FINAL STUDY REPORT
SEASONAL AND DIURNAL WATER QUALITY IN CONOWINGO POND AND BELOW CONOWINGO DAM
RSP 3.1

CONOWINGO HYDROELECTRIC PROJECT

FERC PROJECT NUMBER 405

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EXECUTIVE SUMMARY

Exelon Generation Company, LLC (Exelon) has initiated with the Federal Energy Regulatory Commission (FERC) the process of relicensing the 573-megawatt Conowingo Hydroelectric Project (Conowingo Project). The current license for the Conowingo Project was issued on August 14, 1980 and expires on September 1, 2014. FERC issued the final study plan determination for the Conowingo Project on February 4, 2010, approving the revised study plan with certain modifications.

The final study plan determination required Exelon to conduct a water quality study with two primary objectives: (1) document water quality within Conowingo Pond under a variety of conditions, and (2) confirm the dissolved oxygen (DO) of turbine discharges under all operational configurations is accurately monitored to ensure state DO water quality standards are being met downstream of the project. Both these objectives were met.

An initial study report (ISR) was filed on March 29, 2011, containing Exelon's 2010 study findings. A meeting was held on August 23 and 24, 2011 with resource agencies and interested members of the public. Formal comments on the ISR including requested study plan modifications were filed with FERC on March 21, 2012 by several resource agencies and interested members of the public. Exelon filed responses to the ISR comments with FERC on April 20, 2012. On May 21, 2012, FERC issued a study plan modification determination order. The order specified what, if any, modifications to the ISR should be made. For this study, FERC's May 21, 2012 order required no modifications to the original study plan. This final study report is being filed with the Final License Application for the Project.

Weekly monitoring of DO, water temperature, surface pH, and turbidity at five historically (1996-1999) established transects in Conowingo Pond and three newly established transects for this study below Conowingo Dam occurred between April and October 2010. Fecal coliform samples were also collected once per month at the midpoint station of each transect. Additionally, discharge "boils" of operating turbines were sampled hourly (0600 hr to 1800 hr) on 20 dates in July and August (preselected by FERC during study scoping).

Water temperature data collected in Conowingo Pond (at Transect 5 approximately 0.5 mi upstream of Conowingo Dam) were compared to data collected at monitoring Station 643, approximately 0.6 mi downstream of Conowingo Dam to confirm the effect of project operations on the temperature of water being released downstream. DO and temperature data collected in the turbine boils and the downstream transects were compared to that measured at the continuous DO monitoring station (Station 643) to confirm that Station 643 is a representative location for determining compliance with the applicable Maryland state DO standards.

Relative to the historic records, flows in the Susquehanna River during the 2010 sampling period were lower in April through September but higher in October. Likewise, incoming water temperatures were higher in April through September and lower in October relative to historical records. The observed pattern of DO and temperature distribution in Conowingo Pond in 2010 was similar to that which has been observed for more than 50 years. Thermal stratification (a decrease in water temperature of 1°C per 1 m increase in depth or 0.55 °F decrease per 1 ft increase in depth) was not observed in Conowingo Pond in 2010. However, summer DO stratification (top to bottom differences in DO) did occur in the lower half of Conowingo Pond in 2010.

Consistent with the findings of earlier studies (Mathur *et al.* 1988; Normandeau Associates 1998-2000), there was no evidence from the DO and temperature data collected in Conowingo Pond in 2010, that the operation of Conowingo Dam had an effect on vertical distribution patterns of DO or water temperature in lower Conowingo Pond. However, meteorological-hydrological events that produced sudden increases of inflows or high wind produced near homogeneous water column conditions at depths greater than 25 ft.

Comparison of water temperature data collected upstream and downstream of Conowingo Dam in 2010 confirmed that the operation of the Project has no measureable effect on the temperature of the water being released downstream. Water temperatures were uniform throughout lower Conowingo Pond and the tailwater area under a variety of unit operating and river flow conditions. Moreover, the temperature of the water measured at Station 643 was also consistently similar (R^2 square ≥ 0.99, to that measured along transects in both the lower head pond and in the tailwater areas, indicating that the location of Station 643 is representative of tailwater temperature conditions.

Comparisons of the water temperature of specific turbine boils to the temperature measured at Station 643 were also made. The water temperature recorded at downstream Station 643 was virtually identical to that of turbine discharge boils.

Aeration capabilities on the smaller Francis generating units (Units 1-7), increase the DO concentration of the water being released from the Project and allow the discharges to meet current state DO standards (5.5 mg/L). DO concentrations measured at the three transects below Conowingo Dam (and Station 643) were at or above the standard on all sampling days in 2010. Comparison of DO concentrations along the downstream transects with the DO measured at Station 643 indicated that Station 643 is representative of DO conditions measured along Transects 6 and 7 most of the time. The greatest difference between DO measured at Station 643 and DO measured at one of the transects was at Transect 8, in late August and mid September, when Station 643 consistently measured DO concentrations 1-2 mg/L lower than the DO measured at Transect 8. This difference seems mostly likely due to natural aeration in the river, as waters move downstream from Station 643.

DO concentrations measured in the turbine boils were mostly above the historical Maryland State standard of 5.0 mg/L. A few hourly DO values of less than 5.5 mg/L were measured in specific turbine boils, on certain sampling days, but all of these measurements were confined to the turbine boils of one of the larger, non-aerating, Kaplan units (Units 8-11) when the head pond was stratified. However, average DO conditions within all the turbine boils were always at or above standards, and were usually similar to the DO conditions measured at Station 643. Additionally, these large turbines are generally used for a few hours only in combination with small Francis turbines when the river flows exceed 10,000cfs.

A detailed comparison of DO concentrations measured in the turbine boils to the DO measured at Station 643 indicated that under most combinations of unit operation, DO concentrations measured at Station 643 are representative of DO conditions in the turbine boils. Exceptions can occur when one or more of the larger Kaplan turbines (Units 8-11) are operating and the head pond is stratified with bottom water DO less than 5.0 mg/L. Under these circumstances, DO measured at Station 643 is, at times, somewhat higher than the average DO concentration measured in the turbine boils. However, when DO was averaged across all the turbine boils during a given sampling day, the DO concentrations in the turbine discharge were shown to be the same as that measured at Station 643 during the same period (33% of the time, 85 of 255 observations), and within + 0.5 mg/l of Station 643 72% of the time (184 of 255 measurements). Moreover a frequency plot of the differences in DO values observed between the turbine boils and Station 643 showed that the distribution was nearly equal between observations when Station 643 under or over recorded the DO measured in the turbine boils. Historically (prior to 2005), the daily DO Maryland State standard was 5.0 mg/L. In addition, the current Maryland State DO standards were also met as stated below.

The current Maryland State DO standard applicable to discharges from Conowingo Dam is as follows:

February 1 through May 31: DO ≥ to 6 mg/L for a 7-day averaging period

June 1 to January 31: DO ≥ 5.5 mg/L for a 30-day averaging period; 4.0 mg/L for a 7-day average; 3.2 mg/L as an instantaneous minimum year round; and for protection of endangered shortnose sturgeon, 4.3 mg/L as an instantaneous minimum at water column temperatures 77°F (25°C).

