STATE OF COLORADO

Musick - DNR, Jason <jason.musick@state.co.us>

Yoast 2016 AHR

1 message

Watterson, Brian <BWatterson@peabodyenergy.com> Thu, Mar 30, 2017 at 11:12 AM
To: "Musick - DNR, Jason <jason.musick@state.co.us> (jason.musick@state.co.us)" <jason.musick@state.co.us>

16_Yoast_AHR_Final.pdf
4829K

Seneca Coal Company
Peabody Energy
PO Box 670
36600 Routt County Road 27
Hayden, CO 81639

February 24, 2017

Jason Musick
Colorado Division of Reclamation, Mining and Safety
1313 Sherman Street, Room 215
Denver, CO 80203-2273

RE: Yoast AHR, Permit C-94-082

Dear Jason,

Enclosed is the 2016 Annual Hydrology Report (AHR) for the Yoast Mine (Yoast). This report contains a compilation and analysis of hydrologic data collected during the period extending from October 1, 2015 through September 30, 2016.

Please contact me with any comments and/or questions.

Sincerely,

Brian Watterson
Geologist

TNS/*tns*
Enclosure: Yoast AHR

cc: Alan Boehms, OSMRE
Jennifer Maiolo, BLM

Seneca Coal Company
PO Box 670
36600 Routt County Road 27
Hayden, CO. 81639

2016 WATER YEAR

ANNUAL HYDROLOGY REPORT

YOAST MINE

FEBRUARY 2017

2016

ANNUAL HYDROLOGY REPORT

YOAST MINE

2016 ANNUAL HYDROLOGY REPORT

YOAST MINE

Table of Contents

LIST OF APPENDICES

TABLE A

Hydrologic Monitoring Site Numbering System

Bedrock well site syntax:	**mine/aquifer/site #**
Alluvial well site syntax:	**mine/drainage/aquifer/site #**
Stream station syntax:	**mine/S "for stream"/drainage/site #**
Spring site syntax:	**mine/spring abbr./site #**
NPDES site syntax:	**NPDES/site#**

Mine designations: Yoast - Y; Seneca II-W = W; Seneca II = S

Aquifer designations:

Wadge Overburden	**= OV**	**Lennox Overburden**	**= LOV**
Wadge Coal	**= W**	**Trout Creek**	**= TC**
Wadge Underburden	**= WU**	**Spoil**	**= SP**
Wolf Creek	**= WC**	**Spring**	**= SPG**
Wolf Creek Under	**= WCU**	**Spoil Spring**	**= SSPG**
Lennox Coal	**= L**	**Alluvium**	**= AL preceded by drainage designation**

Drainage designations:

Grassy Creek	**= G**	**Watering Trough**	**= WT**
Little Grassy Creek	**= LG**	**Fish Creek**	**= F**
Sage Creek	**= S**	**Cow Camp**	**= C**
Dry Creek	**= D**	**Bond Creek**	**= B**
Hubberson	**= H**	**N. of Bond Creek**	**= NB**
Annand Draw	**= A**		

NOTE: An "F" that follows the drainage designation on stream sites indicate the presence of a flume (see examples).

Examples:

II-W Overburden Site 4-02	**WOV4-2**	**Yoast Stream Site 3 on Sage**	**YSS3**
Yoast Annand Draw Alluv. Site 14	**YAAL14**	**Seneca Spoil Spring #8**	**SSSPG8**
Yoast flume Site 5 on Grassy	**YSG**		

Introduction

The information assembled in this 2016 Annual Hydrology Report (AHR) includes data collected from approved monitoring sites established at Seneca Coal Company's (SCC) Yoast Mine (State Permit No. C-94-082). Locations of monitoring sites discussed in this report can be found by referring to Exhibit 7-1, Hydrology Monitoring Map, provided in the Yoast Mine Permit Application Package (PAP). In addition, NPDES ponds and surface water sites are depicted on Figures 1 and 2, Appendix A. A map of ground water monitor wells is provided as Figure 3.

All references to 2016 (or to “this year”) will be for Water Year 2016 (October 1, 2015 through September 30, 2016) unless otherwise noted. All tables referred to in the following text can be found in Appendix A. In addition, a table of contents for Appendix A is given at the beginning of that appendix.

The Yoast Mine permit went into effect on August 8, 1995. Overburden removal began in October 1996 in the Grassy Creek basin and in 2000 in the Sage Creek basin. The last of the coal at the Yoast Mine was removed in February 2006.

Field conductivity and pH meters were calibrated prior to each day’s use. The conductivity meter is calibrated using a potassium chloride solution with an electrical conductivity in the 1000 to 4000 umhos/cm range. The pH meter is calibrated using NBS traceable buffers with pH values of 7 and 10. Lab analyses have been performed by ACZ Laboratory in Steamboat Springs, Colorado since May 31, 1983. ACZ Laboratory performs all analyses by EPA or equivalent methods. Samples are delivered the day of collection to the lab in an iced cooler.

SCC instituted in 1995 a new monitoring site numbering system for its new Paradox™ water quality database. This revised system is detailed in Table A. For convenience sake, this table has been placed at the end of the Table of Contents (see previous page).

Meteorological Data

Data from the National Climatic Data Center's (NCDC) Hayden Station are used to evaluate the precipitation trend. These data are provided in Appendix A1. For this year, 18.43 inches of precipitation was measured, which is 0.17 inch (1%) above the 1981-2015 average, 18.26 inches. All months except October, February, March, June, July, August, and September were above average. Snowpack runoff, as estimated by totaling November through March precipitation values, was 9.66 inches, which was 2.29 inches (31%) above the 1981-2015 average, 7.37 inches.

Ground Water

Water Levels.

Table 3 provides a summary of ground water monitoring sites at the Yoast Mine. Water level data are provided in Appendix B. For each well water level reports for the past ten years are presented immediately after the water level hydrograph of all data since 1991. Water level measurements are collected with an electrical water level indicator or a steel tape. Pressure readings (in psi) obtained from flowing wells with pressure gages are multiplied by 2.31 to obtain head in feet. The current ground water monitoring program is presented in Table 15-8 of the Yoast Mine PAP.

Ground Water Level Summary.

This year, water levels at all wells were within their historic ranges, except for well YW30. Well YW30 exhibited its highest water level this year with a value of 151.19 feet to water. All alluvial wells exhibit distinct seasonal water level fluctuations in response to periods of precipitation recharge or the lack of precipitation. Overburden and coal well water levels are fluctuating in response to the precipitation recharge and induced ground water flow to the reclaimed mine pits.

Ground Water Quality.

Table 3 provides a summary of ground water monitoring sites at the Yoast Mine. Tables 4a and 4b show the 2010 ground water parameter lists. Appendix C provides all ground water quality data collected during this year, along with sampling remarks. This is followed by a plot of TDS versus time for the entire period of record. The regression line on this plot is generated by a method known as LOWESS which is an acronym from Locally Weighted Scatter plot Smoothing (Cleveland, 1979). Unless otherwise noted, smoothness factor (SF) of 1 (on a scale of 0 to 1) was used, which gives maximum smoothing.

A statistical report representing baseline (i.e., premining) data for each well (when available) is presented in Appendix C1 of the 2010 AHR. On this statistics report, "censored data" refers to analytical values that were below the detection limit, which were censored from the min/max/mean calculations. The time frame for baseline conditions is listed under "conditions specified" at the bottom of each page.

Alluvium.

One well, YAAL14, monitors water quality in the Annand Draw alluvium. TDS values for this well display an increasing TDS trend with the peak value occurring in May 2008.

One well, YGAL16, monitors water quality in the Grassy Creek alluvium. This well is located immediately below NPDES11 on a Grassy Creek tributary. It displays an increasing TDS trend. However, the peak value occurred in May 2011.

Two wells, YSAL1 and YSAL3, monitor water quality in the Sage Creek alluvium. Well 1 is the furthest downstream well for the Yoast Mine. It displays an increasing TDS trend, with the peak value occurring in October 2007. Well 3 is upstream of Well 1, and is located along Sage Creek, just below the discharge from NPDES12. It displays an increasing TDS trend with the peak value occurring in May 2011.

Wadge Overburden.

Well YOV30 displays an increasing TDS trend. However, the peak values occurred in September 1992 and September 2014.

Wadge Coal.

Well YW30 displays an increasing TDS trend, with the peak value occurring in May 2014.

Wadge Underburden.

Well YWU30 displays a decreasing TDS trend with the peak values occurring in December 1990 and August 2007.

Wolf Creek Coal and Underburden.

As of September 2002, Well YWC33 monitors the Wolf Creek coal water quality in the Sage Creek basin. This well displays a decreasing TDS trend, with the peak value occurring in 2005. Mining of this seam began in November 2002. Well YWCU33 now monitors the Wolf Creek underburden water quality in the Sage Creek basin. It displays a decreasing TDS trend with the peak value occurring in August 2003.

Comparison of Ground Water Quality to Water Use Standards.

SCC has compiled a list of ground water standards for agricultural uses (Table 5). This list is composed of Colorado Department of Health ground water standards (CDPHE, Reg. 41, May 2008).

Table 6 provides a comparison of ground water quality to agricultural standards. This Paradox database-generated table does not include the units of concentration (mg/l or ug/l) for each parameter. The units used for each parameter are the same as those listed on the standards table (Table 5) and are also the same as those used in the water quality reports. The frequency column on Table 6 indicates, in this order: uncensored, that is, the number of exceedances above the Method Detection Limit (MDL) / the number of exceedances between the MDL and the Practical Quantitation Level (PQL) / censored, that is, the number of sample values below the MDL but the MDL was higher than the standard / the total number of samples. This year, no excursions were observed at any site.

Ground Water Points of Compliance

Two GWPOCs have been established for the Yoast Mine. Attachment 15-1 of the Yoast Mine PAP provides the details. The ground water standards for Grassy Creek Alluvial Well SGAL70 are provided in this AHR on Table 7. Data from Well SGAL70 may be found in the Peabody Sage Creek Mine AHR, Appendix C. No exceedances of those standards were observed in the sample collected from this well this year.

The ground water standards for Sage Creek Alluvial Well YSAL3 are provided in this AHR on Table 8. Data from Well YSAL3 may be found in Appendix C of this AHR. The sole exceedance of those standards was observed in May. Well SGAL70 exhibited an elevated concentration of selenium, 43.70 ug/l. The September concentration decreased to 0.30 ug/l. The selenium standard is 20.0 ug/l.

Ground Water Summary

TDS trends are decreasing at three wells and increasing at six wells. CDPHE agricultural ground water standards were not exceeded this year. In the area surrounding Yoast, ground water is not being pumped for irrigation or livestock watering purposes, nor has the CDPHE classified any aquifer in this region for any use. The above discussion is provided only to serve as a comparative basis to judge ground water quality.

In the Probable Hydrological Consequences (PHC, Tab 17, Attachment 17-5) section of the Yoast Mine PAP, predictions were made as to the expected TDS increases to be observed at various monitoring wells. The following table outlines these predictions along with this year’s observed average values (annual average for bedrock wells, May-September average for alluvial wells).

Well	Predicted TDS values (mg/l)	This year's average TDS (mg/l)
YOV30	3201	2900
YW30	2570	7790*
YWC33	2721	742
YWCU33		898
YWU30		568
YAAL14	2036	2010
YGAL16	1296	1480*
YSAL1	798	1430*
YSAL3	798	1150*

* indicates value above prediction

This year's TDS value at Wadge coal well YW30 was 7790 mg/l. The PHC predicted value for this well is 2570 mg/l. Since 2009, TDS values have been fluctuating up and down, making it difficult to determine an accurate trend.

At Grassy Creek alluvial well YGAL16, the average TDS value observed this year was 1480 mg/l. This value exceeds the predicted value of 1296 mg/l. The GWPOC well for the Grassy Creek Alluvium, SGAL70, did not exceed the TDS GWPOC standard, 5038 mg/l.

At Sage Creek alluvial well YSAL1, the average TDS value observed this year was 1430 mg/l. The TDS value observed this year upstream at Well YSAL3 (directly below Pond 012) was 1150 mg/l. These two values exceed the predicted value of 798 mg/l. The GWPOC well for the Sage Creek Alluvium, YSAL3, did not exceed the TDS GWPOC standard, 2675 mg/l.

At well YSAL3, the average TDS value observed this year was 1150 mg/l. This value exceeded the predicted value of 798 mg/l. The GWPOC well for the Sage Creek Alluvium, YSAL3, did not exceed the TDS GWPOC standard, 2675 mg/l.

Surface Water

A summary of surface water sites is provided in Table 9. Stream monitoring occurs on Sage Creek at Sites YSSF3 and YSS2, and on Grassy Creek at Sites YSGF5 and YSG5. These surface water sites are monitored biannually for flow and field parameters (pH, temperature, and electrical conductivity [EC]). All five NPDES sites are monitored monthly for NPDES parameters and field parameters. Samples obtained at the stream sites are analyzed for one of the new surface water parameter lists during spring runoff and summer baseflow. Spring sites are monitored in the spring season. The current surface water and spring monitoring program is presented in Table 15-9 of the Yoast Mine PAP.

All surface water data collected during this reporting period are provided in Appendix D. Data for each site begin with a flow hydrograph of all historic data (plus an annual hydrograph for NPDES sites), followed by a listing of individual water quality and quantity data for the current water year, followed by an instantaneous flow measurement report, and followed by remarks, if present. This is followed by a TDS regression plot using the LOWESS method (see the Ground Water Quality section).

A statistical report representing baseline (i.e., premining) data for each site downstream of mining (when available) is provided in Appendix D1 of the 2010 AHR. On this statistics report, "censored data" refers to analytical values that were below the detection limit, which were censored from the min/max/mean calculations. The time frame for baseline conditions is listed under "conditions specified" at the bottom of each page.

Sage Creek

Site YSSF3.
This site exists on Sage Creek upstream of all potential Yoast Mine discharges. It displays a decreasing TDS trend.

NPDES12.

Mining in this basin began in 2000. Reconstruction of the water augmentation Pond Y1 (Site YSSF2) was completed on September 13, 1999. It is now referred to as Pond 012 (NPDES12). This pond began to flow again (after reconstruction) in April 2000. Flow at this pond is continuous. The average flow value for this year was 0.14 cfs, which was 40% greater than the historic (2000-2016) average for Pond 012, 0.10 cfs. The timing of when flow values are collected affects these averages. A statistical summary of baseline chemistry data from Site YSSF2 (Y1 outflow) and YSS3 (Y1 inflow) is provided in Appendix D1 of the 2010 AHR. NPDES12 exhibits a decreasing TDS trend, with the peak value occurring in July 2007.

A slide north of Pond 012 was repaired in 2010 and 2011. An additional pond, 012A, was constructed in August 2008 to compensate for the lost capacity in Pond 012. Pond 012 was cleaned out in 2010 and 2012.

NPDES13.

Construction of this pond was completed in December 2003. It first began discharging on March 14, 2005. Average flow this year was 0.023 cfs, which was 130% higher than the historic (2005-2016) average value, 0.01 cfs. The timing of when flow values are collected affects these averages. The TDS trend is increasing.

NPDES14.

Construction of this pond was completed in September 2001. It discharged for the first time on April 4, 2006. The average flow this year was 0.022 cfs, which was 10% greater than the historic (2006-2016) average value, 0.02 cfs. The timing of when flow values are collected affects these averages. TDS values are slightly increasing with the peak occurring this year.

Site YSS2.

This site exists on Sage Creek below all potential Yoast Mine discharges. Monitoring at this site was resumed in 1998 after the monitoring requirement was discontinued in 1993 (although field

parameters were occasionally collected in 1994 to 1997). A statistical summary of baseline chemistry data is provided in Appendix D1 of the 2010 AHR. Its TDS plot indicates a slightly increasing trend, with the peak value occurring in September 2006.

Grassy Creek / Annand Draw

NPDES10.

This sediment pond on Annand Draw was completed in August 1996. Flow was observed at this site for the first time ever on February 24, 1997. Flow at this pond is normally continuous. Average flow this year was 0.085 cfs, which is 47% less than its historic (1997-2016) average, 0.16 cfs. The timing of when flow values are collected affects these averages. This pond was dredged out in 2002. Baseline data for this site, both downstream (Site YSA4) and upstream (Site YSAF4) of the pond, have been provided in Appendix D1 of the 2010 AHR. NPDES10 exhibits a slightly increasing TDS trend. However, the peak value occurred in 2002.

NPDES11.

This pond exists on a Grassy Creek tributary and was completed in October 1997. Flow was first observed at this site in 1998. No discharge occurred in 1999 or 2000. Average flow this year was 0.038 cfs, which was 27% higher than the historic (1998-2016) average, 0.03 cfs. The timing of when flow values are collected affects these averages. Due to high sediment level, this pond was dredged out in the fall of 2003. TDS values exhibited an increasing trend, with the peak value occurring in 2011.

Site YSGF5.

This site exists on Grassy Creek below the NPDES11 pond. A statistical summary of baseline chemistry data is provided in Appendix D1 of the 2010 AHR. Its TDS plot indicates an increasing trend, with the peak value occurring in 2013. This site is also a part of the Peabody Sage Creek Mine monitoring program.

Site YSG5.

This site exists on Grassy Creek below all discharges from both the Yoast and Peabody Sage Creek Mines. It became part of the required monitoring program in October 1995. TDS values here are affected more by the Peabody Sage Creek Mine than the Yoast Mine. TDS values recently display a stable trend, with the peak value occurring in 2013. This site is also a part of the Peabody Sage Creek Mine monitoring program.

Springs

Spoil Spring 1 (YSSPG1).

This spoil spring was discovered in September 2002. It is located just above the old haul road culvert crossing Annand Draw. Its TDS plot displays a increasing trend.

Spoil Spring 2 (YSSPG2).

This spoil spring was discovered in May 2005 below Stock Pond 011A (i.e., above NPDES Pond 011). It is normally dry in the fall. Its TDS plot displays decreasing trend since 2010.

Spoil Spring 3 (YSSPG3).

This spoil spring was discovered in September 2005 above NPDES Pond 012. Its TDS plot displays an increasing trend.

Spoil Spring 4 (YSSPG4).

This spoil spring was discovered in June 2006, in the main channel that feeds NPDES Pond 012. It is located to the north of Spoil Spring 3. Recently, its TDS plot displays a slightly increasing trend.

Comparison of Surface Water Quality to Water Use Standards.

SCC has compiled a list of surface water standards for agricultural uses (Table 11). This list is composed of CDPHE surface water agricultural use standards (CDPHE, Reg.31, November 2009).

Table 12 provides a comparison of surface water quality (including springs) to agricultural standards. This Paradox database-generated table does not include the units of concentration (mg/l or ug/l) for each parameter. The units used for each parameter are the same as those listed on the standards table (Table 11) and are also the same as those used in the water quality reports. The frequency column on Table 12 indicates, in this order: uncensored, that is, the number of exceedances above the Method Detection Limit (MDL) / the number of exceedances between the MDL and the Practical Quantitation Level (PQL) / censored, that is, the number of sample values below the MDL but the MDL was higher than the standard / the total number of samples. Below is a summary of standards that were exceeded. Given in parenthesis is the source and use of each standard. Although the CDPHE does not indicate between livestock and irrigation uses in their surface water agricultural standards, they have done so in their similar ground water agricultural standards (see Table 5). For the sake of discussion, SCC chooses to use those ground water use standards classifications (livestock or irrigation) for surface water use evaluation. Following is a list of standards exceeded this year.

Parameter	# of Sites / # of Excursions
Manganese (CDPHE irrigation)	4/4
Selenium	1/1

This summary indicates that two CDPHE surface water agricultural use standards were exceeded. The manganese standard was exceeded at four sites and the selenium standard was exceeded at one site. However, as indicated in the recently revised CDPHE Regulation 31, the standard of 0.2 mg/l for manganese, applies to plants grown in acidic (<6.0 pH) soils. In alkaline soils, as are found in the Seneca II region, a more appropriate (EPA) standard would be 10 mg/l. The maximum manganese value for any surface water site observed this year was 1.58 mg/l. Premining manganese values often exceeded the 0.2 mg/l standard.

Table 13 shows the CDPHE receiving stream standards for Sage Creek (Yampa Segment 13e), Table 15 shows the upper Grassy Creek (Yampa

Segment 13i) and Table 17 shows the lower Grassy Creek (Yampa Segment 13j). Sage Creek was re-segmented by the CDPHE in 2003. Regulation 33 was further revised in 2005, 2008 and 2015. These standards were based on the presence of fish in the lower portions of the creeks. However, the upper portions that the Yoast Mine discharges into have no fish present. Tables 14 (Yampa Segment 13e) 16 (Yampa Segment 13i) and 18 (Yampa Segment 13j) provide a comparison of those standards to water quality data collected this year from NPDES and stream sites in those basins. Standards that were exceeded are:

Parameter	# of Sites / # of Excursions
Iron, Total Recoverable (TR)	2/2
Mercury, Total	3/3

The total recoverable iron standard (1.0 mg/l) was exceeded two times at two sites this year (YSGF5 and YSG5) with a high of 2.53 mg/l. Iron excursions were likely the result of high suspended solids (TSS) and are generally observed during snowmelt runoff. This strict aquatic life standard was exceeded in over half of the pre-mining stream samples.

The aquatic life ammonia standard is dependent on pH and temperature. The detection limit for ammonia is 0.05 mg/l. All values above detection limit are compared to table standards found on this website, page 87: https://nepis.epa.gov/Adobe/PDF/20003O3L.pdf
No ammonia excursions occurred this year.

The drinking water standard for mercury is 2 ug/l. The aquatic life standard for mercury is 0.01 ug/l, which is set to protect the average human consumer of fish. SCC runs two different mercury tests, a high level test with a MDL of 0.2 ug/l (for streams) and a low level test with a MDL of 0.0002 ug/l (for certain NPDES sites only). All high level test values this year were less than the detection limit, which is 0.2 ug/l.

The sulfide data presented in Appendix D are the total of both the ionized (S^-) and un-ionized (H_2S) forms of hydrogen sulfide. The un-

ionized form is the potentially toxic form, and is what the CDPHE water quality standard is based upon. A procedure for calculating the un-ionized form may be found on the website, page 5, Table 1: http://www.mullalyengineering.com.au/images/product/file/Problem_of_Hydrogen_Sulphide_in_Sewers.pdf

No excursions of the 0.002 mg/l un-ionized sulfide standard occurred this year.

NPDES Effluent Criteria (Permit No. CO-0000221)

No excursions of NPDES limits occurred this year.

Surface Water Summary

The Yoast Mine PHC (PAP Tab 17, Attachment 17-5) predicts TDS increases to be observed at various stream sites during the irrigation season (June-September). The following table outlines those predictions along with this year's observed averages.

Stream Site	Predicted TDS values (mg/l)	This year's average TDS (mg/l)
YSGF5	1337	852
NPDES10	3938	2462
NPDES12	4291	3075
WSSF3 (Seneca II-W site)	2118	839

No sites exceeded the PHC predictions.

TDS trends are increasing at NPDES10, NPDES11, NPDES13, NPDES14; Stream Sites YSS2, YSGF5; Spoil Spring 3 (YSSPG3) and Spoil Springs 1 (YSSPG1). TDS values have decreased at sites NPDES12, YSSF3, and Spoil Springs 2 (YSSPG2). A recently stable trend has been observed at Spoil Spring 4 (YSSPG4) and at YSG5. Average flow values this year were above historic averages at all NPDES sites, except NPDES10.

Water discharged from the Yoast Mine is not used directly for irrigation. Indirectly, although, water discharged from the mine is significantly diluted by water from Grassy Creek, Sage Creek, or the Yampa River before it is diverted and used for irrigation. Due to the relative amount of dilution, the ambient water qualities of Grassy Creek, Sage Creek, and the Yampa River are the dominant factors in determining their suitability for irrigation. Water discharged from the Yoast Mine is, however, used for livestock watering. NPDES discharges are suitable for livestock and irrigation, but sometimes exceed water quality standards for aquatic life.

References

American Public Health Association (Ed.). 1985. "Standard Methods for the Examination of Water and Wastewater", 16th Edition, Washington, D.C.

Brakensieh and others. 1979. "Field Manual for Research in Agricultural Hydrology".

Buchanan and Sumers. 1968. "Stage Measurements at Gaging Stations".

Cleveland, W.S. 1979. “Robust Locally Weighted Regression and Smoothing Scatterplots: J.Am.Stat.Assoc. 74, 829-836.

Colorado Dept. of Health. August 2005. "Regulation No. 31, The Basic Standards and Methodologies for Surface Water"

Colorado Dept. of Health. December 2005. "Regulation No. 33, Classification and Numeric Standards for the Upper Colorado River Basin"

Colorado Dept. of Health. November 2004. "Regulation No. 41, The Basic Standards for Ground Water"

EPA. 1976. "Quality Criteria for Water"

Hem, John D. 1985. "Study and Interpretation of the Chemical Characteristics of Natural Water" USGS Water Supply Paper 2254, Third Edition

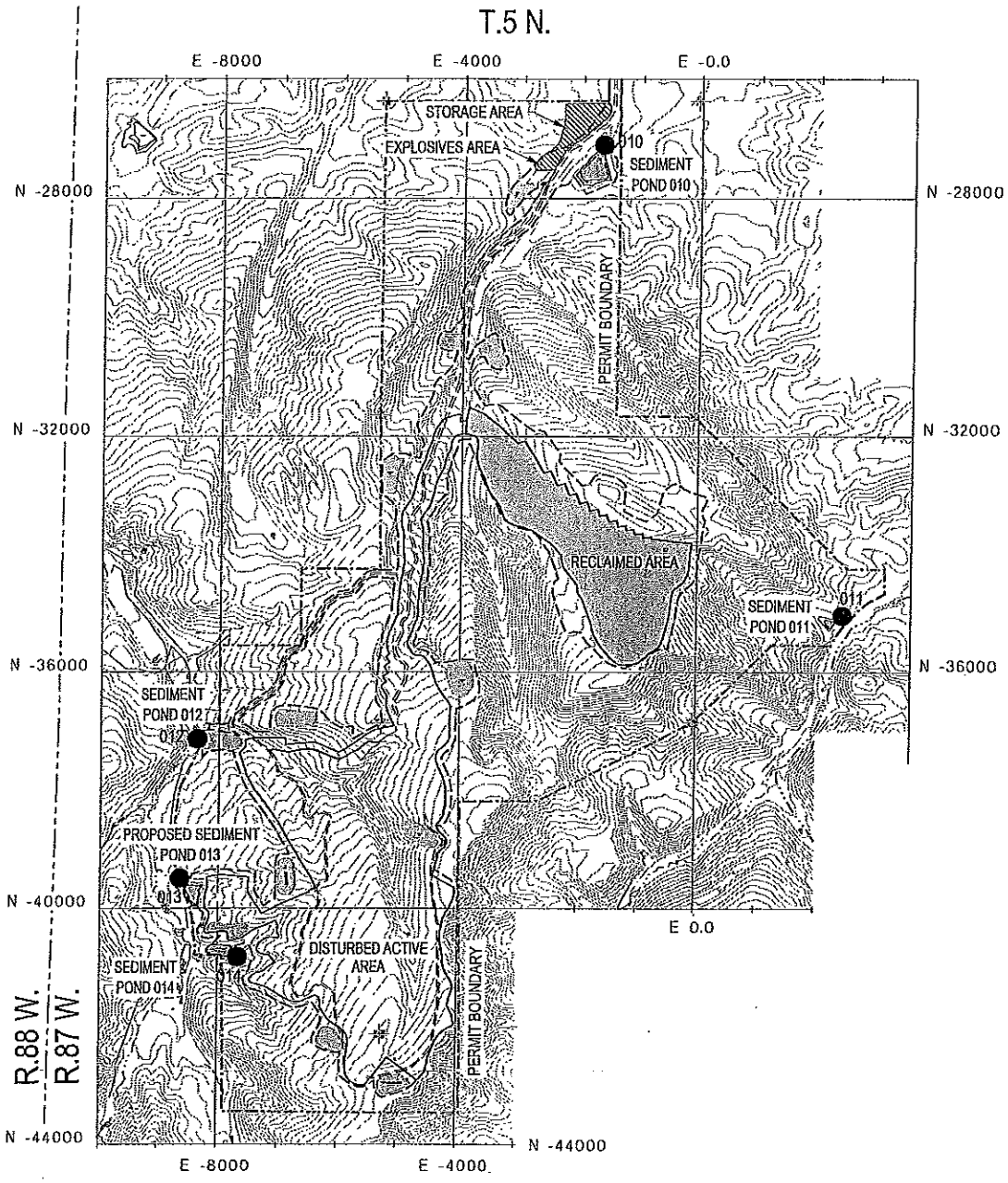
APPENDIX A

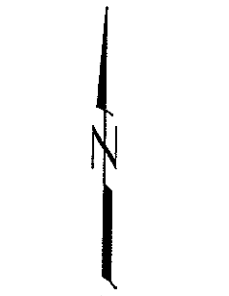
TABLES

APPENDIX A

Yoast Mine

Table of Contents





LEGEND

- HAUL ROADS
- DISTURBANCE BOUNDARY
- COAL RECOVERY BOUNDARY
- PERMIT BOUNDARY — PERMIT BOUNDARY
- SURFACE CONTOUR
- 010 — NPDES DISCHARGE POINT
- TOPSOIL STOCKPILES

SENECA Coal Company

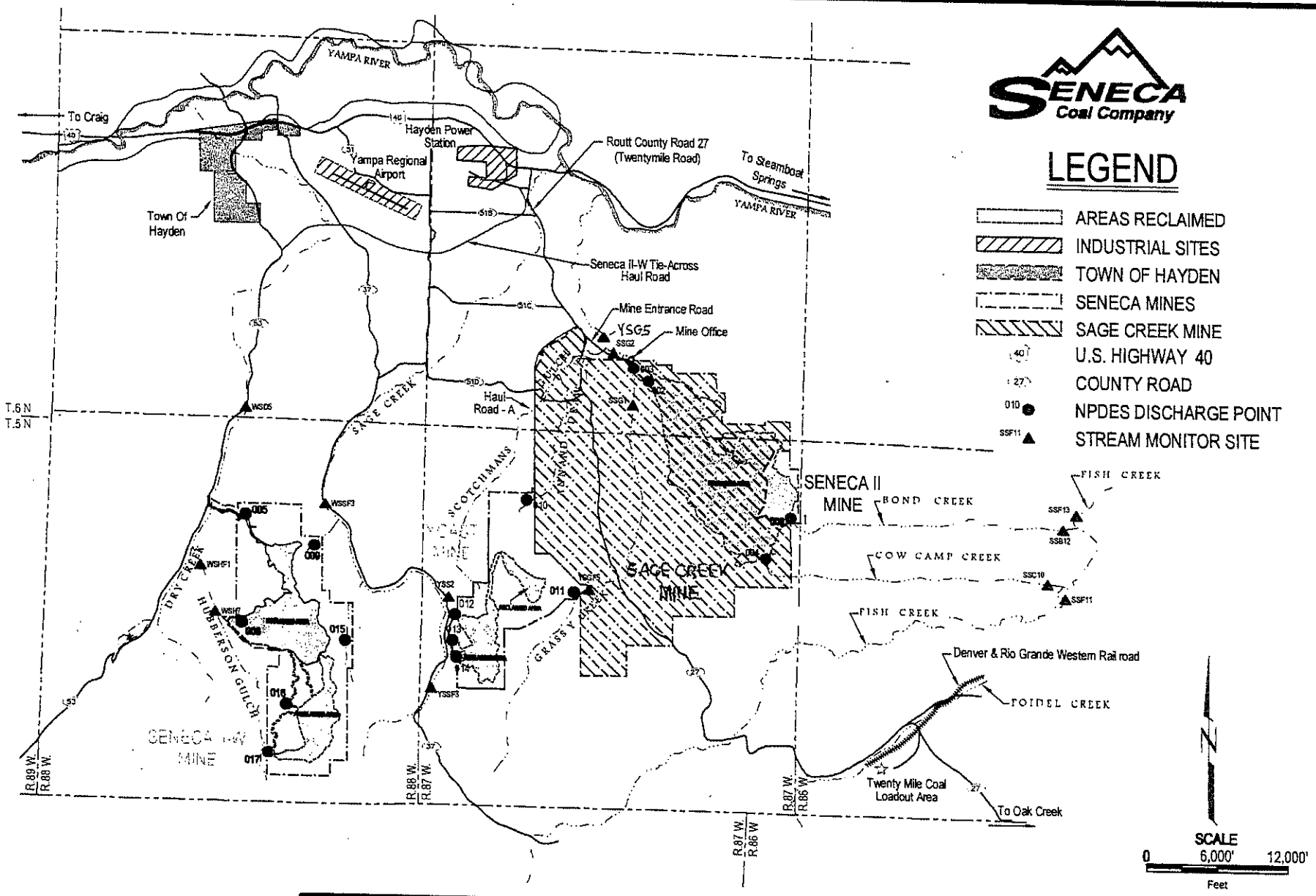
REV. No.	REVISIONS	REV. DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY
0	Issued For Draft Report	03/02	J.James	M.Mathisen	J.James

MWH
MONTGOMERY WATSON HARZA

PROJECT No.: 2470108
AutoCAD FILE: GENLOC-YOAST
SCALE: See Scale Bar
FIGURE No.: 1

SENECA COAL COMPANY

YOAST MINE
GENERAL LOCATION MAP



REV. No.	REVISIONS	DATE	DESIGN BY	DRAWN BY	REVIEWED AND SIGNED BY

PROJECT No.:

AutoCAD FILE: SAGE-GENLOC

SCALE: See Scale Bar

FIGURE No: 1

SENECA COAL COMPANY

GENERAL LOCATION

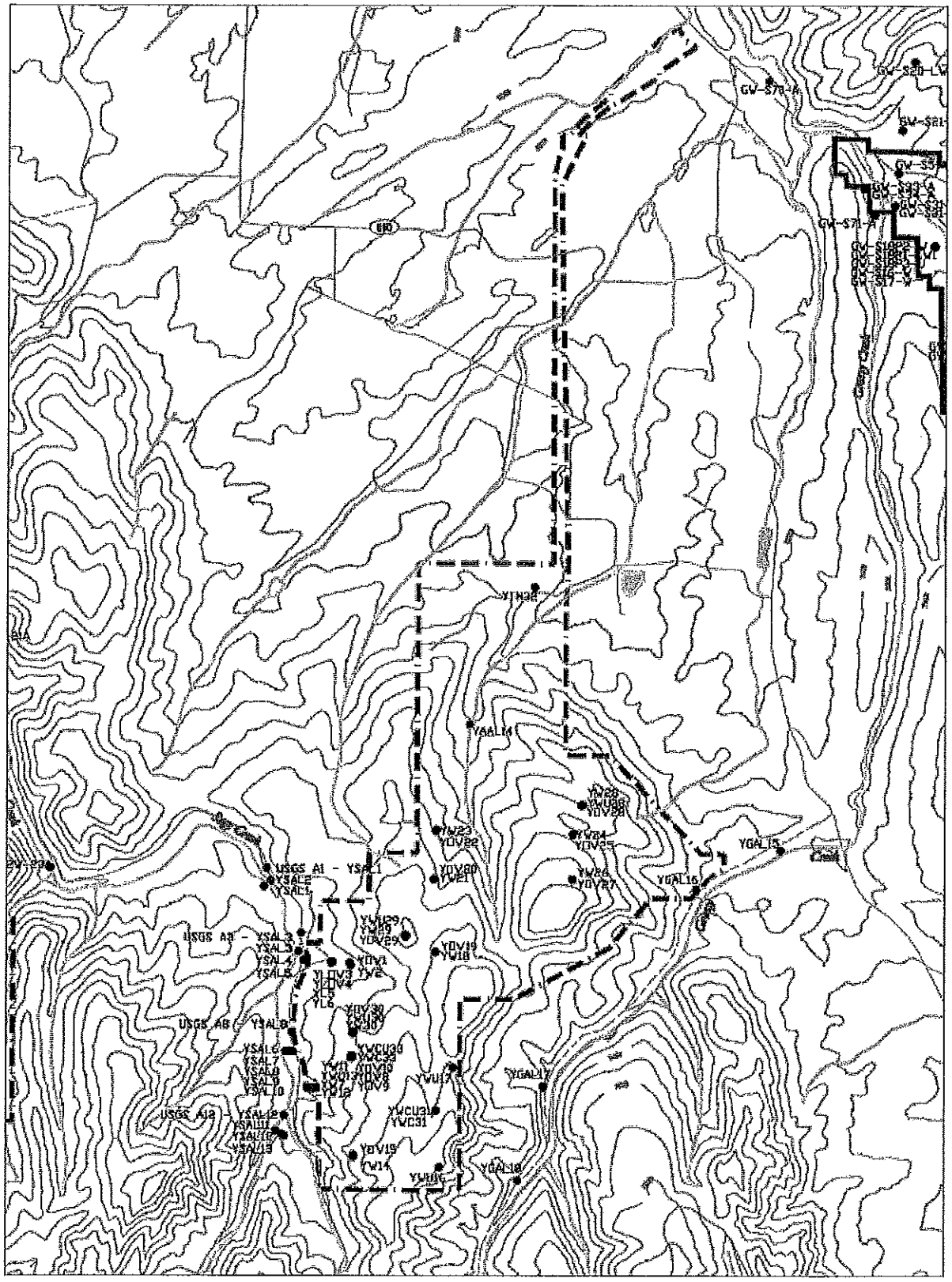


Figure 3: Map showing the monitoring well locations at Yoast Mine. Major drainages include Sage Creek to the west and Grassy Creek to the east. Minor drainages include Annand Draw to the north.

TABLE 2
Total Precipitation in Inches 1981-2016 Water Years
Yoast Mine, Routt County, Colorado

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Total
2016	1.39	1.9	2.55	2.65	1.16	1.40	3.02	1.94	.40	.81	.19	1.02	18.43
2015	1.60	2.10	1.84	0.55	1.02	1.30	1.60	4.36	0.61	2.36	1.53	0.90	19.77
2014	2.69	1.75	1.42	2.02	0.78	1.96	1.19	2.58	0.72	1.50	3.77	0.87	21.25
2013	0.86	0.46	3.21	1.02	0.73	1.29	3.58	1.67	0.06	0.46	1.48	2.76	17.58
2012	1.41	1.65	0.36	0.87	1.97	0.50	1.13	0.22	0.15	2.43	0.55	1.56	12.80
2011	2.18	1.91	2.98	1.59	2.09	2.52	4.50	3.56	0.85	1.82	0.65	1.14	25.79
2010	1.22	0.77	1.24	0.75	0.90	0.73	1.98	2.80	1.34	1.19	1.56	0.62	15.10
2009	0.53	1.16	1.38	2.80	0.60	1.32	1.40	1.89	2.08	0.51	1.04	0.48	15.19
2008	1.41	0.13	3.36	2.51	1.70	1.64	0.94	1.68	0.37	0.57	0.75	0.91	15.97
2007	2.64	0.76	0.86	1.04	1.34	1.46	0.62	0.87	0.33	0.52	1.12	2.72	14.28
2006	2.27	2.04	2.01	1.78	0.58	1.06	0.95	0.93	0.24	1.48	2.71	2.75	18.80
2005	1.34	1.68	0.50	1.49	0.84	0.99	1.97	1.41	3.36	0.57	1.57	1.30	17.02
2004	0.44	2.90	1.58	0.74	1.64	0.40	1.57	1.26	0.86	1.00	1.44	2.76	16.59
2003	1.88	1.09	1.28	0.74	1.95	0.99	2.57	1.15	1.33	0.47	0.62	1.83	15.90
2002	1.14	1.17	0.54	0.88	0.92	1.06	1.39	0.40	0.37	0.78	1.26	1.94	11.86
2001	0.67	1.60	1.16	0.96	1.41	1.07	1.28	1.15	0.85	1.11	2.06	1.66	14.98
2000	0.43	0.61	1.66	1.66	1.68	1.46	1.84	1.94	0.54	0.75	2.38	2.00	16.95
1999	1.85	0.81	1.13	2.13	0.99	0.57	3.21	2.00	1.39	2.10	1.85	0.78	18.81
1998	2.37	1.08	0.95	1.34	1.93	1.77	1.77	0.62	2.51	1.50	0.48	1.50	17.82
1997	1.79	2.39	1.69	2.88	0.97	0.48	3.19	2.75	1.60	1.05	3.57	5.48	27.84
1996	1.32	2.20	1.26	3.60	2.19	0.99	1.34	2.10	1.00	1.33	0.35	1.37	19.05
1995	0.95	2.09	0.68	1.47	0.97	0.82	3.36	4.48	1.54	1.23	0.73	2.69	21.01
1994	3.02	1.61	1.16	0.69	1.13	0.56	1.85	1.07	0.43	0.24	0.98	0.72	13.46
1993	1.46	1.48	1.33	2.28	1.66	1.53	2.55	1.14	1.29	0.65	1.37	1.39	18.13
1992	1.18	2.79	0.85	0.88	1.16	1.20	1.66	3.08	1.15	4.38	0.95	0.98	20.26
1991	3.20	1.71	1.18	1.75	0.86	2.42	1.09	0.96	1.74	1.59	2.00	1.32	19.82
1990	0.77	1.38	2.08	0.65	1.64	1.54	1.36	1.12	1.38	1.14	0.51	1.22	14.79
1989	0.13	2.79	1.13	1.02	2.50	1.38	0.45	1.39	0.53	1.82	1.33	1.52	15.99
1988	1.27	1.22	2.32	2.80	0.70	1.31	0.83	1.85	1.93	0.60	1.03	2.31	18.17
1987	2.65	1.00	0.56	1.28	1.35	1.50	1.60	1.92	0.64	1.78	1.35	0.46	16.09
1986	3.51	4.19	1.34	0.79	3.01	1.59	2.70	0.99	1.00	1.65	1.96	2.12	24.85
1985	2.61	1.68	1.80	2.40	1.01	2.40	3.77	1.40	0.68	1.28	0.64	1.17	20.84
1984	2.16	2.82	5.03	0.59	0.43	2.31	2.68	1.33	2.36	1.84	2.61	1.31	25.47
1983	1.64	1.52	1.03	1.10	1.66	2.17	2.28	1.57	2.76	1.88	1.08	0.79	19.48
1982	3.76	0.78	2.51	1.71	0.62	2.64	1.92	0.97	0.46	1.60	1.19	2.64	20.80
1981	1.09	0.33	0.43	0.53	0.45	2.50	0.69	3.97	1.65	2.24	1.12	1.33	16.33
Average	1.69	1.6	1.57	1.5	1.29	1.41	1.94	1.79	1.13	1.34	1.38	1.62	18.26

Data October 80 to February 82, and 2011 Water Year and later, from U.S. Department of Commerce - NOAA - Hayden Station. All other data from Seneca II Mine Meteorological Station with Belfort Weighing Bucket Rain Gage. Site relocated to USGS site on 8/31/91.

