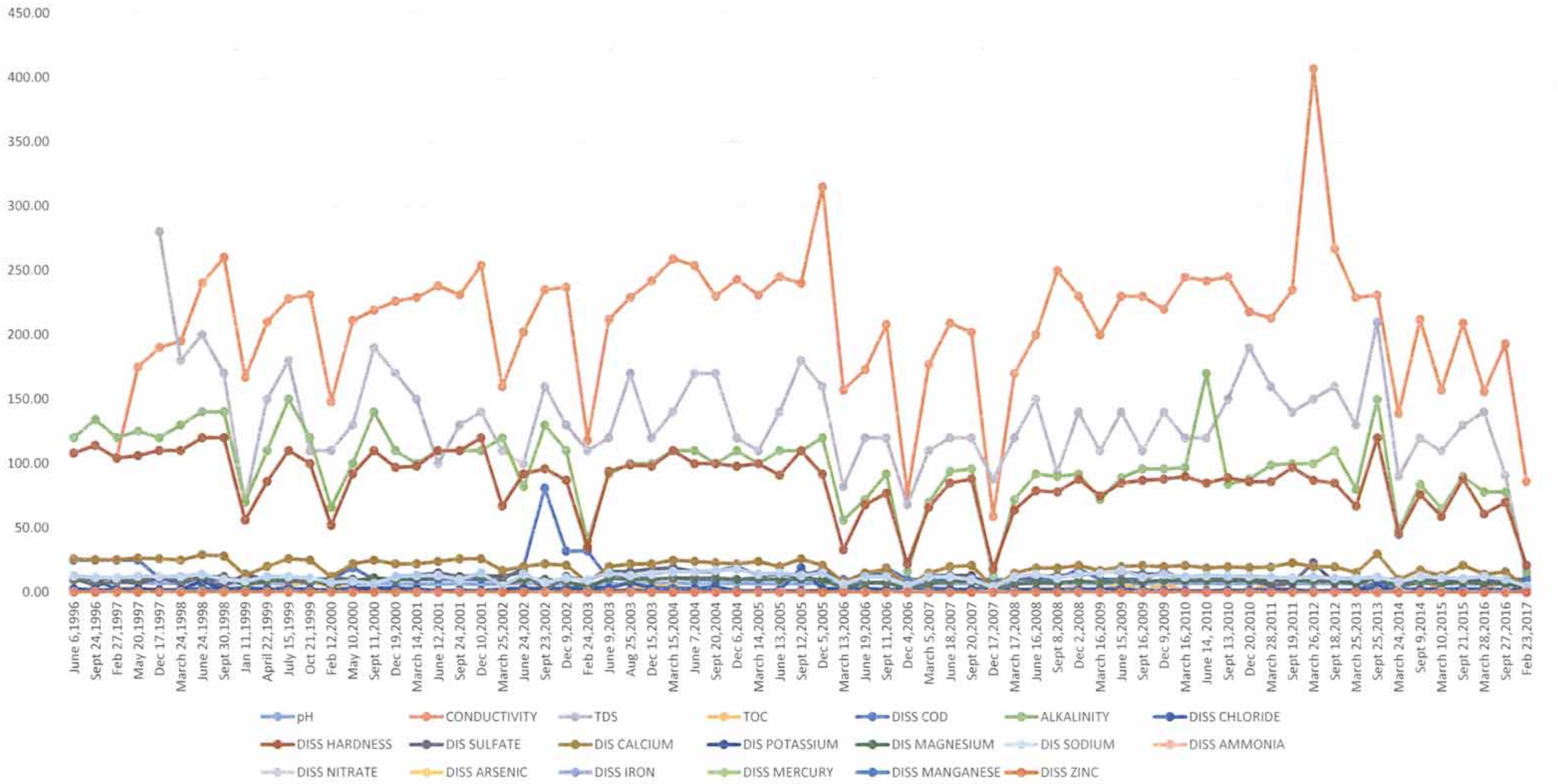
Well MW-2SU