As measured at Station 643, the discharge from Conowingo Dam met the state DO standards 100% of the time in 2010. Measured DO concentrations in the transects below Conowingo Dam were all greater than 5.5 mg/L.

Although simultaneous discharges from multiple turbines may introduce complexity in downstream flow patterns, hourly DO measurements recorded at Station 643 under multiple turbine operational scenarios adequately reflect DO and temperature conditions in the Conowingo Dam discharges. Consequently, the present monitoring location of Station 643 is considered representative of turbine discharges for the purpose of monitoring compliance with the State of Maryland DO standards.

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LIST OF ABBREVIATIONS

Agencies/Companies

Exelon	Exelon Generating Company, LLC
FERC	Federal Energy Regulatory Commission
MDNR	Maryland Department of Natural Resources
PADEP	Pennsylvania Department of Environmental Protection
PBAPS	Peach Bottom Atomic Power Station
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey

Units of Measure

C	Celsius, Centigrade
cfs	cubic feet per second
F	Fahrenheit
ft	foot/feet
h	hour
kcfs	thousand cubic feet per second
L	liter
m	meter
mg	milligram
mi	mile
ml	milliliter
MW	megawatt
NTU	Nephelometric Turbidity Units

Environmental

DO	dissolved oxygen

Miscellaneous

ILP	Integrated Licensing Process
NOI	Notice of Intent
PAD	Pre-application Document
PSP	Proposed Study Plans
RSP	Revised Study Plans

1.0 INTRODUCTION

Exelon Generation Company, LLC (Exelon) has initiated with the Federal Energy Regulatory Commission (FERC) the process of relicensing the 573-megawatt (MW) Conowingo Hydroelectric Project (Project) (Figure 1-1). Exelon is applying for license renewal using the FERC's Integrated Licensing Process (ILP). The current license for the Conowingo Project was issued on August 14, 1980 and expires on September 1, 2014.

Exelon filed its Pre-Application Document (PAD) and Notice of Intent (NOI) with FERC on March 12, 2009. On June 11 and 12, 2009, a site visit and two scoping meetings were held at the Project for resource agencies and interested members of the public. Following these meetings, formal study requests were filed with FERC by several resource agencies. Many of these study requests were included in Exelon's Proposed Study Plan (PSP), which was filed on August 24, 2009. On September 22 and 23, 2009, Exelon held a meeting with resource agencies and interested members of the public to discuss the PSP.

Formal comments on the PSP were filed with FERC on November 22, 2009 by Commission staff and several resource agencies. Exelon filed a Revised Study Plan (RSP) for the Project on December 22, 2009. FERC issued the final study plan determination for the Project on February 4, 2010, approving the RSP with certain modifications.

The final study plan determination required Exelon to conduct a Water Quality Study, which is the subject of this report. The goals and objectives of this study are to: (1) document water quality within Conowingo Pond under a variety of conditions, and (2) confirm the dissolved oxygen (DO) of turbine discharges under all operational configurations is accurately monitored to ensure that the state dissolved oxygen water quality standard is being met downstream of the Project.

An initial study report (ISR) was filed on March 29, 2011, containing Exelon's 2010 study findings. A meeting was held on August 23 and 24, 2011 with resource agencies and interested members of the public. Formal comments on the ISR including requested study plan modifications were filed with FERC on March 21, 2012 by several resource agencies and interested members of the public. Exelon filed responses to the ISR comments with FERC on April 20, 2012. On May 21, 2012, FERC issued a study plan modification determination order. The order specified what, if any, modifications to the ISR should be made. For this study, FERC's May 21, 2012 order required no modifications to the original study plan. This final study report is being filed with the Final License Application for the Project.

2.0 BACKGROUND

2.1 Conowingo Pond

Conowingo Pond, the lower most impoundment on the Susquehanna River (Figure 1-1), was formed in 1928 by the backwater of Conowingo Hydroelectric Dam (river mile 10). The Pond is bounded upstream by Holtwood Dam (river mile 24), which was built in 1914. The Pond has a surface area of about 9,000 acres with a storage capacity of 310,000 acre-ft. It is 14 miles long and averages 1 mile in width. The average depth of the Pond is 20 ft (6.1 m) with a maximum depth of nearly 90 ft (27.4 m) in the lower Pond behind Conowingo Dam; however, some localized deep areas also exist in the upper Pond. Conowingo turbines withdraw water for generation from the deeper portions of Conowingo Pond. The intakes for the Conowingo powerhouse are located at a depth of approximately 40 ft (top of intake).

Water quality of Conowingo Pond and surrounding areas has been characterized for over the past several decades (Whaley 1960; RMC 1985; Mathur *et al*. 1988; Normandeau Associates 1998-2000). Between 1959 and 2007, more than 400,000 DO and temperature measurements were taken over diverse meteorological, hydrological, and Conowingo Station operational conditions. Results of these studies indicated that the patterns of seasonal, spatial, temporal, and diurnal variations in DO and water temperature have essentially remained the same. However, variations in absolute values for these parameters were dependent primarily on prevailing meteorological and hydrological conditions. In general, DO stratification began to develop in the lower Conowingo Pond at river flows of less than 20,000 cfs and decreasing and water temperatures of greater than or equal to 75 °F (23.8 °C) and increasing.

Historical sampling showed that although a vertical DO stratification occurred in deeper waters of lower Conowingo Pond for varying periods in June-September, a classical (Welch 1952) thermal stratification (a decrease of 1° C per 1 m increase in depth or 0.55 ° F decrease in temperature per 1 ft increase in depth) was not observed. It was found that meteorological-hydrological events such as high wind or rain storms would disrupt summer DO stratification in lower Conowingo Pond. DO stratification was not disrupted by station mode of operation (continuous flow, run-of-the-river, or peaking) (RMC 1985; Mathur *et al*. 1988).

The Susquehanna River below Conowingo Dam flows approximately 10 miles before entering Chesapeake Bay (Figure 1-1). The non-tidal portion of the Susquehanna River encompasses approximately 4 miles of river length, from Conowingo Dam downstream to the mouth of Deer Creek (a tributary), which is the approximate natural upstream limit of tidal influence. The Chesapeake Bay stretches about 200 miles from the Susquehanna River in the north to the Atlantic Ocean in the south.

Much of the bay is quite shallow. At the point where the Susquehanna River flows into the bay, the average depth is 30 feet.

2.1.2 Conowingo Project

The Conowingo Project uses limited active storage within Conowingo Pond for generation purposes. Maximum hydraulic capacity of the Conowingo powerhouse is 86,000 cfs. The Conowingo powerhouse is oriented perpendicular to the river (Figure 2-1). The powerhouse contains seven Francis and four Kaplan type turbines which withdraw water for generation from deeper depths from lower Conowingo Pond. The water depth in the area behind the dam is 60 to 90 ft deep, with most areas about 70 ft deep. The top of the Conowingo Station intakes are located at 40 ft and extend to the bottom (Mathur *et al.* 1988). Each Francis turbine has a hydraulic capacity of 5,000 cfs and each Kaplan type turbine has a hydraulic capacity of 10,000 cfs.