TABLE 3
Summary of Ground Water Monitoring Sites, Yoast Mine

Well Number	USGS Number	Coordinates	Formation Completed In	Well Depth (ft)	Casing Dia. (in)	Surface Elev. (ft)	Remarks	Historic Water Quality Data
YSAL1	A1	S 35,180.90 W 9,544.48	Sage Creek Alluvium	39.1	4	7174.93		Yes
YSAL2	A2	S 35,020.85 W 9,344.12	Sage Creek Alluvium	40.0	2	7179.47	Well abandoned 2014	No
YSAL3	A3	S 36,967.39 W 8,585.95	Sage Creek Alluvium	44.0	2	7223.53	Point of compliance well	Yes
YSAL4	A4	S 37,206.98 W 8,443.68	Sage Creek Alluvium	59.0	2	7230.80	Well abandoned 2014	No
YSAL5	A5	S 37,224.27 W 8,393.76	Sage Creek Alluvium	45.0	2	7233.33	Well abandoned 2014	No
YSAL6	A6	S 39,713.05 W 8,935.08	Sage Creek Alluvium	40.0	2	7318.08	Well abandoned 2014	No
YSAL7	A7	S 39,717.24 W 8,836.39	Sage Creek Alluvium	45.0	2	7325.21	Discontinued 10/95, duplicate well. Well abandoned 2014	No
YSAL8	A8	S 39,707.34 W 8,840.15	Sage Creek Alluvium	20.0	4	7324.76	Well abandoned 2014	Yes
YSAL9	A9	S 39,697.69 W 8,842.49	Sage Creek Alluvium	20.0	4	7324.52	Discontinue 10/95, duplicate well. Well abandoned 2014	No
YSAL10	A10	S 39,715.52 W 8,732.48	Sage Creek Alluvium	53.0	2	7330.13	Abandoned 10/01 (TR 22)	No
YSAL11	A11	S 41,880 W 9,200	Sage Creek Alluvium	40.0	2	7382	Well destroyed by farming, location and elevation estimated Last data 8/83	No
YSAL12	A12	S 41,972.54 W 9,052.38	Sage Creek Alluvium	40.0	4	7381.13		Yes
YSAL13	A13	S 42,025.40 W 8,963.62	Sage Creek Alluvium	30.0	2	7384.23	Casing damaged by farming, well abandoned 8/96	No

TABLE 3
(Continued)

Well Number	USGS Number	Coordinates	Formation Completed In	Well Depth (ft)	Casing Dia. (in)	Surface Elev. (ft)	Remarks	Historic Water Quality Data
YAAL14	N/A	S 30,718.62 W 3,904.05	Annand Draw Alluvium	22.3	4	6971.97		Yes
YGAL15	N/A	S 34,182.12 E 4,745.60	Grassy Creek Alluvium	12.5	4	6909.16		Yes
YGAL16	N/A	S 35,257.00 E 2,400.86	Grassy Creek Trib. Alluvium	28.7	4	6982.12		Yes
YGAL17	N/A	S 40,670.06 W 1,816.56	Grassy Creek Trib. Alluvium	27.4	4	7178.04	Discontinued 11/99 Well abandoned 2014	Yes
YGAL18	N/A	S 43,243.86 W 2,521.10	Grassy Creek Trib. Alluvium	48.6	4	7302.09	Discontinued 11/99 Well abandoned 2014	Yes
WSAL12	N/A	S 28,958.95 W 18,280.44	Sage Creek Alluvium	20.2	4	6859.14	Also part of Seneca II-W monitoring program	Yes
YOV1	1	S 37,279.85 W 7,174.11	Wadge Overburden	62.0	4	7329.35	Some cement may be present in gravel pack. Bottom 8 ft of casing filled in. Abandoned 7/99	Yes
YW2	2	S 37,352.29 W 7,149.85	Wadge Coal	58.5	2	7325.36	Abandoned 7/99	Yes
YLOV3	3	S 37,270.86 W 7,684.96	Lennox Overburden	47.0	4	7282.36	Abandoned 7/99	Yes
YLOV4	4	S 37,280.56 W 7,685.00	Lennox Overburden	47.0	4	7282.45	Abandoned 7/99	Yes
YL5	5	S 37,257.28 W 7,641.88	Lennox Coal	54.0	4	7283.38	Abandoned 7/99	Yes
YL6	6	S 37,266.04 W 7,644.64	Lennox Coal	54.0	4	7282.86	Abandoned 7/99	Yes
YW7	7	S 39,849.88 W 7,096.90	Wadge Coal	146.3	4	7591.99	Some cement may be present in gravel pack. Well abandoned 2014	Yes

TABLE 3
(Continued)

Well Number	USGS Number	Coordinates	Formation Completed In	Well Depth (ft)	Casing Dia. (in)	Surface Elev. (ft)	Remarks	Historic Water Quality Data
YOV8	8	S 39,854.09 W 7,115.76	Wadge Overburden	133.0	2	7590.52	Some cement may be present in gravel pack. Discontinued monitoring 9/94. Well abandoned 2014	No
YOV9	9	S 39,843.92 W 7,121.53	Wadge Overburden	135.0	4	7589.94	Well abandoned 2014	Yes
YOV10	10	S 39,847.96 W 7,131.91	Wadge Overburden	135.0	4	7588.97	Pump test observation well for YOV9. Discontinue monitoring 9/94.	No
YW11	11	S 39,840.76 W 7,098.58	Wadge Coal	151.0	4	7592.33	Bottom 5' of 10' of completion zone has filled in. Discontinue monitoring 9/94. Well abandoned 2014	No
YW12	12	S 39,835.67 W 7,090.33	Wadge Coal	151.0	4	7592.91	Discontinue monitoring 8/93. June '90 total depth (130') is higher than top of completion zone (141'). Well abandoned 2014	No
YWU13	13	S 39,832.10 W 7,082.54	Wadge Underburden	170.0	4	7593.59	Discontinue monitoring 8/93. Well partially filled in. Better underburden data exists at adjacent Well YWU30. Well abandoned 2014	No
YW14	14	S 42,573.41 W 7,071.19	Wadge Coal	26.3	2	7721.19	Discontinued 7/01 (TR 22) Well abandoned 2014	No
YOV15	15	S 42,548.14 W 7,070.48	Wadge Overburden	9.5	4	7720.87	Discontinued 7/01 (TR 22) Well abandoned 2014	No
YWU16	16	S 42,871.69 W 4,687.51	Wadge Underburden	65.0	4	7975.23		No
YWU17	17	S 40,156.52 W 4,335.27	Wadge Underburden	48.0	4	7797.00	Some cement may have flowed past packer into completion Zone, abandoned 6/00	No
YW18	18	S 36,987.99 W 4,821.26	Wadge Coal	37.4	4	7679.24	Discontinued 10/99, mined out 12/99.	Yes

TABLE 3
(Continued)

Well Number	USGS Number	Coordinates	Formation Completed In	Well Depth (ft)	Casing Dia. (in)	Surface Elev. (ft)	Remarks	Historic Water Quality Data
YOV19	19	S 36,982.28 W 4,814.65	Wadge Overburden	27.0	2	7679.32	Discontinued 10/99, mined out 12/99.	No
YOV20	20	S 34,968.70 W 4,859.54	Wadge Overburden	85.7	2	7550.96	Discontinued monitoring 8/83. June '90 total depth (32') is higher than top of completion zone (56'). Abandoned 8/98.	No
YW21	21	S 34,986.14 W 4,863.92	Wadge Coal	100.5	4	7551.62	Bottom 3' of 4' of completion zone has filled in. Abandoned 8/98.	No
YOV22	22	S 33,645.85 W 4,824.44	Wadge Overburden	79.3	4	7376.95	Improper completion (see construction form). Abandoned 8/98.	No
YW23	23	S 33,632.52 W 4,804.15	Wadge Coal	104.0	4	7375.35	Abandoned 8/98.	Yes
YW24	24	S 33,749.35 W 1,021.11	Wadge Coal	108.8	2	7560.09	Discontinued monitoring 10/91. June '90 total depth (67') is higher than top of completion zone (103'). Mined out 1998.	No
YOV25	25	S 33,767.84 W 1,009.79	Wadge Overburden	90.0	4	7559.71	Discontinued monitoring 9/94. June '90 total depth (47') is higher than top of completion zone (50'). Mined out 1998.	Yes
YW26	26	S 34,985.61 W 1,042.53	Wadge Coal	43.0	4	7746.39	Mined out 8/97	No
YOV27	27	S 35,000.07 W 1,025.40	Wadge Overburden	25.0	2	7746.79	Mined out 8/97	No
YOV28	N/A	S 32,950.98 W 798.11	Wadge Overburden	305.0	4	7503.05		Yes
YW28	N/A	S 32,952.04 W 777.41	Wadge Coal	323.0	4	7503.33		Yes
YWU28	N/A	S 32,943.32 W 744.56	Wadge Underburden	383.5	4	7503.13		Yes

TABLE 3
(Continued)

Well Number	USGS Number	Coordinates	Formation Completed In	Well Depth (ft)	Casing Dia. (in)	Surface Elev. (ft)	Remarks	Historic Water Quality Data
YOV29	N/A	S 36,561.00 W 5,654.38	Wadge Overburden	221.0	4	7705.67		No
YW29	N/A	S 36,545.45 W 5,646.88	Wadge Coal	259.0	4	7705.53		Yes
YWU29	N/A	S 36,520.99 W 5,635.87	Wadge Underburden	303.9	4	7705.87		Yes
YOV30	N/A	S 39,202.68 W 7,083.35	Wadge Overburden	141.0	4	7585.45		Yes
YW30	N/A	S 39,175.95 W 7,075.14	Wadge Coal	208.0	4	7586.49		Yes
YWU30	N/A	S 39,189.87 W 7,078.95	Wadge Underburden	261.0	4	7586.62		Yes
YWC31	N/A	S 41,334.97 W 4,798.52	Wolf Creek Coal	108.0	4	7809.03	Abandoned 10/01	Yes
YWCU31	N/A	S 41,325.10 W 4,801.04	Wolf Creek Underburden	180.0	4	7808.61	Abandoned 10/01	No
YTM32	N/A	S 26,947.95 W 2,107.89	Twentymile Sandstone	1000.0	5	6856.13	Shop Well, currently not in service	No
YWC33	N/A	S 39,868.44 W 7,128.03	Wolf Creek Coal	309.38	3	7588.39	Replaces YWC31, drilled 8/02	No
YWCU33	N/A	S 39,883.37 W 7,122.79	Wolf Creek Underburden	391.61	3	7587.79	Replaces YWCU31, drilled 8/02	No
SGAL70	N/A	S 12889.99 W 4358.42	Grassy Creek Alluvium	22.0	4	6537.04	Point of compliance well (also downstream of the Sage Creek Mine)	Yes

Table 4a

Ground Water Parameter New Long List

Seneca Coal Company

Parameter	Analysis Technique	Units
Field		
Conductivity	Direct Measurement	umhos/cm
pH	Direct Measurement	units
Temperature	Direct Measurement	°C
Laboratory		
~~Alkalinity as $CaCO_3$~~	~~Dissolved~~	~~mg/l~~
~~Aluminum~~	~~Dissolved~~	~~mg/l~~
~~Arsenic~~	~~Dissolved~~	~~ug/l~~
~~Bicarbonate~~	~~Dissolved~~	~~mg/l~~
~~Boron~~	~~Dissolved~~	~~ug/l~~
~~Cadmium~~	~~Dissolved~~	~~ug/l~~
~~Calcium~~	~~Dissolved~~	~~mg/l~~
~~Carbonate~~	~~Dissolved~~	~~mg/l~~
~~Chloride~~	~~Dissolved~~	~~mg/l~~
~~Chromium~~	~~Dissolved~~	~~ug/l~~
	~~(+3 & +6 valences combined)~~	
~~Conductivity at 25°C~~	~~Direct Measurement~~	~~umhos/cm~~
~~Copper~~	~~Dissolved~~	~~ug/l~~
Fluoride	Dissolved	mg/l
~~Hardness as $CaCO_3$~~	~~Dissolved~~	~~mg/l~~
Iron	Dissolved	mg/l
~~Lead~~	~~Dissolved~~	~~ug/l~~
~~Magnesium~~	~~Dissolved~~	~~mg/l~~
Manganese	Dissolved	mg/l

Table 4a (cont.)

Ground Water Parameter New Long List

Seneca Coal Company

Parameter	Analysis Technique	Units
~~Mercury~~	~~Dissolved~~	~~ug/l~~
~~Nickel~~	~~Dissolved~~	~~ug/l~~
Nitrogen, Nitrate	Dissolved	mg/l
Nitrogen, Nitrite	Dissolved	mg/l
~~pH~~	~~Direct Measurement~~	~~units~~
~~Potassium~~	~~Dissolved~~	~~mg/l~~
Selenium	Dissolved	ug/l
~~Sodium~~	~~Dissolved~~	~~mg/l~~
~~Sodium Adsorption Ratio~~	~~Calculated~~	~~unitless~~
Sulfate	Dissolved	mg/l
~~Sulfide~~	~~Total~~	~~mg/l~~
~~Suspended Solids~~	~~Total~~	~~mg/l~~
~~Zinc~~	~~Dissolved~~	~~mg/l~~
~~Cation/Anion Balance~~	~~Calculated~~	~~percent~~
Total Dissolved Solids at 180°C	Dissolved	mg/l
~~Total Dissolved Solids Calculated~~	~~Calculated~~	~~mg/l~~

Parameters crossed out were suspended in 2010 TR 69. These parameters will be analyzed again one year prior to final bond release.

Table 4b

Ground Water Short Parameter List

Seneca Coal Company

Parameter	Analysis Technique	Units
Field		
Conductivity	Direct Measurement	umhos/cm
pH	Direct Measurement	units
Temperature	Direct Measurement	°C
Laboratory		
Iron	Dissolved	mg/l
Manganese	Dissolved	mg/l
Total Dissolved Solids at 180°C	Dissolved	mg/l

TABLE 5

CDOH 2008 Ground Water Agricultural Use Standards

Aluminum, mg/l [A]	5.0
Arsenic, ug/l	100.0
Boron, ug/l [B]	750.0
Cadmium, ug/l	10.0
Chromium, ug/l	100.0
Copper, ug/l	200.0
Fluoride, mg/l	2.0
Iron, mg/l	5.0
Lead, ug/l [A]	100.0
Manganese, mg/l [C]	0.2
Mercury, ug/l [A]	10.0
Nickel, ug/l	200.0
Nitrate/Nitrite as N, mg/l [A]	100.0
Nitrite as N, mg/l [A]	10.0
pH (S.U.)	6.5-8.5
Selenium, ug/l	20.0
Zinc, mg/l	2.0

A : CDOH livestock standard, without this footnote indicates a CDOH irrigation standard. Irrigation standard for lead is 5000 ug/l.

B : CDOH standard is set to protect plant sensitive species. Standard for most species found in Routt County is 5000 ug/l.

C : This standard in only appropriate where irrigation water is applied to soils with pH values lower than 6.0.

Table 6
Comparison of Ground Water Quality to CDPHE Agricultural Use Standards

Analyte	Standard	No. Sites	Sites	Frequency	Exceedence Date Range	Exceedence Value Range	Exceedence Median
CDOH (5/08) AGRICULTURAL GROUNDWATER STANDARDS ONLY - AHRGW.STD							
Aluminum, Dissolved	0.0000 - 5.0000	0	none				
Arsenic, Dissolved	0.0000 - 100.0000	0	none				
Boron, Dissolved	0.0000 - 750.0000	0	none				
Boron, Dissolved	0.0000 - 5000.0000	0	none				
Cadmium, Dissolved	0.0000 - 10.0000	0	none				
Chromium, Dissolved	0.0000 - 100.0000	0	none				
Copper, Dissolved	0.0000 - 200.0000	0	none				
Field Ph	6.5000 - 8.5000	0	none				
Fluoride	0.0000 - 2.0000	0	none				
Iron, Dissolved	0.0000 - 5.0000	0	none				
Lead, Dissolved	0.0000 - 100.0000	0	none				
Manganese, Dissolved	0.0000 - 0.2000	0	none				
Mercury, Dissolved	0.0000 - 10.0000	0	none				
Nickel, Dissolved	0.0000 - 200.0000	0	none				
Nitrate/Nitrite Nitrogen_N	0.0000 - 100.0000	0	none				
Nitrite Nitrogen_N	0.0000 - 10.0000	0	none				
Selenium, Dissolved	0.0000 - 20.0000	0	none				
Zinc, Dissolved	0.0000 - 2.0000	0	none				

Frequency = uncensored/between MDL&PQL/censored/no. samples, (B) = Between MDL&PQL range, (<) = Censored range

Table 6
Comparison of Ground Water Quality to CDPHE Agricultural Use Standards

---- Water Use Summary Report ----

Site	CDOH
YAAL14	
YGAL16	
YOV30	
YSAL1	
YSAL3	
YW30	
YWC33	
YWCU33	
YWU30	

TABLE 7

Ground Water Point of Compliance Standards
Grassy Creek Alluvial Well SGAL70
As Provided in Permit Attachment 15-1, Table 4

Aluminum, mg/l	5.0
Arsenic, ug/l	50.0
Boron, ug/l	750.0
Cadmium, ug/l	5.0
Chloride, mg/l	250.0
Chromium, ug/l	100.0
Copper, ug/l	200.0
Fluoride, mg/l	2.0
Iron, mg/l	14.1
Lead, ug/l	70.0
Manganese, mg/l	2.44
Mercury, ug/l	2.0
Nickel, ug/l	100.0
Nitrate as N, mg/l	10.0
Nitrite as N, mg/l	1.0
Nitrate/Nitrite as N, mg/l	10.0
Selenium, ug/l	20.0
Sulfate, mg/l	2517.0
Zinc, mg/l	2.0
pH (S.U.)	6.5-8.5
TDS, mg/l (from Table 7)	5038.0

TABLE 8

Ground Water Point of Compliance Standards
Sage Creek Alluvial Well YSAL3
As Provided in Permit Attachment 15-1, Table 1

Aluminum, mg/l	20.0
Arsenic, ug/l	50.0
Boron, ug/l	750.0
Cadmium, ug/l	12.0
Chloride, mg/l	250.0
Chromium, ug/l	100.0
Copper, ug/l	200.0
Fluoride, mg/l	2.0
Iron, mg/l	4.91
Lead, ug/l	60.0
Manganese, mg/l	0.76
Mercury, ug/l	2.0
Nickel, ug/l	100.0
Nitrate as N, mg/l	10.0
Nitrite as N, mg/l	1.0
Nitrate/Nitrite as N, mg/l	10.0
Selenium, ug/l	20.0
Sulfate, mg/l	1200.0
Zinc, mg/l	2.0
pH (S.U.)	6.5-8.5
TDS, mg/l (from Table 3)	2675.0

TABLE 9

Summary of Surface Water Monitoring Sites, Yoast Mine

Site Number	Location and Elevation	Period of Operation	Comments
YSSF1	Middle Sage Creek 7216 feet (5N87W18CDD)	01/81-10/83	2.5 ft. wide (2.0 ft. deep) Parshall flume w/continuous recorder, monitors downstream of Yoast Mine. Data for this for this site contained in USGS Open-File Report 90-708. Discontinued 10/83, flume relocated to Site YSSF3 (see above) summer 1990. Replaced by Site YSS2 (see below) in 5/91
YSSF2	Y1 Pond, Tributary to Sage Creek 7258 feet (5N87W19BAA)	03/91-10/99	1.0 ft. wide (1.5 ft. deep) Parshall flume w/continuous flow recorder, monitors discharge of Y1 Pond (renamed to NPDES12 11/99).
YSSF3	Upper Sage Creek 7409 feet (5N87W30BBA)	09/90-present	2.5 ft. wide (2.0 ft. deep) Parshall flume w/continuous flow recorder, monitors upstream of Yoast Mine
WSSF3	Lower Sage Creek 6857 feet (5N88W11ACC)	09/90-present	3.0 ft. wide (2.5 ft. deep) Parshall flume w/continuous flow recorder, monitors downstream of both Yoast and Seneca II-W Mines (not now required for Yoast monitoring)
YSS2	Middle Sage Creek 7218 feet (5N87W18CDD)	05/91-present	No instrumentation, replaces Site YSSF1 (see above), located approx. 150 ft. upstream of Site YSSF1 due to beaver dams
YSS3	Y1 Draw, Tributary to Sage Creek 7265 feet (5N87W19ABB)	05/91-10/93 5/98-10/98	No instrumentation, monitors inflow to Y1 Pond Discontinued 11/1999.
YSA4	Annand Draw Tributary to Grassy Creek 6780 feet (5N87W8ABD)	06/94-08/96	No instrumentation, monitors Annand Draw below NPDES10 site, discontinued 1996 upon completion of that pond.
YSAF4	Annand Draw, Tributary to Grassy Creek 6968 feet (5N87W8CDB)	05/91-06/96	1.5 ft. wide (1.5 ft. deep) Parshall flume w/continuous flow recorder. Monitors baseline data only for Annand Draw downstream of proposed mining. Discontinued and replaced with YSA4
YSGF5	Grassy Creek 6905 feet (5N87W16DAA)	04/91-present	2.0 ft. wide (2.0 ft. deep) Parshall flume w/continuous flow recorder. Monitors downstream of minor disturbances by Yoast Mine in Grassy Creek basin. Will discontinue continuous flow recorder starting in 1994

TABLE 9
(Continued)

Site Number	Location and Elevation	Period of Operation	Comments
YSG5	Grassy Creek below Scotchmans Gulch 6550 Feet (6N87W28DAD)	10/96-present	No instrumentation Monitor discharges from both Seneca II and Yoast Mines on Grassy Creek
NPDES10	Annand Draw Tributary to Grassy Creek 6780 feet (5N87W8ABD)	Constructed 8/96	~~1.5 ft. wide (1.5 ft. deep) Parshall flume with continuous flow recorder~~ Install 3-ft H-flume in 2015
NPDES11	Tributary to Grassy Creek 7000 ft. (5N87W16CAD)	Constructed 10/97	1.0 ft. wide (1.5 ft. deep) Parshall flume with continuous flow recorded
NPDES12	Tributary to Sage Creek 7258 ft. (5N87W19BAA)	Constructed 9/99	1.0 ft. wide (1.5 ft. deep) Parshall flume with continuous flow recorder
NPDES13	Tributary to Sage Creek 7380 ft. (5N87W19CAA)	Constructed 12/03	2' H-flume with continuous flow recorder
NPDES14	Tributary to Sage Creek 7400 ft. (5N87W19DBC)	Constructed 9/01	3' H-flume with continuous flow recorder
YSPG1	Pond 012 Basin 7250 feet (5N87W19BAA)	N/A	Spring w/water rights aka Yoast Spring #1, now inundated by Y1 (012) Pond
YSPG2	Pond 012 Basin 7268 feet (5N87W19ABB)	N/A	Spring w/water rights aka Yoast Spring #2. Per water rights document, this is a stock pond at the YSS3 site (see above). Will be replaced by NPDES12 pond.
YSPG3	Pond 012 Basin 7338 feet (5N87W19ABA)	06/91-08/93	Clearwell spring w/water rights aka Yoast Spring #3, former water supply to Valora Ranch. Sample site was exposed waterline approx. 700 ft. west (downstream) of clear well. Removed by mining.

TABLE 9
(Continued)

Site Number	Location and Elevation	Period of Operation	Comments
YSPG4	Pond 012 Basin 7620 feet (5N87W20CBC)	06/91-08/93	Spring w/water rights aka Yoast Spring #4. Apparent bedrock discharge adjacent to ephemeral stream channel
YSPG5	Pond 012 Basin 7697 feet (5N87W20CBB)	06/91-08/93	Spring w/water rights aka Yoast Spring #5. Per water rights document, this is a stock pond. No flow out of this pond has ever been noted; therefore, no sample has ever been collected.
YSPG6	Annand Draw Basin 6875 feet (5N87W8CAA)	06/91-2004	Spring with water rights aka Annand Spring #1. Spring house supplies water to trough at old Annand homestead
YSPG7	Annand Draw Basin 6915 feet (5N87W8CAB)	06/91-08/93	Spring w/water rights aka Annand Spring #2. Per water rights document, this is a stock pond. This pond has now washed out. Samples were collected 50 yds below the pond in the stream channel
YSPG8	Annand Draw Basin 6960 feet (5N87W8CDB)	06/91-08/93	Spring w/water rights aka Annand Spring #3. Per water rights document, this is a stock pond. Discharge from this pond is too widespread and marshy to measure; therefore, only water quality can be monitored
YSPG9	Annand Draw Basin 7057 feet (5N87W17BBA)	06/91-08/93	Not water righted. Sample is collected downstream of marshy area in Annand Draw. Aka Annand Draw Spring #1
YSPG10	Annand Draw Basin 6925 feet (5N87W8CAC)	05/93-2004	Spring w/water rights. Spring is actually an artesian well aka Annand Artesian Well. 600 ft deep per water rights document. Only sampled when flowing.
YSSPG1	Annand Draw Basin 7050 feet (5N87W17BAB)	9/02-present	Spoil Spring 1, located at Annand Draw road culvert, above Well YAAL14

TABLE 9
(Continued)

Site Number	Location and Elevation	Period of Operation	Comments
YSSPG2	Pond 011 Basin 7380 feet (5N87W16CBB)	5/05-present	Spoil Spring 2, located just below Pond 011A
YSSPG3	Pond 012 Basin 7260 feet (5N87W19BAA)	9/05-present	Spoil Spring 3, located just above Pond 012
YSSPG4	Pond 012 Basin 7260 feet (5N87W19BAA)	6/06-present	Spoil Spring 4, located just above Pond 012 in main channel, north of YSSPG3

Location Key : First Number = Township, Second Number = Range, Third Number = Section
A = Northeast quarter, B = Northwest, C = Southwest, D = Southeast

TABLE 10a

Surface Water Parameter New Long List

Seneca Coal Company

Parameter	Analysis Technique	Units
Field		
Conductivity	Direct Measurement	umhos/cm
pH	Direct Measurement	units
Temperature	Direct Measurement	°C
Laboratory		
~~Alkalinity as $CaCO_3$~~	~~Dissolved~~	~~mg/l~~
~~Arsenic~~	~~Total Recoverable~~	~~ug/l~~
~~Bicarbonate~~	~~Dissolved~~	~~mg/l~~
~~Boron~~	~~Dissolved~~	~~ug/l~~
~~Cadmium~~	~~Potentially Dissolved~~	~~ug/l~~
~~Calcium~~	~~Dissolved~~	~~mg/l~~
~~Carbonate~~	~~Dissolved~~	~~mg/l~~
~~Chloride~~	~~Dissolved~~	~~mg/l~~
~~Chromium~~	~~Potentially Dissolved (+3 & +6 valences)~~	~~ug/l~~
~~Conductivity at 25°C~~	~~Direct Measurement~~	~~umhos/cm~~
~~Copper~~	~~Potentially Dissolved~~	~~ug/l~~
~~Hardness as $CaCO_3$~~	~~Dissolved~~	~~mg/l~~
Iron	Total Recoverable*	mg/l
~~Lead~~	~~Potentially Dissolved~~	~~ug/l~~
~~Magnesium~~	~~Dissolved~~	~~mg/l~~
Manganese	~~Potentially~~ Dissolved	mg/l

TABLE 10a (cont.)

Surface Water Parameter New Long List

Seneca Coal Company

Parameter	Analysis Technique	Units
Mercury	Total	ug/l
~~Nickel~~	~~Potentially Dissolved~~	~~ug/l~~
Nitrogen, Ammonia	Total	mg/l
Nitrogen, Nitrate	Dissolved	mg/l
Nitrogen, Nitrite	Dissolved	mg/l
~~pH~~	~~Direct Measurement~~	~~units~~
~~Potassium~~	~~Dissolved~~	~~mg/l~~
Selenium	~~Potentially~~ Dissolved	ug/l
~~Silver~~	~~Potentially Dissolved~~	~~ug/l~~
~~Sodium~~	~~Dissolved~~	~~mg/l~~
~~Sodium Adsorption Ratio~~	~~Calculated~~	~~unitless~~
Sulfate	Dissolved	mg/l
Sulfide	Total	mg/l
Suspended Solids	Total	mg/l
~~Zinc~~	~~Potentially Dissolved~~	~~mg/l~~
~~Cation/Anion Balance~~	~~Calculated~~	~~percent~~
Total Dissolved Solids at 180°C	Dissolved	mg/l
~~Total Dissolved Solids Calculated~~	~~Calculated~~	~~mg/l~~

Parameters crossed out were suspended in 2010 TR 69. These parameters will be analyzed again one year prior to final bond release. Also, the 'Potentially Dissolved' analytical technique will be changed to 'Dissolved' as recommended by the CDPHE.

* If Colorado Water Quality Control Commission changes the required analytical technique for iron (for aquatic life) from total recoverable to another technique, then Seneca Coal Company will do likewise.

TABLE 10b

Surface Water Short Parameter List

Seneca Coal Company

Parameter	Analysis Technique	Units
Field		
Conductivity	Direct Measurement	umhos/cm
pH	Direct Measurement	units
Temperature	Direct Measurement	°C
Laboratory		
Iron	Total Recoverable*	mg/l
Manganese	Dissolved	mg/l
Suspended Solids	Total	mg/l
Total Dissolved Solids at 180°C	Dissolved	mg/l

* If Colorado Water Quality Control Commission changes the required analytical technique for iron (for aquatic life) from total recoverable to another technique, then Seneca Coal Company will do likewise.

TABLE 11

CDOH Surface Water Agricultural Use Standards

Arsenic, ug/l [A]	100.0
Boron, ug/l [B]	750.0
Cadmium, ug/l [A]	10.0
Chromium, ug/l [A]	100.0
Copper, ug/l [A]	200.0
Lead, ug/l [C]	100.0
Manganese, mg/l [A,D]	0.2
Nickel, ug/l [A]	200.0
Nitrate, Nitrogen, mg/l [C]	100.0
Nitrite, Nitrogen, mg/l [C]	10.0
Selenium, ug/l [A]	20.0
Zinc, mg/l [A]	2.0

A : CDOH surface water agricultural standard. Same as the CDOH groundwater irrigation standard.

B : CDOH surface water standard is set to protect sensitive plant species. Standard for plant species grown in Routt County is 5000 ug/l.

C : CDOH surface water agricultural standard. Same as the CDOH groundwater livestock standard.

D : This standard in only appropriate where irrigation water is applied to soils with pH values lower than 6.0.

Table 12
Comparison of Surface Water Quality to CDPHE Agricultural

Analyte	Standard	No. Sites	Sites	Frequency	Exceedence Date Range	Exceedence Value Range	Exceedence Median	
CDOH (11/09) AG. SURFACE WATER STANDARDS ONLY! ADDED DISSOLVED METALS!!!! - NEWAHRSW.STD								
Arsenic, Total Rec.	0.0000 - 100.0000	0	none					
Boron, Dissolved	0.0000 - 750.0000	0	none					
Cadmium, Pot. Diss.	0.0000 - 10.0000	0	none					
Cadmium, Total Rec.	0.0000 - 10.0000	0	none					
Chromium, Dissolved	0.0000 - 100.0000	0	none					
Chromium, Pot. Diss.	0.0000 - 100.0000	0	none					
Chromium, Total Rec.	0.0000 - 100.0000	0	none					
Copper, Dissolved	0.0000 - 200.0000	0	none					
Copper, Pot. Diss.	0.0000 - 200.0000	0	none					
Copper, Total Rec.	0.0000 - 200.0000	0	none					
Lead, Dissolved	0.0000 - 100.0000	0	none					
Lead, Pot. Diss.	0.0000 - 100.0000	0	none					
Lead, Total Rec.	0.0000 - 100.0000	0	none					
Manganese, Dissolved	0.0000 - 0.2000	0	none					
Manganese, Pot. Diss.	0.0000 - 0.2000	4	NPDES12	1/0/0/4	01/13/16-01/13/16	0.4430 - 0.4430	0.4430	
			YSSPG1	1/0/0/1	06/01/16-06/01/16	0.3230 - 0.3230	0.3230	
			YSSPG2	1/0/0/1	06/01/16-06/01/16	1.3200 - 1.3200	1.3200	
			YSSPG4	1/0/0/1	06/01/16-06/01/16	1.5800 - 1.5800	1.5800	
Manganese, Total	0.0000 - 0.2000	0	none					
Nickel, Dissolved	0.0000 - 200.0000	0	none					
Nickel, Pot. Diss.	0.0000 - 200.0000	0	none					
Nickel, Total Rec.	0.0000 - 200.0000	0	none					
Nitrate Nitrogen_N	0.0000 - 100.0000	0	none					
Nitrite Nitrogen_N	0.0000 - 10.0000	0	none					
Selenium, Dissolved	0.0000 - 20.0000	0	none					
Selenium, Pot. Diss.	0.0000 - 20.0000	1	NPDES10	1/0/0/12	02/03/16-02/03/16	149.0000 - 149.0000	149.0000	
Selenium, Total Rec.	0.0000 - 20.0000	0	none					

Table 12
Comparison of Surface Water Quality to CDPHE Agricultural

Analyte	Standard	No. Sites	Sites	Frequency	Exceedence Date Range	Exceedence Value Range	Exceedence Median
Zinc, Dissolved	0.0000 - 2.0000	0	none				
Zinc, Pot. Diss.	0.0000 - 2.0000	0	none				
Zinc, Total Rec.	0.0000 - 2.0000	0	none				

Frequency = uncensored/between MDL&PQL/censored/no. samples, (B) = Between MDL&PQL range, (<) = Censored range

Table 12
Comparison of Surface Water Quality to CDPHE Agricultural

---- Water Use Summary Report ----

Site	CDOH
NPDES10	Selenium, Pot. Diss.(1/12)
NPDES11	
NPDES12	Manganese, Pot. Diss.(1/4)
NPDES13	
YSG5	
YSGF5	
YSS2	
YSSF3	
YSSPG1	Manganese, Pot. Diss.(1/1)
YSSPG2	Manganese, Pot. Diss.(1/1)
YSSPG3	
YSSPG4	Manganese, Pot. Diss.(1/1)

TABLE 13

CDOH Yampa Segment 13e (Sage Creek) Standards

FIELD PH	6.5 - 9.0
AMMONIA, NITROGEN, MG/L	0.05[A]
ARSENIC, TOTAL REC., UG/L	340.0 (acute)
ARSENIC, TOTAL REC., UG/L	100.0 (chronic)
BORON, DISSOLVED, UG/L	750.0
CADMIUM, UG/L	9.2 (acute)
CADMIUM, UG/L	1.2 (chronic)
CHROMIUM, UG/L	1773 (acute)
CHROMIUM, UG/L	231 (chronic)
COPPER, UG/L	50.0 (acute)
COPPER, UG/L	29.0 (chronic)
IRON, TOTAL REC., MG/L	1.25[A1]
IRON, TOTAL REC., MG/L	1.00[A1]
LEAD, UG/L	281.0 (acute)
LEAD, UG/L	11.0 (chronic)
MANGANESE, MG/L	4.738 (acute)
MANGANESE, MG/L	2.618 (chronic)
MERCURY, TOTAL, UG/L	0.01[B]
NICKEL, UG/L	1513.0 (acute)
NICKEL, UG/L	168.0 (chronic)
NITRITE, NITROGEN, MG/L	0.05
NITRATE, NITROGEN, MG/L	100.0
SELENIUM, UG/L	18.4 (acute)
SELENIUM, UG/L	4.6[C] (chronic)
SULFIDE, MG/L	0.02[D]
SILVER, UG/L	22.0 (acute)
SILVER, UG/L	3.5 (chronic)
ZINC, MG/L	0.565 (acute)
ZINC, MG/L	0.428 (chronic)

Acute = one day max., Chronic = 30 day average. These values were taken from Table IV, CDOH Reg. 31, using a mean hardness of 400 mg/l. All acute/chronic values are the 'dissolved' form.

TABLE 13 (cont.)

A = Detection limit is 0.05 mg/l. All values above detection limit are compared to table standards found on this website: http://nepis.epa.gov/Adobe/PDF/2000303L.pdf

A1 = Upper Sage Creek iron standard = 1.25 mg/l. Lower Sage Creek = 1.00 mg/l. Break between two sections is upper edge of old Sage Creek Res.. All Yoast Mines outfalls discharge into Upper Sage Creek.

B = Detection limit for stream and spring sites is 0.2 ug/l.

C = Temporary Modification Se(ch): "current conditions" expires 12/31/18

D = Standard is 0.002 mg/l (un-ionized). Detection limit is 0.02 mg/l.

Table 14
Comparison of Surface Water Quality to Yampa Segment 13e Standards

Analyte	Standard	No. Sites	Sites	Frequency	Exceedence Date Range	Exceedence Value Range	Exceedence Median	
RECEIVING STREAM STANDARDS, 13E SAGECR JUNE 2014 DISS.STD								
Ammonia Nitrogen_N	0.0000 - 0.0500	0	none					
Arsenic, Total Rec.	0.0000 - 100.0000	0	none					
Arsenic, Total Rec.	0.0000 - 340.0000	0	none					
Boron, Dissolved	0.0000 - 750.0000	0	none					
Cadmium, Dissolved	0.0000 - 1.2000	0	none					
Cadmium, Dissolved	0.0000 - 9.2000	0	none					
Cadmium, Pot. Diss.	0.0000 - 1.2000	0	none					
Cadmium, Pot. Diss.	0.0000 - 9.2000	0	none					
Chromium, Dissolved	0.0000 - 231.0000	0	none					
Chromium, Dissolved	0.0000 - 1773.0000	0	none					
Chromium, Pot. Diss.	0.0000 - 231.0000	0	none					
Chromium, Pot. Diss.	0.0000 - 1773.0000	0	none					
Copper, Dissolved	0.0000 - 29.0000	0	none					
Copper, Dissolved	0.0000 - 50.0000	0	none					
Copper, Pot. Diss.	0.0000 - 29.0000	0	none					
Copper, Pot. Diss.	0.0000 - 50.0000	0	none					
Field Ph	6.5000 - 9.0000	0	none					
Iron, Total Rec.	0.0000 - 1.0000	2	YSG5	2/0/0/3	04/20/16-06/20/16	1.0700 - 2.5300	1.8000	
			YSGF5	2/0/0/3	04/20/16-06/21/16	1.4600 - 2.3300	1.8950	
Iron, Total Rec.	0.0000 - 1.2500	2	YSG5	1/0/0/3	04/20/16-04/20/16	2.5300 - 2.5300	2.5300	
			YSGF5	2/0/0/3	04/20/16-06/21/16	1.4600 - 2.3300	1.8950	
Lead, Dissolved	0.0000 - 11.0000	0	none					
Lead, Dissolved	0.0000 - 281.0000	0	none					
Lead, Pot. Diss.	0.0000 - 11.0000	0	none					
Lead, Pot. Diss.	0.0000 - 281.0000	0	none					
Manganese, Dissolved	0.0000 - 2.6180	0	none					

Table 14
Comparison of Surface Water Quality to Yampa Segment 13e Standards

Analyte	Standard	No. Sites	Sites	Frequency	Exceedence Date Range	Exceedence Value Range	Exceedence Median	
Manganese, Dissolved	0.0000 - 4.7380	0	none					
Manganese, Pot. Diss.	0.0000 - 2.6180	0	none					
Manganese, Pot. Diss.	0.0000 - 4.7380	0	none					
Mercury, Total	0.0000 - 0.0100	3	YSG5	0/0/3/3	04/20/16-09/06/16(<)	0.2000 -	0.2000	0.2000
			YSGF5	0/0/3/3	04/20/16-09/06/16(<)	0.2000 -	0.2000	0.2000
			YSS2	0/0/2/2	04/21/16-06/21/16(<)	0.2000 -	0.2000	0.2000
Mercury, Total	0.0000 - 0.2000	0	none					
Nickel, Dissolved	0.0000 - 168.0000	0	none					
Nickel, Dissolved	0.0000 - 1513.0000	0	none					
Nickel, Pot. Diss.	0.0000 - 168.0000	0	none					
Nickel, Pot. Diss.	0.0000 - 1513.0000	0	none					
Nitrate Nitrogen_N	0.0000 - 100.0000	0	none					
Nitrite Nitrogen_N	0.0000 - 0.0500	0	none					
Selenium, Dissolved	0.0000 - 4.6000	0	none					
Selenium, Dissolved	0.0000 - 18.4000	0	none					
Selenium, Pot. Diss.	0.0000 - 4.6000	0	none					
Selenium, Pot. Diss.	0.0000 - 18.4000	0	none					
Selenium, Total Rec.	0.0000 - 4.6000	0	none					
Selenium, Total Rec.	0.0000 - 18.4000	0	none					
Silver, Dissolved	0.0000 - 3.5000	0	none					
Silver, Dissolved	0.0000 - 22.0000	0	none					
Silver, Pot. Diss.	0.0000 - 3.5000	0	none					
Silver, Pot. Diss.	0.0000 - 22.0000	0	none					
Sulfide	0.0000 - 0.0200	0	none					
Zinc, Dissolved	0.0000 - 0.4280	0	none					
Zinc, Dissolved	0.0000 - 0.5650	0	none					
Zinc, Pot. Diss.	0.0000 - 0.4280	0	none					
Zinc, Pot. Diss.	0.0000 - 0.5650	0	none					

Table 14
Comparison of Surface Water Quality to Yampa Segment 13e Standards

Analyte	Standard	No. Sites	Sites	Frequency	Exceedence Date Range	Exceedence Value Range	Exceedence Median

Frequency = uncensored/between MDL&PQL/censored/no. samples, (B) = Between MDL&PQL range, (<) = Censored range

Table 14
Comparison of Surface Water Quality to Yampa Segment 13e Standards

---- Water Use Summary Report ----

Site	RECEIVING
YSG5	Iron, Total Rec.(3/6) Mercury, Total(3/6)
YSGF5	Iron, Total Rec.(4/6) Mercury, Total(3/6)
YSS2	Mercury, Total(2/4)
YSSF3	

TABLE 15

CDOH Yampa Segment 13i (upper Grassy Creek) Standards

FIELD PH	6.5 - 9.0
AMMONIA, NITROGEN, MG/L	0.05[A]
ARSENIC, TOTAL REC., UG/L	340.0 (acute)
ARSENIC, TOTAL REC., UG/L	100.0 (chronic)
BORON, DISSOLVED, UG/L	750.0
CADMIUM, UG/L	9.2 (acute)
CADMIUM, UG/L	1.2 (chronic)
CHROMIUM, UG/L	1773 (acute)
CHROMIUM, UG/L	231 (chronic)
COPPER, UG/L	50.0 (acute)
COPPER, UG/L	29.0 (chronic)
IRON, TOTAL REC., MG/L	1.0[B]
LEAD, UG/L	281.0 (acute)
LEAD, UG/L	11.0 (chronic)
MANGANESE, MG/L	4.738 (acute)
MANGANESE, MG/L	2.618 (chronic)
MERCURY, TOTAL, UG/L	0.01[C]
NICKEL, UG/L	1513.0 (acute)
NICKEL, UG/L	168.0 (chronic)
NITRITE, NITROGEN, MG/L	0.05
NITRATE, NITROGEN, MG/L	100.0
SELENIUM, UG/L	18.4 (acute)
SELENIUM, UG/L	4.6[D] (chronic)
SULFIDE, MG/L	0.02[E]
SILVER, UG/L	22.0 (acute)
SILVER, UG/L	3.5 (chronic)
ZINC, MG/L	0.565 (acute)
ZINC, MG/L	0.428 (chronic)

Acute = one day max., Chronic = 30 day average. These values were taken from Table IV, CDOH Reg. 31, using a mean hardness of 400 mg/l. All acute/chronic values are the 'dissolved' form.