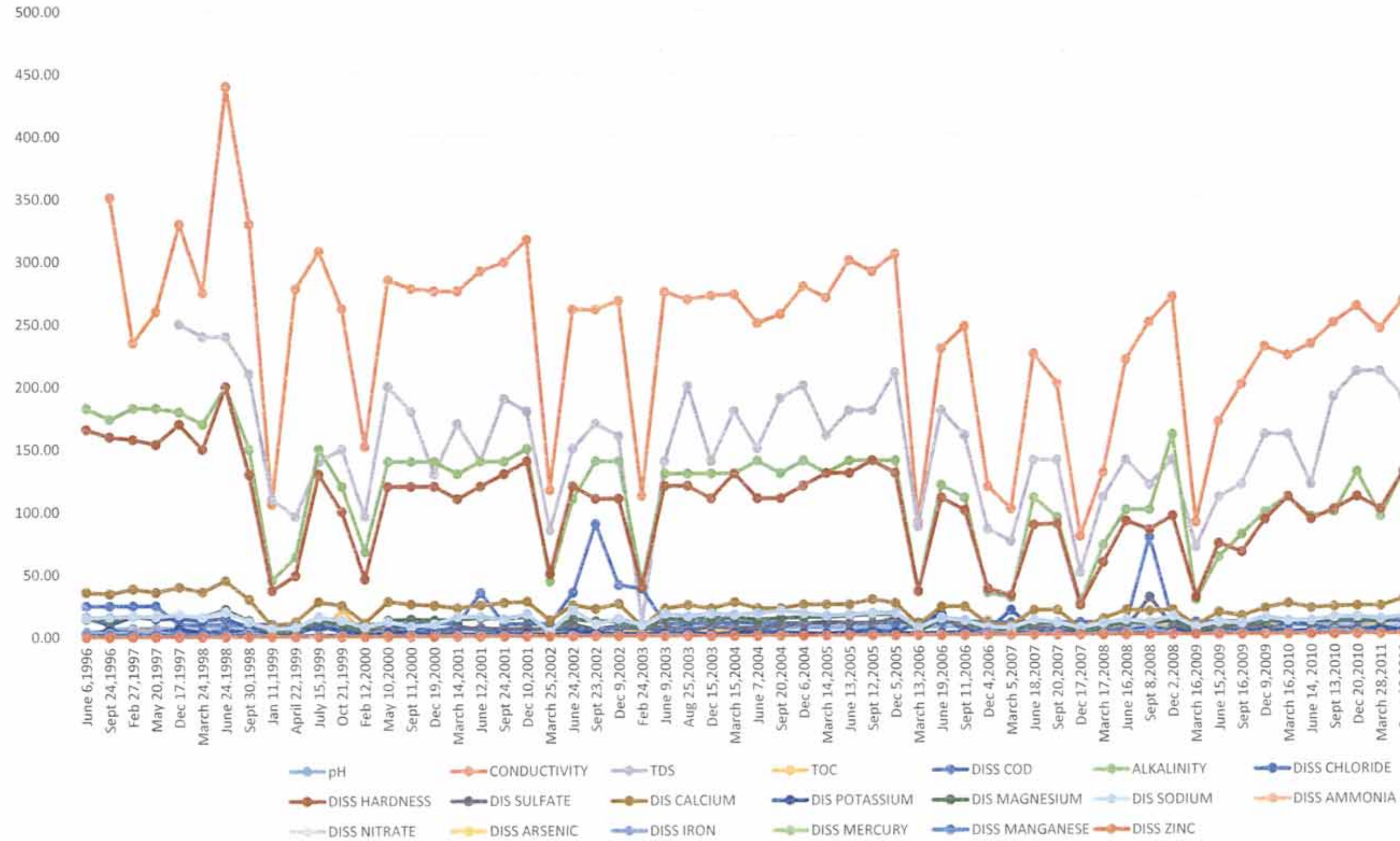
Well MW-3D



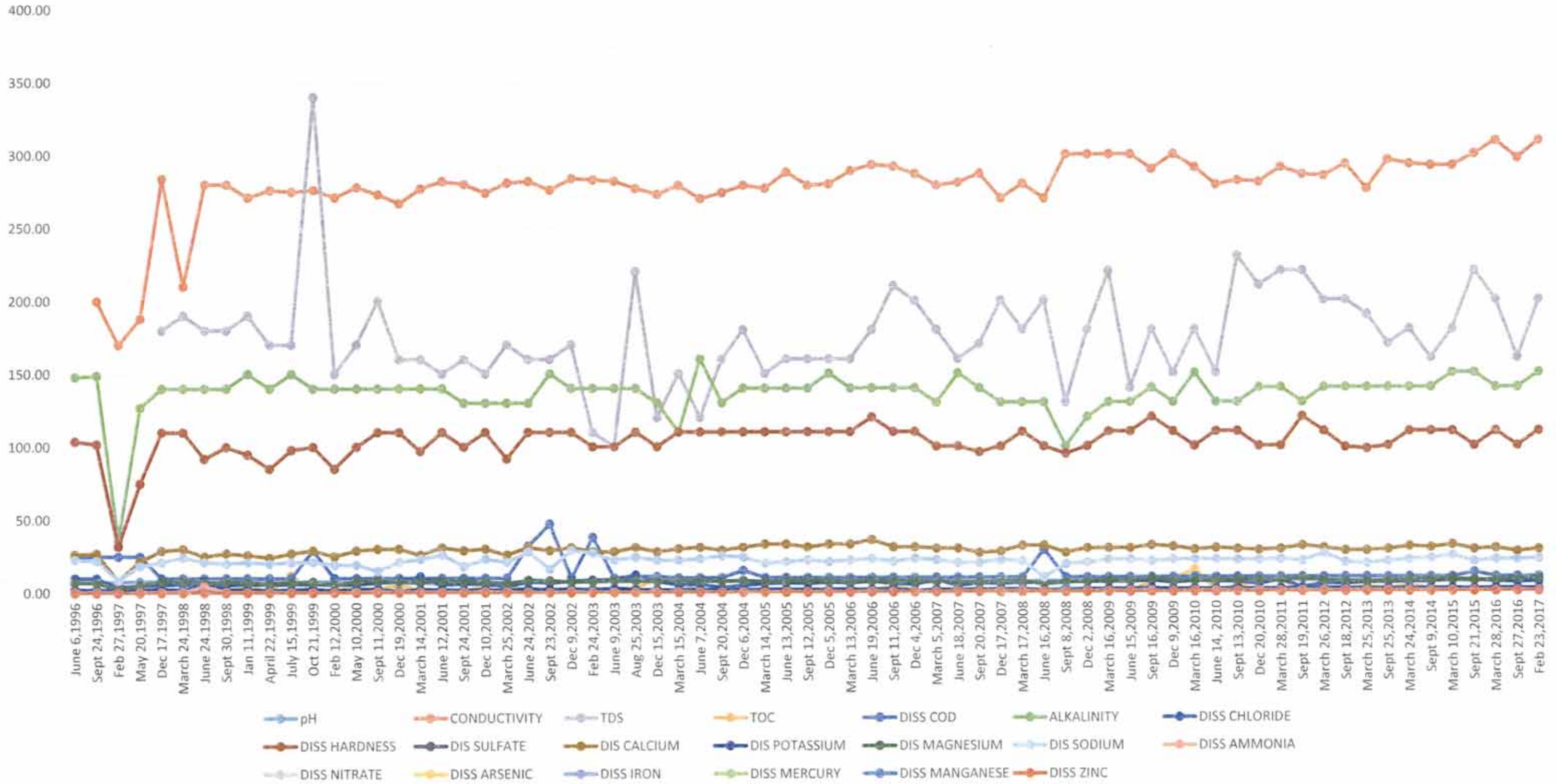
Well MW-45



Well MW-55



Well MW-CNE1D



Well MW-CNE1S