The current minimum flow regime below Conowingo Dam was formally established with the signing of a settlement agreement in 1989 between the project owners and several federal and state resource agencies (FERC 1989). The established minimum flow regime below Conowingo Dam is the following:

- March 1 – March 31: 3,500 cfs or natural river flow
- April 1 – April 30: 10,000 cfs or natural river flow, whichever is less
- May 1 – May 31: 7,500 cfs or natural river flow, whichever is less
- June 1 – September 14: 5,000 cfs or natural river flow, whichever is less
- September 15 – November 30: 3,500 cfs or natural river flow, whichever is less
- December 1 – February 28: 3,500 cfs intermittent (maximum six hours off followed by equal amount on)

The downstream discharge must equal these values or the discharge measured at the Susquehanna River at the Marietta, PA United States Geological Survey (USGS gage No. 01576000), whichever is less. The Marietta gage is located approximately 35 miles upstream of Conowingo Dam above the Safe Harbor Dam. Typically, the summer minimum flow requirements are met by releasing flow from either Francis turbine Unit 2 or 5 individually or in combination, as these units have the ability to operate at a lower range of flow then the other Francis units.

The seven Francis turbines (Units 1-7) are equipped with aeration venting systems which were installed between 1988 and 1991 to improve downstream DO conditions. First, a prototype system was installed in Francis Unit 5 in late June 1988, with an intake air injection system and draft tube oxygen augmentation systems available for testing. The installation of the venting system occurred in concurrence with the consulted resource agencies, primarily Maryland Department of Natural Resources (MDNR), and after satisfactory test results and evaluation of a prototype system (C.T. Main 1987; PECO 1989a, 1990). In 1989, a full-scale modified (with more holes/vents than in the initial design) turbine venting system (Figure 2-2) was installed on Francis Units 1 and 3, along with a partial intake air injection system. Each unit was tested with and without the intake air injection system. Comparison of test results revealed that the modified system substantially increased air flow and DO (over ambient levels) in the vented releases (PECO 1990). Based on the test results, the modified venting system (Figure 2-2) was installed in Francis Units 4, 6, and 7, Unit 5 was retrofitted with the same venting system in 1990, and Unit 2 in spring 1991 (PECO 1989a). At that time it was concluded that these installations would allow discharge from the Project to meet Maryland's DO standard under most conditions. The larger Kaplan turbines (Units 8-11) were not equipped with an aeration system because their usage during low summer flow period was anticipated to be infrequent except in the event of a power emergency.

2.1.3 DO Compliance Monitoring

Since the late 1980s, DO and temperature have been measured continuously (1 hour intervals) at Station 643 which is located approximately 0.6 mi downstream of Conowingo Dam near the western shoreline (Figure 2-1). Station 643 was established at this location in consultation with the MDNR, and has served as the monitoring point for compliance with the state DO standards (PECO 1989b). Station 643 is operated from May 1 through October 31 each year, and DO and temperature conditions are recorded hourly.

3.0 METHODS

As specified in the study plan determination, the sampling frequency and locations for DO, water temperature, pH, turbidity, and fecal coliform described below were established to meet the objectives for both Conowingo Pond and downstream of Conowingo Dam. Sampling locations and methods used were in accordance with COMAR 26.08.02 Surface Water Quality Standards for the State of Maryland. The sampling period was between April and October, 2010.

3.1 Transect Water Quality Sampling

To evaluate DO and temperature conditions in the headpond and tailwater areas, weekly monitoring was conducted along five historically (1996-1999) established transects in Conowingo Pond (Figure 3-1 and Table 3-1) and three new transects established for this study downstream of Conowingo Dam (Figure 3-2 and Table 3-1). Station 502 (designated as Station 611 in previous reports, Peach Bottom Atomic Power Station Pre- and Post-operational Reports, 1974-1980) on Transect 5 in Conowingo Pond had been sampled for over four decades. Historic DO and water temperature profiles collected at this station were used to compare to the 2010 findings. Historic daily average inflow water temperatures measured at Holtwood Dam were used to develop temperature duration curves to provide a perspective on 2010 water temperature data.

Vertical profiles (surface to bottom at 5 ft intervals) of DO and water temperature were taken at three to five points on each transect in Conowingo Pond (Figure 3-1). For example, Transect 1 is comprised of Stations 101, 102, and 103; Transect 4 is comprised of Stations 401, 402, 403, and 404. The number of sampling points along each transect was dependent on river width.

Surface pH and turbidity (NTU) values were measured at the mid-point location of each transect. For transects with an even number of sampling points, the deepest of the two middle sampling points was used as the mid-point station.

River flows at Marietta, PA (USGS gage No. 01576000), Conowingo, MD (USGS gage No. 01578310), and Holtwood Dam, PA (data provided by PPL Holtwood), as well as Conowingo generation status and approximate wind speed were recorded during each sampling event. To be consistent with previous water quality studies of Conowingo Pond and downstream areas (*e.g.*, Mathur *et al*. 1988; Normandeau Associates 1998-2000), average daily river flows measured at Holtwood Dam were used in this report for comparison with 2010 data.

Water temperature data collected at Transect 5 in the lower half of Conowingo Pond were compared to hourly water temperatures recorded at Station 643 for corresponding dates and times to assess potential alterations in water temperature in transport through turbines.

Three transects located downstream of Conowingo Dam (Figure 3-2) were sampled on the same dates as those in Conowingo Pond. DO and water temperature measurements were taken at three points along each transect (Figure 3-2). Turbidity, pH and fecal coliform samples were taken from the mid-point station of each transect. DO and water temperature data recorded in this sampling effort were compared with those recorded at the continuous monitoring Station 643. Sampling at both the pond and downstream transects were completed on the same day at approximately the same time each sampling day.

A HACH Surveyor (data logger) and HACH Hydrolab MS5 data sonde with a 30 meter (approximately 100 ft) cable to handle the data electronically was used to measure and record water quality data in both the pond and tailwater areas. This MS5 data sonde was equipped with sensors to measure temperature (±0.1 °C or ±0.2 °F), dissolved oxygen (±0.1 mg/L), pH (±0.2 units), and turbidity (±1% up to 100 NTU and ±3% from 100-400 NTU). The MS5 data sonde along with the Surveyor was used to manually record DO and water temperature vertical profile data. The temperature sensor was set at the factory and all parameter sensors were calibrated per manufacturer's requirements prior to each sampling event. A calibrated YSI Model 57 meter equipped with a DO (±0.1 mg/L)/temperature (±0.5 °C or ±0.9 °F) combination probe and cable (with attached submersible stirrer) was utilized as a back-up. Calibration records for the HACH Hydrolab and YSI meter along with their specifications are provided in Appendix A-1.