TABLE 15 (cont.)

A = Detection limit is 0.05 mg/l. All values above detection limit are compared to table standards found on this website:
http://nepis.epa.gov/Adobe/PDF/20003O3L.pdf

B = Temporary Modification Fe(ch): "current conditions" expires 12/31/17

C = Detection limit for stream and spring sites is 0.2 ug/l.

D = Temporary Modification Se(ch): "current conditions" expires 12/31/18

E = Standard is 0.002 mg/l (un-ionized). Detection limit is 0.02 mg/l.

Table 16
Comparison of Surface Water Quality to Yampa Segment 13i Standards (Sites YSGF5 and NPDES11)

Analyte	Standard	No. Sites	Sites	Frequency	Exceedence Date Range	Exceedence Value Range	Exceedence Median	
RECEIVING STREAM STANDARDS, 13I UP GRASSYCR JUNE 2014 DISS.STD								
Ammonia Nitrogen_N	0.0000 - 0.0500	0	none					
Arsenic, Total Rec.	0.0000 - 100.0000	0	none					
Arsenic, Total Rec.	0.0000 - 340.0000	0	none					
Boron, Dissolved	0.0000 - 750.0000	0	none					
Cadmium, Dissolved	0.0000 - 1.2000	0	none					
Cadmium, Dissolved	0.0000 - 9.2000	0	none					
Cadmium, Pot. Diss.	0.0000 - 1.2000	0	none					
Cadmium, Pot. Diss.	0.0000 - 9.2000	0	none					
Chromium, Dissolved	0.0000 - 231.0000	0	none					
Chromium, Dissolved	0.0000 - 1773.0000	0	none					
Chromium, Pot. Diss.	0.0000 - 231.0000	0	none					
Chromium, Pot. Diss.	0.0000 - 1773.0000	0	none					
Copper, Dissolved	0.0000 - 29.0000	0	none					
Copper, Dissolved	0.0000 - 50.0000	0	none					
Copper, Pot. Diss.	0.0000 - 29.0000	0	none					
Copper, Pot. Diss.	0.0000 - 50.0000	0	none					
Field Ph	6.5000 - 9.0000	0	none					
Iron, Total Rec.	0.0000 - 1.0000	2	YSG5	2/0/0/3	04/20/16-06/20/16	1.0700 - 2.5300	1.8000	
			YSGF5	2/0/0/3	04/20/16-06/21/16	1.4600 - 2.3300	1.8950	
Lead, Dissolved	0.0000 - 11.0000	0	none					
Lead, Dissolved	0.0000 - 281.0000	0	none					
Lead, Pot. Diss.	0.0000 - 11.0000	0	none					
Lead, Pot. Diss.	0.0000 - 281.0000	0	none					
Manganese, Dissolved	0.0000 - 2.6180	0	none					
Manganese, Dissolved	0.0000 - 4.7380	0	none					
Manganese, Pot. Diss.	0.0000 - 2.6180	0	none					

Table 16
Comparison of Surface Water Quality to Yampa Segment 13i Standards (Sites YSGF5 and NPDES11)

Analyte	Standard	No. Sites	Sites	Frequency	Exceedence Date Range	Exceedence Value Range	Exceedence Median	
Manganese, Pot. Diss.	0.0000 - 4.7380	0	none					
Mercury, Total	0.0000 - 0.0100	3	YSG5	0/0/3/3	04/20/16-09/06/16(<)	0.2000 - 0.2000	0.2000	0.2000
			YSGF5	0/0/3/3	04/20/16-09/06/16(<)	0.2000 - 0.2000	0.2000	0.2000
			YSS2	0/0/2/2	04/21/16-06/21/16(<)	0.2000 - 0.2000	0.2000	0.2000
Mercury, Total	0.0000 - 0.2000	0	none					
Nickel, Dissolved	0.0000 - 168.0000	0	none					
Nickel, Dissolved	0.0000 - 1513.0000	0	none					
Nickel, Pot. Diss.	0.0000 - 168.0000	0	none					
Nickel, Pot. Diss.	0.0000 - 1513.0000	0	none					
Nitrate Nitrogen_N	0.0000 - 100.0000	0	none					
Nitrite Nitrogen_N	0.0000 - 0.0500	0	none					
Selenium, Dissolved	0.0000 - 4.6000	0	none					
Selenium, Dissolved	0.0000 - 18.4000	0	none					
Selenium, Pot. Diss.	0.0000 - 4.6000	0	none					
Selenium, Pot. Diss.	0.0000 - 18.4000	0	none					
Selenium, Total Rec.	0.0000 - 4.6000	0	none					
Selenium, Total Rec.	0.0000 - 18.4000	0	none					
Silver, Dissolved	0.0000 - 3.5000	0	none					
Silver, Dissolved	0.0000 - 22.0000	0	none					
Silver, Pot. Diss.	0.0000 - 3.5000	0	none					
Silver, Pot. Diss.	0.0000 - 22.0000	0	none					
Sulfide	0.0000 - 0.0200	0	none					
Zinc, Dissolved	0.0000 - 0.4280	0	none					
Zinc, Dissolved	0.0000 - 0.5650	0	none					
Zinc, Pot. Diss.	0.0000 - 0.4280	0	none					
Zinc, Pot. Diss.	0.0000 - 0.5650	0	none					

Frequency = uncensored/between MDL&PQL/censored/no. samples, (B) = Between MDL&PQL range, (<) = Censored range

Table 16
Comparison of Surface Water Quality to Yampa Segment 13i Standards (Sites YSGF5 and NPDES11)

---- Water Use Summary Report ----

Site	RECEIVING
YSG5	Iron, Total Rec.(2/3) Mercury, Total(3/6)
YSGF5	Iron, Total Rec.(2/3) Mercury, Total(3/6)
YSS2	Mercury, Total(2/4)
YSSF3	

TABLE 17

CDOH Yampa Segment 13j (lower Grassy Creek) Standards

FIELD PH	6.5 - 9.0
AMMONIA, NITROGEN, MG/L	0.05[A]
ARSENIC, TOTAL REC., UG/L	340.0 (acute)
ARSENIC, TOTAL REC., UG/L	100.0 (chronic)
BORON, DISSOLVED, UG/L	750.0
CADMIUM, UG/L	9.2 (acute)
CADMIUM, UG/L	1.2 (chronic)
CHROMIUM, UG/L	1773 (acute)
CHROMIUM, UG/L	231 (chronic)
COPPER, UG/L	50.0 (acute)
COPPER, UG/L	29.0 (chronic)
IRON, TOTAL REC., MG/L	1.0
LEAD, UG/L	281.0 (acute)
LEAD, UG/L	11.0 (chronic)
MANGANESE, MG/L	4.738 (acute)
MANGANESE, MG/L	2.618 (chronic)
MERCURY, TOTAL, UG/L	0.01[B]
NICKEL, UG/L	1513.0 (acute)
NICKEL, UG/L	168.0 (chronic)
NITRITE, NITROGEN, MG/L	0.05
NITRATE, NITROGEN, MG/L	100.0
SELENIUM, UG/L	18.4 (acute)
SELENIUM, UG/L	4.6[C] (chronic)
SULFIDE, MG/L	0.02[D]
SILVER, UG/L	22.0 (acute)
SILVER, UG/L	3.5 (chronic)
ZINC, MG/L	0.565 (acute)
ZINC, MG/L	0.428 (chronic)

Acute = one day max., Chronic = 30 day average. These values were taken from Table IV, CDOH Reg. 31, using a mean hardness of 400 mg/l. All acute/chronic values are the 'dissolved' form.

TABLE 17 (cont.)

A = Detection limit is 0.05 mg/l. All values above detection limit are compared to table standards found on this website: http://nepis.epa.gov/Adobe/PDF/2000303L.pdf

B = Detection limit for stream and spring sites is 0.2 ug/l.

C = Temporary Modification Se(ch): "current conditions" expires 12/31/18

D = Standard is 0.002 mg/l (un-ionized). Detection limit is 0.02 mg/l.

Table 18
Comparison of Surface Water Quality to Yampa Segment 13j Standards (Sites YSG5 and NPDES10)

Analyte	Standard	No. Sites	Sites	Frequency	Exceedence Date Range	Exceedence Value Range	Exceedence Median	
RECEIVING STREAM STANDARDS, 13I LO GRASSYCR SCOTS JUNE 2014 DISS.STD								
Ammonia Nitrogen_N	0.0000 - 0.0500	0	none					
Arsenic, Total Rec.	0.0000 - 100.0000	0	none					
Arsenic, Total Rec.	0.0000 - 340.0000	0	none					
Boron, Dissolved	0.0000 - 750.0000	0	none					
Cadmium, Dissolved	0.0000 - 1.2000	0	none					
Cadmium, Dissolved	0.0000 - 9.2000	0	none					
Cadmium, Pot. Diss.	0.0000 - 1.2000	0	none					
Cadmium, Pot. Diss.	0.0000 - 9.2000	0	none					
Chromium, Dissolved	0.0000 - 231.0000	0	none					
Chromium, Dissolved	0.0000 - 1773.0000	0	none					
Chromium, Pot. Diss.	0.0000 - 231.0000	0	none					
Chromium, Pot. Diss.	0.0000 - 1773.0000	0	none					
Copper, Dissolved	0.0000 - 29.0000	0	none					
Copper, Dissolved	0.0000 - 50.0000	0	none					
Copper, Pot. Diss.	0.0000 - 29.0000	0	none					
Copper, Pot. Diss.	0.0000 - 50.0000	0	none					
Field Ph	6.5000 - 9.0000	0	none					
Iron, Total Rec.	0.0000 - 1.0000	2	YSG5	2/0/0/3	04/20/16-06/20/16	1.0700 -	2.5300	1.8000
			YSGF5	2/0/0/3	04/20/16-06/21/16	1.4600 -	2.3300	1.8950
Lead, Dissolved	0.0000 - 11.0000	0	none					
Lead, Dissolved	0.0000 - 281.0000	0	none					
Lead, Pot. Diss.	0.0000 - 11.0000	0	none					
Lead, Pot. Diss.	0.0000 - 281.0000	0	none					
Manganese, Dissolved	0.0000 - 2.6180	0	none					
Manganese, Dissolved	0.0000 - 4.7380	0	none					
Manganese, Pot. Diss.	0.0000 - 2.6180	0	none					

Table 18
Comparison of Surface Water Quality to Yampa Segment 13j Standards (Sites YSG5 and NPDES10)

Analyte	Standard	No. Sites	Sites	Frequency	Exceedence Date Range	Exceedence Value Range	Exceedence Median	
Manganese, Pot. Diss.	0.0000 - 4.7380	0	none					
Mercury, Total	0.0000 - 0.0100	3	YSG5	0/0/3/3	04/20/16-09/06/16(<)	0.2000 -	0.2000	0.2000
			YSGF5	0/0/3/3	04/20/16-09/06/16(<)	0.2000 -	0.2000	0.2000
			YSS2	0/0/2/2	04/21/16-06/21/16(<)	0.2000 -	0.2000	0.2000
Mercury, Total	0.0000 - 0.2000	0	none					
Nickel, Dissolved	0.0000 - 168.0000	0	none					
Nickel, Dissolved	0.0000 - 1513.0000	0	none					
Nickel, Pot. Diss.	0.0000 - 168.0000	0	none					
Nickel, Pot. Diss.	0.0000 - 1513.0000	0	none					
Nitrate Nitrogen_N	0.0000 - 100.0000	0	none					
Nitrite Nitrogen_N	0.0000 - 0.0500	0	none					
Selenium, Dissolved	0.0000 - 4.6000	0	none					
Selenium, Dissolved	0.0000 - 18.4000	0	none					
Selenium, Pot. Diss.	0.0000 - 4.6000	0	none					
Selenium, Pot. Diss.	0.0000 - 18.4000	0	none					
Selenium, Total Rec.	0.0000 - 4.6000	0	none					
Selenium, Total Rec.	0.0000 - 18.4000	0	none					
Silver, Dissolved	0.0000 - 3.5000	0	none					
Silver, Dissolved	0.0000 - 22.0000	0	none					
Silver, Pot. Diss.	0.0000 - 3.5000	0	none					
Silver, Pot. Diss.	0.0000 - 22.0000	0	none					
Sulfide	0.0000 - 0.0200	0	none					
Zinc, Dissolved	0.0000 - 0.4280	0	none					
Zinc, Dissolved	0.0000 - 0.5650	0	none					
Zinc, Pot. Diss.	0.0000 - 0.4280	0	none					
Zinc, Pot. Diss.	0.0000 - 0.5650	0	none					

Frequency = uncensored/between MDL&PQL/censored/no. samples, (B) = Between MDL&PQL range, (<) = Censored range

Table 18
Comparison of Surface Water Quality to Yampa Segment 13j Standards (Sites YSG5 and NPDES10)

---- Water Use Summary Report ----

Site	RECEIVING
YSG5	Iron, Total Rec.(2/3) Mercury, Total(3/6)
YSGF5	Iron, Total Rec.(2/3) Mercury, Total(3/6)
YSS2	Mercury, Total(2/4)
YSSF3	

APPENDIX B

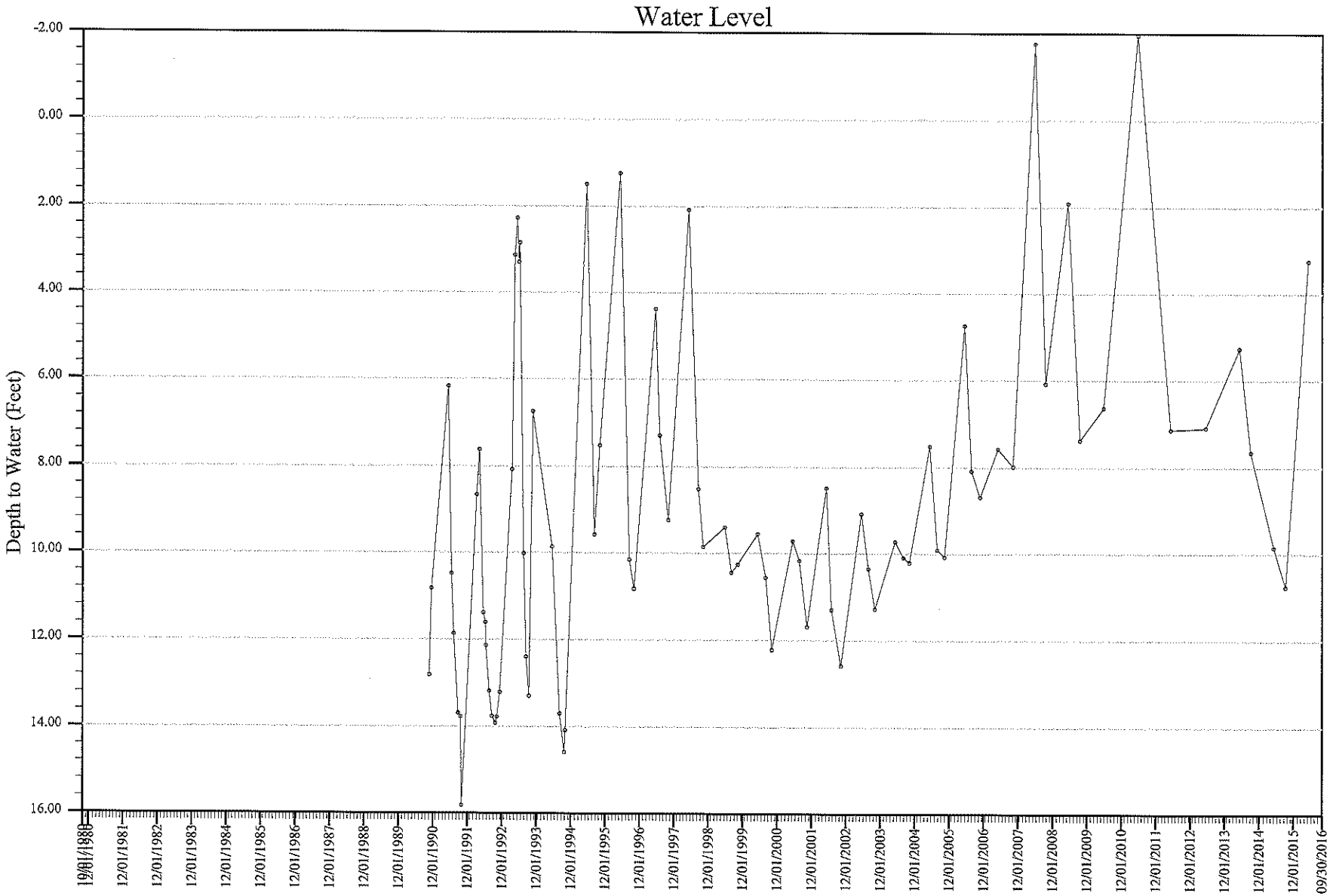
GROUND WATER LEVEL REPORTS

AND HYDROGRAPHS

APPENDIX B

Ground Water Level Reports and Hydrographs

Table of Contents

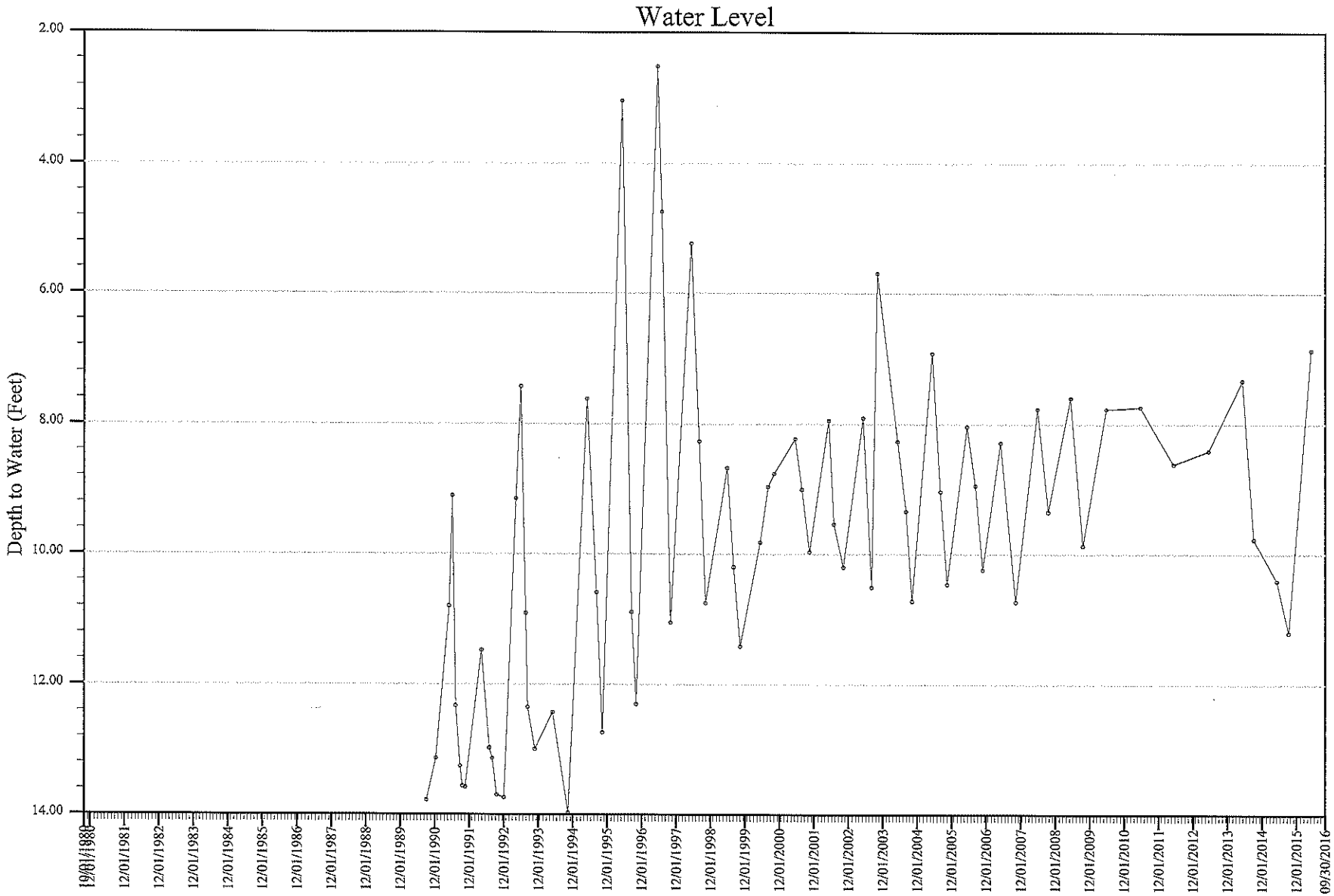

Water Level
Depth to Water (Feet)
-2.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
12/01/1980
12/01/1981
12/01/1982
12/01/1983
12/01/1984
12/01/1985
12/01/1986
12/01/1987
12/01/1988
12/01/1989
12/01/1990
12/01/1991
12/01/1992
12/01/1993
12/01/1994
12/01/1995
12/01/1996
12/01/1997
12/01/1998
12/01/1999
12/01/2000
12/01/2001
12/01/2002
12/01/2003
12/01/2004
12/01/2005
12/01/2006
12/01/2007
12/01/2008
12/01/2009
12/01/2010
12/01/2011
12/01/2012
12/01/2013
12/01/2014
12/01/2015
09/30/2016

YAAL14

Water Level Report
YAAL14
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Water Level	Elevation	Correction	Status
05/05/2016	12:05:00	MANF	3.24	6968.73	0.00	

Average water level = 0.00 feet
Minimum water level 3.24 feet at 05/05/2016-12:05:00
Maximum water level 3.24 feet at 05/05/2016-12:05:00

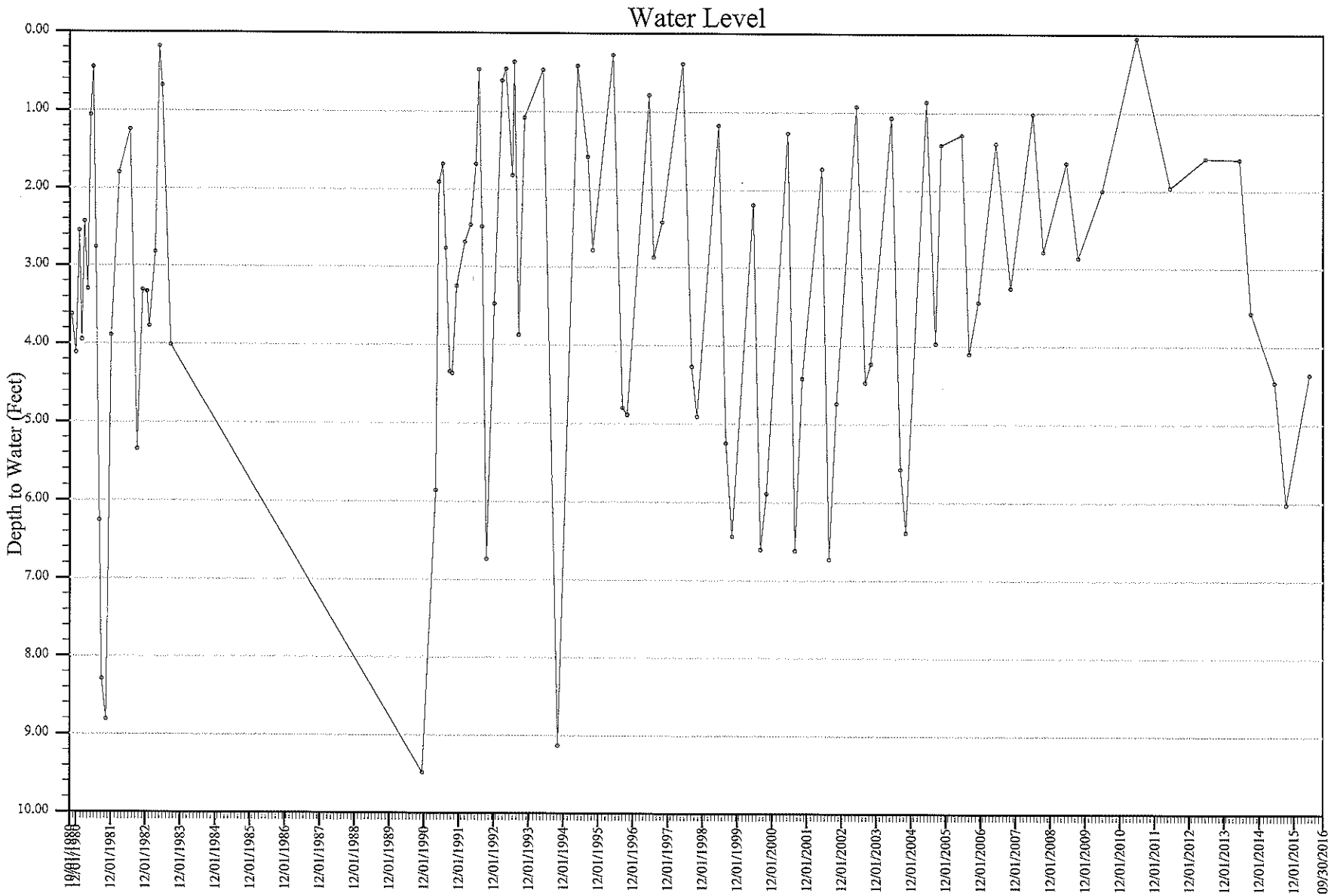

Water Level
Depth to Water (Feet)
2.00
4.00
6.00
8.00
10.00
12.00
14.00
12/01/1980
12/01/1981
12/01/1982
12/01/1983
12/01/1984
12/01/1985
12/01/1986
12/01/1987
12/01/1988
12/01/1989
12/01/1990
12/01/1991
12/01/1992
12/01/1993
12/01/1994
12/01/1995
12/01/1996
12/01/1997
12/01/1998
12/01/1999
12/01/2000
12/01/2001
12/01/2002
12/01/2003
12/01/2004
12/01/2005
12/01/2006
12/01/2007
12/01/2008
12/01/2009
12/01/2010
12/01/2011
12/01/2012
12/01/2013
12/01/2014
12/01/2015
09/30/2016

YGAL16

Water Level Report
YGAL16
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Water Level	Elevation	Correction	Status
05/05/2016	12:55:00	MANF	6.87	6975.25	0.00	

Average water level = 0.00 feet
Minimum water level 6.87 feet at 05/05/2016-12:55:00
Maximum water level 6.87 feet at 05/05/2016-12:55:00

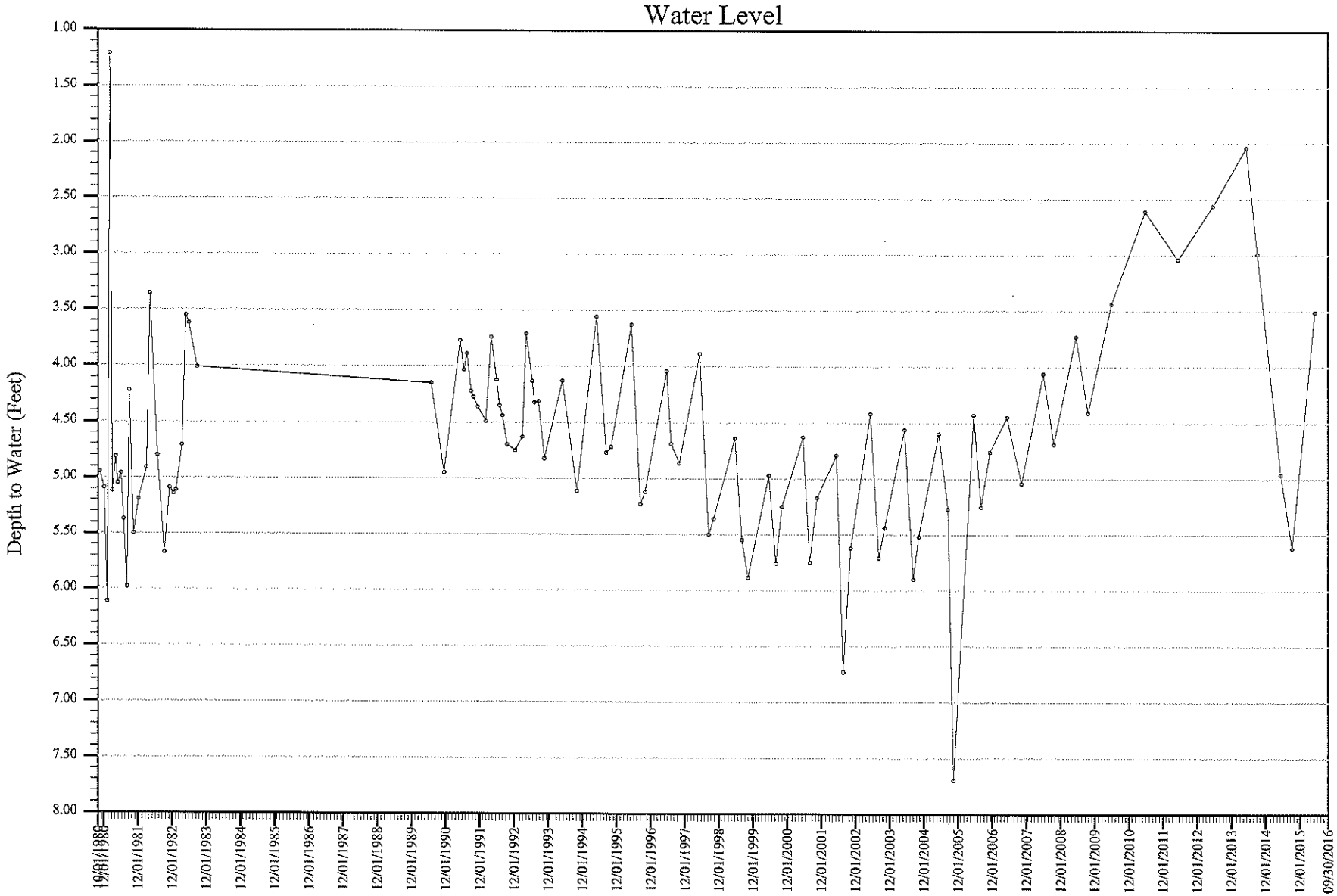

Water Level
Depth to Water (Feet)
0.00
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
12/01/1981
12/01/1982
12/01/1983
12/01/1984
12/01/1985
12/01/1986
12/01/1987
12/01/1988
12/01/1989
12/01/1990
12/01/1991
12/01/1992
12/01/1993
12/01/1994
12/01/1995
12/01/1996
12/01/1997
12/01/1998
12/01/1999
12/01/2000
12/01/2001
12/01/2002
12/01/2003
12/01/2004
12/01/2005
12/01/2006
12/01/2007
12/01/2008
12/01/2009
12/01/2010
12/01/2011
12/01/2012
12/01/2013
12/01/2014
12/01/2015
09/30/2016

YSAL1

Water Level Report
YSAL1
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Water Level	Elevation	Correction	Status
05/11/2016	07:55:00	MANF	4.36	7170.57	0.00	

Average water level = 0.00 feet
Minimum water level 4.36 feet at 05/11/2016-07:55:00
Maximum water level 4.36 feet at 05/11/2016-07:55:00

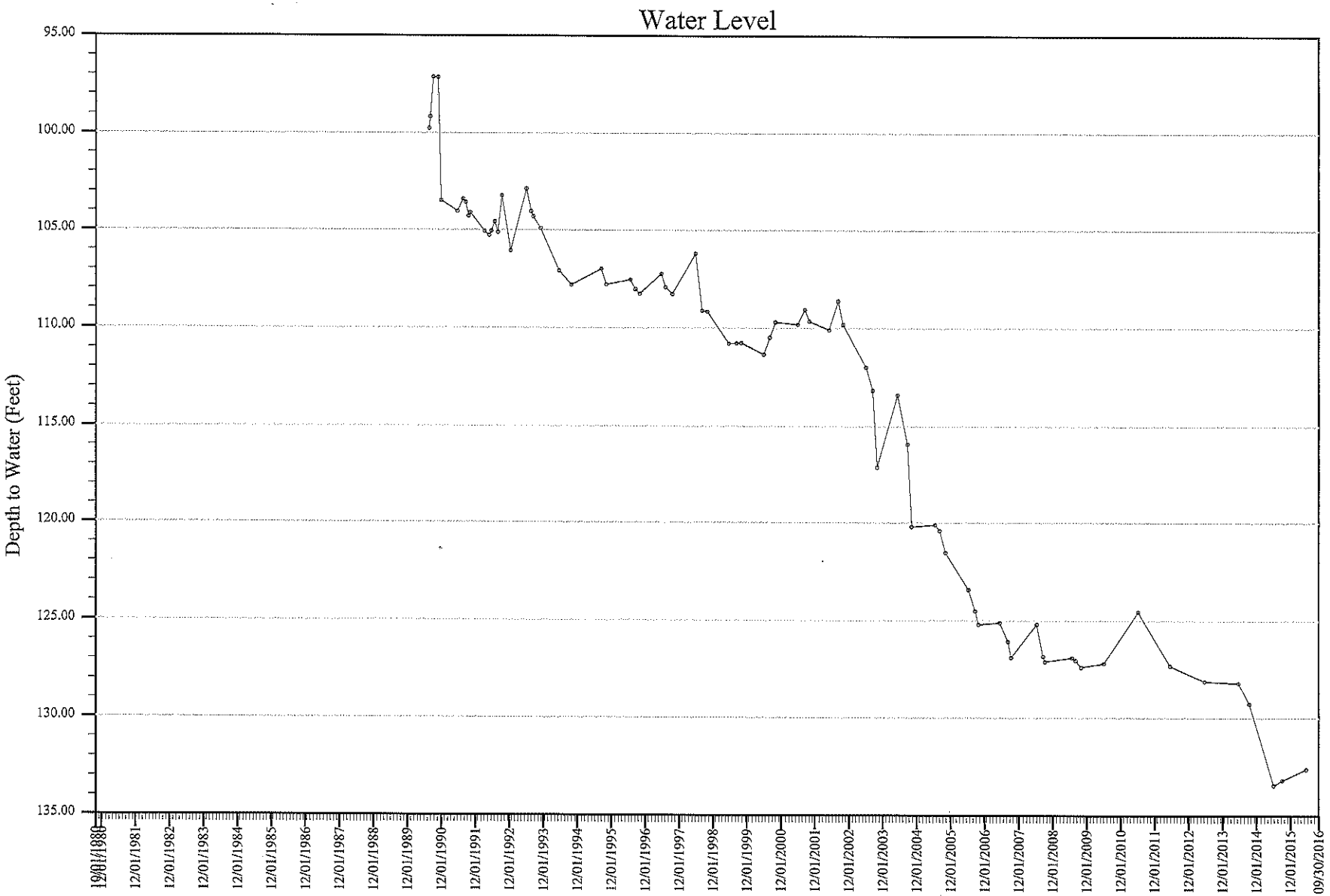

Water Level
Depth to Water (Feet)
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
6.00
6.50
7.00
7.50
8.00
12/01/1980
12/01/1981
12/01/1982
12/01/1983
12/01/1984
12/01/1985
12/01/1986
12/01/1987
12/01/1988
12/01/1989
12/01/1990
12/01/1991
12/01/1992
12/01/1993
12/01/1994
12/01/1995
12/01/1996
12/01/1997
12/01/1998
12/01/1999
12/01/2000
12/01/2001
12/01/2002
12/01/2003
12/01/2004
12/01/2005
12/01/2006
12/01/2007
12/01/2008
12/01/2009
12/01/2010
12/01/2011
12/01/2012
12/01/2013
12/01/2014
12/01/2015
09/30/2016

YSAL3

Water Level Report
YSAL3
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Water Level	Elevation	Correction	Status
05/11/2016	07:15:00	MANF	3.51	7220.02	0.00	

Average water level = 0.00 feet
Minimum water level 3.51 feet at 05/11/2016-07:15:00
Maximum water level 3.51 feet at 05/11/2016-07:15:00

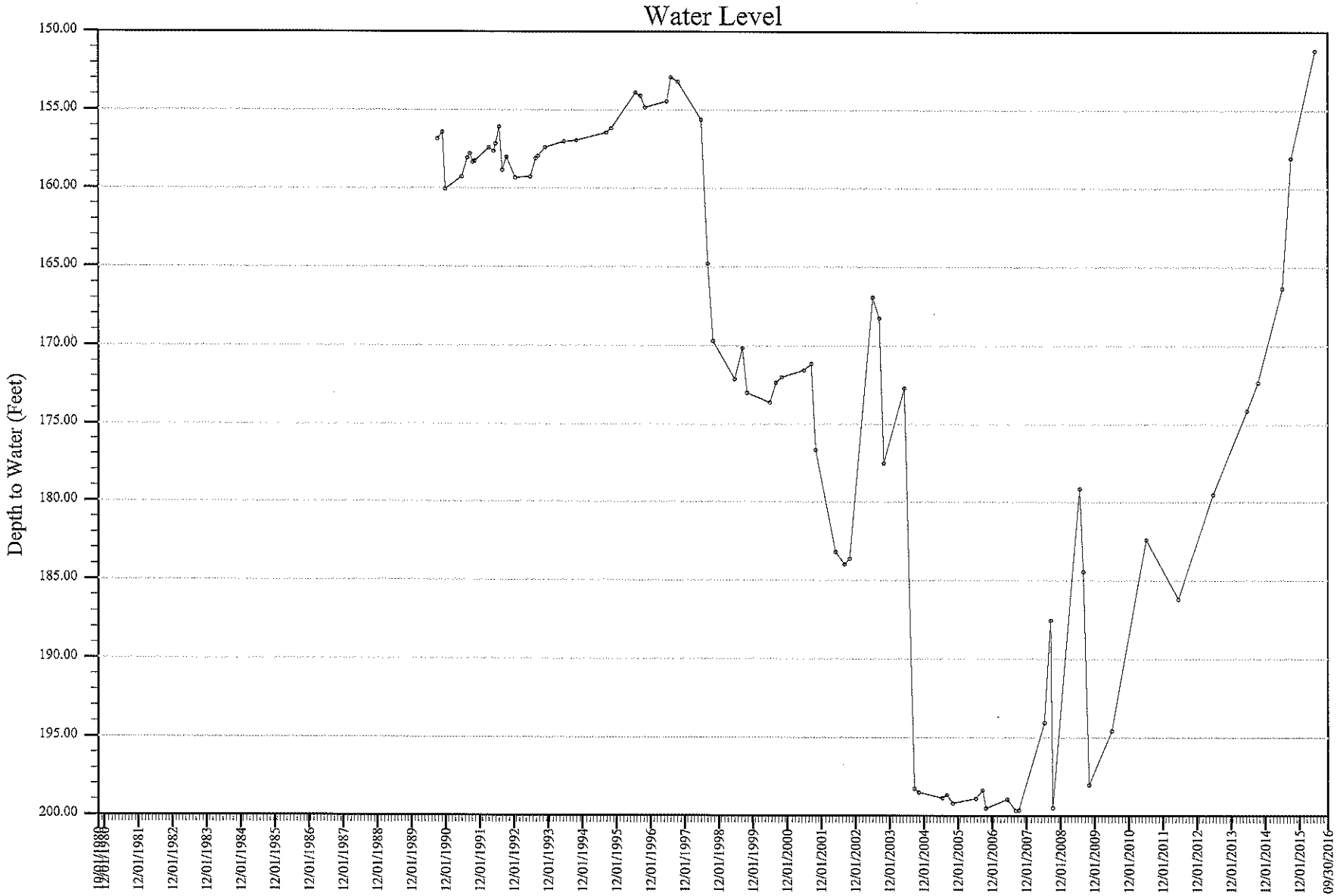

Water Level
Depth to Water (Feet)
95.00
100.00
105.00
110.00
115.00
120.00
125.00
130.00
135.00
12/01/1980
12/01/1981
12/01/1982
12/01/1983
12/01/1984
12/01/1985
12/01/1986
12/01/1987
12/01/1988
12/01/1989
12/01/1990
12/01/1991
12/01/1992
12/01/1993
12/01/1994
12/01/1995
12/01/1996
12/01/1997
12/01/1998
12/01/1999
12/01/2000
12/01/2001
12/01/2002
12/01/2003
12/01/2004
12/01/2005
12/01/2006
12/01/2007
12/01/2008
12/01/2009
12/01/2010
12/01/2011
12/01/2012
12/01/2013
12/01/2014
12/01/2015
09/30/2016

YOV30

Water Level Report
YOV30
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Water Level	Elevation	Correction	Status
05/19/2016	10:45:00	MANF	132.61	7452.84	0.00	

Average water level = 0.00 feet
Minimum water level 132.61 feet at 05/19/2016-10:45:00
Maximum water level 132.61 feet at 05/19/2016-10:45:00