Monthly water samples for fecal coliform were collected and delivered the same day to Lancaster Labs, Inc., New Holland, PA, for laboratory analysis using the SM20 9222 D methods (Appendix A-2). The samples were collected in a clear 120 ml round plastic bottle with an added preservative ($Na_2S_2O_3$) (provided by Lancaster Laboratories) and immediately chilled by placing in a cooler with ice as instructed by Lancaster Laboratories personnel (Appendix A-2). The sample bottles were labeled with the site number, date, and time of sample collection. Thirty-five fecal coliform samples were collected in Conowingo Pond during the sampling period, with 21 fecal coliform samples collected downstream of Conowingo Dam during the same sampling period. Weather conditions, approximate wind speed, river flow, and Conowingo generation status were recorded also during each sampling event.

3.1.1 Turbine Boil Discharge Sampling

In accordance with the study plan determination, project discharge turbine boils were sampled on 20 days in July and August 2010. Dates sampled were specified by FERC in the final study plan determination. Sampling occurred on four consecutive days, covering both weekend days (N = 8) and weekdays (N = 12).

- Weekdays in July: 2, 5, 14-16, and 30;
- Weekend days in July: 3-4, 17, and 31;
- Weekdays in August: 2, 13, 16, and 25-27;
- Weekend days in August: 1, 14-15, and 28.

DO and water temperature samples were collected hourly from each operating turbine boil between 0600 and 1800, or for the duration of time that a particular turbine was operating. The DO and water temperature of the turbine boils were measured in grab water samples collected using a bucket and rope. A bucket was lowered from a catwalk on the powerhouse into an operating turbine boil discharge, allowed to fill, then carefully pulled up to the catwalk, (to avoid additional agitation of the sample). The DO and water temperature of the sample was then measured. The process was repeated for any remaining operating turbines. Collection of water samples by bucket is preferred when sampling in highly turbulent waters as it limits the potential for DO probe/cable damage from the turbulent boil discharges.

Turbine boil DO and water temperature were measured using a calibrated YSI model 57 meter equipped with a DO/temp combination probe and cable (with attached submersible stirrer). The instrumentation was calibrated in accordance with manufacturer's specifications prior to each set of hourly measurements. Calibration records for the YSI meter are provided in Appendix A-3. Appendix B-1 provides a listing of individual "boil" hourly measurements of DO and water temperature, along with meteorological data on sampled dates. Appendix B-2 provides river flow and water temperature joint probability occurrences for each month (April-October). Appendix C provides temperature and DO profile plots for Transects 1 through 8. Summarized data are presented in the body of the report text.

DO and temperature conditions measured in the turbine discharge boils were compared with those recorded from the continuous monitoring station (Station 643) to assess the representativeness of the Station 643 location for measuring Conowingo turbine discharge DO and water temperature. When comparing turbine boil conditions with DO and temperature recorded at Station 643, a lag time of up to one hour travel time was allowed for discharge water to reach Station 643.

4.0 RESULTS

4.1 River Flow and Water Temperature Conditions During 2010 Sampling Season

The river flow and water temperature conditions of the Susquehanna River during the 2010 study season were compared to long-term averages (1952-2009) to discern the comparability of conditions during the 2010 study season as compared to average conditions over the past 50+ years. Figure 4-1 shows average daily river flows at Holtwood between April and October of 2010 as compared to the average daily flow at Holtwood for the period 1952-2009. As shown (Figure 4-1), average daily river flows, as measured at Holtwood Dam in 2010, showed a typical seasonal pattern of decrease during the spring and early summer, with the lowest flows recorded in September, 2010. Average daily river flow at Holtwood for the period April thorugh October 2010 ranged from a low of 4,500 cfs (September 14, 2010) to a high of 109,500 cfs (October 3, 2010). Average daily river flows were less than 14,000 cfs in mid-June through September. However, river flows increased precipitously from less than 6,300 cfs in September to 109,500 cfs in early October. As compared to the long-term average flow, river flows were generally lower in 2010 during the period April through September, and higher in October. Flows in 2010 were particularly low during the summer months July-September, as compared to historic averages.

Figure 4-2 provides an average daily flow duration curve for the period April-October, 2010, in comparison to the long-term (1952-2009) average daily flow duration curve for the same months. Individual monthly average daily flow duration curves are provided in Figures 4-3 through 4-9. Again, as shown in these figures, relative to the historical record, the average daily river flows in 2010 were lower for the period April through September, and higher in October.

Figure 4-10 shows average daily water temperature at Holtwood in 2010 as compared to the averge daily water temperature at Holtwood for the period 1956-2009. The seasonal water temperature cycle observed at Holtwood Dam in 2010 was typical of temperate regions, with the lowest temperatures recorded in April and October, and the highest water temperatures occuring during the late summer.

Figure 4-11 provides a 2010 average daily water temperature duration curve for the period April-October, 2010, in comparison to the long-term (1956-2009) average daily temperature duration curve for those same months. Across the study season (April through October) average daily water temperures were higher in 2010 than the historic average. Monthly water temperature duration plots shown in Figures 4-12 through 4-18 demonstrate that water temperatures in 2010 were higher than average in April through June, comparable with the long-term average during the summer months July-September, and lower than the long-term average in October.

Table 4-1 provides a summary of flow and, water temperature conditions during sampling days in 2010, as compared to the long-term averages on those days. Wind information for the 2010 sampling days is also shown. Comparison of flow and water temperature conditions on sampling days to the long-term averages for those days confirms that for most of the sampling season (June through September) river flows were lower and water temperatures were higher than the long-term averages for that period.

Previous studies of Conowingo pond have shown that the probability of strong DO stratification in the lower Pond is high when river flows are less than 20,000 cfs and decreasing, and water temperature is greater than 75 °F (23.9 °C) and increasing (RMC 1985; Mathur *et al.* 1988; Normandeau Associates 1998-2000). An analysis of the joint probability occurrence for each month (April-October) of flows less than 20,000 cfs and water temperatures great than 75 °F (23.9 °C) was performed to provide a perspective on flow and temperature conditions experienced in 2010 relative to those observed historically. The results of this analysis are provided in Appendix B-2.

4.2 Water Quality Conditions in Conowingo Pond in 2010

4.2.1 Conowing Pond Transect Water Temperature

Vertical water temperature profiles for each of the stations sampled on 30 dates in 2010 were developed and are provided in Appendix C. Figure 4-19 provides water temperature profile data for Station 502, the mid-stream station at the lower most transect (approximately 0.5 mile upstream of Conowingo Dam), where water quality data has been collected historically (historic station 611). As shown, a classic thermal stratification (decrease of 1 °C per 1 m increase in depth or 0.55 °F decrease in temperature per 1 ft increase in depth; Welch 1952) was absent at this station on all sampled dates in 2010. A review of temperature profiles for the other sampling stations (Appendix C) reveals that thermal stratification (as defined above) was also absent from all the other transects and sampling stations. There were some small (<4°F or < 2.2 °C) top to bottom temperature differences measured at the sampling locations near the west shore on Transects 2-4 (Stations 201, 301, and 401) in summer months. Surface heating of the water in these locations was limited to the top 15 ft of the water column, and was likely an affect of the Peach Bottom Atomic Power Station (PBAPS) thermal discharge. Compared to Transect 1 (upstream of PBAPS), surface temperatures at locations across the state line and downstream areas were generally less than 2-4 °F (approximately 1-2 °C) than at the deeper depths. This finding is consistent with that observed in previous years (RMC 1985; Normandeau Associates 1998-2000).