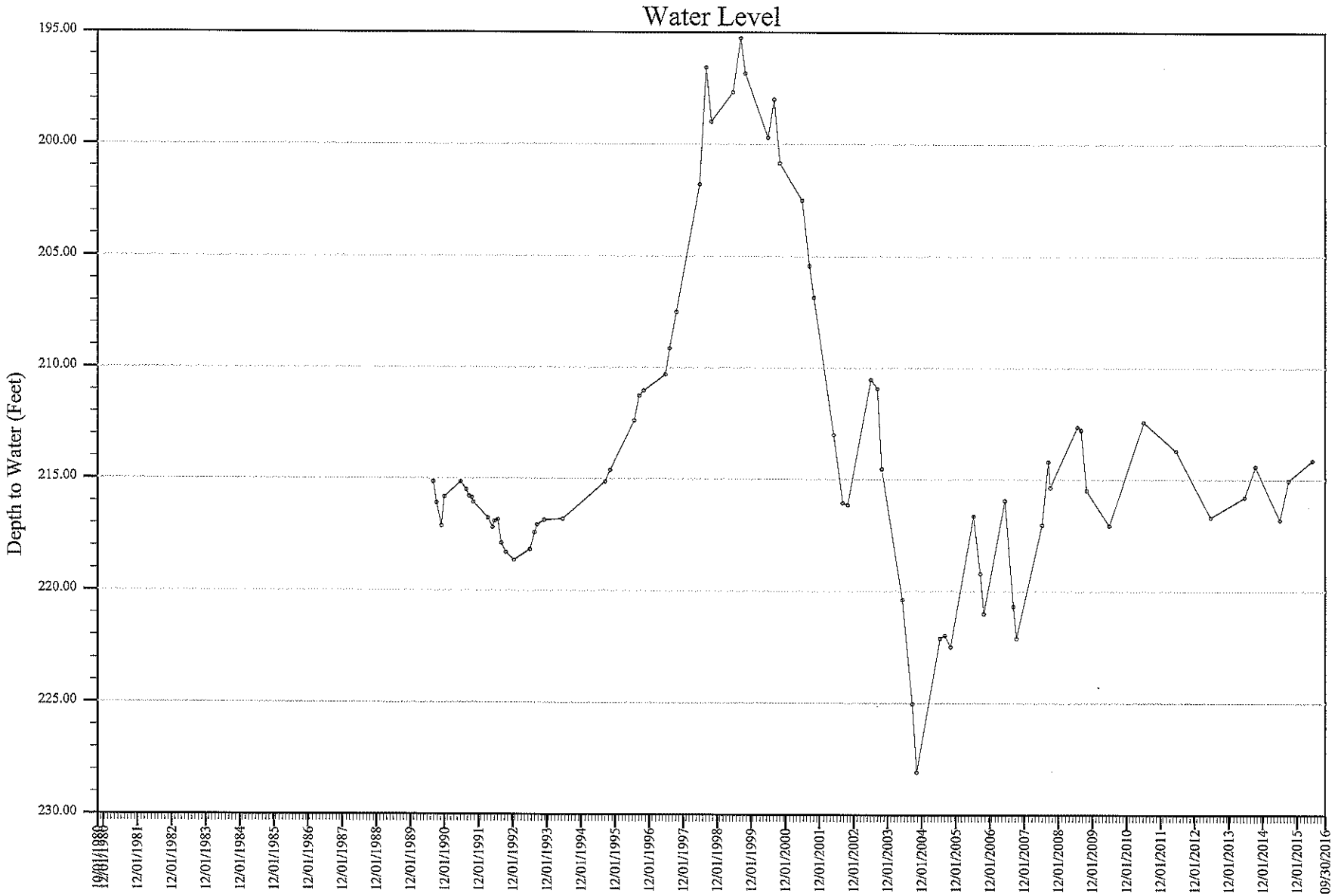

Water Level
Depth to Water (Feet)
150.00
155.00
160.00
165.00
170.00
175.00
180.00
185.00
190.00
195.00
200.00
12/01/1980
12/01/1981
12/01/1982
12/01/1983
12/01/1984
12/01/1985
12/01/1986
12/01/1987
12/01/1988
12/01/1989
12/01/1990
12/01/1991
12/01/1992
12/01/1993
12/01/1994
12/01/1995
12/01/1996
12/01/1997
12/01/1998
12/01/1999
12/01/2000
12/01/2001
12/01/2002
12/01/2003
12/01/2004
12/01/2005
12/01/2006
12/01/2007
12/01/2008
12/01/2009
12/01/2010
12/01/2011
12/01/2012
12/01/2013
12/01/2014
12/01/2015
09/30/2016

YW30

Water Level Report
YW30
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Water Level	Elevation	Correction	Status
05/19/2016	12:00:00	MANF	151.19	7435.30	0.00	

Average water level = 0.00 feet
Minimum water level 151.19 feet at 05/19/2016-12:00:00
Maximum water level 151.19 feet at 05/19/2016-12:00:00

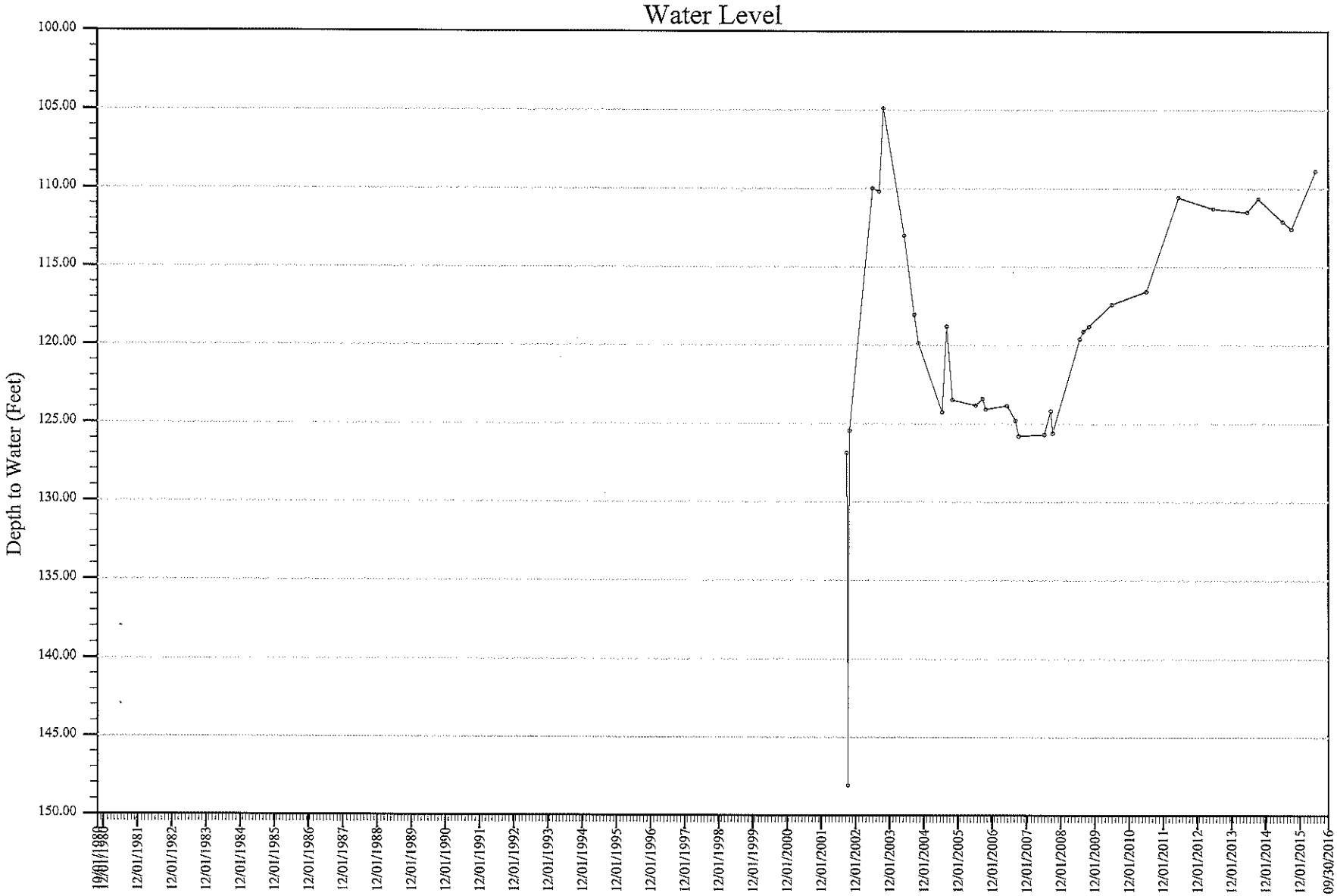

Water Level
Depth to Water (Feet)
195.00
200.00
205.00
210.00
215.00
220.00
225.00
230.00
12/01/1980
12/01/1981
12/01/1982
12/01/1983
12/01/1984
12/01/1985
12/01/1986
12/01/1987
12/01/1988
12/01/1989
12/01/1990
12/01/1991
12/01/1992
12/01/1993
12/01/1994
12/01/1995
12/01/1996
12/01/1997
12/01/1998
12/01/1999
12/01/2000
12/01/2001
12/01/2002
12/01/2003
12/01/2004
12/01/2005
12/01/2006
12/01/2007
12/01/2008
12/01/2009
12/01/2010
12/01/2011
12/01/2012
12/01/2013
12/01/2014
12/01/2015
09/30/2016

YWU30

Water Level Report
YWU30
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Water Level	Elevation	Correction	Status
05/19/2016	11:20:00	MANF	214.14	7372.48	0.00	

Average water level = 0.00 feet
Minimum water level 214.14 feet at 05/19/2016-11:20:00
Maximum water level 214.14 feet at 05/19/2016-11:20:00

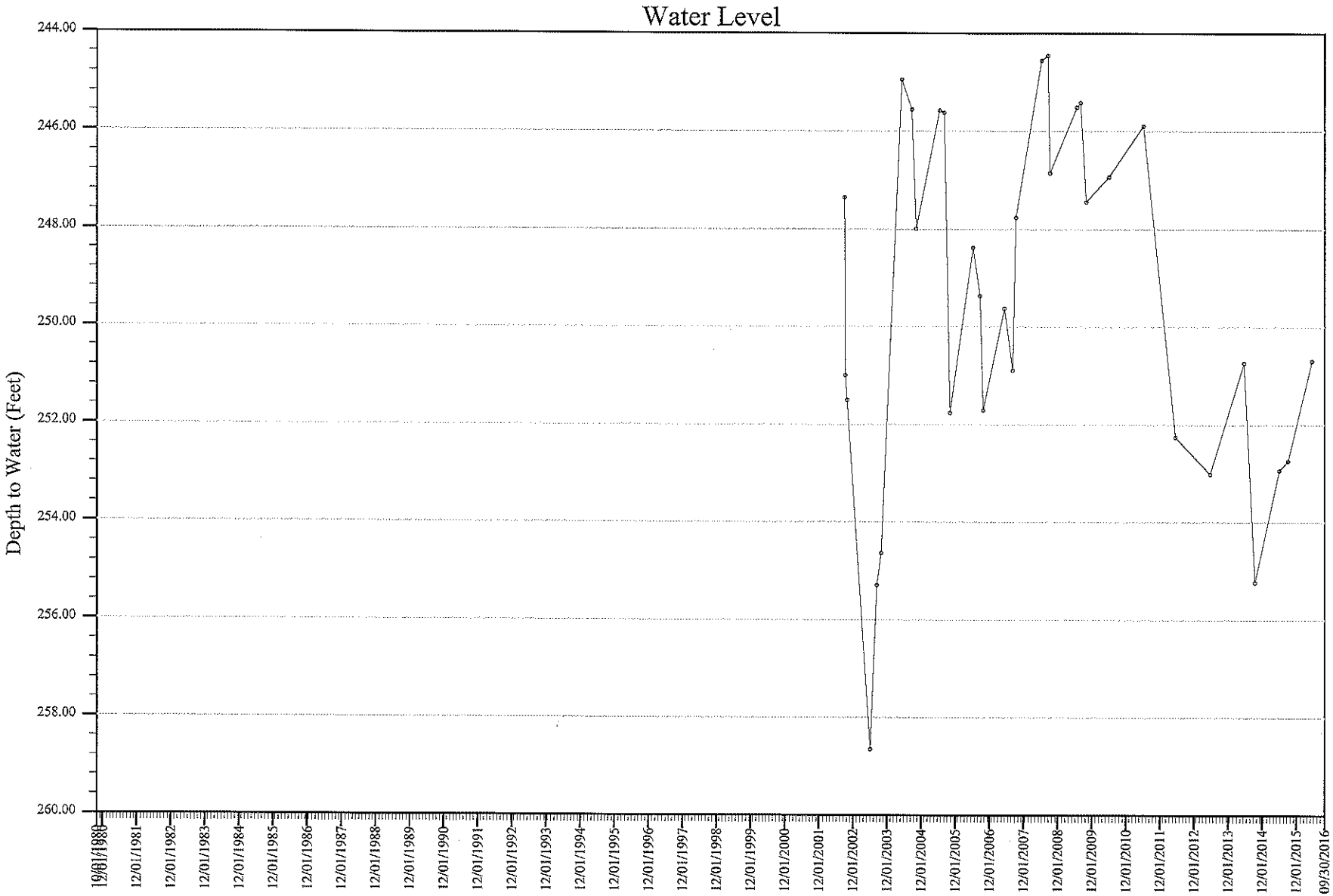

Water Level
Depth to Water (Feet)
100.00
105.00
110.00
115.00
120.00
125.00
130.00
135.00
140.00
145.00
150.00
12/01/1980
12/01/1981
12/01/1982
12/01/1983
12/01/1984
12/01/1985
12/01/1986
12/01/1987
12/01/1988
12/01/1989
12/01/1990
12/01/1991
12/01/1992
12/01/1993
12/01/1994
12/01/1995
12/01/1996
12/01/1997
12/01/1998
12/01/1999
12/01/2000
12/01/2001
12/01/2002
12/01/2003
12/01/2004
12/01/2005
12/01/2006
12/01/2007
12/01/2008
12/01/2009
12/01/2010
12/01/2011
12/01/2012
12/01/2013
12/01/2014
12/01/2015
09/30/2016

YWC33

Water Level Report
YWC33
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Water Level	Elevation	Correction	Status
05/19/2016	09:55:00	MANF	108.91	7479.48	0.00	

Average water level = 0.00 feet
Minimum water level 108.91 feet at 05/19/2016-09:55:00
Maximum water level 108.91 feet at 05/19/2016-09:55:00


Water Level
Depth to Water (Feet)
244.00
246.00
248.00
250.00
252.00
254.00
256.00
258.00
260.00
12/01/1980
12/01/1981
12/01/1982
12/01/1983
12/01/1984
12/01/1985
12/01/1986
12/01/1987
12/01/1988
12/01/1989
12/01/1990
12/01/1991
12/01/1992
12/01/1993
12/01/1994
12/01/1995
12/01/1996
12/01/1997
12/01/1998
12/01/1999
12/01/2000
12/01/2001
12/01/2002
12/01/2003
12/01/2004
12/01/2005
12/01/2006
12/01/2007
12/01/2008
12/01/2009
12/01/2010
12/01/2011
12/01/2012
12/01/2013
12/01/2014
12/01/2015
09/30/2016

YWCU33

Water Level Report
YWCU33
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Water Level	Elevation	Correction	Status
05/19/2016	08:55:00	MANF	250.70	7337.09	0.00	

Average water level = 0.00 feet
Minimum water level 250.70 feet at 05/19/2016-08:55:00
Maximum water level 250.70 feet at 05/19/2016-08:55:00

APPENDIX C

GROUND WATER QUALITY DATA

APPENDIX C

Ground Water Quality Data

Table of Contents

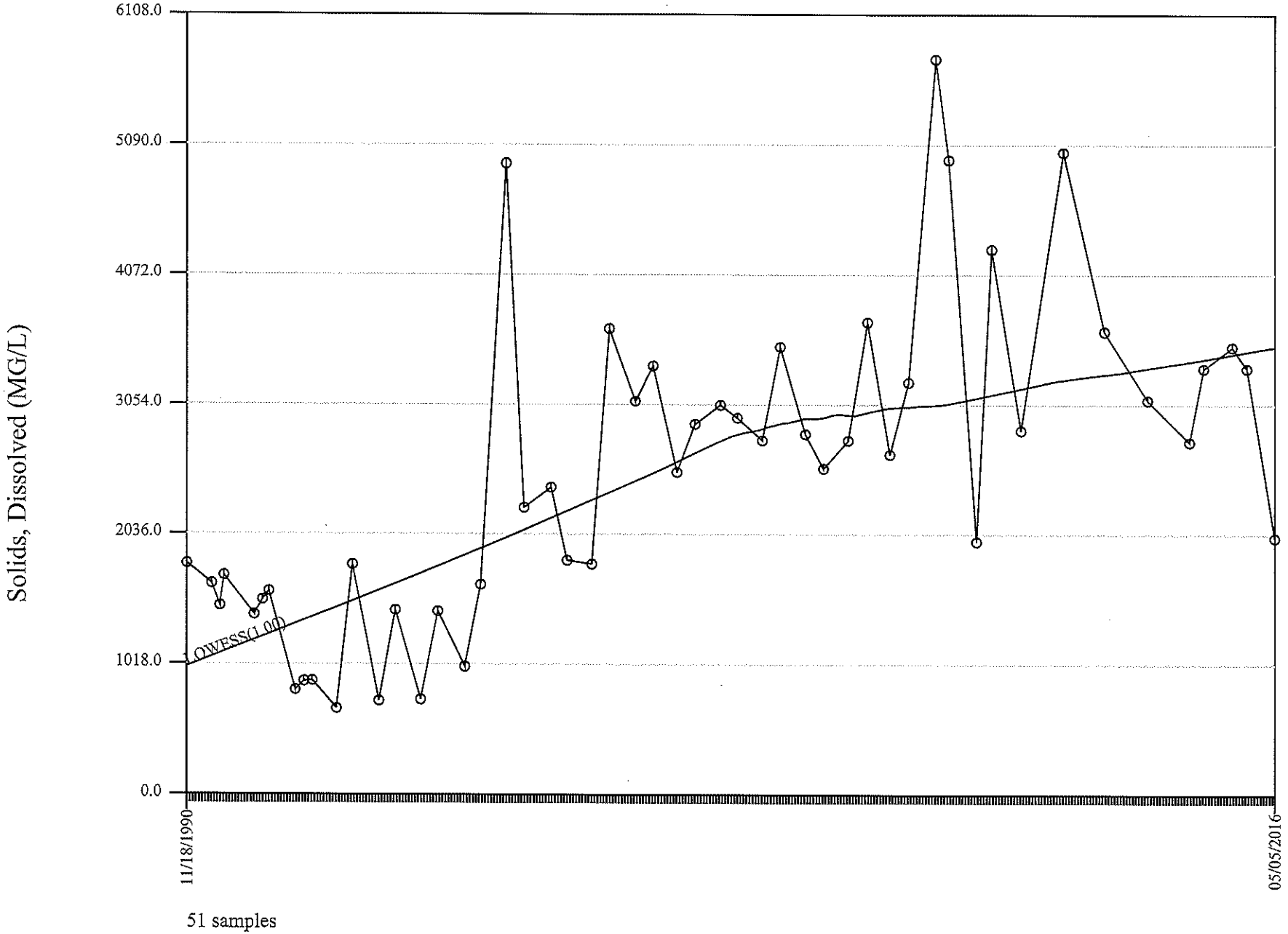
On water quality reports: < indicates an analytical value below the Method Detection Limit

B indicates an analytical value between the Method Detection Limit and the Practical Quantitation Limit

Water Quality Report
YAAL14
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	05/05/2016 12:05
Field Parameters		
Field Ph	S.U.	7.1200
Temperature	C	7.4000
Field Conductivity	UMHOS/CM	2340.0000
Laboratory Parameters		
Fluoride	MG/L	B 0.1800
Iron, Dissolved	MG/L	< 0.0200
Manganese, Dissolved	MG/L	0.0500
Nitrate Nitrogen_N	MG/L	0.1800
Nitrite Nitrogen_N	MG/L	< 0.0100
Nitrate/Nitrite Nitrogen_N	MG/L	0.1800
Selenium, Dissolved	UG/L	B 2.4000
Solids, Dissolved	MG/L	2010.0000
Sulfate	MG/L	1100.0000

"B" -- Between MDL and PQL, "<" -- Less than detection limit


Solids, Dissolved (MG/L)
6108.0
5090.0
4072.0
3054.0
2036.0
1018.0
0.0
LOWESS(1.00)
11/18/1990
05/05/2016
51 samples

YAAL14

YAAL14 Sample Remarks

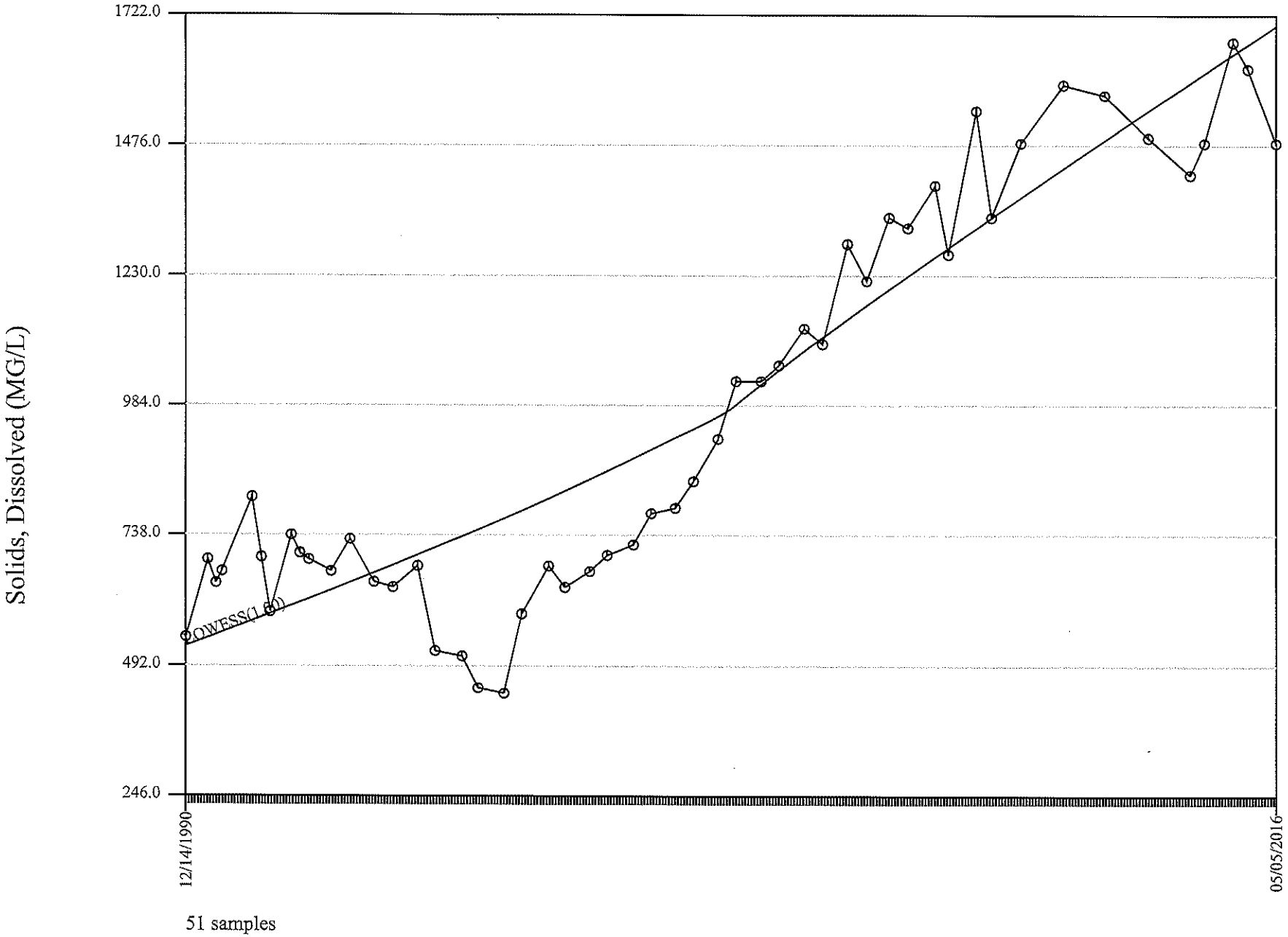
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
05/05/2016-12:05	PUMP GAL/GPM: 45/3

Water Quality Report
YGAL16
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	05/05/2016 12:55
Field Parameters		
Field Ph	S.U.	7.2800
Temperature	C	9.2000
Field Conductivity	UMHOS/CM	1800.0000
Laboratory Parameters		
Fluoride	MG/L	B 0.1700
Iron, Dissolved	MG/L	< 0.0200
Manganese, Dissolved	MG/L	B 0.0170
Nitrate Nitrogen_N	MG/L	0.7400
Nitrite Nitrogen_N	MG/L	< 0.0100
Nitrate/Nitrite Nitrogen_N	MG/L	0.7400
Selenium, Dissolved	UG/L	< 1.0000
Solids, Dissolved	MG/L	1480.0000
Sulfate	MG/L	800.0000

"B" -- Between MDL and PQL, "<" -- Less than detection limit


Solids, Dissolved (MG/L)
1722.0
1476.0
1230.0
984.0
738.0
492.0
246.0
LOWESS(1,0)
12/14/1990
05/05/2016
51 samples
YGAL16

YGAL16 Sample Remarks

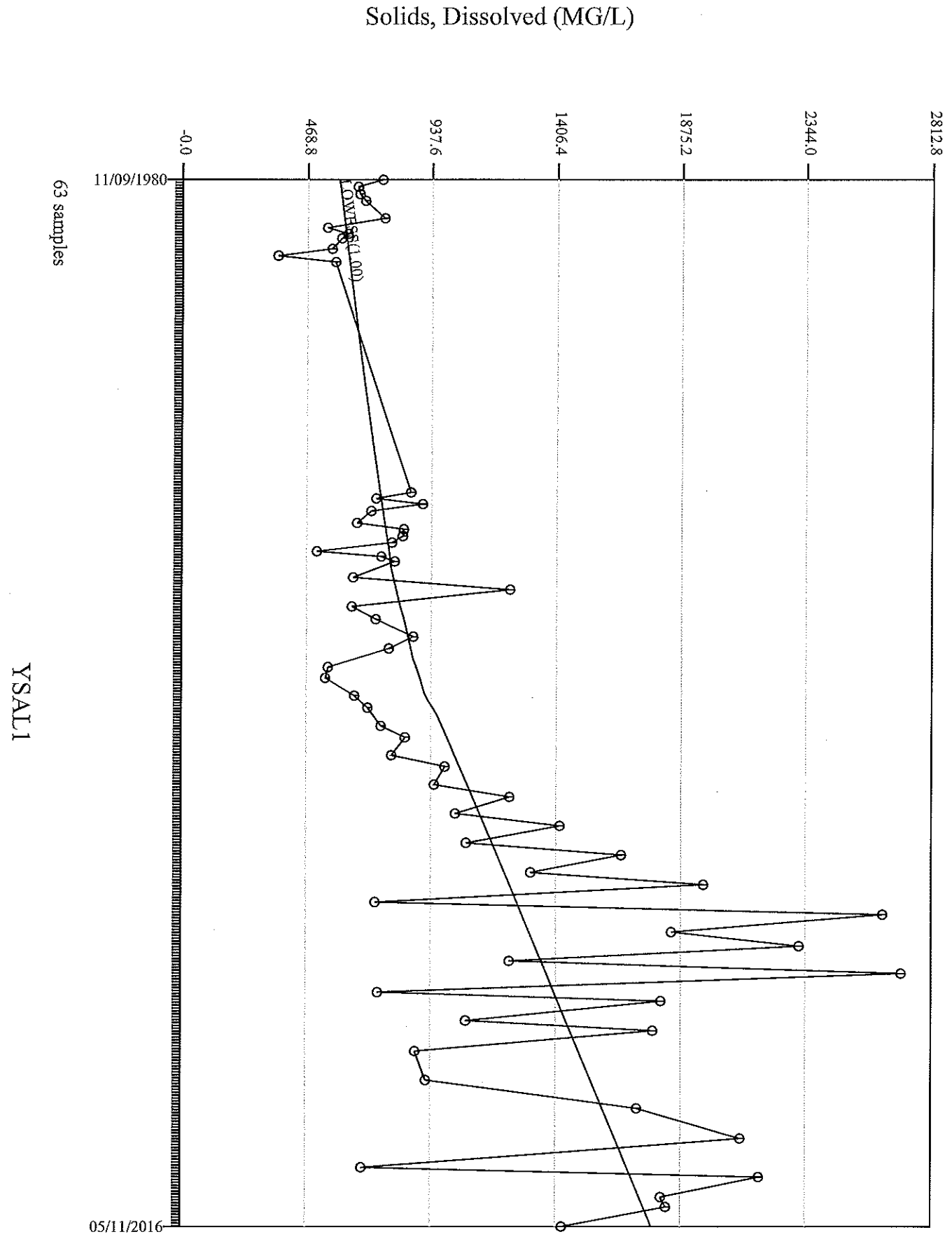
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
05/05/2016-12:55	PUMP GAL/GPM: 60/3

Water Quality Report
YSAL1
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	05/11/2016 07:55
Field Parameters		
Field Ph	S.U.	7.0900
Temperature	C	6.4000
Field Conductivity	UMHOS/CM	1850.0000
Laboratory Parameters		
Fluoride	MG/L	B 0.2300
Iron, Dissolved	MG/L	B 0.0300
Manganese, Dissolved	MG/L	B 0.0060
Nitrate Nitrogen_N	MG/L	1.7300
Nitrite Nitrogen_N	MG/L	< 0.0100
Nitrate/Nitrite Nitrogen_N	MG/L	1.7300
Selenium, Dissolved	UG/L	10.0000
Solids, Dissolved	MG/L	1430.0000
Sulfate	MG/L	670.0000

"B" -- Between MDL and PQL, "<" -- Less than detection limit


Solids, Dissolved (MG/L)
2812.8
2344.0
1875.2
1406.4
937.6
468.8
-0.0
11/09/1980
05/11/2016
63 samples
YSAL1

YSAL1 Sample Remarks
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
05/11/2016-07:55	PUMP GAL/GPM: 60/3

Water Quality Report
YSAL3
10/01/2015-00:00 to 09/30/2016-23:59

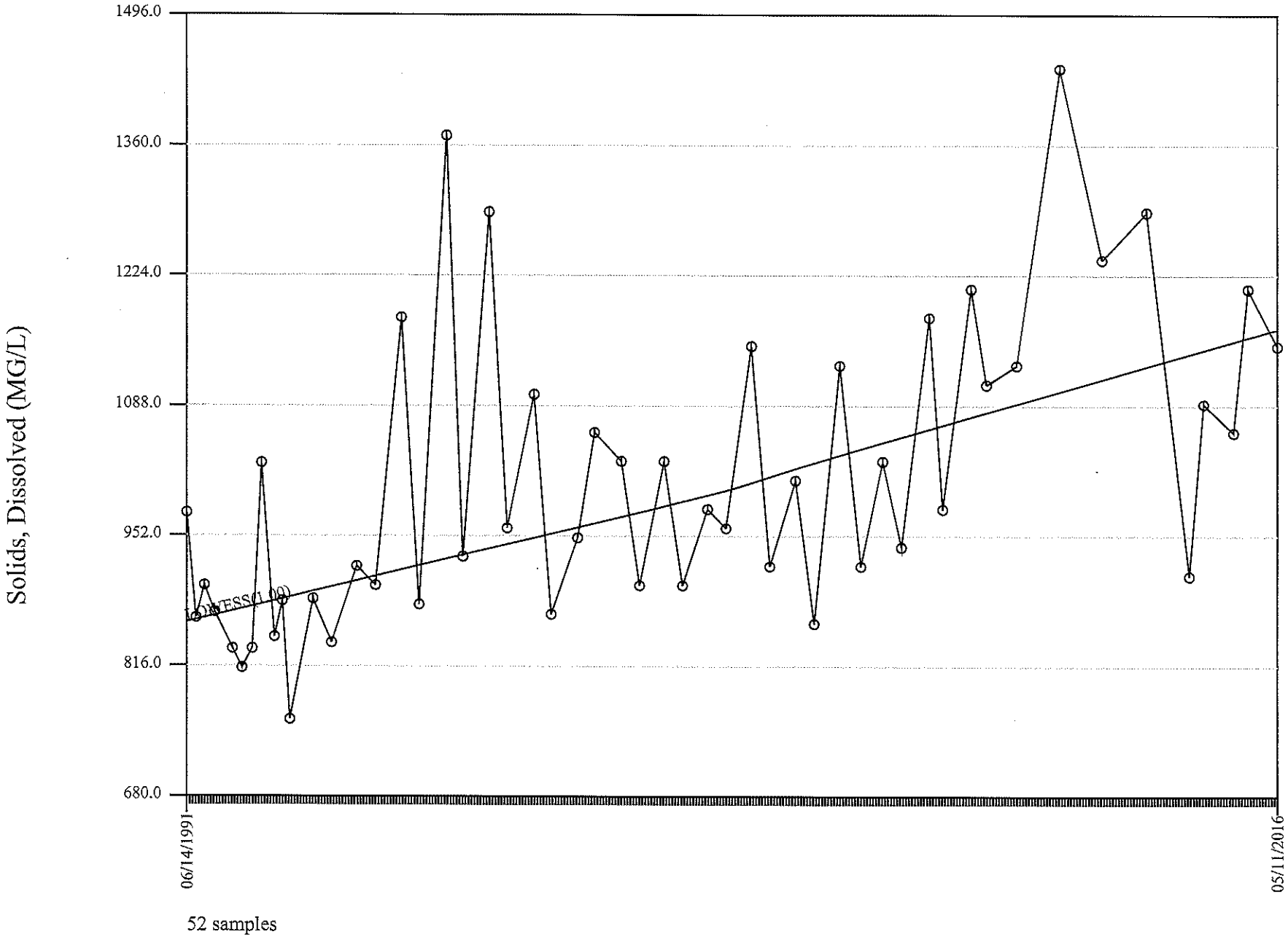
Parameters	Units	05/11/2016 07:15
Field Parameters		
Field Ph	S.U.	7.7000
Temperature	C	6.7000
Field Conductivity	UMHOS/CM	1670.0000
Laboratory Parameters		
Alk As CaCO3, Ph 4.5	MG/L	331.0000
Alk, Bicarb As CaCO3	MG/L	331.0000
Alk, Carb As CaCO3	MG/L	< 2.0000
Alk, Hydrox As CaCO3	MG/L	< 2.0000
Aluminum, Dissolved	MG/L	< 0.0300
Arsenic, Dissolved	UG/L	B 0.4000
Boron, Dissolved	UG/L	120.0000
Cadmium, Dissolved	UG/L	< 5.0000
Calcium, Dissolved	MG/L	113.0000
Chloride	MG/L	8.9000
Chromium, Dissolved	UG/L	< 10.0000
Conductivity	UMS/CM2	1620.0000
Copper, Dissolved	UG/L	< 10.0000
Fluoride	MG/L	0.3100
Hardness As CaCO3	MG/L	557.0000
Iron, Dissolved	MG/L	0.5800
Lead, Dissolved	UG/L	< 30.0000
Magnesium, Dissolved	MG/L	66.8000
Manganese, Dissolved	MG/L	0.1800
Mercury, Dissolved	UG/L	< 0.2000
Nickel, Dissolved	UG/L	B 9.0000
Nitrate Nitrogen_N	MG/L	B 0.0300
Nitrite Nitrogen_N	MG/L	< 0.0100
Nitrate/Nitrite Nitrogen_N	MG/L	B 0.0300
Ph At 25 Deg. Cent.	S.U.	8.1000
Potassium, Dissolved	MG/L	4.1000
Selenium, Dissolved	UG/L	< 1.0000
Sodium, Dissolved	MG/L	169.0000
Solids, Dissolved	MG/L	1150.0000
Solids, Suspended	MG/L	2170.0000
Sulfate	MG/L	590.0000
Sulfide	MG/L	< 0.2000
Zinc, Dissolved	MG/L	< 0.0100
Bicarbonate As HCO3	MG/L	404.0000
Carbonate As CO3	MG/L	< 2.0000
Hydroxide As OH	MG/L	< 2.0000
Cation_Anion Balance	PERCENT	< 0.0000
Sar	RATIO	3.2000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

Water Quality Report
YSAL3
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	05/11/2016 07:15
Laboratory Parameters		
Solids, Diss. (Calc)	MG/L	1150.0000
Sum Of Anions	MEQ/L	19.0000
Sum Of Cations	MEQ/L	19.0000
Tds Ratio	ANAL/CALC	1.0000

"B" -- Between MDL and PQL, "<" -- Less than detection limit


1496.0
1360.0
1224.0
1088.0
952.0
816.0
680.0
Solids, Dissolved (MG/L)
06/14/1991
05/11/2016
52 samples
YSAL3

YSAL3 Sample Remarks

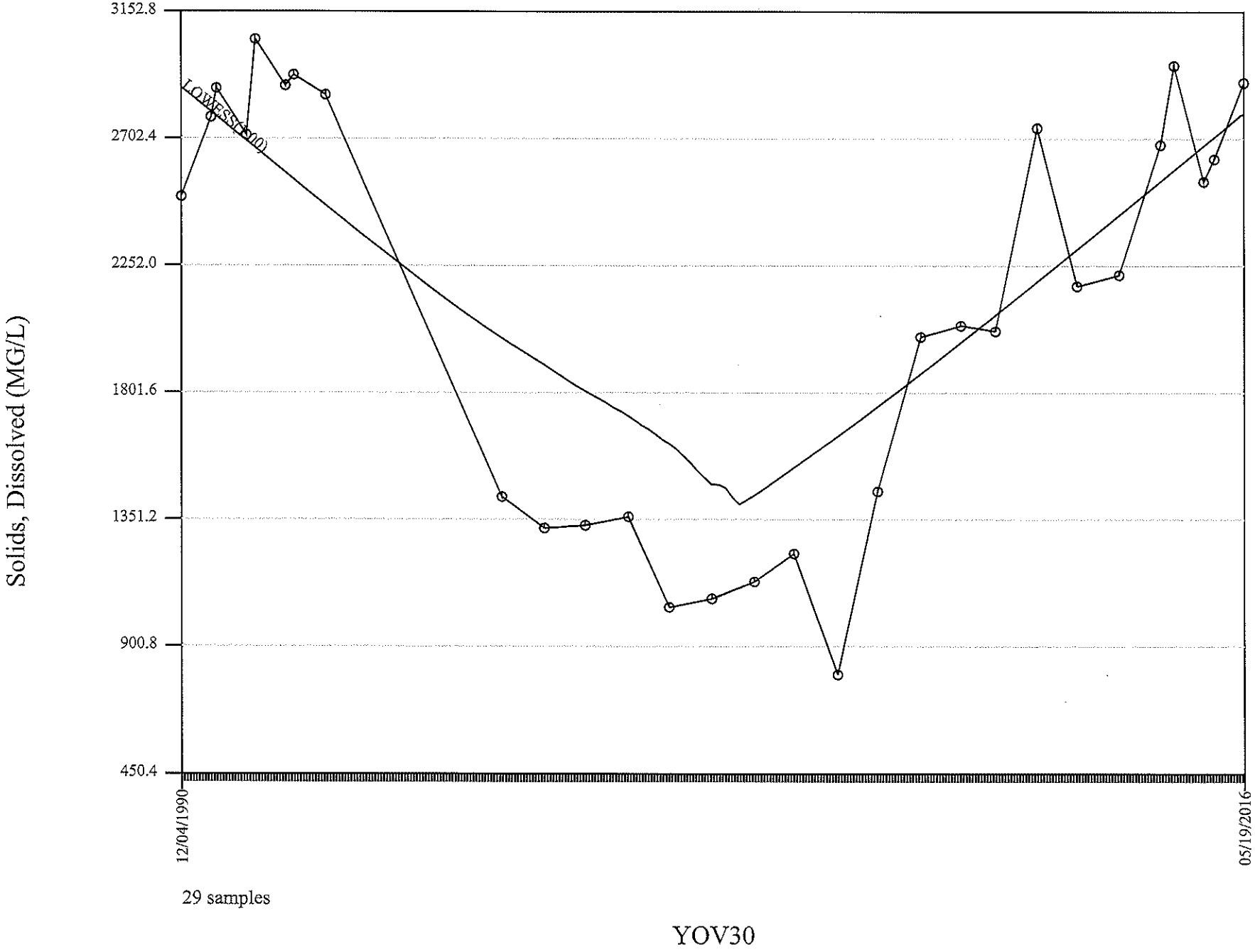
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
05/11/2016-07:15	PUMP GAL/GPM: 15/2

Water Quality Report
YOV30
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	05/19/2016 10:45
Field Parameters		
Field Ph	S.U.	7.3000
Temperature	C	9.1000
Field Conductivity	UMHOS/CM	3760.0000
Laboratory Parameters		
Fluoride	MG/L	1.1200
Iron, Dissolved	MG/L	0.3100
Manganese, Dissolved	MG/L	0.1020
Nitrate Nitrogen_N	MG/L	0.2000
Nitrite Nitrogen_N	MG/L	< 0.0100
Nitrate/Nitrite Nitrogen_N	MG/L	0.2000
Selenium, Dissolved	UG/L	< 1.0000
Solids, Dissolved	MG/L	2900.0000
Sulfate	MG/L	1460.0000

"B" -- Between MDL and PQL, "<" -- Less than detection limit


3152.8
2702.4
2252.0
1801.6
1351.2
900.8
450.4
Solids, Dissolved (MG/L)
LOWESS (0.5)
12/04/1990
05/19/2016
29 samples
YOV30