In summary, water temperature profiles taken from Conowingo Pond indicated no thermal stratification in the Pond in 2010, even during the summer months when flows were lower than average, and water temperuatres were similar to the historic average for those months. Lack of thermal stratification in Conowingo Pond is consistent with historic conditions observed over the past 30 years.

4.2.2 Conowingo Pond Transect DO

Vertical DO profiles for each of the stations sampled in 2010 were developed and are provided in Appendix C. Figure 4-20 provides top to bottom DO profiles for Station 502, the mid-stream station at the lower most transect (approximately 0.5 mile upstream of Conowingo Dam), where water quality data has been collected historically (Station 611). As shown, at Station 502 differences in top to bottom DO appeared in late May and were consistently evident into July. Through much of August and September, top to bottom differences in DO concentrations had decreased, but during that period DO throughout the water column had dropped below 5.0 mg/L. By early October, DO values had increased significantly and there was little top to bottom diference observed.

Looking at DO conditions along the other transects shows a similar pattern to Transect 4. In adddition, on some sampling dates in July and August, low DO levels (less than 4.0 mg/L) were observed at deeper depths at three locations (Stations 404, 304, and 301).

Overall the DO trends observed in Conowingo Pond in 2010 were similar to those observed in the past. Historically, top to bottom DO differentials have occurred in the lower Conowingo Pond generally in areas with depths greater than or equal to 25 ft (Normandeau Associates 1998-2000).

Previous studies have shown that DO stratification in Conowingo Pond can be destroyed by natural meteorological events that produce high river flows, strong winds, or both (Mathur *et al*. 1988). This phenomenon was also observed in 2010. For example, on July 7, 2010 the lower Pond Transect 5 location (Station 502) was stratified with river flows at 8,000 cfs. By July 13, as flows were increasing, the top to bottom DO difference was significantly reduced, but then began to increase again on July 20 as flows subsided. Stratification was re-established within a week. Overall, both historic data collection and the 2010 sampling results demonstrate that the disruption of DO stratification by a high flow event can result in uniformly low DO conditions throughout the water column.

4.2.3 Conowingo Pond pH, Turbidity, and Fecal Coliform

In addition to DO and temperature, pH and turbidity values were also measured at mid-point stations in Conowingo Pond. Figure 4-21 shows the pH values measured in 2010. The minimum and maximum pH values in Conowingo Pond were 7.0 and 8.9, respectively. Although variations between dates were evident, little difference occurred between locations on a given sampling date. These values are within the range observed in the past (*e.g.*, Pre- and Post-operational Reports for Peach Bottom Atomic Power Station, 1974-1980).

Turbidity values measured at mid-point stations in Conowingo Pond are shown in Figure 4-22. The minimum and maximum turbidity values recorded in Conowingo Pond during the 2010 sampling period were 1.2 and 146.5 NTU units.

Fecal coliform values recorded at each of the Conowingo Pond stations are provided in Table 4-2. Generally, fecal coliform values were low throughout Conowingo Pond during the 2010 sampling season. In the Pond, higher coliform values were recorded at two stations on May 4, and at all stations on October 5, following a period of unusually high river flows. In total, only 5 fecal coliform samples collected from Conowingo Pond in 2010 were greater than 200 per 100 ml.[1] And only one value (May 4 at Station 102) collected during the swimming season (May through September) exceeded 200 per 100 ml.

4.3 Water Quality Downstream of Conowingo Dam

4.3.1 Downstream Transect Temperature and DO

Temporal trends in water temperature measured at the three downstream transects during the 2010 study season are shown in Figure 4-23. As expected, water temperature downstream of the dam increased from April through August and declined thereafter, with the highest temperatures recorded in July and August. This typical seasonal pattern of water temperatures closely mirrored that observed in Conowingo Pond. Figure 4-23 also demonstrates that there was little variation in water temperature between depths observed at any of the downstream transects. This is not surprising given the relatively shallow depths (less than 10 ft or 3.1 m) at each of the transects, making conditions relatively homothermous.

For comparison purposes, the average water temperature measured at Station 643 on the same date and during Transect 6, 7, and 8 sampling period (generally same 4 hours) is also provided in Figure 4-23. This comparison demonstrates a very high degree of similarity between the temperature at Station 643 and that measured along Transects 6, 7 and 8.

[1] The Pennsylvania Department of Environmental Protection (PADEP, 1999, p.16) fecal coliform standard for bathing (full body contact) is 200 and the U.S. Environmental Protection Agency (USEPA) have the same set of criteria for fecal coliform levels, on the basis of water use. For bathing (full body contact) in recreational freshwater, on the basis of a statistically sufficient number of samples (generally not less than five samples equally spaced over a 30-day period), the geometric mean of the indicated bacterial densities of fecal coliform should not exceed 200 colonies/100 ml during the swimming season (May 1 through September 30) and should not exceed 2,000 colonies/100 ml for the remainder of the year.

DO concentrations measured at the downstream transects along with the DO reference line of historical Maryland State standard of 5.0 mg/L are plotted in Figure 4-24. At Transect 6, DO concentrations were relatively homogenous along the transect and at all depths, for most of the sampling season. On one sampling date, July 31, the recorded DO at the surface of Station 603 was notably higher than the other values, and may have been the result of photosynthetic activity in a shallow pool with little or no flow. DO concentrations along Transects 7 and 8 were also very similar, indicating good mixing and homogenous conditions throughout the tailwater area. For comparison purposes, DO concentrations recorded at Station 643 on the same date and during Transect 6, 7, and 8 sampling period (generally same 4 hours) are also shown in Figure 4-24.

Generally, the DO measured at Station 643 was similar to the DO measured along all three transects, with a few exceptions. At Transect 6, the closest to Station 643, DO values measured at Station 643 were very similar to those measured along the transect from April through June. Starting in July, however, on several days, DO concentrations measured at Station 643 were noticeably higher than those measured along Transect 6. The greatest difference was measured on July 19, when Station 643 DO was approximately 1 mg/L greater than the highest value measured at Transect 6. Later in the summer and into the fall, the DO concentrations measured at Station 643 were again similar to those measured at Transect 6.

In comparison to Transect 7, DO measured at Station 643 was very similar across the entire sampling period. At Transect 8 (the furthest downstream of Station 643) DO concentrations were similar to those measured at Station 643 during the spring and early summer, but by late summer and into the fall, the DO measured at Station 643 was consistently lower than that measured at Transect 8. These results suggest that during the summer months there was additional aeration of the water moving downstream of the powerhouse that was measured at Transect 8 that was not reflected at Station 643. The increased DO at Transect 8 is likely due to natural aeration processes as water traveled downstream to the location of Transect 8, which is tidally influenced.

4.3.2 Turbine Discharge Boil Temperature and DO

Discharge boils of operating turbines were sampled on 20 dates in July and August, 2010 (Table 4-3). A total of 635 hourly DO and water temperature measurements were taken. The turbine discharge boil of each of the 11 Conowingo generating units was sampled on at least two separate days during the study period. The number of combinations of operating turbines available for sampling at any given hour differed between sampling days and even varied between hours within a given sampling day. Some units operated for only one or two hours, while others operated over the entire sampling period (0600 to 1800). During the sampling period, turbine Units 2 and 5 were operated more consistently than other units on these sampling dates, resulting in more hourly measurements of DO and water temperature taken in the discharge boils of these units than the other units. However, when inflows increased, particularly in mid July, the large Kaplan turbine Units 8 to11 were used for a few hours on several days. Turbine boil sampling was conducted at all of the generating units on at least two days during the sampling period.

The number of hours each combination of small and large units operated and sampled is summarized in Figure 4-25. As shown, by far the most sampling occurred during periods of operation when one or two small units, and no large units were operating. Generally, the one or two smaller units operating were Units 2 and 5. As the Licensee typically uses Francis (small) Units 2 and 5 for generation during the lower flow summer months, the sampling emphasis of the operation of one or two of the small units was appropriate for this study.

The hourly water temperature values measured in each of the turbine boils sampled in July and August are plotted in Figure 4-26. In July, turbine discharge temperatures ranged from a low of about 83 °F (28.4 °C) to a high near 90 °F (32.2 °C), with most values measured during the month between 84-86 °F (28.9-30.0 °C). Across turbines, differences in water temperature were small, generally less than 2 °F or approximately 1 °C, and overall, the discharge boils were thermally homogeneous. Differences between hourly temperature measurements within a turbine discharge boil on a given date were also small (up to 2 °F or approximately 1 °C). In early August, turbine boil temperatures were generally higher than in July, but still very homogenous between turbines and over a sampling day. By late August, water temperatures had cooled and during the August 25-28 sampling event water temperatures were notably cooler, in the 80-85 °F (26.7-29.5 °C) range.

Table 4-4 shows the average hourly water temperatures of individual turbine discharge boils on each sampled date. Turbine boil averages were derived by averaging the hourly values taken at each turbine boil on that day. Because not all units operated for the same period of time on each sampling day, the number of hourly values used to create the average varied depending on how many hours each day a given turbine was operated. Also shown is an average of all hourly values taken in all of the turbine boils sampled within a given day (daily average discharge boil water temperature). Because the daily average discharge boil temperature was calculated by averaging all of the hourly values sampled on that day, the daily average turbine boil DO shown is appropriately weighted to reflect the duration of operation of each of the turbines sampled on that day. Finally, for comparison purposes, Table 4-4 shows the average of hourly temperature values taken at Sation 643 during the same day. The hourly Station 643 values used to create the daily average were lagged 1 hour, to account for travel time. For example, for a daily turbine boil sampling period from 0600-1800, Station 643 values between 0700-1900 were used to create the daily average shown in Table 4-4.

Table 4-4 shows that there was little variation in discharge boil temperature observed within a sampled day. In addition, there was no marked difference in the temperature in turbine boils from the smaller Francis turbines (Units 1-7) as compared to the larger Kaplan units (Units 8-11). The daily average temperature for all turbine boils was also very representative of all the units operating in a given day.

Comparing the daily average temperature for all the turbine boils to the daily average temperature measured at Station 643, the values were also very similar. Station 643 consistently measured temperature values within 1 °F (0.5 °C) of the average temperature measured in the turbine boils on any given sampling day. Of 20 days when turbine boils were sampled, on only two was the difference between temperatures measured in the turbine boils more than 1 °F (0.5 °C). On these two occasions, temperature measured at Station 643 was higher (1.1 to 1.2 °F) than that measured in the discharge boils.

Turbine discharge boils were also sampled for DO. The hourly DO values measured in each of the turbine boils sampled in July and August are plotted in Figure 4-27.

Virtually all (622 of 635 or 97.8%) the hourly turbine discharge boil(s) DO values exceeded 5 mg/L. Two consecutive hours of DO less than 5.0 mg/L (4.4-4.8 mg/L) were recorded in the turbine discharge boil of Unit 6 (Figure 4-27 and Appendix B-1). Although the exact causative factors for the occurrence of relatively small number of sporadic low DO values less than 5.0 mg/L (mostly 4.4 to 4.9 mg/L; 8 in large turbine, 5 in Unit 6, and 1 in Unit 4) in discharge boils are unclear at present, two explanations seem likely. First, in some instances low DO values might reflect sampling that occurred during or immediately following turbine start up with insufficient time for stabilization before sampling occurred. This may have occurred as the scheduled sampling was to occur on the hour, and no time was allocated for the discharge to stabilize prior to sampling, in the event a unit came on immediately before or during the scheduled sampling time. In such cases, lower DO water sitting in an idle turbine, particularly a large unit, may have been discharged during initial start up and a sample taken from the boil during or immediately after start up might reflect this lower DO water. Second, in the case of the larger Kaplan units, which do not have aeration capability, lower DO values recorded in these discharge boils may simply be more reflective of the DO concentrations being drawn into the unit from the headpond.

Table 4-5 shows the average of the hourly DO concentrations measured at each of the individual turbine discharge boils on each sampled date. As with temperature, turbine boil DO averages were derived by averaging the hourly values taken at each turbine boil on that day. Because not all units operated for the same period of time on each sampling day, the number of hourly DO values used to create the average varied depending on how many hours each day a given turbine was operated. Also shown is an average of all hourly values taken in all of the turbine boils sampled within a given day (daily average discharge boil DO). For comparison purposes, Table 4-5 shows the average of hourly DO values taken at Sation 643 during the same day. Station 643 values used to create the average were lagged 1 hour, to account for travel time. Thus, for a daily sampling period from 0600-1800, Station 643 DO values between 0700-1900 were used to create the daily average DO shown in Table 4-5.

In general, there was more variability in turbine boil DO averages between turbines, than observed for water temperature. As shown in Table 4-5, on any given sampling day, there might be significant differences in the average DO in each turbine boil. For example, On July 15, turbine boil DO averages ranged from a high of 7.7 mg/L (Unit 2) to a low of 4.8 (Unit 11). On other days, the DO values recorded during a given sampling day were similar for all the operating turbines. Over the course of the sampling season, some general patterns seemed apparent. First, and not surprisingly, among all the turbines the DO averages were generally higher in the discharge boils of the Francis turbines (Units 1 to 7) that have aeration capabilities, than in the discharge boils of the Kaplan turbines (Units 8 to 11) which do not have aeration. Among the smaller Francis units (Units 1-7), the average DO in the discharge boils of Units 2 and 5 was consistently a little higher than the DO measured at Units 1, 3, 4, 6 and 7. The observed differences in DO among Francis turbines may be due to different aeration capabilities and efficiency at the prevailing hydrological-meteorological conditions. However, some of the observed differences between the Francies units in the average DO measured in a given turbine boil on a given day may be due to the fact that on most days Units 2 and 5 operated for many more hours than the other Francis units. Thus, the average DO recorded for that day for Unit 2 and/or Unit 5 is probably averaged across a longer period of time than the average shown for the other units. Among the larger Kaplan turbines (Units 8-11), there were no consistent patterns of differences in DO averages measured in the discharge boils on any given day. In mid-July (July 14-15), the DO average for Unit 11 tended to be lower than the DO average measured on the same day in the discharge boils of Units 8 and 9. This was again observed on August 14. However, Unit 11 was not measured frequently enough to suggest any consistent pattern.