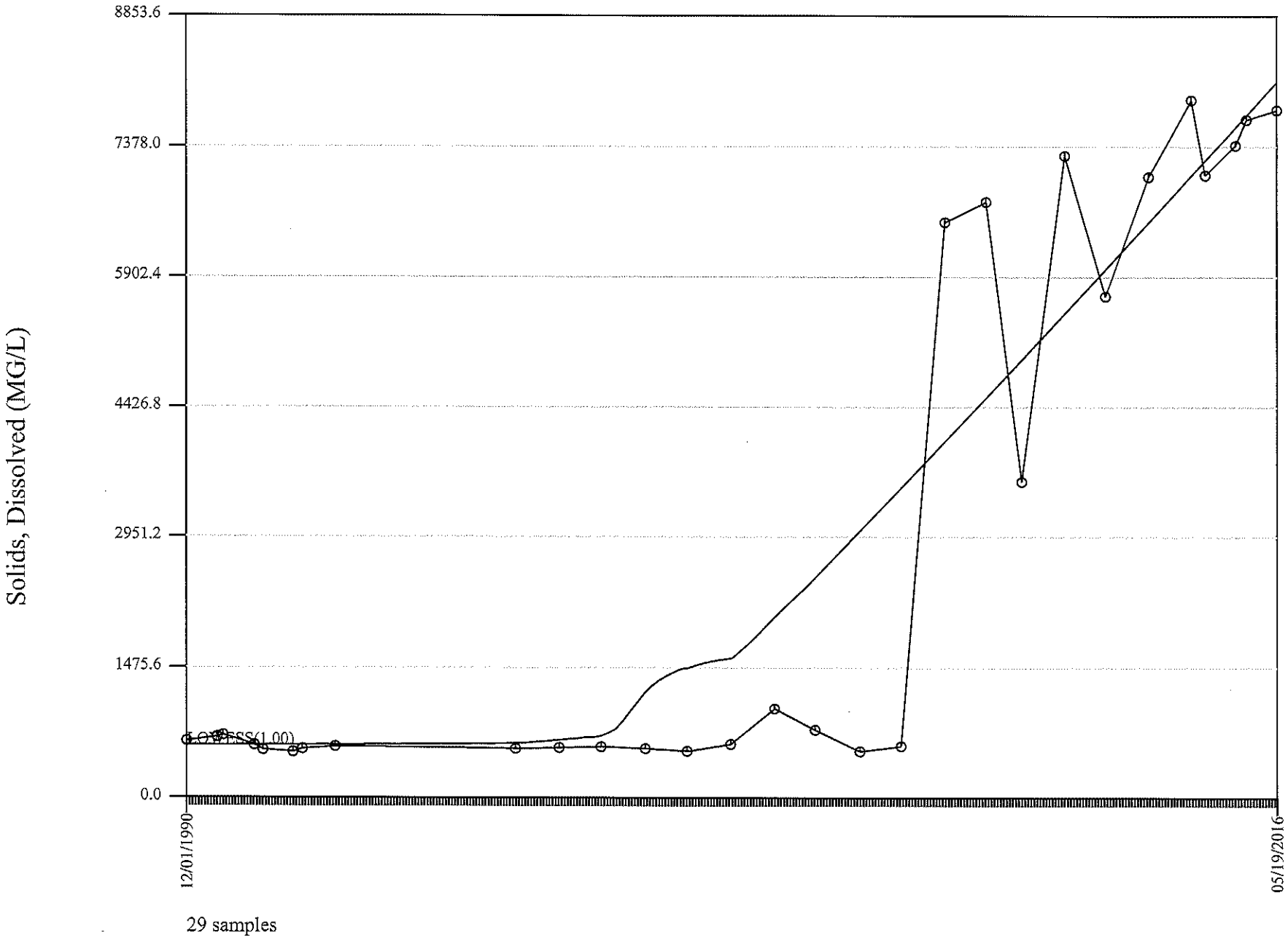
YOV30 Sample Remarks
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
05/19/2016-10:45	PUMP GAL/GPM: 24/1

Water Quality Report
YW30
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	05/19/2016 12:00
Field Parameters		
Field Ph	S.U.	7.4900
Temperature	C	9.2000
Field Conductivity	UMHOS/CM	9940.0000
Laboratory Parameters		
Fluoride	MG/L	0.9100
Iron, Dissolved	MG/L	0.3700
Manganese, Dissolved	MG/L	0.0740
Nitrate Nitrogen_N	MG/L	1.8500
Nitrite Nitrogen_N	MG/L	0.4900
Nitrate/Nitrite Nitrogen_N	MG/L	2.3400
Selenium, Dissolved	UG/L	< 1.0000
Solids, Dissolved	MG/L	7790.0000
Sulfate	MG/L	5200.0000

"B" -- Between MDL and PQL, "<" -- Less than detection limit


Solids, Dissolved (MG/L)
8853.6
7378.0
5902.4
4426.8
2951.2
1475.6
0.0
12/01/1990
05/19/2016
29 samples
YW30

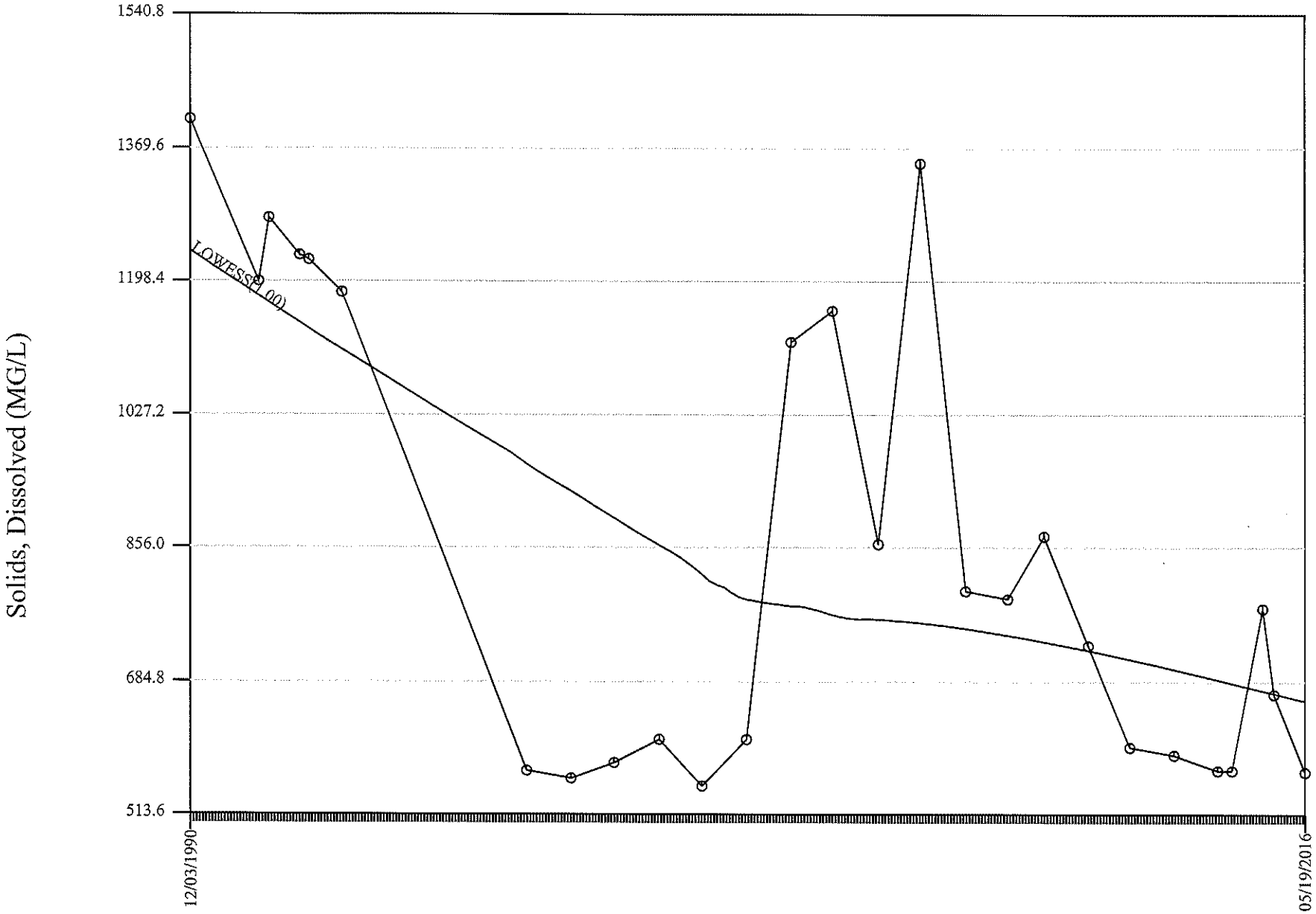
YW30 Sample Remarks
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
05/19/2016-12:00	PUMP GAL/GPM: 110/3

Water Quality Report
YWU30
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	05/19/2016 11:20
Field Parameters		
Field Ph	S.U.	7.2100
Temperature	C	10.6000
Field Conductivity	UMHOS/CM	1000.0000
Laboratory Parameters		
Fluoride	MG/L	B 0.1400
Iron, Dissolved	MG/L	0.3100
Manganese, Dissolved	MG/L	0.0650
Nitrate Nitrogen_N	MG/L	1.1900
Nitrite Nitrogen_N	MG/L	< 0.0100
Nitrate/Nitrite Nitrogen_N	MG/L	1.1900
Selenium, Dissolved	UG/L	< 1.0000
Solids, Dissolved	MG/L	568.0000
Sulfate	MG/L	90.0000

"B" -- Between MDL and PQL, "<" -- Less than detection limit


Solids, Dissolved (MG/L)
1540.8
1369.6
1198.4
1027.2
856.0
684.8
513.6
LOWESS(1.00)
12/03/1990
05/19/2016
27 samples

YWU30

YWU30 Sample Remarks

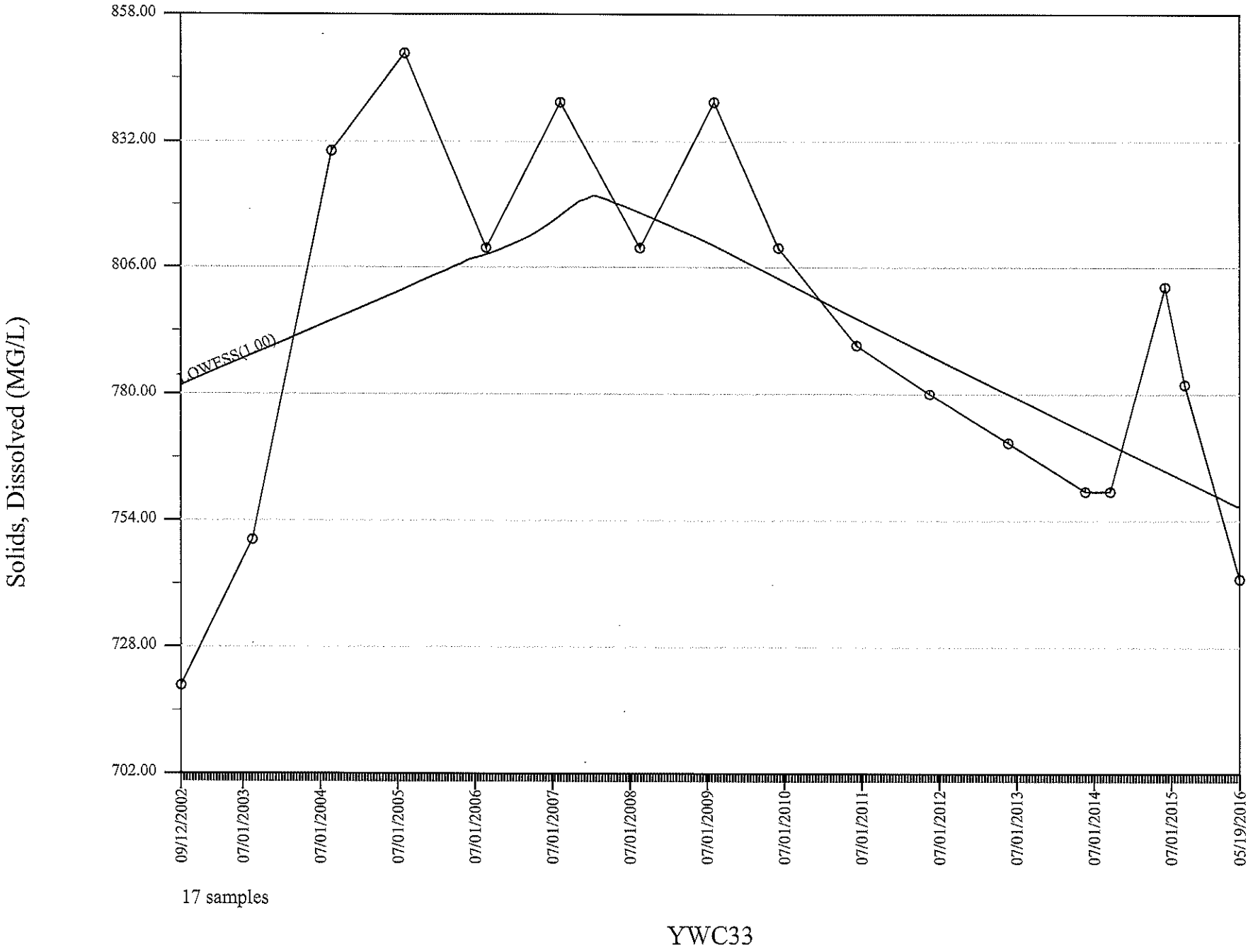
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
05/19/2016-11:20	PUMP GAL/GPM: 15/1

Water Quality Report
YWC33
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	05/19/2016 09:55
Field Parameters		
Field Ph	S.U.	7.3700
Temperature	C	10.8000
Field Conductivity	UMHOS/CM	1310.0000
Laboratory Parameters		
Iron, Dissolved	MG/L	0.2300
Manganese, Dissolved	MG/L	B 0.0270
Solids, Dissolved	MG/L	742.0000

"B" -- Between MDL and PQL, "<" -- Less than detection limit


Solids, Dissolved (MG/L)
858.00
832.00
806.00
780.00
754.00
728.00
702.00
LOWESS(1.00)
09/12/2002
07/01/2003
07/01/2004
07/01/2005
07/01/2006
07/01/2007
07/01/2008
07/01/2009
07/01/2010
07/01/2011
07/01/2012
07/01/2013
07/01/2014
07/01/2015
05/19/2016
17 samples
YWC33

YWC33 Sample Remarks

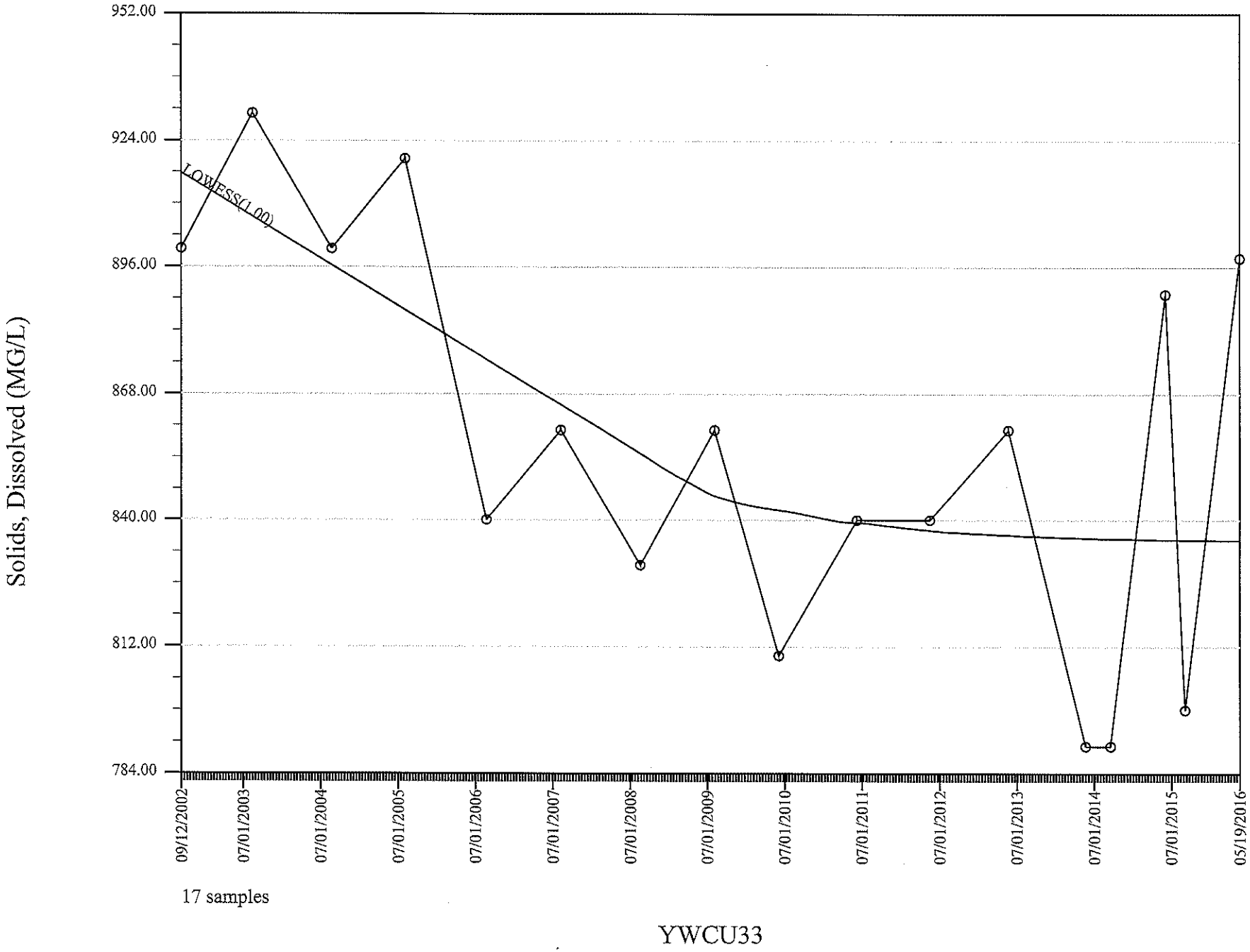
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
05/19/2016-09:55	PUMP GAL/GPM: 100/2

Water Quality Report
YWCU33
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	05/19/2016 08:55
Field Parameters		
Field Ph	S.U.	8.4100
Temperature	C	11.0000
Field Conductivity	UMHOS/CM	1490.0000
Laboratory Parameters		
Iron, Dissolved	MG/L	< 0.0200
Manganese, Dissolved	MG/L	< 0.0050
Solids, Dissolved	MG/L	898.0000

"B" -- Between MDL and PQL, "<" -- Less than detection limit


Solids, Dissolved (MG/L)
952.00
924.00
896.00
868.00
840.00
812.00
784.00
LOWESS(1.00)
09/12/2002
07/01/2003
07/01/2004
07/01/2005
07/01/2006
07/01/2007
07/01/2008
07/01/2009
07/01/2010
07/01/2011
07/01/2012
07/01/2013
07/01/2014
07/01/2015
05/19/2016
17 samples
YWCU33

YWCU33 Sample Remarks
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
05/19/2016-08:55	PUMP GAL/GPM: 100/2

APPENDIX D

SURFACE WATER QUALITY DATA AND HYDROGRAPHS

APPENDIX D

Surface Water Quality Data

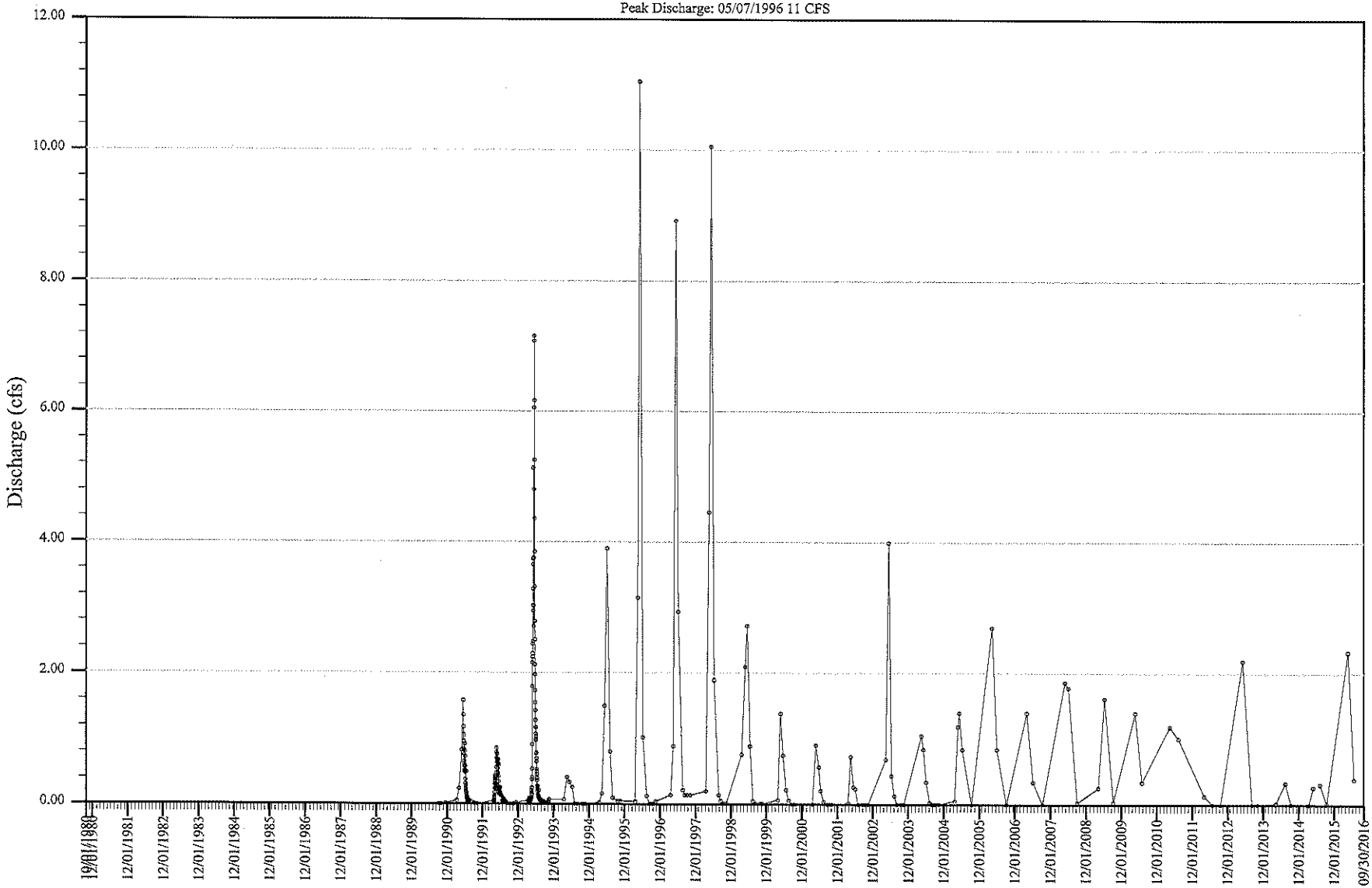
Table of Contents

On water quality reports: < indicates an analytical value below the Method Detection Limit

B indicates an analytical value between the Method Detection Limit and the Practical Quantitation Limit

Discharge Hydrograph

Peak Discharge: 05/07/1996 11 CFS



YSSF3

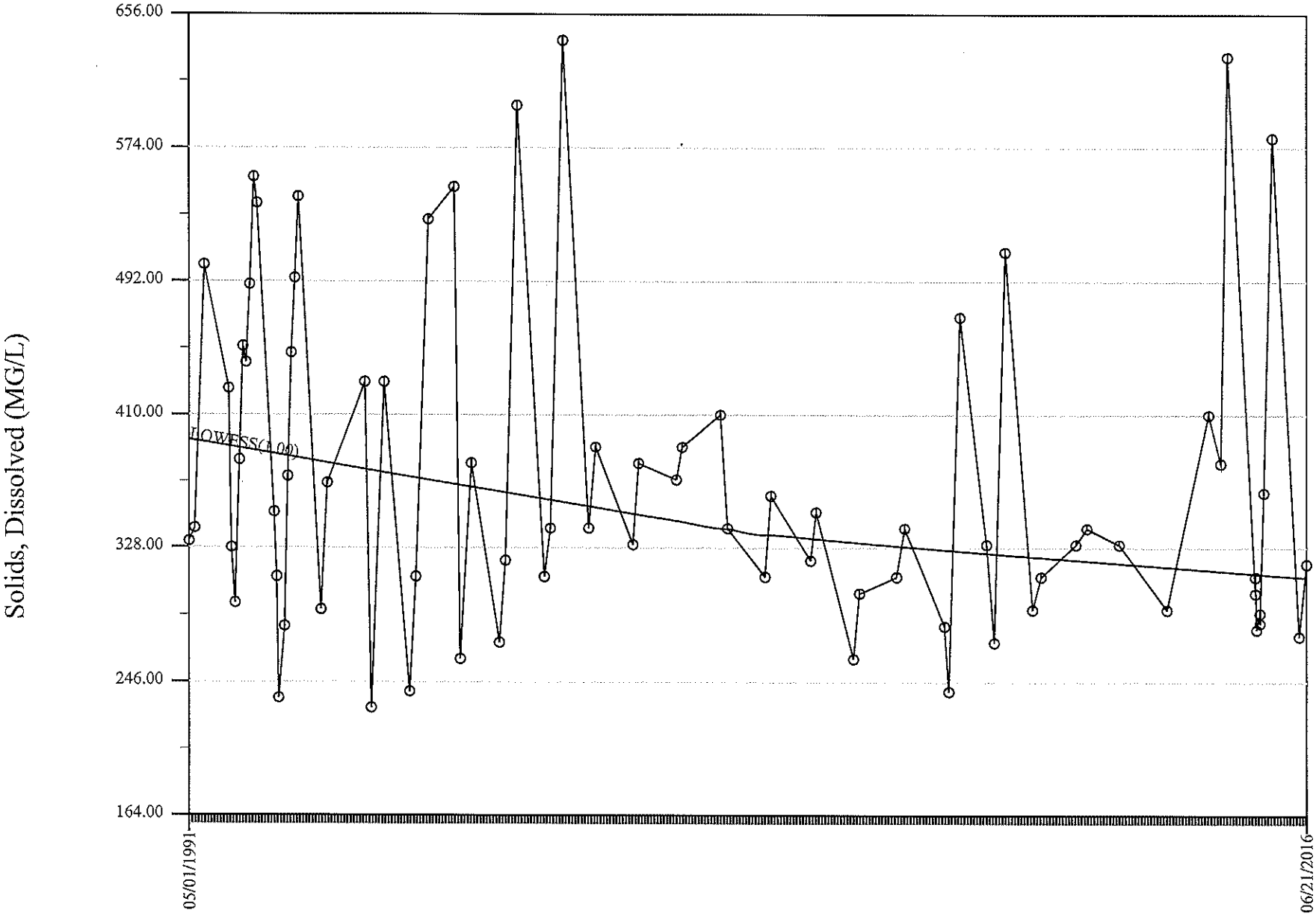
Extended Water Quality Report
YSSF3 - SW-S2W-FG5
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	04/21/2016 11:15	06/21/2016 13:15
Field Parameters			
Field Ph	S.U.	7.7800	7.7700
Temperature	C	9.1000	20.9000
Field Conductivity	UMHOS/CM	540.0000	490.0000
Flow	CFS	2.3260	0.3866
Laboratory Parameters			
Selenium, Dissolved	UG/L	0.5000	< 0.1000
Solids, Dissolved	MG/L	274.0000	318.0000
Solids, Suspended	MG/L	B 7.0000	B 6.0000
Iron, Total Rec.	MG/L	0.3200	0.5500
Selenium, Total Rec.	UG/L	0.5000	B 0.2000
Manganese, Pot. Diss.	MG/L	0.0088	0.0090
Selenium, Pot. Diss.	UG/L	0.4000	B 0.2000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

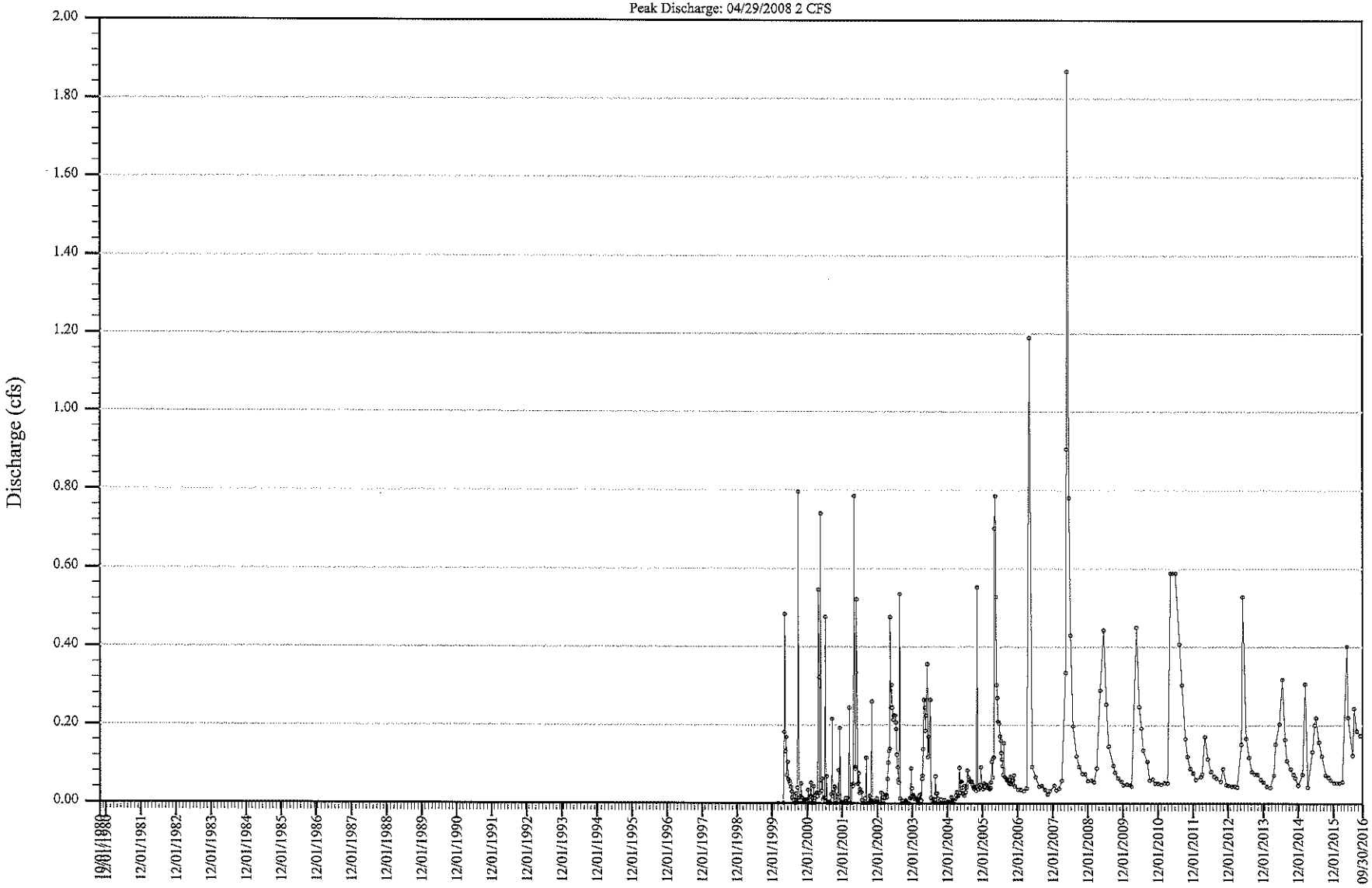
Instantaneous Flow Measurements Report
YSSF3 - SW-S2W-FG5
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
04/21/2016	11:15:00	MANF	INS				2.33	1044.00	1.50
06/21/2016	13:15:00	MANF	INS				0.39	173.50	0.25


656.00
574.00
492.00
410.00
328.00
246.00
164.00
Solids, Dissolved (MG/L)
LOWESS(0.00)
05/01/1991
06/21/2016
77 samples
YSSF3

Discharge Hydrograph

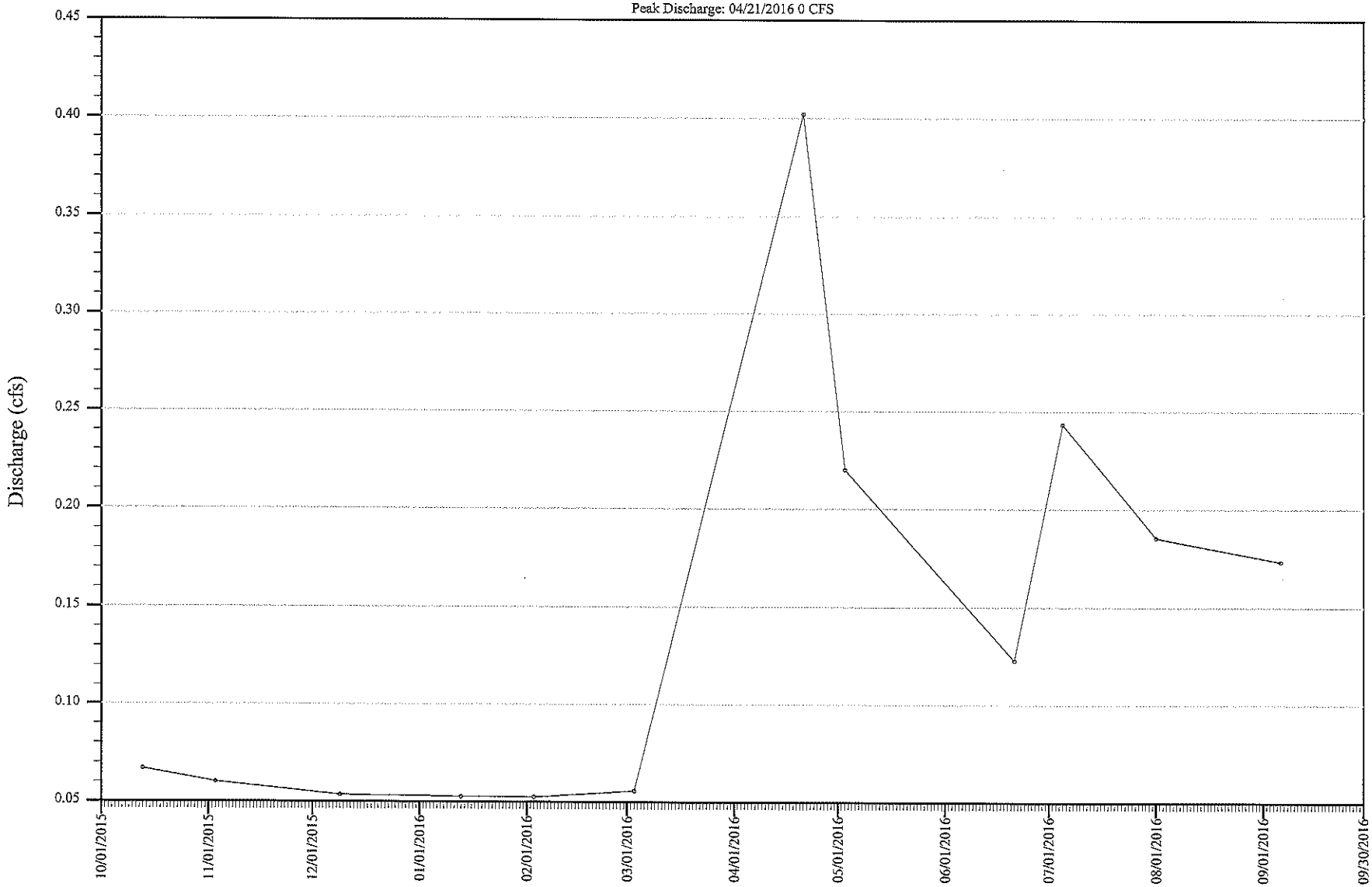
Peak Discharge: 04/29/2008 2 CFS



NPDES12

Discharge Hydrograph

Peak Discharge: 04/21/2016 0 CFS



NPDES12

Extended Water Quality Report
NPDES12 - NPDES 012 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	10/13/2015 11:45	11/03/2015 08:45	12/09/2015 12:20	01/13/2016 10:10	02/03/2016 08:50	02/04/2016 08:50	03/03/2016 13:45	04/21/2016 10:35	05/03/2016 16:25
Field Parameters										
Field Ph	S.U.	7.7500	7.7900	7.7400	7.4600	7.5900		7.5300	7.4500	7.6800
Temperature	C	12.6000	6.6000	5.4000	2.0000	0.9000		7.5000	11.1000	15.3000
Field Conductivity	UMHOS/CM	3910.0000	3820.0000	3830.0000	3700.0000	3640.0000		3650.0000	1820.0000	2980.0000
Flow	CFS	0.0668	0.0602	0.0535	0.0526	0.0525	0.0525	0.0556	0.4019	0.2200
Laboratory Parameters										
Solids, Dissolved	MG/L	3650.0000	3340.0000	3330.0000	3190.0000		3350.0000	3230.0000	1350.0000	2670.0000
Iron, Total Rec.	MG/L	0.2400	0.2900	0.2100	0.1700		0.1200	0.1000	0.2600	< 0.0400
Selenium, Total Rec.	UG/L	1.3000	0.9000	0.6000	B 0.3000		1.1000	1.7000	1.9000	3.5000
Manganese, Pot. Diss.	MG/L	0.1070			0.4430				0.0660	
Selenium, Pot. Diss.	UG/L	1.2000	0.8000	0.9000	0.4000		1.1000	1.9000	1.9000	3.9000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

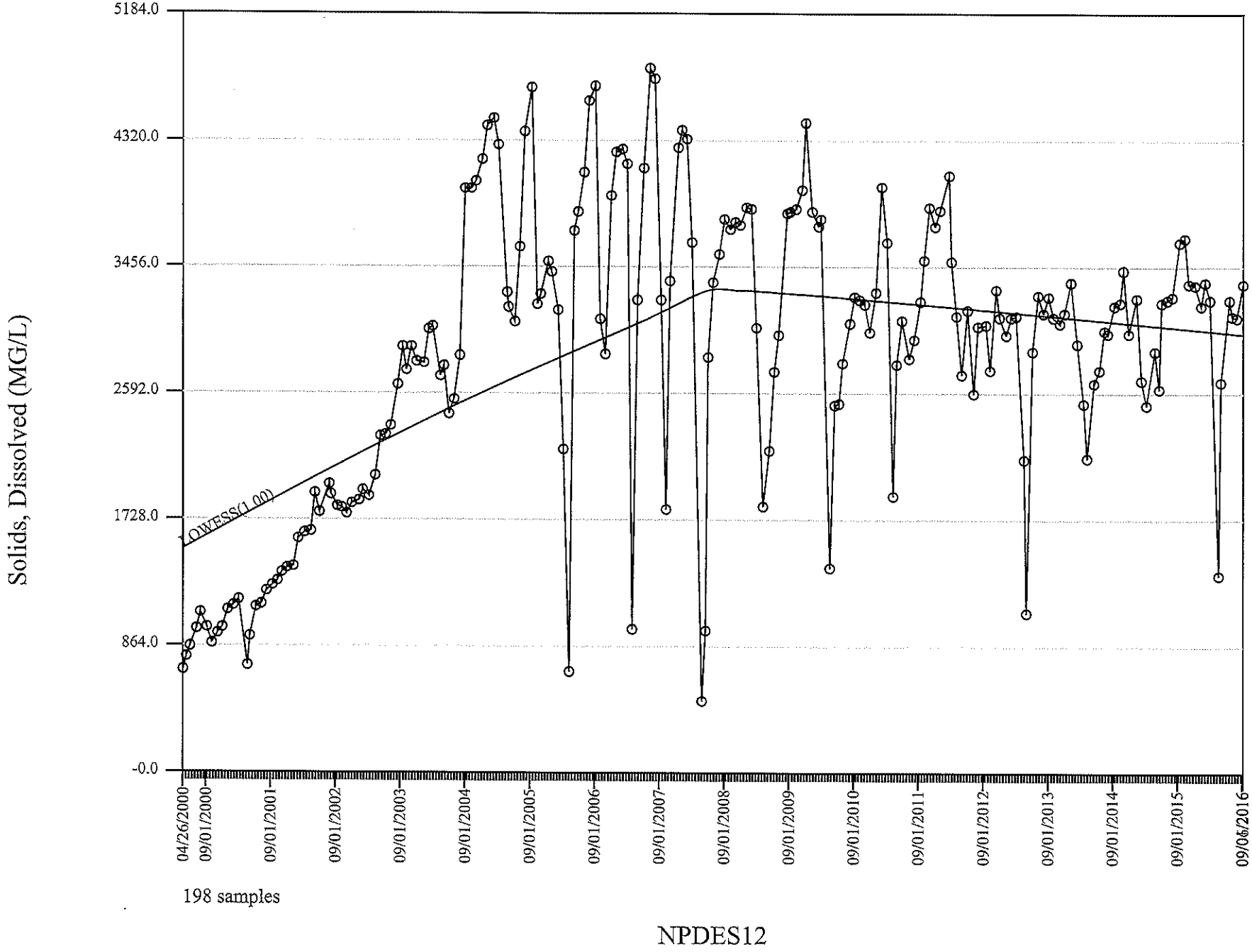
Extended Water Quality Report
NPDES12 - NPDES 012 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	06/21/2016 12:55	07/05/2016 15:20	08/01/2016 14:30	09/06/2016 15:30
Field Parameters					
Field Ph	S.U.	7.7000	7.4800	7.9400	7.7600
Temperature	C	21.3000	22.5000	24.4000	18.8000
Field Conductivity	UMHOS/CM	2970.0000	3400.0000	3430.0000	3630.0000
Flow	CFS	0.1230	0.2433	0.1856	0.1735
Laboratory Parameters					
Solids, Dissolved	MG/L	3230.0000	3120.0000	3110.0000	3340.0000
Iron, Total Rec.	MG/L	B 0.0600	B 0.0600	0.1100	0.2200
Selenium, Total Rec.	UG/L	2.3000	1.4000	1.1000	0.8000
Manganese, Pot. Diss.	MG/L		0.0800		
Selenium, Pot. Diss.	UG/L	1.9000	3.6000	1.0000	0.8000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