Given the variation in DO concentrations observed in the individual turbine boils, overall, the most representative measure of the DO concentration of water being discharged from the Conowingo powerhouse is an average of the DO concentrations in each of the turbine boils. The average DO concentration for each of the turbine boil sampling days is shown in Table 4-5 (daily average discharge boil DO). Comparing the daily average discharge boil DO concentrations to the Station 643 DO average suggests that Station 643 is fairly representative of DO conditions in the discharge. Table 4-6 shows the differences between average DO values at Station 643 and discharge boil with and without Kaplan turbines operating on FERC selected dates in July-August 2010. The majority of averaged DO values between the discharge boils and Station 643 fall within ±1.0 mg/L. The representativeness of Station 643 for measuring both DO and temperature is discussed more in Sections 4.3.3 and 4.3.4, below.

4.3.3 Continuous Monitoring Station 643

Figure 4-28 is a temporal plot of hourly water temperature recorded at Station 643 from May 1 through October 31, 2010. Temperatures increased from April to a seasonal high (greater than 80 °F or greater than 26.6 °C) in late July through mid August, and, thereafter, declined through October. As shown in Figure 4-29 the pattern of seasonal variation in water temperature observed at Station 643 closely paralleled what was observed at Transect 5 in Conowingo Pond and incoming average daily temperatures at Holtwood (Table 4-1).

Figure 4-30 shows hourly water temperature measurements on selected days in July (14-16) and August (14-16) at Station 643 to assess diurnal variations. Over a given 24 h period, water temperatures were mostly within ± 0.5 °C (or within ± 0.9 °F) from hour to hour and fluctuated approximately 2.0 °C over the course of the day.

Figure 4-31 is a plot of hourly DO concentrations recorded at Station 643 from May 1 through October 31, 2010 along with a reference line of 5.0 mg/L (Maryland State standard prior to 2005) . As shown, virtually all hourly DO values were greater than 6 mg/L, and no DO value less than 5 mg/L was recorded over the study season in 2010.

Figure 4-32 shows diurnal variations in DO on selected dates in July (14-16) and August (14-16). Variations over a given 24-hour period were generally within 1.3 mg/L. However, at times, the diurnal variation in DO may have increased to a certain extent due to mixing of unaerated large unit discharge water with its attendant lower DO than that from the aerated Francis turbines. For example, on July 14 at noon, DO at Station 643 was recorded at 6.9 mg/L with Unit 8 coming online. Prior to noontime, no DO value was less than 7.5 mg/L. A similar situation was observed on August 14 during the daylight hours 1600 and 1800; DO ranged from approximately 7.0 to 8.2 mg/L between 0600 and 1500 hours, but ranged from 5.9 to 6.8 mg/L coincident with operation of large units for short duration (≤ 3 h).

4.3.4 Respresentativeness of Station 643 For DO Monitoring

In 1988, in consultation with Maryland agencies, Station 643 was established at its present location (about 0.6 mi downstream of Conowingo Dam near west shore) to monitor DO. One of the objectives of this study was to determine whether continuous DO measurements recorded at Station 643 are representative of the DO in the water being discharged from the Conowingo Project.

The representativeness of Station 643 as a compliance monitoring location was assessed by calculating differences in DO between discharge boil(s) and those recorded at Station 643 approximately 1 hour later. The one hour difference was use to account for travel time of water from the powerhouse to the monitoring point. The calculated differences in DO between the two locations provide the frequency and magnitude of DO differences between the two locations and a further means to assess the representativeness of the present location of Station 643 for compliance monitoring.

Figure 4-33 shows the frequency (number of hours) of DO differences in intervals of 0.5 mg/L between Station 643 and discharge boils. Negative differences shown on the chart represent observations when DO measured at Station 643 was greater than that measured in a turbine boil. Positive numbers refelect observations when DO measured at Station 643 was less than that measured in the DO boil. As shown, by far the greatest number of observations were for those where there was no observed difference between the turbine boil DO and the Station 643. Moreover, the distribution of values around zero is relatively even between observations where Station 643 over or under recorded the DO measured in the turbine boils. Even more importantly the range of differences in DO measurements is very narrow, with most observations falling within $\pm$0.5 mg/L difference. Statistically, the average difference in DO between Station 643 and the discharge boils was -0.32 mg/L with a relatively low variance (standard error = 0.04).

Based on the discharge boil sampling done in 2010 that covered a range of operating conditions and combinations of unit operation, these results demonstrate that the continuous DO and temperature monitoring conducted Station 643 is very representative of discharges from the Conowingo Project.

4.3.5 Effect of Conowingo Project Operation on Water Temperature and DO

To evaluate the effect of Conowingo Project operation on water temperatures in the Pond as compared to those in the tailwater area, upstream water temperatures were compared to those measured downstream of the dam. Because the bulk of water for power generation is withdrawn from deeper depths (the top of Conowingo intakes are located at 40 ft or 13.1 m) in lower Conowingo Pond, water temperature measurements taken at three stations on Transect 5, located 0.5 mi upstream of the dam, on the same dates and times (as close as possible) were compared with those at Station 643 (Figure 4-34). There was little difference observed between water temperatures measured along Transect 5 and those recorded at Station 643. Previously (Section 4.2) it was shown that there is little thermal stratification in Conowingo Pond; even in the deepest part of the Pond located in the vicinity of Transect 5, just upstream of the powerhouse.

Nonetheless, because the powerhouse intakes are deep (approximately 40 ft to 90 ft or 13.1 to 29.8 m), and the proportion of water withdrawn from specific depths in the Pond is unknown, two separate regression analyses were performed to assess potential alterations in water temperature as it passes through the turbines:

- Correlation between average water temperature at ≥ 40 ft (13.1 m) depth separately at each location (Stations 501, 502, and 503) on Transect 5; and
- Correlation between average water temperature at ≥ 40 ft (13.1 m) depth of all stations grouped together on Transect 5;

The results of the two regression analyses along with the 95% confidence intervals are shown in Figure 4-35. Table 4-7 shows the results of these regression analyses. In all cases, high R^2 values (greater than 99%) and relatively low standard errors of estimates (less than 0.83) were obtained, providing confidence that a linear, predictable relationship exists between Transect 5 water temperatures and those recorded at Station 643. Using these regression results, water temperatures at Station 643 were predicted from Transect 5 water temperatures. Figure 4-36 shows a comparison of predicted and actual water temperature values at Station 643. The actual and observed values are virtually identical indicating little evidence of alterations in temperature of water transported through the turbines.