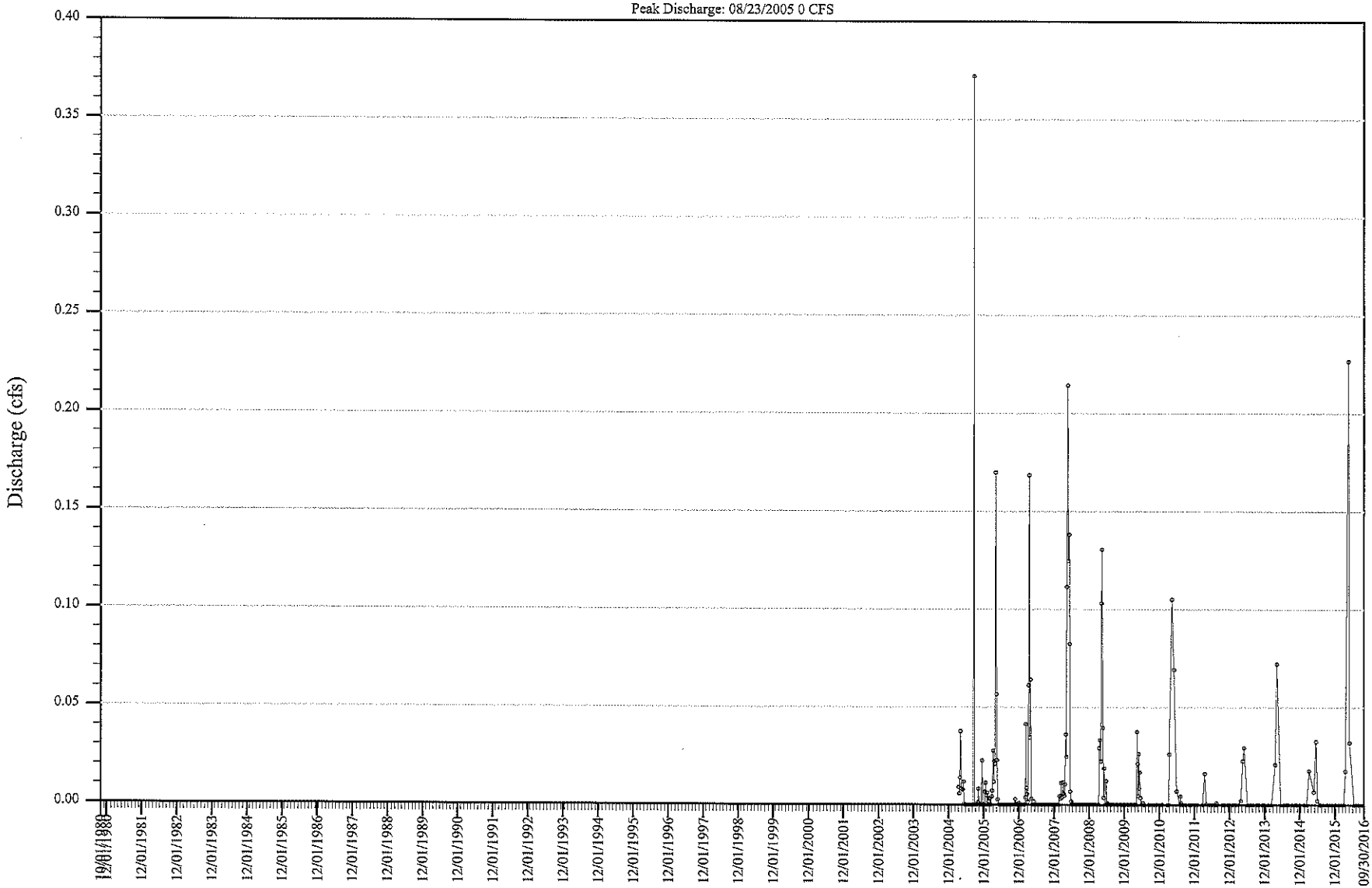
Instantaneous Flow Measurements Report
NPDES12 - NPDES 012 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
10/13/2015	11:45:00	MANF	INS				0.07	30.00	0.04
11/03/2015	08:45:00	MANF	INS				0.06	27.00	0.04
12/09/2015	12:20:00	MANF	INS				0.05	24.00	0.03
01/13/2016	10:10:00	MANF	INS				0.05	23.61	0.03
02/03/2016	08:50:00	MANF	INS				0.05	23.56	0.03
03/03/2016	13:45:00	MANF	INS				0.06	24.97	0.04
04/21/2016	10:35:00	MANF	INS				0.40	180.40	0.26
05/03/2016	16:25:00	MANF	INS				0.22	98.74	0.14
06/21/2016	12:55:00	MANF	INS				0.12	55.20	0.08
07/05/2016	15:20:00	MANF	INS				0.24	109.20	0.16
08/01/2016	14:30:00	MANF	INS				0.19	83.30	0.12
09/06/2016	15:30:00	MANF	INS				0.17	77.85	0.11

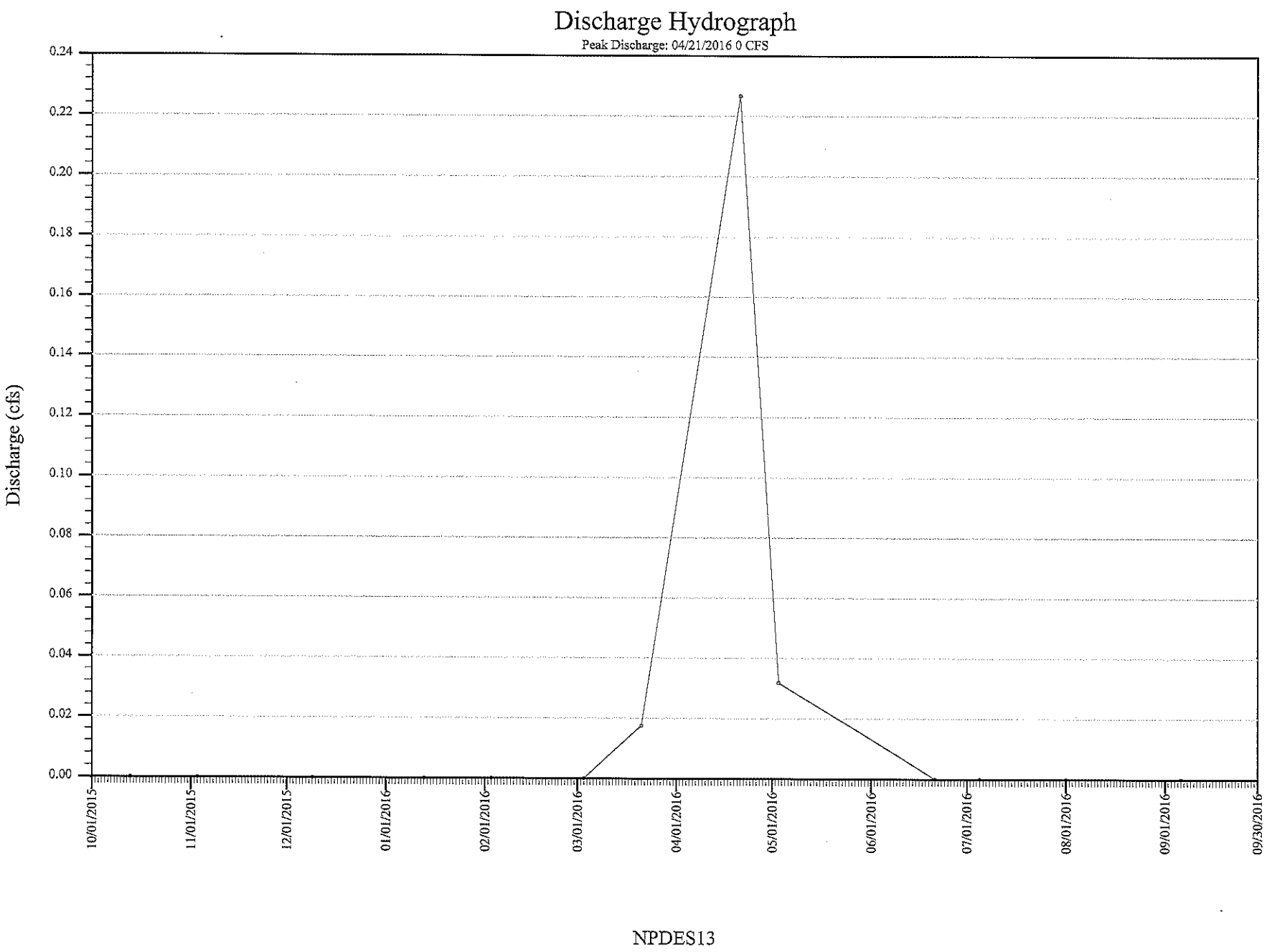

Solids, Dissolved (MG/L)
5184.0
4320.0
3456.0
2592.0
1728.0
864.0
-0.0
LOWESS(1.00)
04/26/2000
09/01/2000
09/01/2001
09/01/2002
09/01/2003
09/01/2004
09/01/2005
09/01/2006
09/01/2007
09/01/2008
09/01/2009
09/01/2010
09/01/2011
09/01/2012
09/01/2013
09/01/2014
09/01/2015
09/06/2016
198 samples
NPDES12

Discharge Hydrograph

Peak Discharge: 08/23/2005 0 CFS



NPDES13


Discharge Hydrograph
Peak Discharge: 04/21/2016 0 CFS
Discharge (cfs)
0.24
0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
10/01/2015
11/01/2015
12/01/2015
01/01/2016
02/01/2016
03/01/2016
04/01/2016
05/01/2016
06/01/2016
07/01/2016
08/01/2016
09/01/2016
09/30/2016
NPDES13

Extended Water Quality Report
NPDES13 - NPDES 013 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	03/21/2016 09:50	04/21/2016 11:00	05/03/2016 16:45
Field Parameters				
Field Ph	S.U.	7.9200	7.7400	8.4900
Temperature	C	4.8000	12.5000	17.1000
Field Conductivity	UMHOS/CM	3700.0000	1700.0000	5180.0000
Flow	CFS	0.0173	0.2267	0.0319
Laboratory Parameters				
Iron, Total	MG/L		0.7800	
Mercury, Total	UG/L		0.0036	
Solids, Dissolved	MG/L	3200.0000	1280.0000	5170.0000
Solids, Suspended	MG/L		B 8.0000	
Arsenic, Total Rec.	UG/L		B 0.9000	
Iron, Total Rec.	MG/L	0.4300	0.8400	< 0.1000
Selenium, Total Rec.	UG/L		10.7000	
Cadmium, Pot. Diss.	UG/L		< 0.1000	
Chromium, Pot. Diss.	UG/L		< 0.5000	
Copper, Pot. Diss.	UG/L		B 1.4000	
Lead, Pot. Diss.	UG/L		B 0.3000	
Manganese, Pot. Diss.	MG/L		B 0.0110	
Nickel, Pot. Diss.	UG/L		< 8.0000	
Selenium, Pot. Diss.	UG/L		10.5000	
Silver, Pot. Diss.	UG/L		< 0.0500	
Zinc, Pot. Diss.	MG/L		< 0.0100	

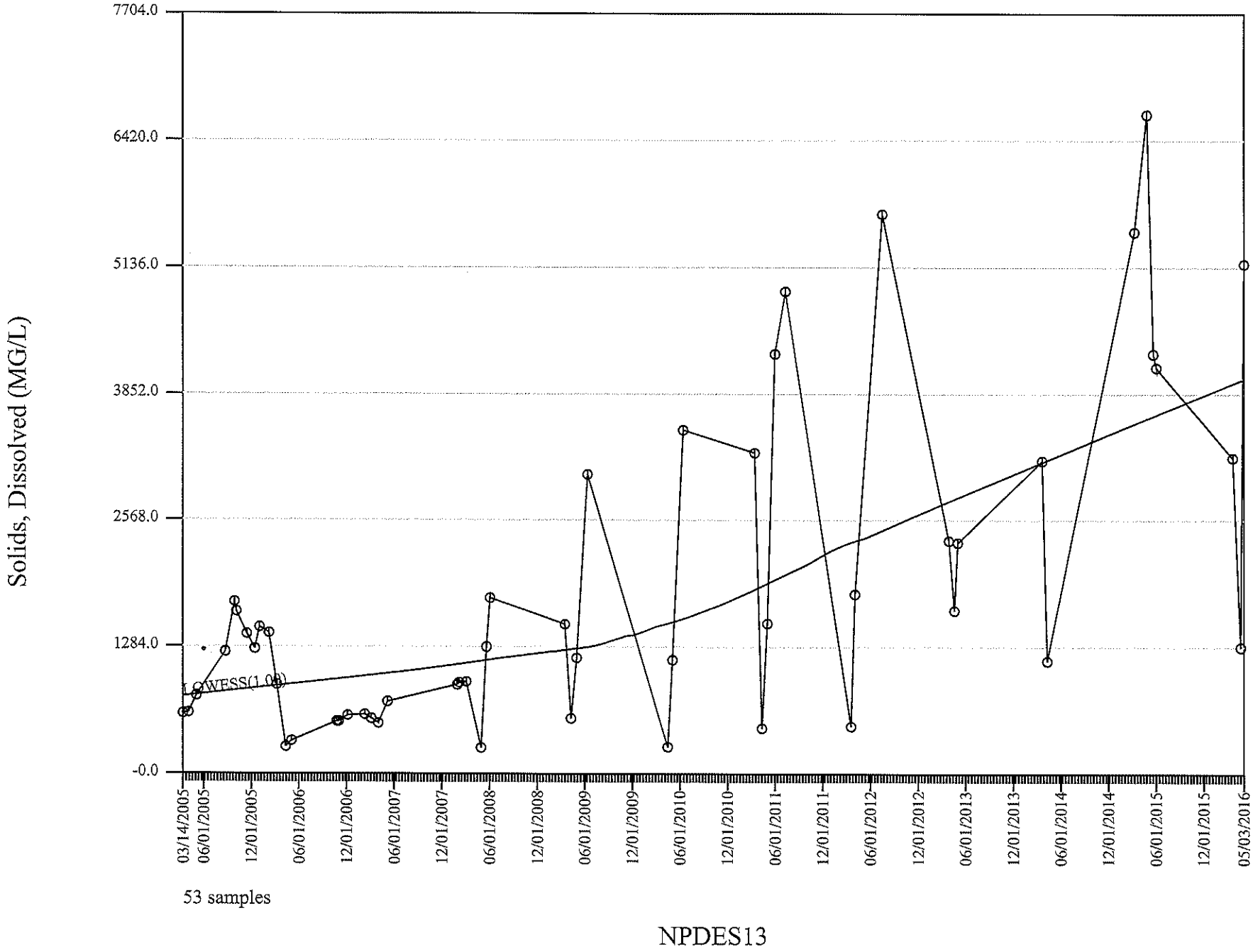
"B" -- Between MDL and PQL, "<" -- Less than detection limit

Instantaneous Flow Measurements Report
NPDES13 - NPDES 013 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
10/13/2015	12:35:00	MANF	INS				0.00	0.00	0.00
11/03/2015	09:20:00	MANF	INS				0.00	0.00	0.00
12/09/2015	12:45:00	MANF	INS				0.00	0.00	0.00
01/13/2016	10:30:00	MANF	INS				0.00	0.00	0.00
02/03/2016	08:45:00	MANF	INS				0.00	0.00	0.00
03/03/2016	15:40:00	MANF	INS				0.00	0.00	0.00
03/21/2016	09:50:00	MANF	INS				0.02	7.77	0.01
04/21/2016	11:00:00	MANF	INS				0.23	101.75	0.15
05/03/2016	16:45:00	MANF	INS				0.03	14.33	0.02
06/21/2016	13:00:00	MANF	INS				0.00	0.00	0.00
07/05/2016	15:50:00	MANF	INS				0.00	0.00	0.00
08/01/2016	14:55:00	MANF	INS				0.00	0.00	0.00
09/06/2016	15:45:00	MANF	INS				0.00	0.00	0.00

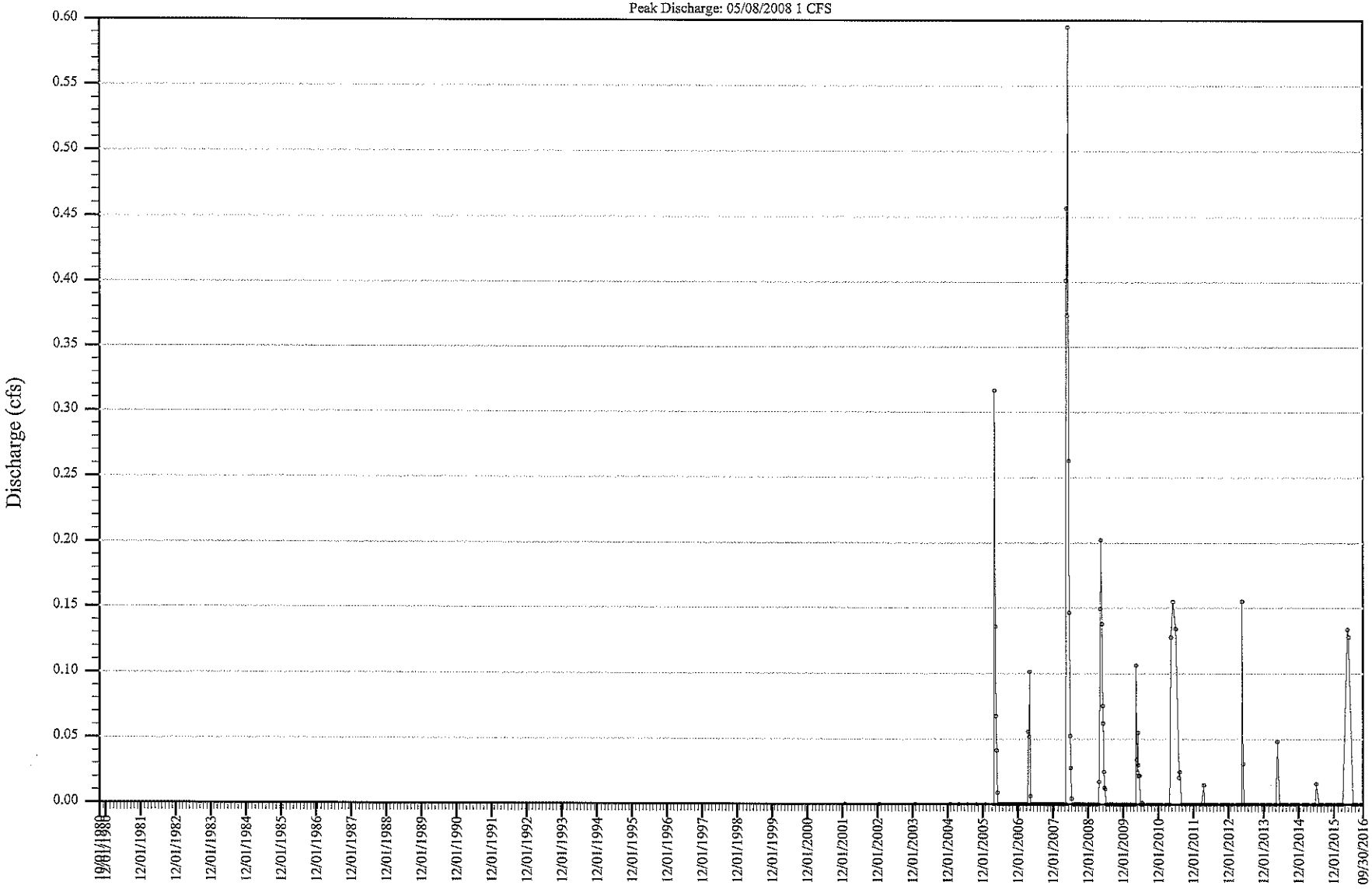
NPDES13 Sample Remarks
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
06/21/2016-13:00	NO FLOW
07/05/2016-15:50	NO FLOW
08/01/2016-14:55	NO FLOW
09/06/2016-15:45	NO FLOW


Solids, Dissolved (MG/L)
7704.0
6420.0
5136.0
3852.0
2568.0
1284.0
-0.0
LOWESS(1.00)
03/14/2005
06/01/2005
12/01/2005
06/01/2006
12/01/2006
06/01/2007
12/01/2007
06/01/2008
12/01/2008
06/01/2009
12/01/2009
06/01/2010
12/01/2010
06/01/2011
12/01/2011
06/01/2012
12/01/2012
06/01/2013
12/01/2013
06/01/2014
12/01/2014
06/01/2015
12/01/2015
05/03/2016
53 samples
NPDES13

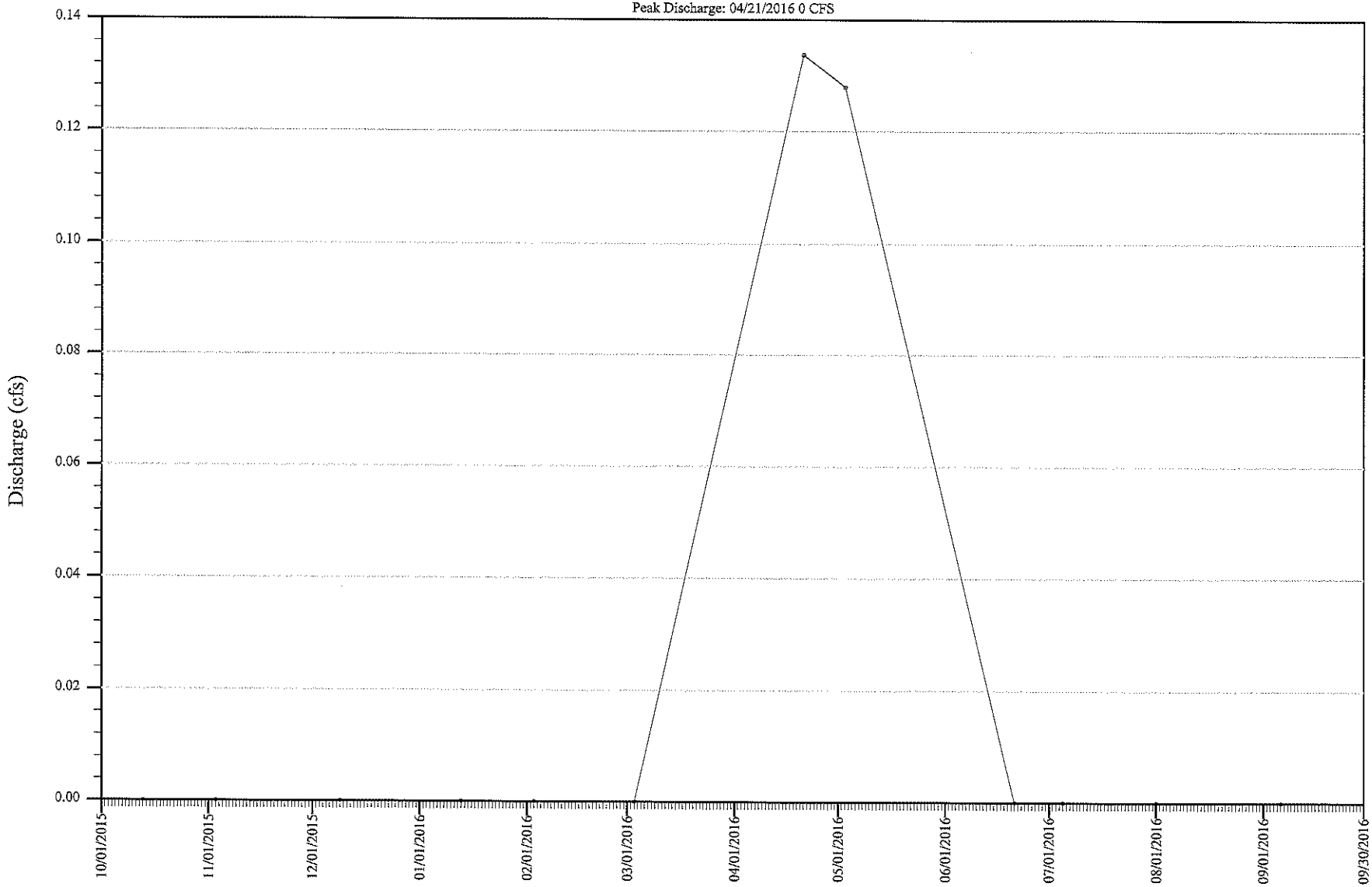
Discharge Hydrograph

Peak Discharge: 05/08/2008 1 CFS



Discharge Hydrograph

Peak Discharge: 04/21/2016 0 CFS



NPDES14

Extended Water Quality Report
NPDES14 - NPDES 014 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	04/21/2016 11:35	05/03/2016 17:05
Field Parameters			
Field Ph	S.U.	7.5800	7.9400
Temperature	C	10.5000	15.6000
Field Conductivity	UMHOS/CM	1310.0000	2120.0000
Flow	CFS	0.1337	0.1279
Laboratory Parameters			
Solids, Dissolved	MG/L	934.0000	1680.0000

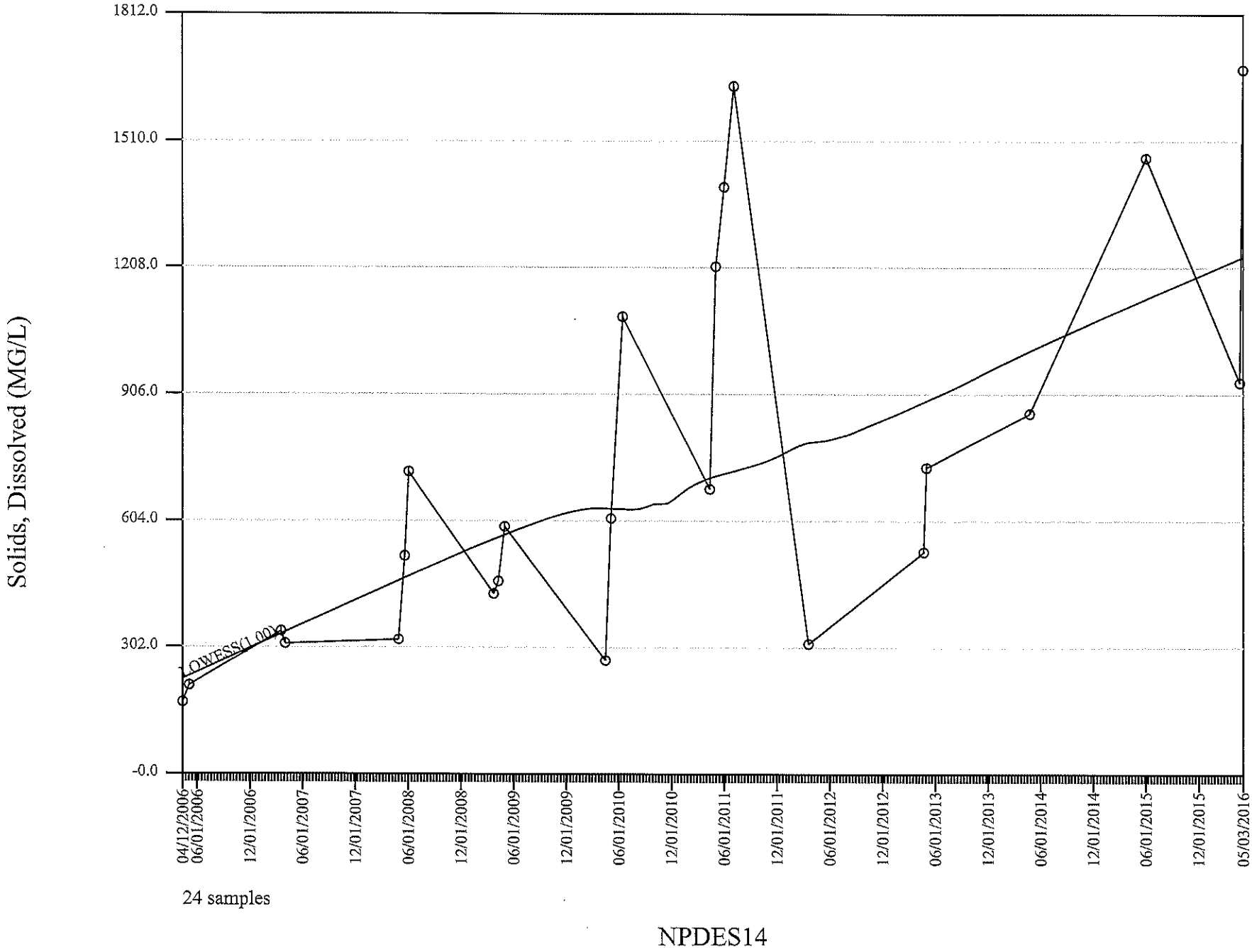
"B" -- Between MDL and PQL, "<" -- Less than detection limit

Instantaneous Flow Measurements Report
NPDES14 - NPDES 014 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
10/13/2015	12:20:00	MANF	INS				0.00	0.00	0.00
11/03/2015	09:05:00	MANF	INS				0.00	0.00	0.00
12/09/2015	12:35:00	MANF	INS				0.00	0.00	0.00
01/13/2016	10:20:00	MANF	INS				0.00	0.00	0.00
02/03/2016	08:40:00	MANF	INS				0.00	0.00	0.00
03/03/2016	15:10:00	MANF	INS				0.00	0.00	0.00
04/21/2016	11:35:00	MANF	INS				0.13	60.00	0.09
05/03/2016	17:05:00	MANF	INS				0.13	57.42	0.08
06/21/2016	13:05:00	MANF	INS				0.00	0.00	0.00
07/05/2016	16:10:00	MANF	INS				0.00	0.00	0.00
08/01/2016	15:10:00	MANF	INS				0.00	0.00	0.00
09/06/2016	16:00:00	MANF	INS				0.00	0.00	0.00

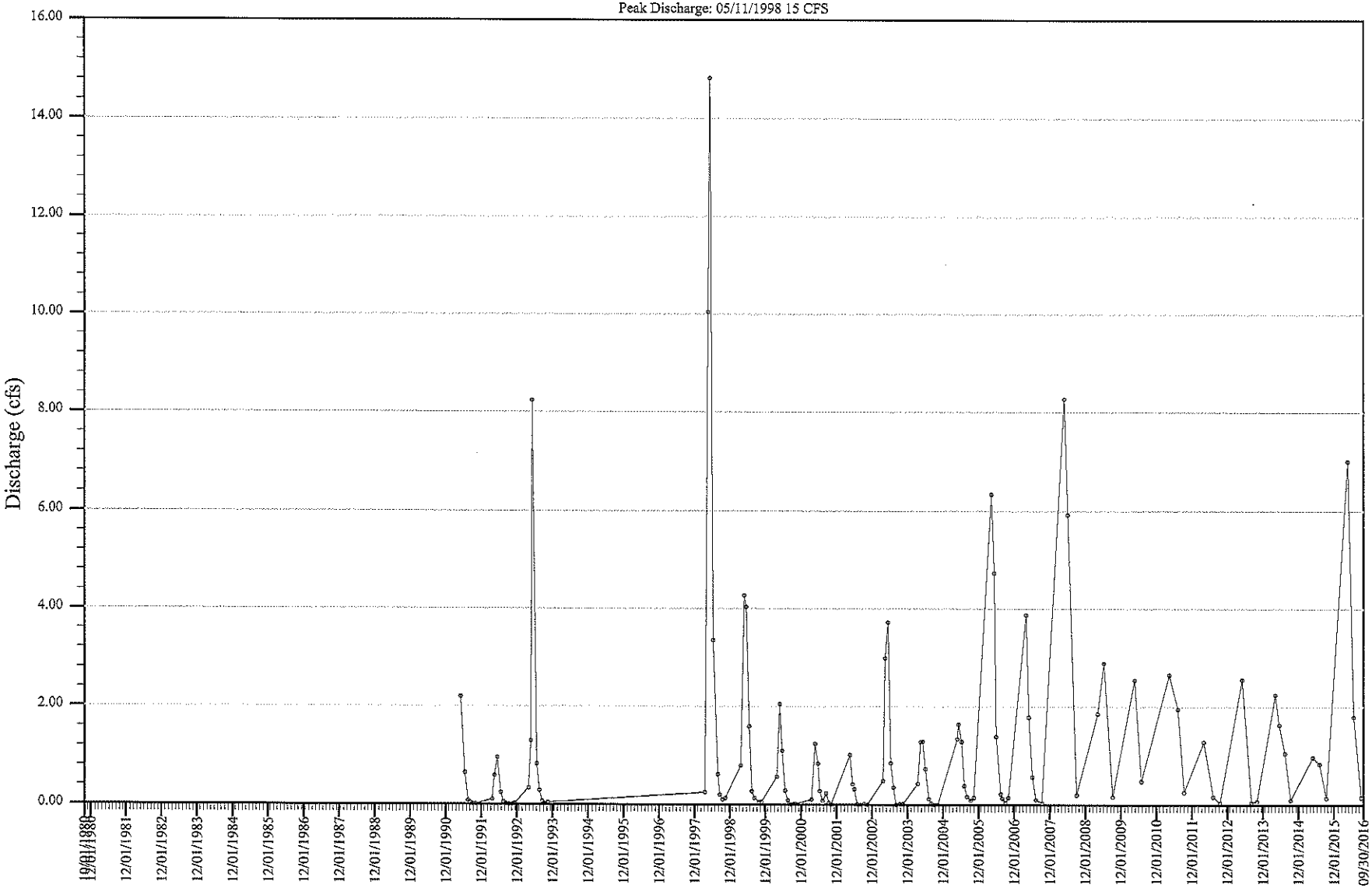
NPDES14 Sample Remarks
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
06/21/2016-13:05	NO FLOW
07/05/2016-16:10	NO FLOW
08/01/2016-15:10	NO FLOW
09/06/2016-16:00	NO FLOW


Solids, Dissolved (MG/L)
1812.0
1510.0
1208.0
906.0
604.0
302.0
-0.0
LOWESS(1.00)
04/12/2006
06/01/2006
12/01/2006
06/01/2007
12/01/2007
06/01/2008
12/01/2008
06/01/2009
12/01/2009
06/01/2010
12/01/2010
06/01/2011
12/01/2011
06/01/2012
12/01/2012
06/01/2013
12/01/2013
06/01/2014
12/01/2014
06/01/2015
12/01/2015
05/03/2016
24 samples
NPDES14

Discharge Hydrograph

Peak Discharge: 05/11/1998 15 CFS



YSS2

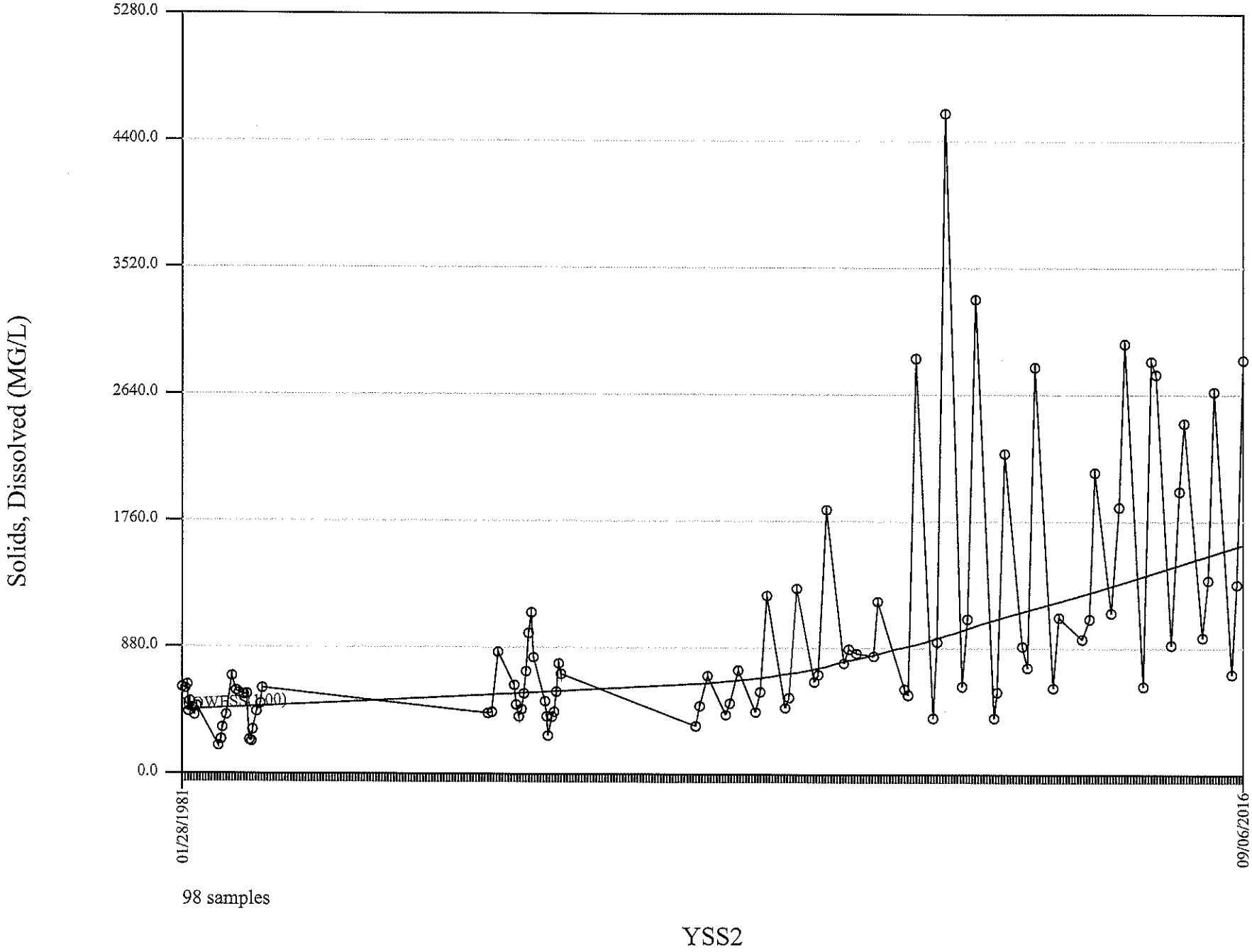
Extended Water Quality Report
YSS2
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	04/21/2016 10:10	06/21/2016 12:45	09/06/2016 15:10
Field Parameters				
Field Ph	S.U.	7.4500	7.9700	7.8500
Temperature	C	9.0000	20.3000	16.5000
Field Conductivity	UMHOS/CM	1100.0000	1450.0000	3200.0000
Flow	CFS	7.0071	1.7958	0.1540
Laboratory Parameters				
Mercury, Total	UG/L	< 0.2000	< 0.2000	
Ammonia Nitrogen_N	MG/L	< 0.0500	< 0.0500	
Nitrate Nitrogen_N	MG/L	0.4800	0.1700	
Nitrite Nitrogen_N	MG/L	< 0.0100	< 0.0100	
Nitrate/Nitrite Nitrogen_N	MG/L	0.4800	0.1700	
Selenium, Dissolved	UG/L	1.3000	0.9000	0.8000
Solids, Dissolved	MG/L	694.0000	1320.0000	2880.0000
Solids, Suspended	MG/L	B 11.0000	B 14.0000	< 5.0000
Sulfate	MG/L	337.0000	669.0000	
Sulfide	MG/L	< 0.0200	< 0.0200	
Iron, Total Rec.	MG/L	0.8100	0.5400	0.4800
Selenium, Total Rec.	UG/L	1.2000	0.8000	0.9000
Manganese, Pot. Diss.	MG/L	0.0470	0.0273	0.0360
Selenium, Pot. Diss.	UG/L	1.3000	0.8000	1.0000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

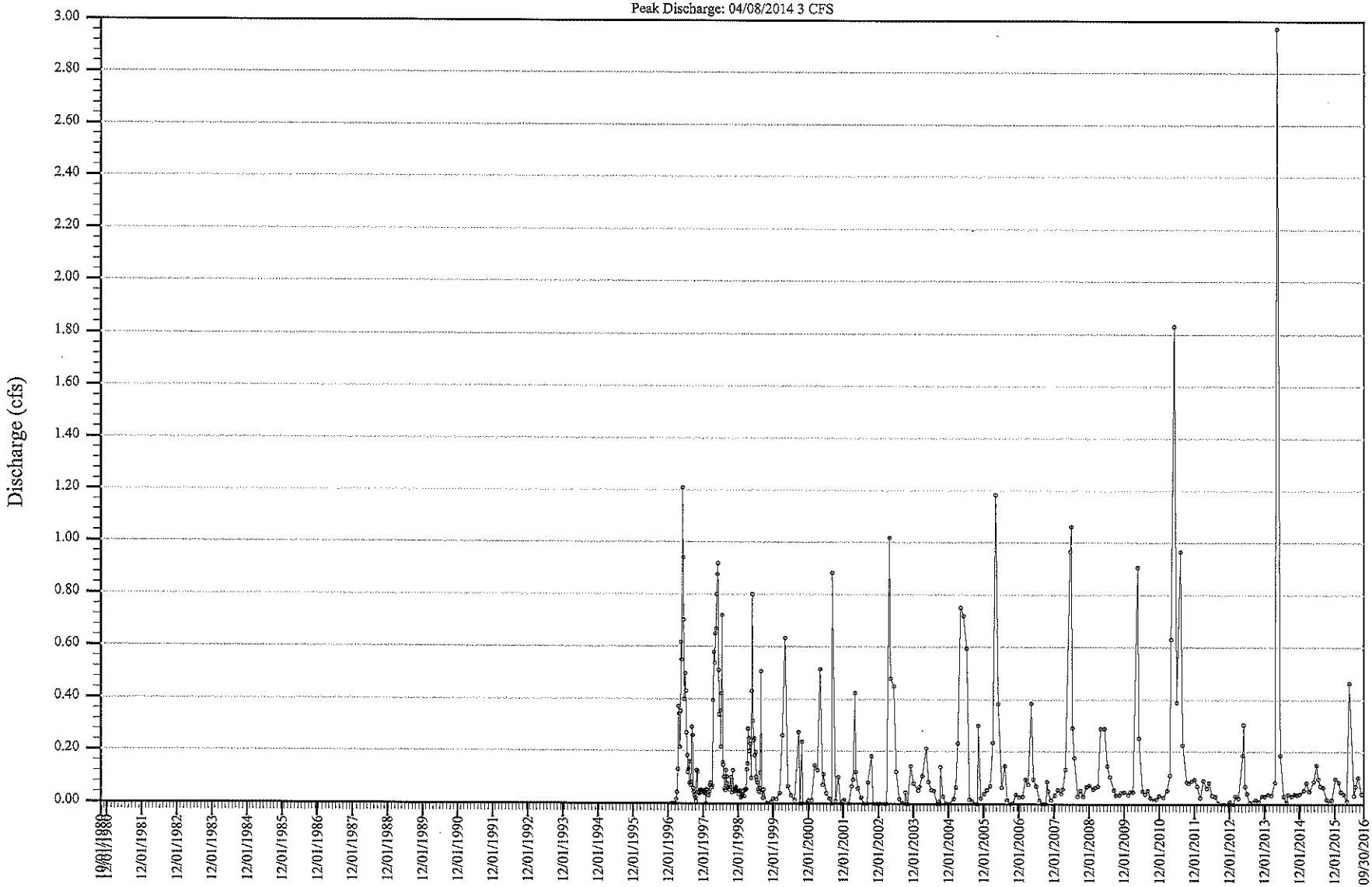
Instantaneous Flow Measurements Report
YSS2
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
04/21/2016	10:10:00	MANF	INS				7.01	3145.00	4.53
06/21/2016	12:45:00	MANF	INS				1.80	806.00	1.16
09/06/2016	15:10:00	MANF	INS				0.15	69.10	0.10


Solids, Dissolved (MG/L)
5280.0
4400.0
3520.0
2640.0
1760.0
880.0
0.0
01/28/1981
09/06/2016
98 samples
YSS2

Discharge Hydrograph

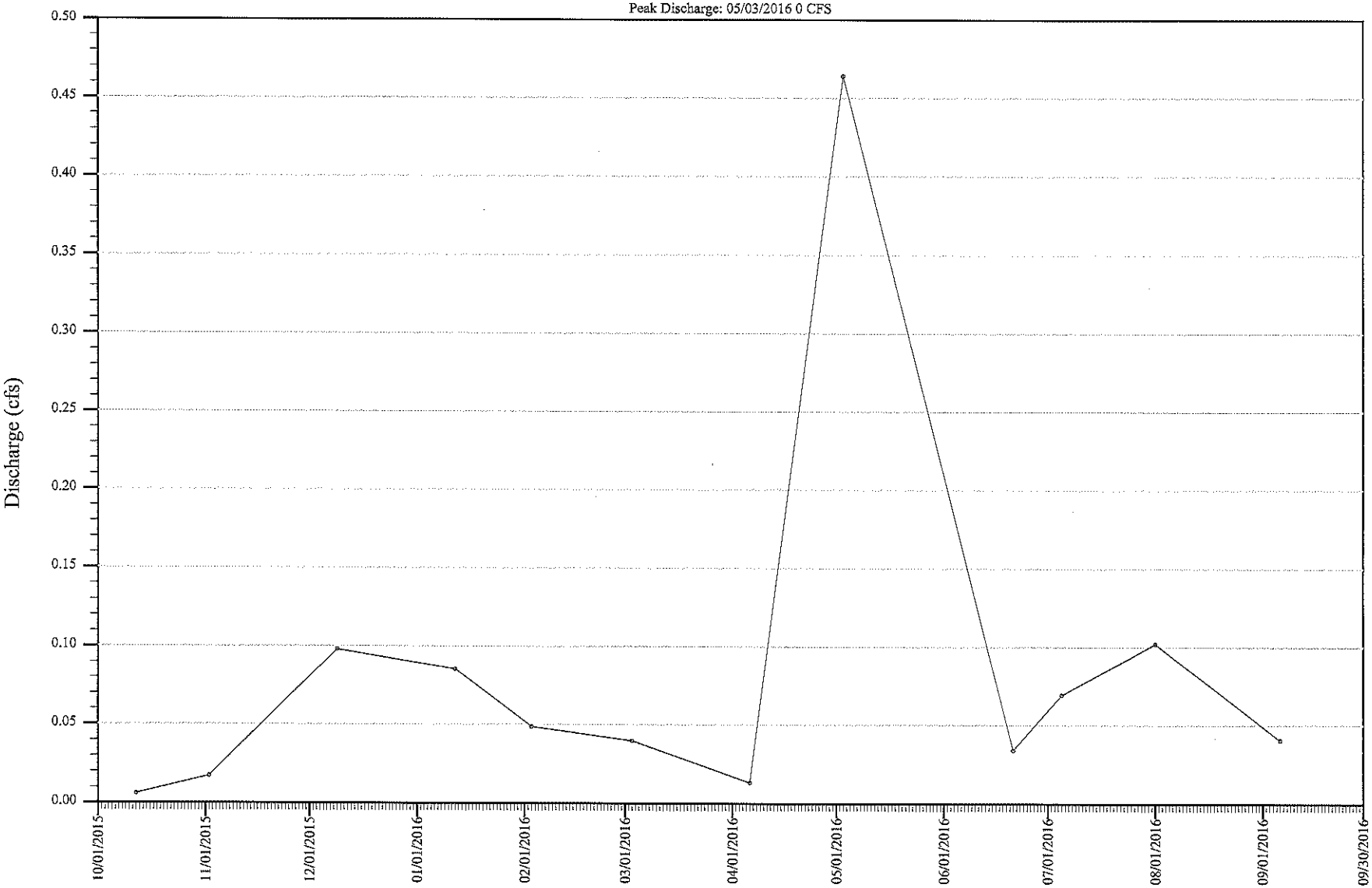
Peak Discharge: 04/08/2014 3 CFS



NPDES10

Discharge Hydrograph

Peak Discharge: 05/03/2016 0 CFS



NPDES10

Extended Water Quality Report
NPDES10 - NPDES 010 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	10/12/2015 14:10	11/02/2015 10:50	12/09/2015 08:55	01/12/2016 12:00	02/03/2016 11:00	03/03/2016 07:30	04/06/2016 07:00	05/03/2016 12:30	06/21/2016 14:00
Field Parameters										
Field Ph	S.U.	7.7500	8.1300	8.1300	7.8300	7.1900	7.0400	7.7000	7.7300	7.2100
Temperature	C	15.2000	9.2000	2.6000	0.5000	1.3000	1.8000	4.2000	12.8000	24.5000
Field Conductivity	UMHOS/CM	3100.0000	3130.0000	3210.0000	3230.0000	3270.0000	3030.0000	2260.0000	2220.0000	2280.0000
Flow	CFS	0.0060	0.0174	0.0980	0.0854	0.0486	0.0398	0.0134	0.4642	0.0341
Laboratory Parameters										
Solids, Dissolved	MG/L	2690.0000	2700.0000	2720.0000	2680.0000	2760.0000	2560.0000	1820.0000	1790.0000	2340.0000
Solids, Settleable	ML/L	< 0.4000								
Iron, Total Rec.	MG/L	B 0.0900	0.0800	B 0.0500	0.1500	B 0.0500	0.1700	0.2000	B 0.0500	B 0.1000
Selenium, Total Rec.	UG/L	< 0.2000	< 0.2000	B 0.3000	0.4000	< 0.5000	B 0.3000	0.7000	0.5000	B 0.3000
Copper, Pot. Diss.	UG/L	< 1.0000	< 1.0000	< 1.0000	< 0.5000	< 1.0000	< 0.5000	B 0.6000	B 0.7000	< 1.0000
Selenium, Pot. Diss.	UG/L	B 0.3000	< 0.2000	< 0.2000	0.4000	149.0000	0.7000	0.7000	0.5000	B 0.3000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

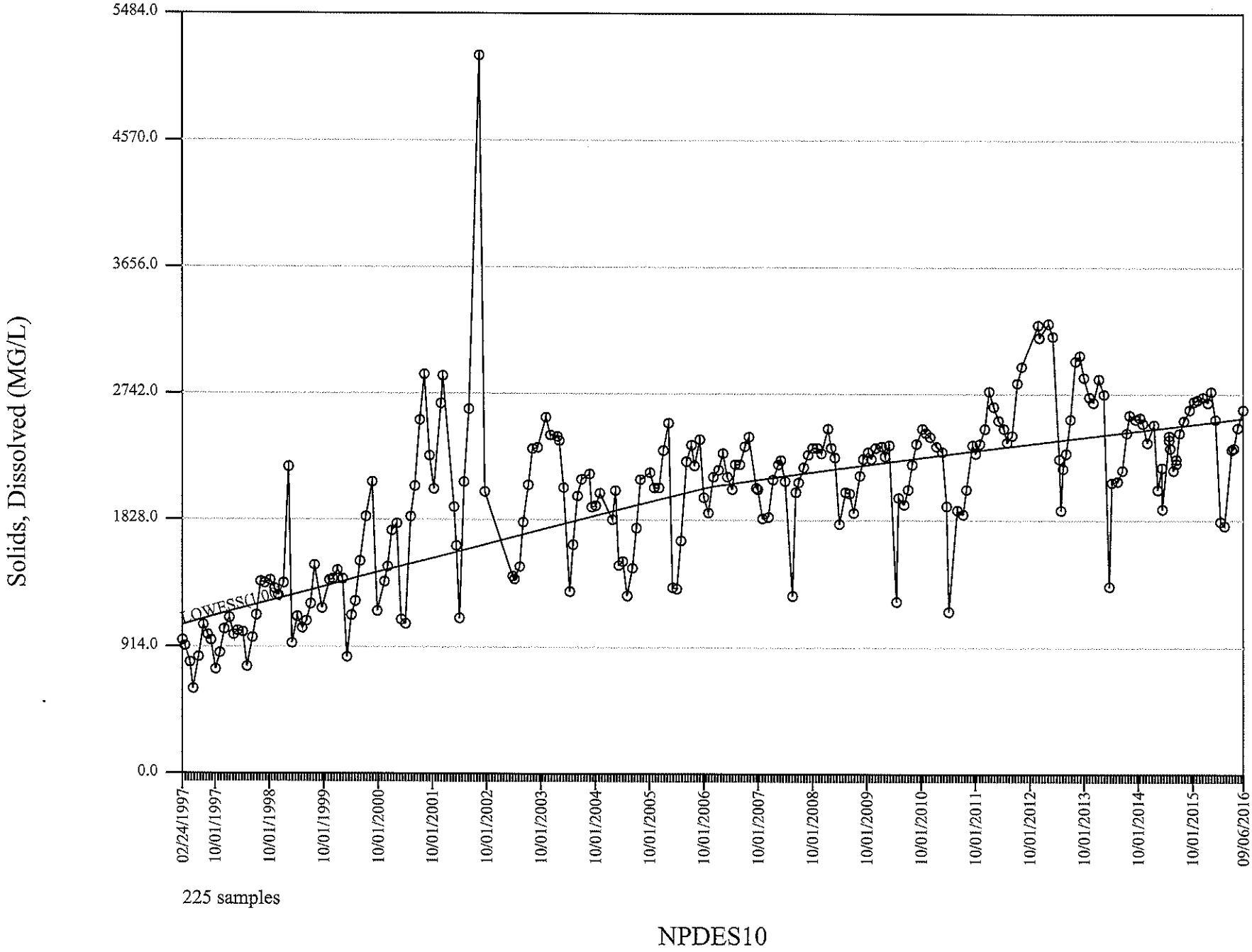
Extended Water Quality Report
NPDES10 - NPDES 010 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	07/05/2016 13:15	08/01/2016 12:20	09/06/2016 13:10
Field Parameters				
Field Ph	S.U.	7.4800	7.7000	7.6800
Temperature	C	22.7000	21.5000	17.4000
Field Conductivity	UMHOS/CM	2700.0000	2890.0000	3020.0000
Flow	CFS	0.0693	0.1023	0.0406
Laboratory Parameters				
Solids, Dissolved	MG/L	2350.0000	2500.0000	2630.0000
Solids, Settleable	ML/L			
Iron, Total Rec.	MG/L	B 0.0900	B 0.0900	0.1800
Selenium, Total Rec.	UG/L	B 0.3000	B 0.3000	< 0.2000
Copper, Pot. Diss.	UG/L	< 1.0000	< 0.5000	< 1.0000
Selenium, Pot. Diss.	UG/L	< 0.2000	< 0.2000	B 0.3000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

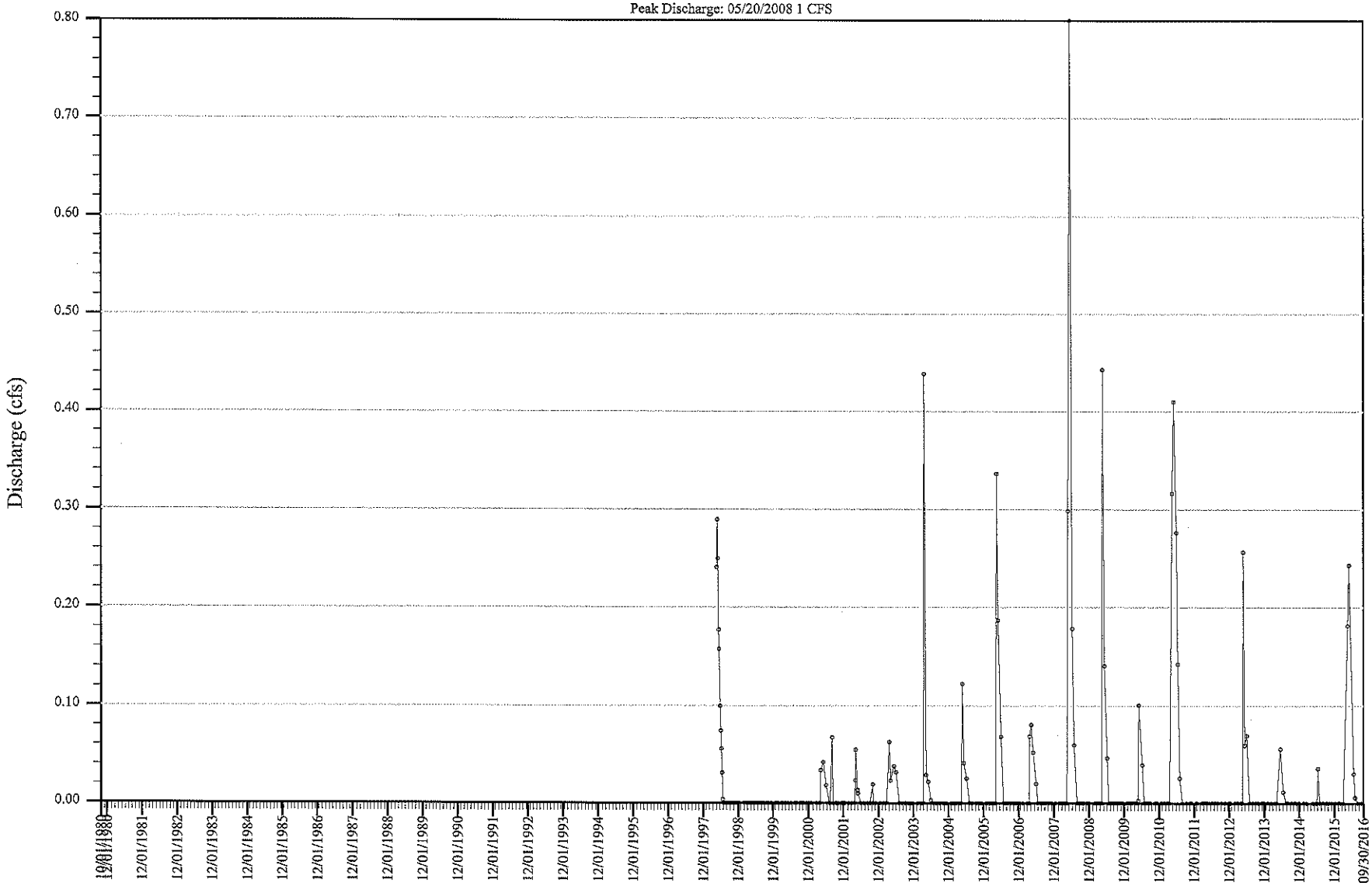
Instantaneous Flow Measurements Report
NPDES10 - NPDES 010 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
10/12/2015	14:10:00	MANF	INS				0.01	2.70	0.00
11/02/2015	10:50:00	MANF	INS				0.02	7.80	0.01
12/09/2015	08:55:00	MANF	INS				0.10	44.00	0.06
01/12/2016	12:00:00	MANF	INS				0.09	38.35	0.06
02/03/2016	11:00:00	MANF	INS				0.05	21.82	0.03
03/03/2016	07:30:00	MANF	INS				0.04	17.87	0.03
04/06/2016	07:00:00	MANF	INS				0.01	6.00	0.01
05/03/2016	12:30:00	MANF	INS				0.46	208.33	0.30
06/21/2016	14:00:00	MANF	INS				0.03	15.30	0.02
07/05/2016	13:15:00	MANF	INS				0.07	31.10	0.04
08/01/2016	12:20:00	MANF	INS				0.10	45.90	0.07
09/06/2016	13:10:00	MANF	INS				0.04	18.23	0.03


Solids, Dissolved (MG/L)
5484.0
4570.0
3656.0
2742.0
1828.0
914.0
0.0
LOWESS(1.0)
02/24/1997
10/01/1997
10/01/1998
10/01/1999
10/01/2000
10/01/2001
10/01/2002
10/01/2003
10/01/2004
10/01/2005
10/01/2006
10/01/2007
10/01/2008
10/01/2009
10/01/2010
10/01/2011
10/01/2012
10/01/2013
10/01/2014
10/01/2015
09/06/2016
225 samples
NPDES10

Discharge Hydrograph

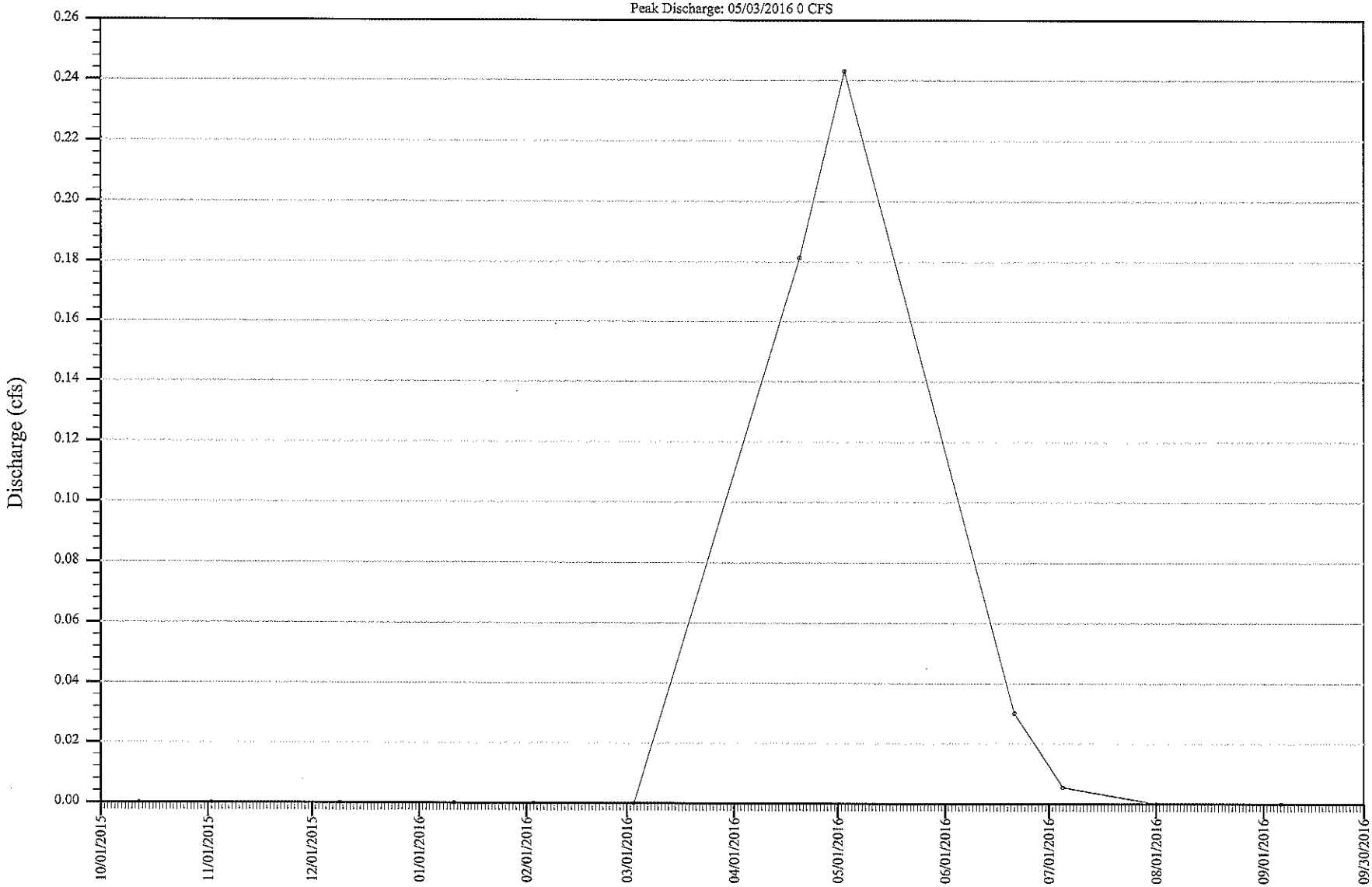
Peak Discharge: 05/20/2008 1 CFS



NPDES11

Discharge Hydrograph

Peak Discharge: 05/03/2016 0 CFS



NPDES11

Extended Water Quality Report
NPDES11 - NPDES 011 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	10/12/2015 14:50	11/02/2015 11:35	12/09/2015 13:10	01/11/2016 15:15	04/20/2016 14:15	05/03/2016 13:30	06/21/2016 14:30	07/05/2016 11:00
Field Parameters									
Field Ph	S.U.					7.7700	7.8400	7.4200	7.7200
Temperature	C					11.7000	13.7000	24.6000	21.7000
Field Conductivity	UMHOS/CM					1160.0000	1880.0000	1700.0000	1932.0000
Flow	CFS	0.0000	0.0000	0.0000	0.0000	0.1813	0.2431	0.0303	0.0056
Laboratory Parameters									
Mercury, Total	UG/L					0.0022			B 0.0004
Solids, Dissolved	MG/L					772.0000	1490.0000	1650.0000	1660.0000
Iron, Total Rec.	MG/L					0.2900	0.0700	< 0.0200	0.0800
Selenium, Total Rec.	UG/L					0.4000			0.4000
Cadmium, Pot. Diss.	UG/L					< 0.1000			< 0.1000
Chromium, Pot. Diss.	UG/L					< 0.5000			< 0.5000
Copper, Pot. Diss.	UG/L					< 0.5000			< 0.5000
Lead, Pot. Diss.	UG/L					< 0.1000			< 0.1000
Nickel, Pot. Diss.	UG/L					< 8.0000			< 8.0000
Selenium, Pot. Diss.	UG/L					0.4000			0.4000
Silver, Pot. Diss.	UG/L					B 0.0900			< 0.0500
Zinc, Pot. Diss.	MG/L					< 0.0100			B 0.0200

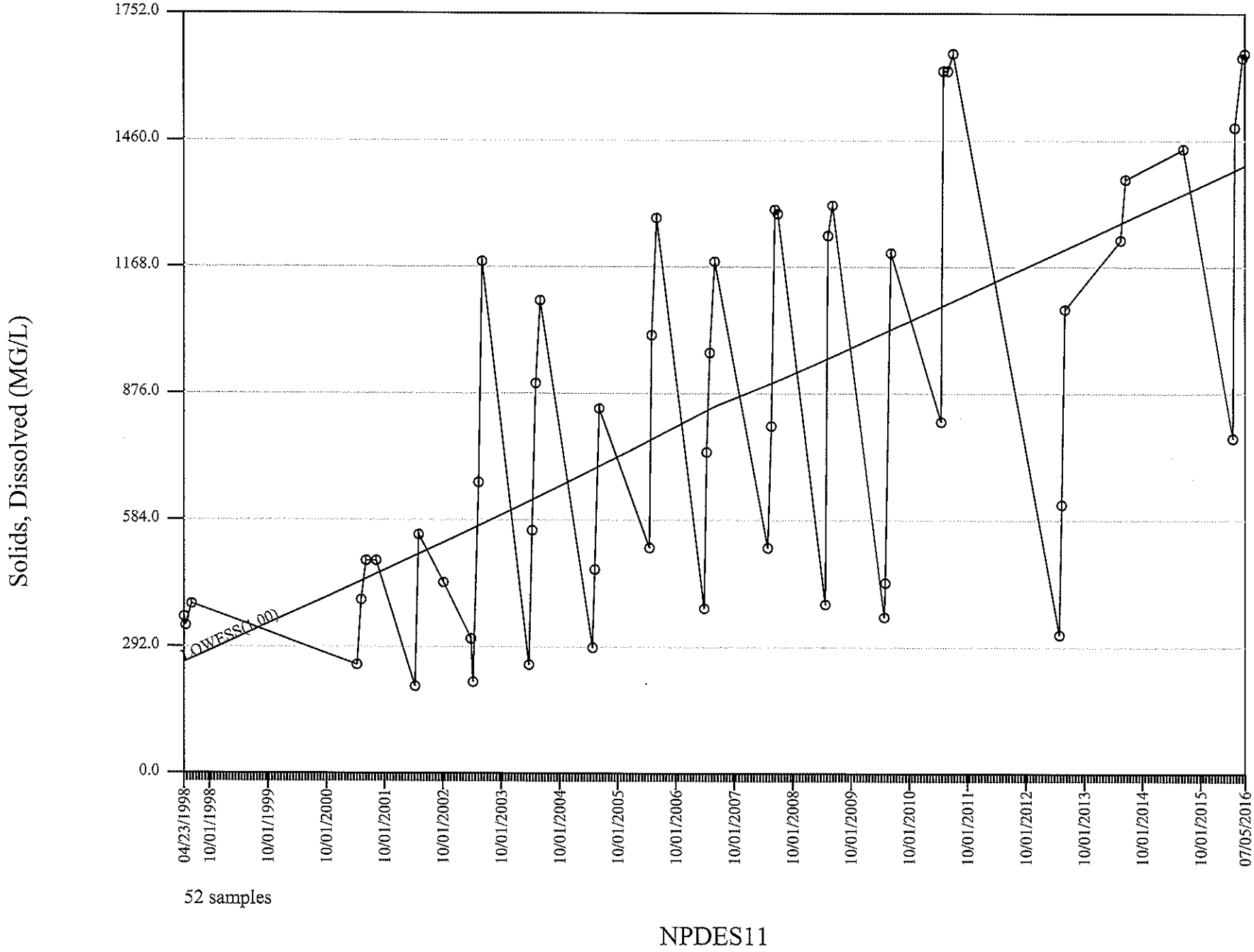
"B" -- Between MDL and PQL, "<" -- Less than detection limit

Instantaneous Flow Measurements Report
NPDES11 - NPDES 011 (YOAST)
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
10/12/2015	14:50:00	MANF	INS	Q			0.00	0.00	0.00
11/02/2015	11:35:00	MANF	INS	Q			0.00	0.00	0.00
12/09/2015	13:10:00	MANF	INS	Q			0.00	0.00	0.00
01/11/2016	15:15:00	MANF	INS	Q			0.00	0.00	0.00
02/03/2016	08:05:00	MANF	INS				0.00	0.00	0.00
03/03/2016	15:55:00	MANF	INS				0.00	0.00	0.00
04/20/2016	14:15:00	MANF	INS				0.18	81.39	0.12
05/03/2016	13:30:00	MANF	INS				0.24	109.09	0.16
06/21/2016	14:30:00	MANF	INS				0.03	13.58	0.02
07/05/2016	11:00:00	MANF	INS				0.01	2.50	0.00
08/01/2016	11:45:00	MANF	INS				0.00	0.00	0.00
09/06/2016	12:30:00	MANF	INS				0.00	0.00	0.00

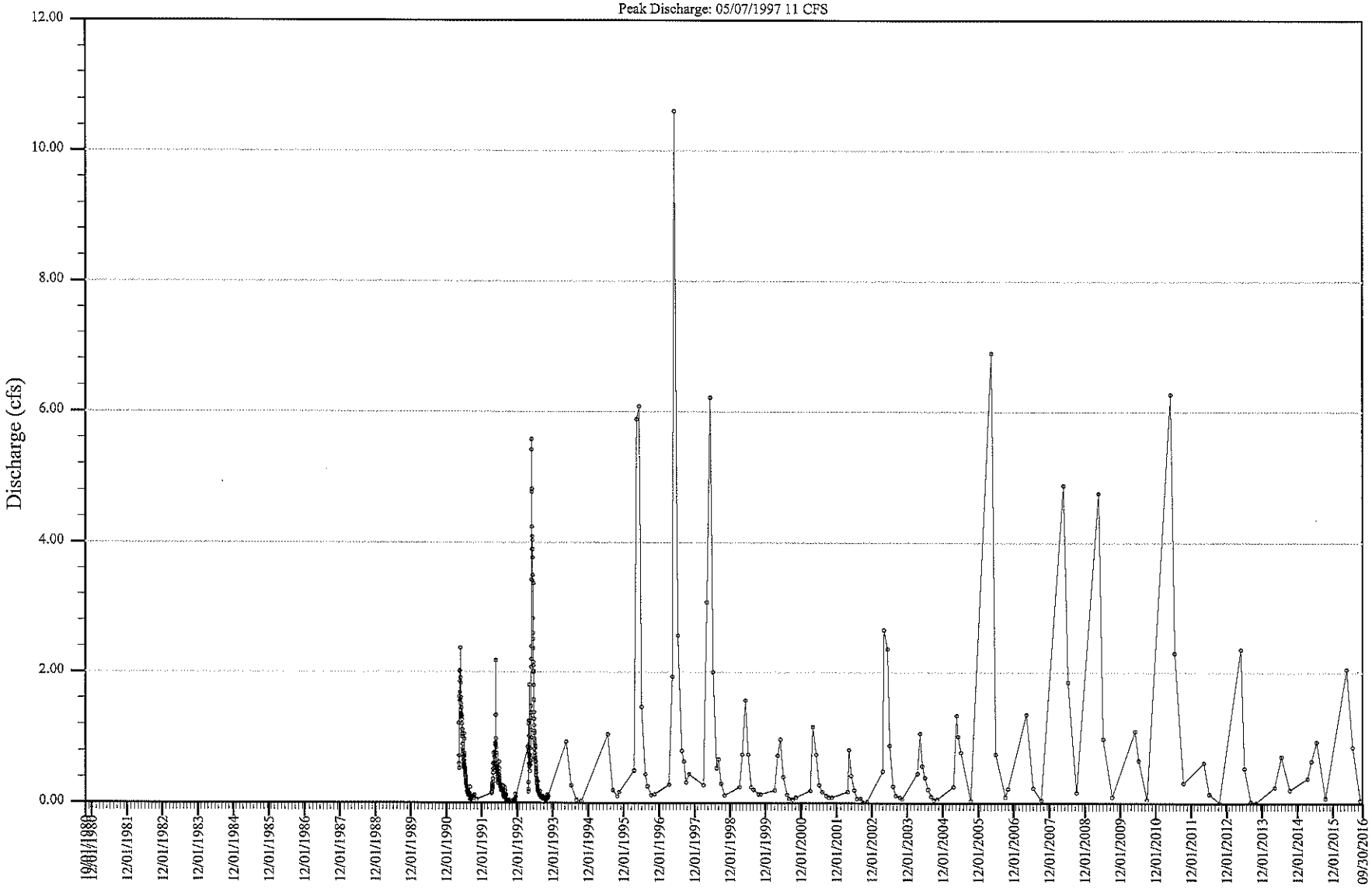
NPDES11 Sample Remarks
10/01/2015 to 09/30/2016

Remark Date-Time	Remark
08/01/2016-11:45	NO FLOW
09/06/2016-12:30	NO FLOW


Solids, Dissolved (MG/L)
1752.0
1460.0
1168.0
876.0
584.0
292.0
0.0
LOWESS(1.00)
04/23/1998
10/01/1998
10/01/1999
10/01/2000
10/01/2001
10/01/2002
10/01/2003
10/01/2004
10/01/2005
10/01/2006
10/01/2007
10/01/2008
10/01/2009
10/01/2010
10/01/2011
10/01/2012
10/01/2013
10/01/2014
10/01/2015
07/05/2016
52 samples
NPDES11

Discharge Hydrograph

Peak Discharge: 05/07/1997 11 CFS



YSGF5

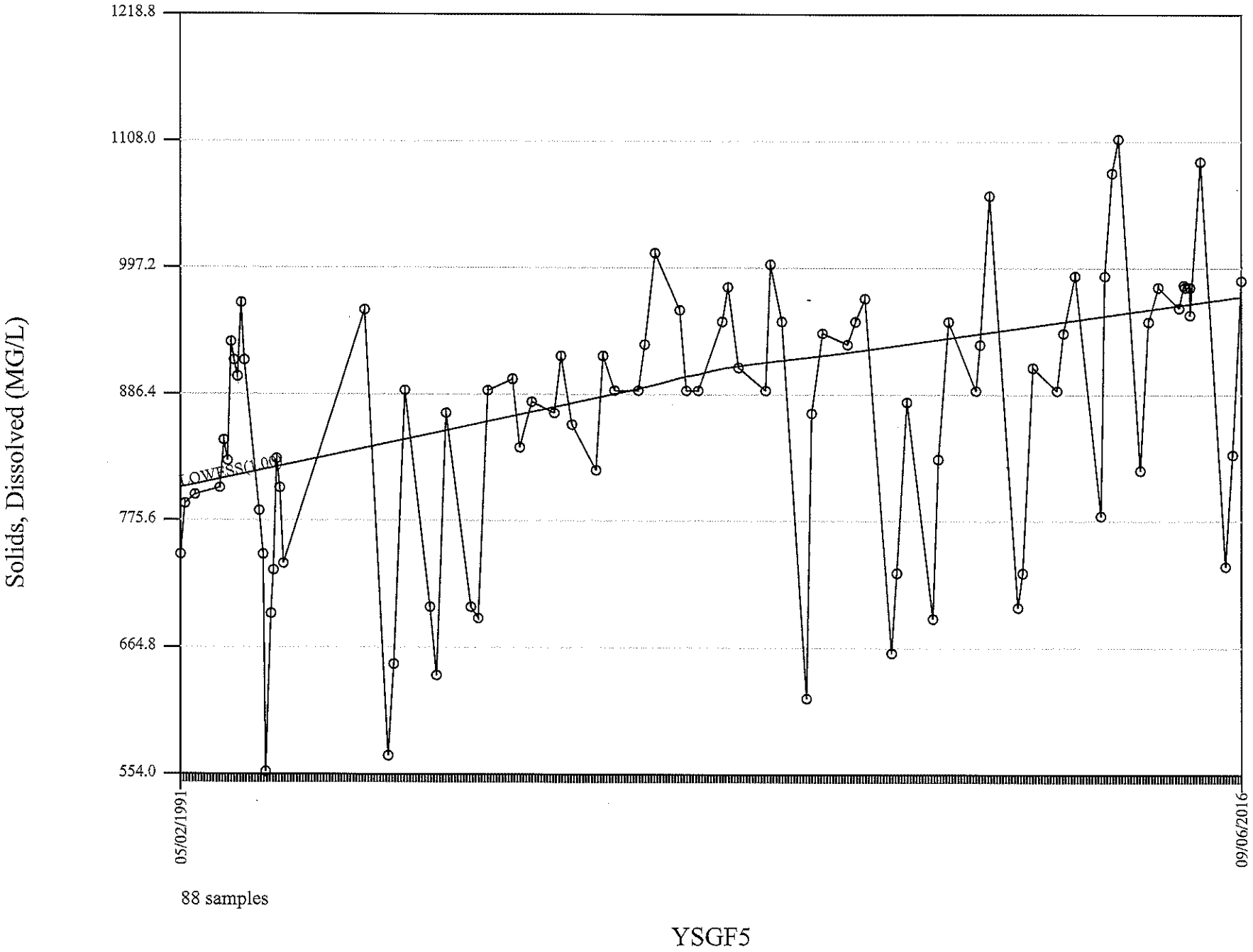
Extended Water Quality Report
YSGF5
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	04/20/2016 14:45	06/21/2016 14:45	09/06/2016 12:40
Field Parameters				
Field Ph	S.U.	7.8600	7.6100	8.2100
Temperature	C	10.3000	24.5000	18.7000
Field Conductivity	UMHOS/CM	1110.0000	1010.0000	1326.0000
Flow	CFS	2.0520	0.8596	0.0410
Laboratory Parameters				
Mercury, Total	UG/L	< 0.2000	< 0.2000	< 0.2000
Ammonia Nitrogen_N	MG/L	< 0.0500	< 0.0500	< 0.0500
Nitrate Nitrogen_N	MG/L	0.1400	B 0.1000	< 0.0200
Nitrite Nitrogen_N	MG/L	< 0.0100	< 0.0100	< 0.0100
Nitrate/Nitrite Nitrogen_N	MG/L	0.1400	B 0.1000	< 0.0200
Selenium, Dissolved	UG/L	0.9000	0.5000	B 0.2000
Solids, Dissolved	MG/L	736.0000	834.0000	986.0000
Solids, Suspended	MG/L	B 20.0000	113.0000	B 19.0000
Sulfate	MG/L	373.0000	354.0000	464.0000
Sulfide	MG/L	< 0.0200	< 0.0200	< 0.0200
Iron, Total Rec.	MG/L	1.4600	2.3300	0.8200
Selenium, Total Rec.	UG/L	0.8000	0.6000	B 0.3000
Manganese, Pot. Diss.	MG/L	0.0682	0.0381	0.0446
Selenium, Pot. Diss.	UG/L	0.8000	0.4000	B 0.3000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

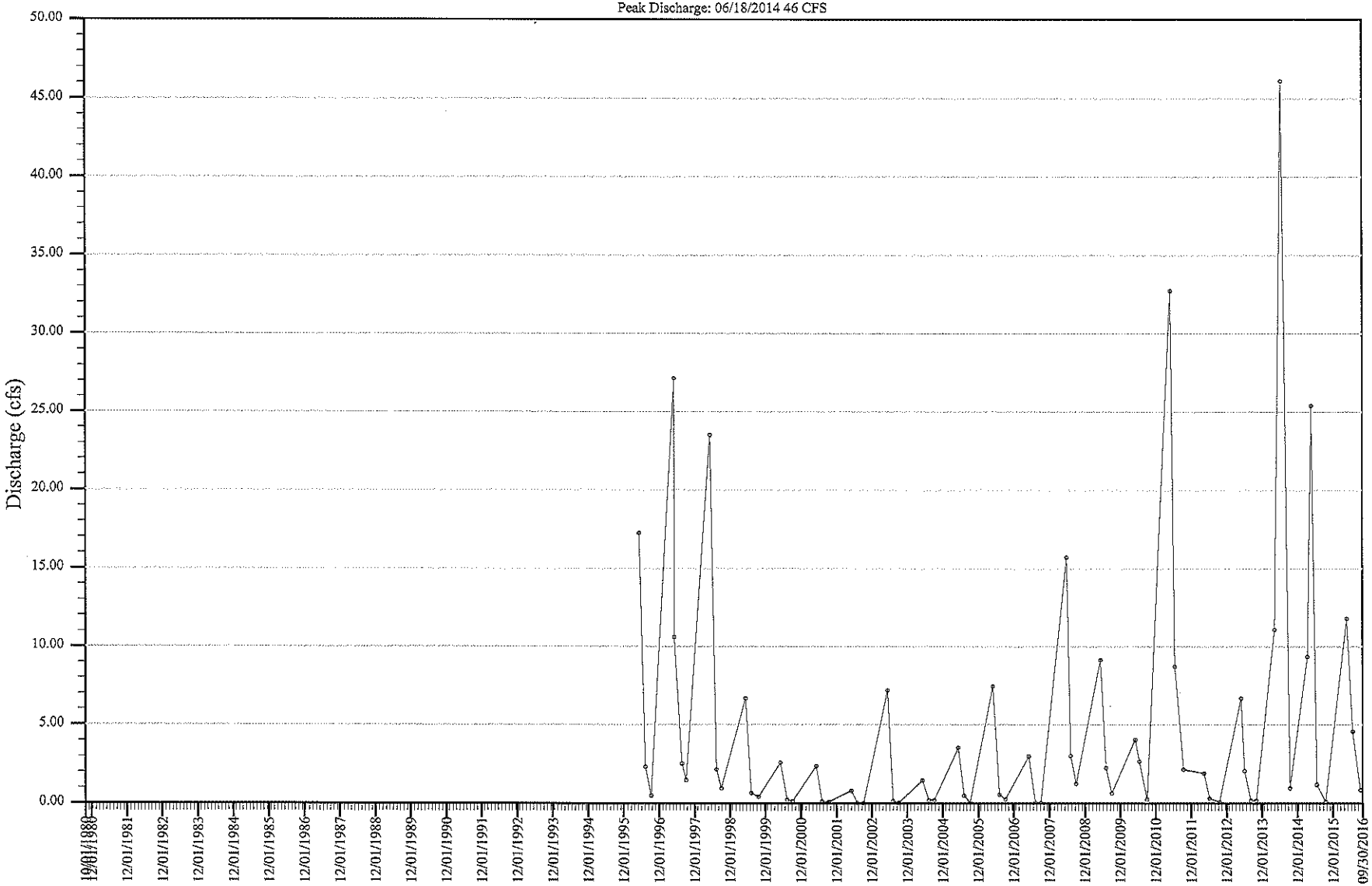
Instantaneous Flow Measurements Report
YSGF5
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
04/20/2016	14:45:00	MANF	INS				2.05	921.00	1.33
06/21/2016	14:45:00	MANF	INS				0.86	385.80	0.56
09/06/2016	12:40:00	MANF	INS				0.04	18.40	0.03


1218.8
1108.0
997.2
886.4
775.6
664.8
554.0
Solids, Dissolved (MG/L)
LOWESS(1.0)
05/02/1991
09/06/2016
88 samples
YSGF5

Discharge Hydrograph

Peak Discharge: 06/18/2014 46 CFS



YSG5

Extended Water Quality Report
YSG5
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	04/20/2016 13:25	06/20/2016 13:20	09/06/2016 12:00
Field Parameters				
Field Ph	S.U.	7.9900	7.8200	7.9500
Temperature	C	11.7000	26.1000	16.4000
Field Conductivity	UMHOS/CM	1760.0000	2780.0000	3590.0000
Flow	CFS	11.7906	4.5875	0.8564
Laboratory Parameters				
Alk As CaCO3, Ph 4.5	MG/L	174.0000	292.0000	300.0000
Alk, Bicarb As CaCO3	MG/L	163.0000	269.0000	292.0000
Alk, Carb As CaCO3	MG/L	B 10.0000	22.6000	B 7.4000
Alk, Hydrox As CaCO3	MG/L	< 2.0000	< 2.0000	< 2.0000
Boron, Dissolved	UG/L	120.0000	180.0000	220.0000
Cadmium, Dissolved	UG/L	< 0.1000	< 0.2000	< 0.2000
Calcium, Dissolved	MG/L	121.0000	248.0000	318.0000
Chloride	MG/L	12.4000	16.1000	24.1000
Chromium, Dissolved	UG/L	< 0.5000	< 1.0000	< 1.0000
Conductivity	UMS/CM2	1550.0000	2530.0000	3300.0000
Copper, Dissolved	UG/L	B 1.5000	< 1.0000	< 1.0000
Hardness As CaCO3	MG/L	759.0000	1540.0000	2120.0000
Lead, Dissolved	UG/L	< 0.1000	< 0.2000	< 0.2000
Magnesium, Dissolved	MG/L	111.0000	223.0000	321.0000
Manganese, Dissolved	MG/L	B 0.0150	B 0.0500	0.0800
Mercury, Total	UG/L	< 0.2000	< 0.2000	< 0.2000
Nickel, Dissolved	UG/L	< 8.0000	< 20.0000	< 20.0000
Ammonia Nitrogen_N	MG/L	< 0.0500	< 0.0500	< 0.0500
Nitrate Nitrogen_N	MG/L	0.9100	0.5100	B 0.0500
Nitrite Nitrogen_N	MG/L	B 0.0200	< 0.0100	< 0.0100
Nitrate/Nitrite Nitrogen_N	MG/L	0.9300	0.5200	B 0.0500
Ph At 25 Deg. Cent.	S.U.	8.5000	8.4000	8.3000
Potassium, Dissolved	MG/L	5.1000	6.6000	9.2000
Selenium, Dissolved	UG/L	4.2000	2.1000	1.1000
Silver, Dissolved	UG/L	< 0.0500	< 0.1000	< 0.1000
Sodium, Dissolved	MG/L	90.3000	73.1000	114.0000
Solids, Dissolved	MG/L	1260.0000	2490.0000	3190.0000
Solids, Suspended	MG/L	35.0000	34.0000	B 9.0000
Sulfate	MG/L	753.0000	1520.0000	1960.0000
Sulfide	MG/L	< 0.0200	< 0.0200	< 0.0200
Zinc, Dissolved	MG/L	< 0.0100	B 0.0800	< 0.0200
Bicarbonate As HCO3	MG/L	199.0000	328.0000	357.0000
Carbonate As CO3	MG/L	B 6.0000	B 13.6000	B 4.5000
Hydroxide As OH	MG/L	< 2.0000	< 2.0000	< 2.0000
Cation_Anion Balance	PERCENT	< -2.6000	< -5.6000	< 0.0000
Sar	RATIO	1.4000	0.8200	1.1000
Solids, Diss. (Calc)	MG/L	1200.0000	2270.0000	2930.0000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

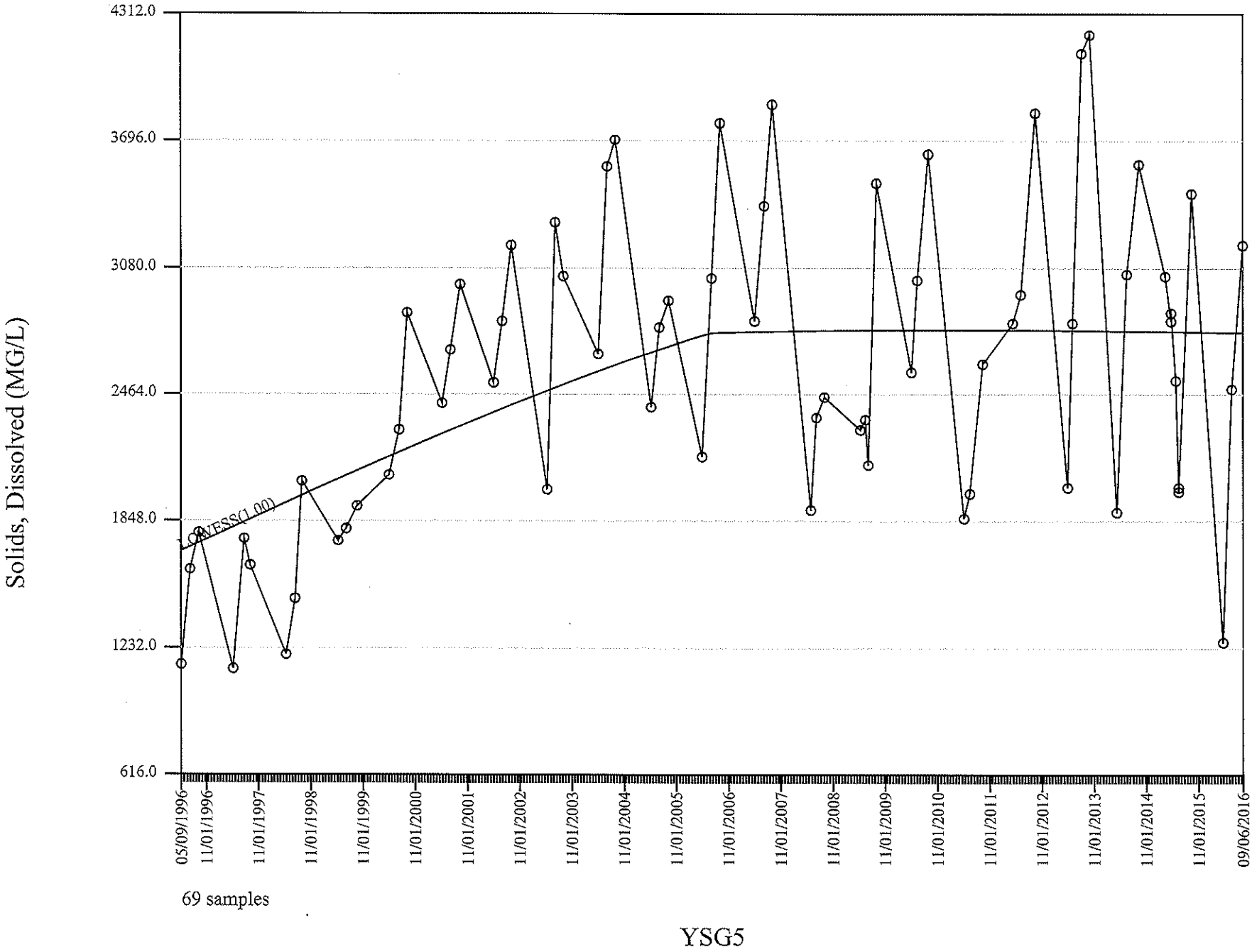
Extended Water Quality Report
YSG5
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	04/20/2016 13:25	06/20/2016 13:20	09/06/2016 12:00
Laboratory Parameters				
Sum Of Anions	MEQ/L	20.0000	38.0000	48.0000
Sum Of Cations	MEQ/L	19.0000	34.0000	48.0000
Arsenic, Total Rec.	UG/L	1.5000	1.3000	B 1.1000
Iron, Total Rec.	MG/L	2.5300	1.0700	0.3700
Selenium, Total Rec.	UG/L	4.0000	2.1000	1.3000
Tds Ratio	ANAL/CALC	1.0500	1.1000	1.0900

"B" -- Between MDL and PQL, "<" -- Less than detection limit

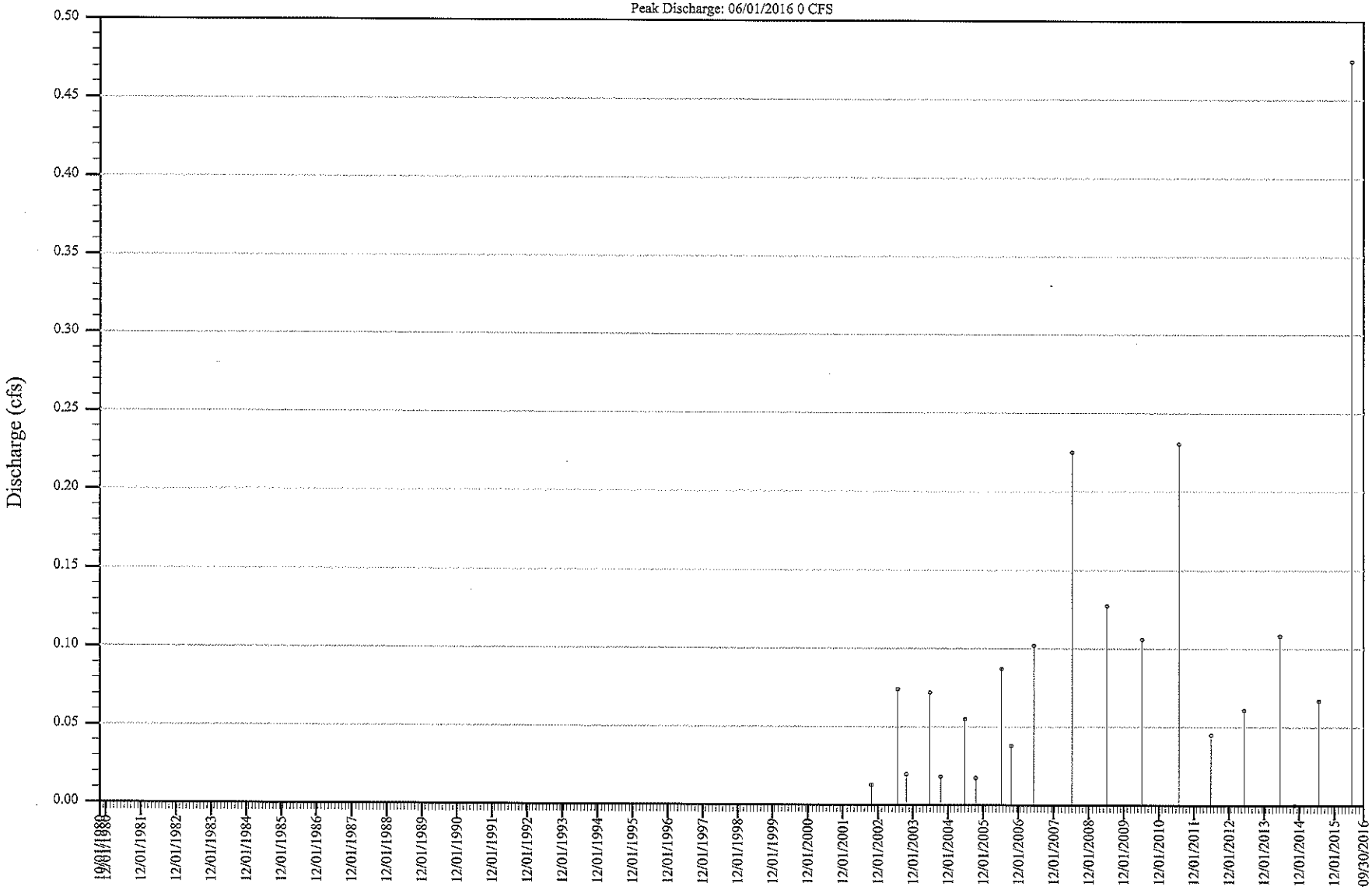
Instantaneous Flow Measurements Report
YSG5
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
04/20/2016	13:25:00	MANF	INS				11.79	5292.00	7.62
06/20/2016	13:20:00	MANF	INS				4.59	2059.00	2.96
09/06/2016	12:00:00	MANF	INS				0.86	384.40	0.55


Solids, Dissolved (MG/L)
4312.0
3696.0
3080.0
2464.0
1848.0
1232.0
616.0
LOWESS(1.00)
05/09/1996
11/01/1996
11/01/1997
11/01/1998
11/01/1999
11/01/2000
11/01/2001
11/01/2002
11/01/2003
11/01/2004
11/01/2005
11/01/2006
11/01/2007
11/01/2008
11/01/2009
11/01/2010
11/01/2011
11/01/2012
11/01/2013
11/01/2014
11/01/2015
09/06/2016
69 samples
YSG5

Discharge Hydrograph

Peak Discharge: 06/01/2016 0 CFS



YSSPG1

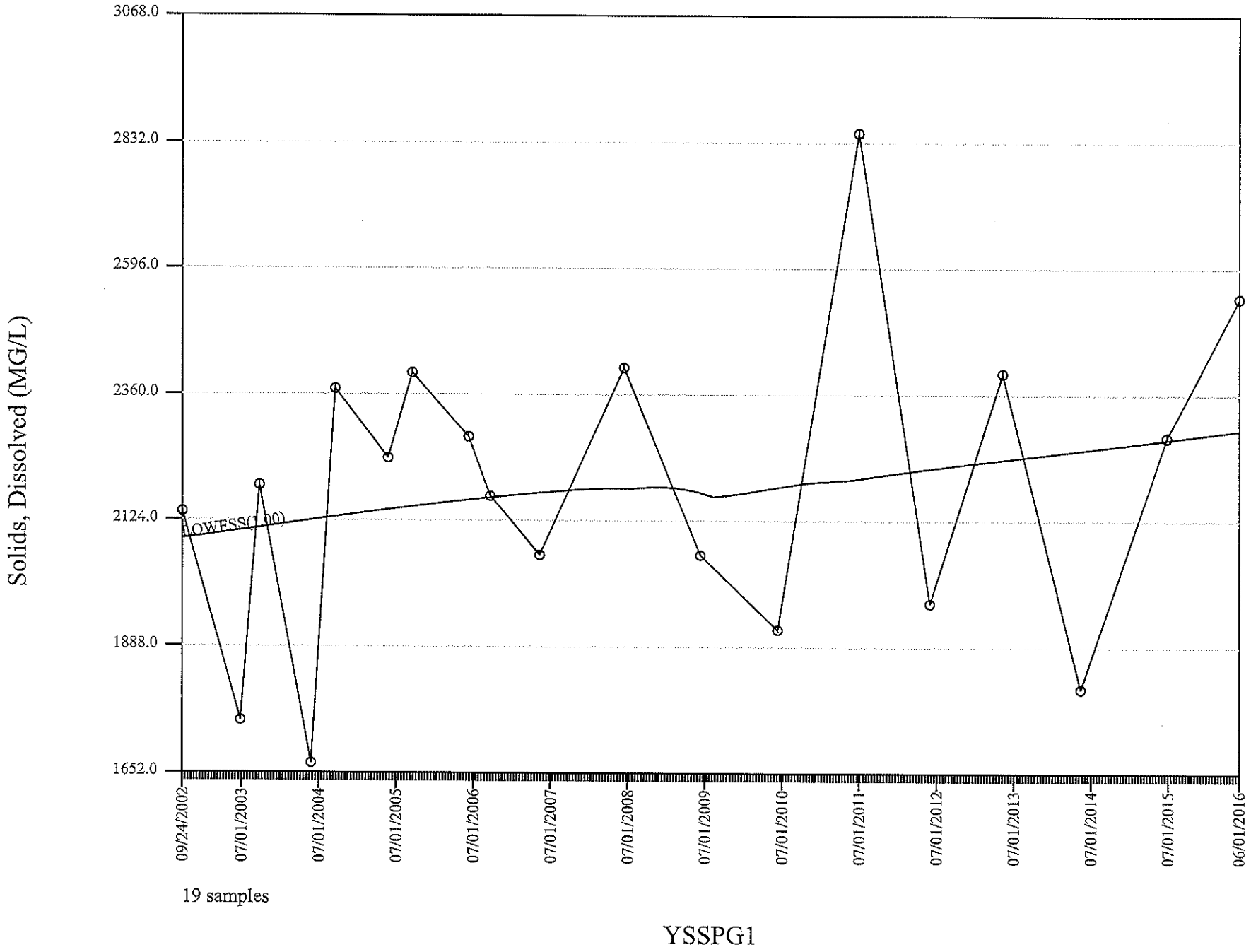
Extended Water Quality Report
YSSPG1 - SPOIL SPRING 1
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	06/01/2016 07:40
Field Parameters		
Field Ph	S.U.	7.5300
Temperature	C	9.3000
Field Conductivity	UMHOS/CM	2860.0000
Flow	GPM	213.0000
Laboratory Parameters		
Mercury, Total	UG/L	< 0.2000
Ammonia Nitrogen_N	MG/L	< 0.0500
Nitrate Nitrogen_N	MG/L	0.1500
Nitrite Nitrogen_N	MG/L	< 0.0100
Nitrate/Nitrite Nitrogen_N	MG/L	0.1500
Selenium, Dissolved	UG/L	< 0.2000
Solids, Dissolved	MG/L	2540.0000
Solids, Suspended	MG/L	< 5.0000
Sulfate	MG/L	1130.0000
Sulfide	MG/L	< 0.0200
Iron, Total Rec.	MG/L	B 0.0700
Selenium, Total Rec.	UG/L	B 0.2000
Manganese, Pot. Diss.	MG/L	0.3230
Selenium, Pot. Diss.	UG/L	B 0.3000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

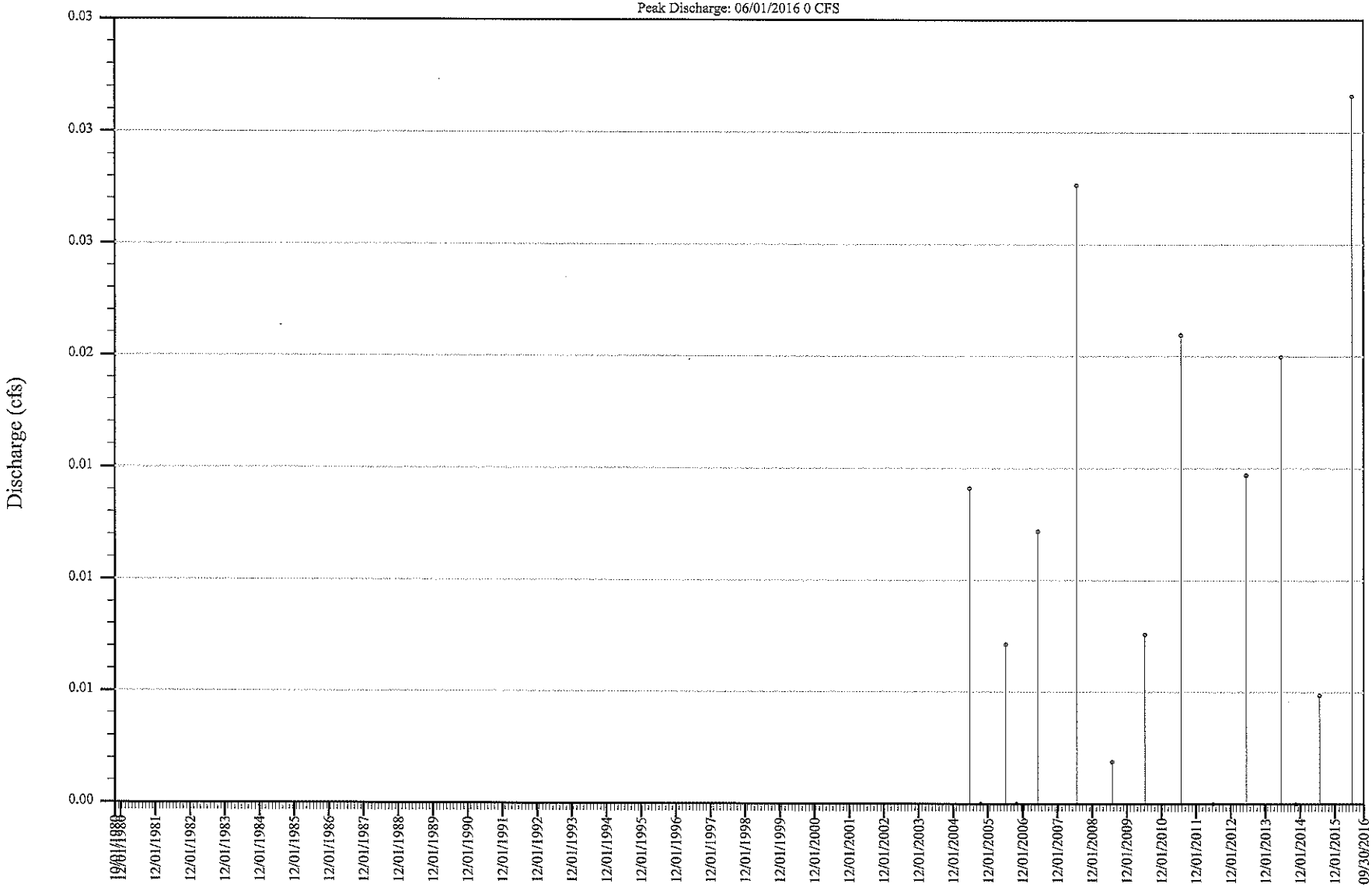
Instantaneous Flow Measurements Report
YSSPG1 - SPOIL SPRING 1
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
06/01/2016	07:40:00	MANF	INS				0.47	213.00	0.31


Solids, Dissolved (MG/L)
3068.0
2832.0
2596.0
2360.0
2124.0
1888.0
1652.0
LOWESS(1.00)
09/24/2002
07/01/2003
07/01/2004
07/01/2005
07/01/2006
07/01/2007
07/01/2008
07/01/2009
07/01/2010
07/01/2011
07/01/2012
07/01/2013
07/01/2014
07/01/2015
06/01/2016
19 samples
YSSPG1

Discharge Hydrograph

Peak Discharge: 06/01/2016 0 CFS



YSSPG2

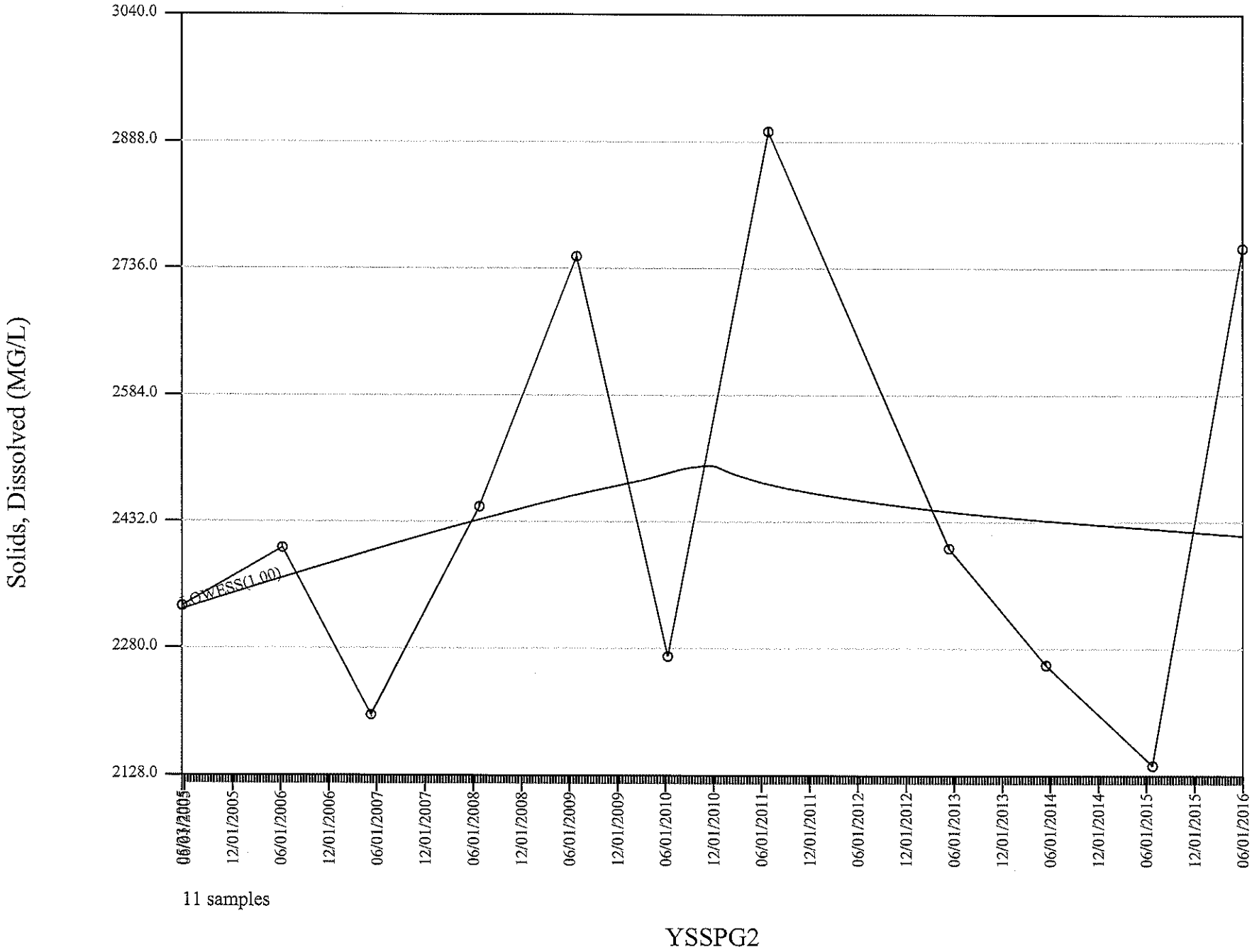
Extended Water Quality Report
YSSPG2 - SPOIL SPRING 2
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	06/01/2016 12:15
Field Parameters		
Field Ph	S.U.	6.9600
Temperature	C	14.2000
Field Conductivity	UMHOS/CM	2990.0000
Flow	GPM	14.2000
Laboratory Parameters		
Selenium, Dissolved	UG/L	< 0.2000
Solids, Dissolved	MG/L	2760.0000
Solids, Suspended	MG/L	< 5.0000
Iron, Total Rec.	MG/L	< 0.0400
Selenium, Total Rec.	UG/L	B 0.2000
Manganese, Pot. Diss.	MG/L	1.3200
Selenium, Pot. Diss.	UG/L	< 0.2000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

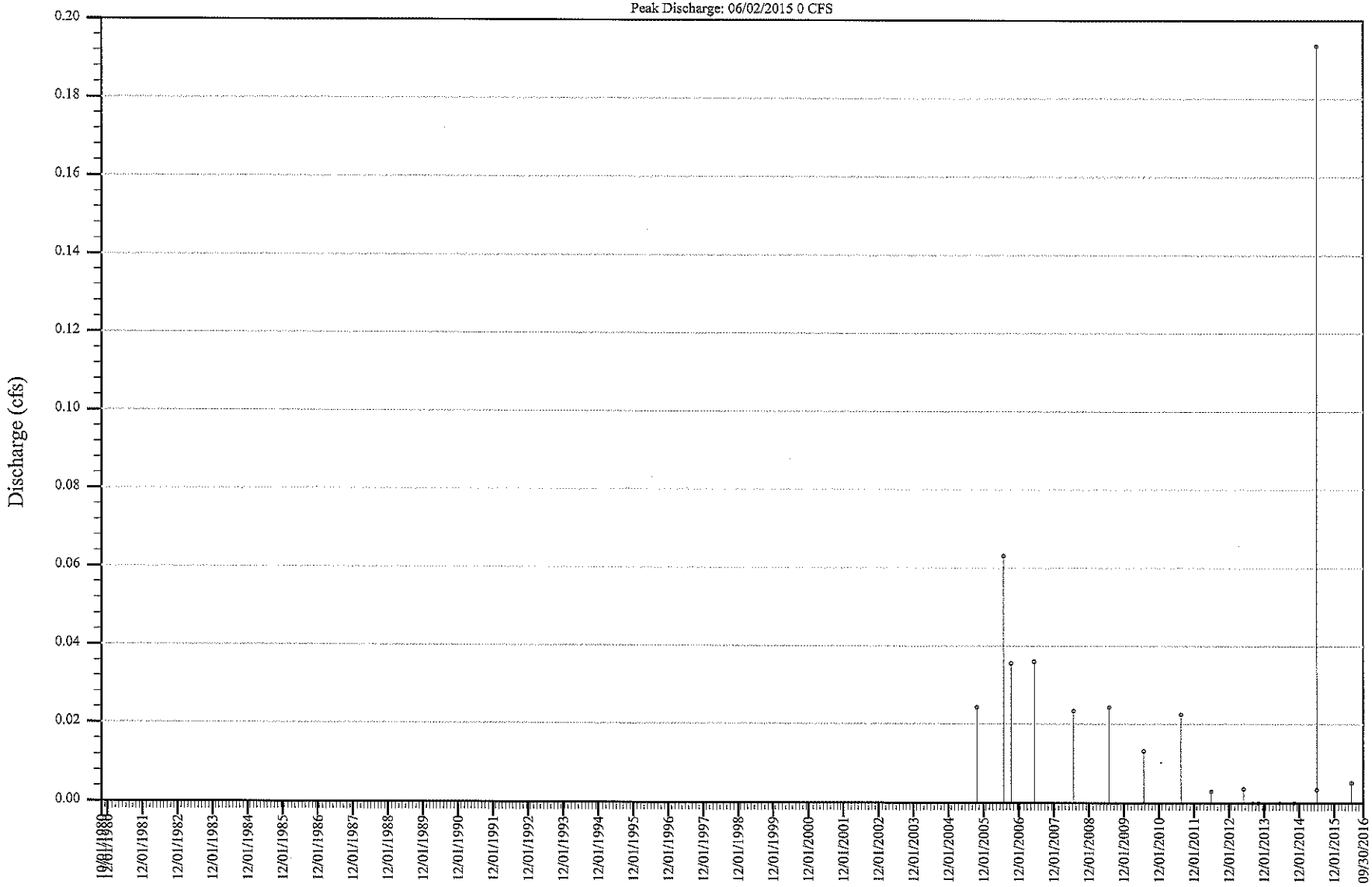
Instantaneous Flow Measurements Report
YSSPG2 - SPOIL SPRING 2
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
06/01/2016	12:15:00	MANF	INS				0.03	14.20	0.02


Solids, Dissolved (MG/L)
3040.0
2888.0
2736.0
2584.0
2432.0
2280.0
2128.0
LOWESS(1.00)
06/01/2005
12/01/2005
06/01/2006
12/01/2006
06/01/2007
12/01/2007
06/01/2008
12/01/2008
06/01/2009
12/01/2009
06/01/2010
12/01/2010
06/01/2011
12/01/2011
06/01/2012
12/01/2012
06/01/2013
12/01/2013
06/01/2014
12/01/2014
06/01/2015
12/01/2015
06/01/2016
11 samples
YSSPG2

Discharge Hydrograph

Peak Discharge: 06/02/2015 0 CFS



YSSPG3

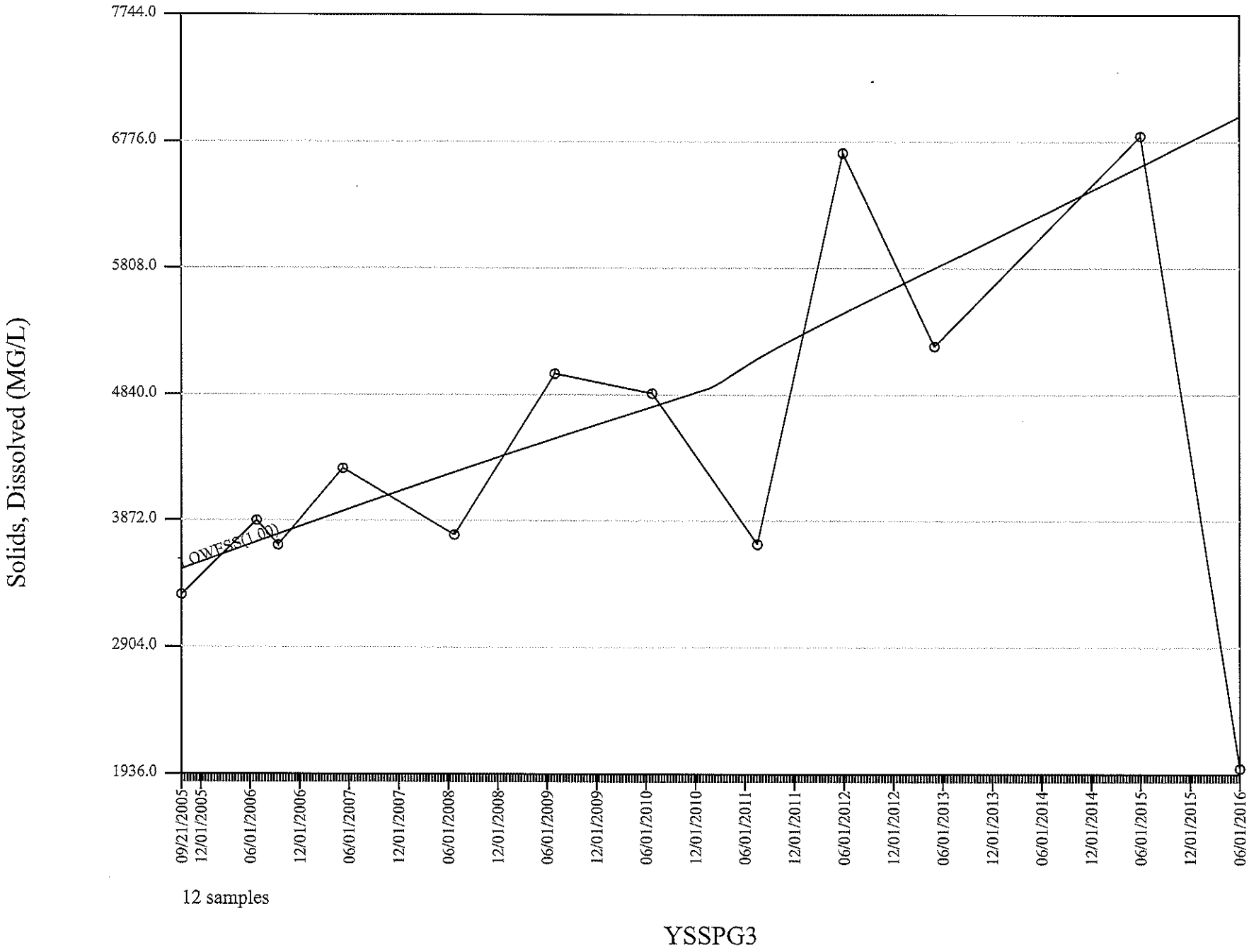
Extended Water Quality Report
YSSPG3 - SPOIL SPRING 3
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	06/01/2016 09:15
Field Parameters		
Field Ph	S.U.	7.1000
Temperature	C	10.8000
Field Conductivity	UMHOS/CM	3000.0000
Flow	GPM	2.3000
Laboratory Parameters		
Selenium, Dissolved	UG/L	1.6000
Solids, Dissolved	MG/L	1980.0000
Solids, Suspended	MG/L	< 5.0000
Iron, Total Rec.	MG/L	< 0.0200
Selenium, Total Rec.	UG/L	1.6000
Manganese, Pot. Diss.	MG/L	0.0072
Selenium, Pot. Diss.	UG/L	1.7000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

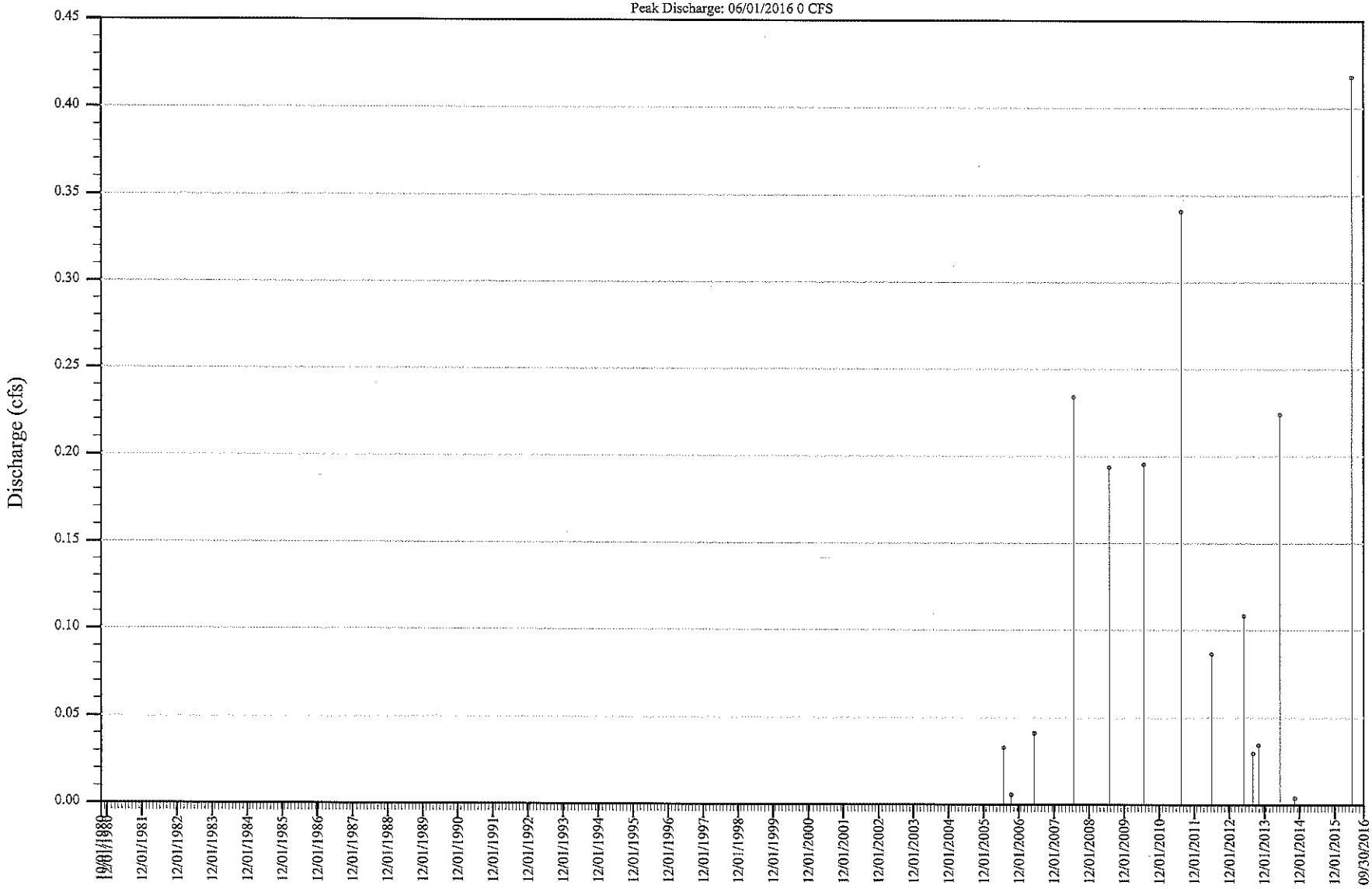
Instantaneous Flow Measurements Report
YSSPG3 - SPOIL SPRING 3
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
06/01/2016	09:15:00	MANF	INS				0.01	2.30	0.00


Solids, Dissolved (MG/L)
7744.0
6776.0
5808.0
4840.0
3872.0
2904.0
1936.0
OWFSS(1.00)
09/21/2005
12/01/2005
06/01/2006
12/01/2006
06/01/2007
12/01/2007
06/01/2008
12/01/2008
06/01/2009
12/01/2009
06/01/2010
12/01/2010
06/01/2011
12/01/2011
06/01/2012
12/01/2012
06/01/2013
12/01/2013
06/01/2014
12/01/2014
06/01/2015
12/01/2015
06/01/2016
12 samples
YSSPG3

Discharge Hydrograph

Peak Discharge: 06/01/2016 0 CFS



YSSPG4

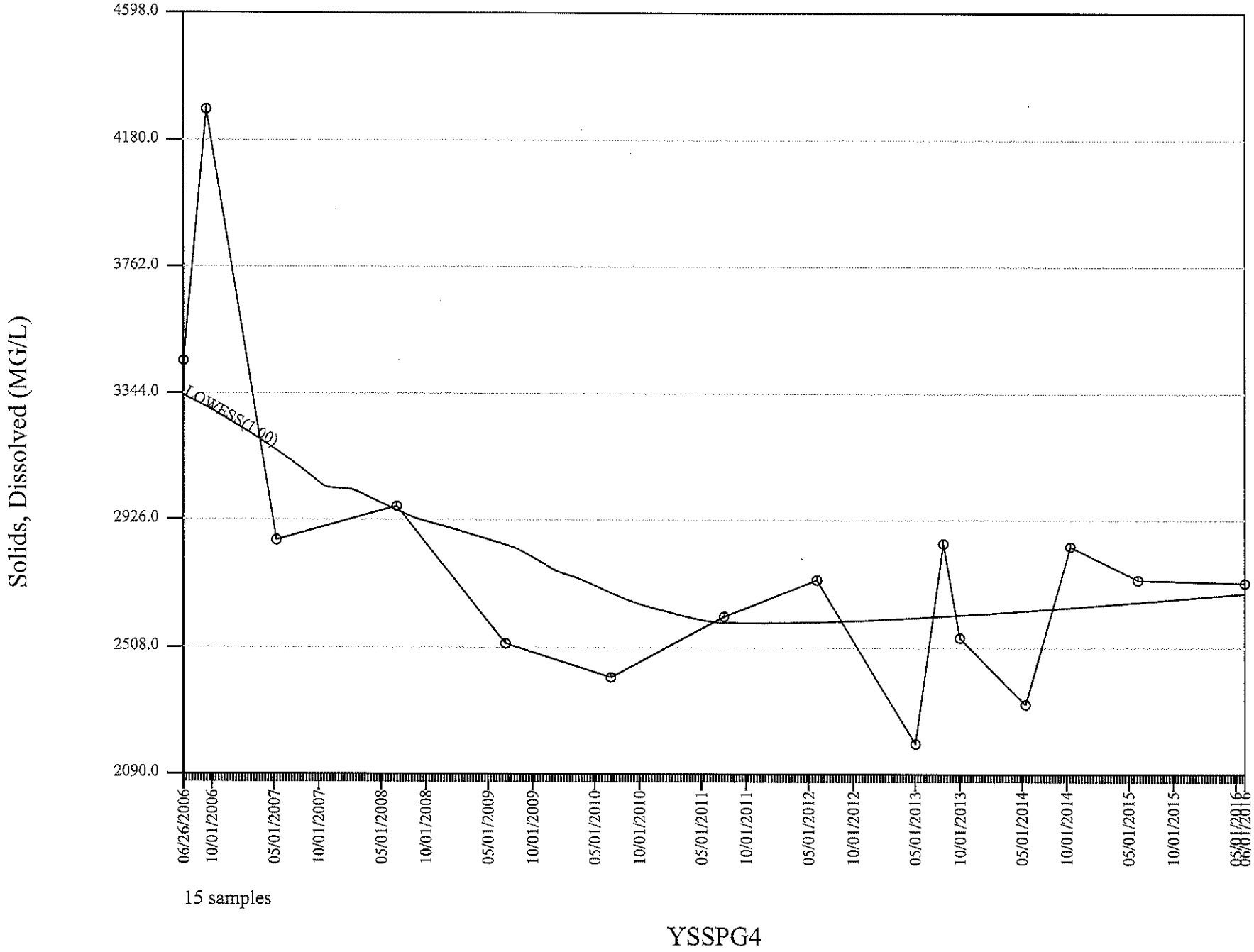
Extended Water Quality Report
YSSPG4 - SPOIL SPRING 4
10/01/2015-00:00 to 09/30/2016-23:59

Parameters	Units	06/01/2016 09:00
Field Parameters		
Field Ph	S.U.	7.7500
Temperature	C	14.9000
Field Conductivity	UMHOS/CM	2340.0000
Flow	GPM	187.5000
Laboratory Parameters		
Selenium, Dissolved	UG/L	1.0000
Solids, Dissolved	MG/L	2720.0000
Solids, Suspended	MG/L	< 5.0000
Iron, Total Rec.	MG/L	< 0.0400
Selenium, Total Rec.	UG/L	1.2000
Manganese, Pot. Diss.	MG/L	1.5800
Selenium, Pot. Diss.	UG/L	1.3000

"B" -- Between MDL and PQL, "<" -- Less than detection limit

Instantaneous Flow Measurements Report
YSSPG4 - SPOIL SPRING 4
10/01/2015-00:00 to 09/30/2016-23:59

Date	Time	Instrument	Type	Flag	Begin/End	Stage	CFS	GPM	MGD
06/01/2016	09:00:00	MANF	INS				0.42	187.50	0.27


Solids, Dissolved (MG/L)
4598.0
4180.0
3762.0
3344.0
2926.0
2508.0
2090.0
LOWESS(1,00)
06/26/2006
10/01/2006
05/01/2007
10/01/2007
05/01/2008
10/01/2008
05/01/2009
10/01/2009
05/01/2010
10/01/2010
05/01/2011
10/01/2011
05/01/2012
10/01/2012
05/01/2013
10/01/2013
05/01/2014
10/01/2014
05/01/2015
10/01/2015
15 samples
YSSPG4