Additional regression analyses were performed between stations on Transect 6 (Stations 601, 602, and 603) downstream of Conowingo Dam and Station 643. Table 4-8 shows the results of these regression analyses. Stations 601 and 602 exhibited high R^2 values (greater than 99% and relatively low standard errors of estimates (less than 0.84), these two stations are located upstream of 643. A slightly lower R^2 (98.0%) and higher standard error (1.467) was obtained for the regression between Station 603 and Station 643. A likely reason is the location of Station 603 and its shallow depth. Station 603 is located farther east and below the spillway area and because of its shallowness was difficult to easily access it for sampling., The regression between pooled temperature data for stations on Transect 6 also showed a strong relationship ($R^2 > 99\%$) with low variance (standard error of estimate slightly less than 0.730).

Table 4-9 shows the total number of hours each Francis and Kaplan turbine operated at Conowingo in July and August from 2005 through 2010. The 24 hour period was divided between three time periods. Early morning operations consisted of 2400-0759 hour, daytime operations consisted of 0800-1959 hour, and nighttime operations were from 2000-2359 hour. The Kaplan units were operated mainly during the daytime hours and particularily when river flows were greater than 10,000 cfs as measured at Holtwood Station. The large Kaplan turbines are primarily operated in combination with Francis units, rarely alone.

4.4 Compliance With Maryland DO Standards

Historically (prior to 2005), the daily DO standard value of 5.0 mg/L was deemed adequate for meeting both MDNR and PADEP water quality standards. This is the reason why the DO figures in this report have the DO reference line of 5.0 mg/L represented on them. In addition, the current DO standards were also met. The State of Maryland's current DO standards (adopted in 2005) applicable to the discharge at Conowingo Dam are as follows:

- February 1 through May 31, DO ≥ 6 mg/L for a 7-day averaging period; and
- June 1-January 31, DO ≥ 5.5 mg/L as a 30-day average.

As measured by continuous DO measurements recorded at monitoring Station 643 downstream of Conowingo Dam for the period May through October, 2010, the 2005 State of Maryland DO standards were met. As shown in Figure 4-31, virtually all hourly DO values were greater than 6.0 mg/L, and no DO value less than 5.0 mg/L was recorded over the study season in 2010. All DO values were greater than 6 mg/L in May. The 30 day respective averages for June through October were 8.3 mg/L, 7.7 mg/L, 7.2 mg/l, 7.8 mg/L, and 9.5 mg/L. Figure 4-37 shows a comparison of DO values measured at Station 643 with the Maryland State standards in May through October, 2010. As illustrated DO discharges from the Conowingo Project, as measured at Station 643, were well above both the 7-day and 30-day average DO standard throughout the May through October, 2010 period.

The respective minimum and maximum pH values downstream of Conowingo Dam were 6.6 and 8.3. The values are within the established criteria (6.0-9.0 inclusive) of the Pennsylvania and Maryland Water Quality Standards for the duration of the sampling period.

The minimum and maximum turbidity values recorded downstream of Conowingo Dam were 1.1 and 31.9 NTU units. An examination of meteorological records during the sampling period suggests that rain events corresponded with higher turbidity during the sampling period.

The minimum and maximum fecal coliform values recorded in the Conowingo tailrace during the non swimming season were 3 and 290 colonies/100 ml (Table 4-2).

5.0 CONCLUSIONS

The two primary objectives of the study: (1) determine the effects of project operations on water quality (DO and temperature), and (2) confirm the representativeness of the monitoring Station 643 located approximately 0.6 mi downstream of Conowingo Dam, were fulfilled in this study.

In 2010, summer river flows were lower and water temperatures were higher compared to long-term historical averages, providing good, representative conditiosn for assessing both reservoir and tailwater water quality.

When compared to the historical data, the pattern of temperature and DO distribution in Conowingo Pond in 2010 was similar to that which has been observed for over 50 years. A classical temperature stratification, as defined by Welch (1952), (*i.e.*, a decrease in water temperature of 1°C per 1 m increase in depth, or 0.55 °F decrease in temperature with 1 ft increase in depth) was not observed in 2010. However, as in the past, summer DO stratification was observed in the deeper layer (depth > 25 ft or 7.6 m) of Conowingo Pond coincident with low river flows (less than 20,000 cfs and decreasing) and high water temperatures (greater than 75 °F or greater than 23.9 °C and increasing).

Operation of Conowingo Dam did not appear to affect DO or water temperature distribution patterns in Conowingo Pond; however, meteorological-hydrological events (*e.g.*, sudden increase in inflows, high wind) altered the pattern of DO vertical distribution in the Pond, resulting in mixing of various DO strata until the river flows subsided and DO stratification was reestablished.

Downstream, DO and temperature conditions measured in the transects below the dam were generally homogeneous. Some increases in DO were observed at Transect 8 during the summer as water moved downstream from the powerhouse. These increases were likely due to natural aeration in the shallower river downstream of the dam.

Since the bulk of the water withdrawn for power production comes from the deeper portions of Conowingo Pond, and the Pond does not thermally stratify, the downstream water temperatures were virtually identical to those of the Pond temperature. No obvious changes in temperature of water transported through turbines were observed.

Across turbine discharge boils, water temperatures were all found to be similar. There was considerably more variability measured in the DO concentrations of the turbine boils. For the most part, hourly DO values across similar turbine types on the same sampling days were similar. However, DO cocentrations in the discharge boils of the non-aerating larger Kaplan turbines were lower than the discharges from the

Francis turbines, on some sampling days, particiularly in late July. Although there was some variability in turbine boil DO concentrations, ninety eight percent of all hourly DO values measured in the turbine discharge boils DO in 2010 were greater than 5.5 mg/L in 2010.

Relative to DO values measured at Transects 6, 7, and 8, the average DO measurements recorded at Station 643 on the same dates within the same approximate 4 hour sampling time frame (day time), exhibited similar trends. However, the DO values at Station 643 (though all greater than 6 mg/L), particularly in the mid summer period, were lower than those at Transects 6, 7, and 8 with the difference increasing with downstream distance (Transect 8 is tidally influenced). This would be expected considering the re-aeration provided by river flow between transects.

Although simultaneous discharges from multiple turbines may introduce complexity in downstream flow patterns, hourly DO measurements recorded at Station 643 under multiple turbine operational scenarios adequately reflected the water quality of Conowingo Dam discharges. Most Station 643 DO values were within ±0.5 mg/L of the discharge boils DO. Consequently, the present monitoring location of Station 643 is considered representative of turbine discharges for the purpose of measuring compliance with the Maryland State DO standards. As measured by continuous DO measurements from May 1 through October 31 at monitoring Station 643 downstream of Conowingo Dam, the 2005 State of Maryland DO standards, were met at all times.

Based on these results, the 2010 signficant conclusions of the study can be summarized as follows:

- The operation of the Conowingo Project has no effect on the distribution of temperature and DO conditions in Conowingo Pond;
- Water temperature in the Conowingo Project discharge is similar to pond water temperatures and is unaffected by Project operations;
- DO in the water discharged from the Francis units is significantly enhanced by the aeration capabilities of these units. DO in the water discharged from the Kaplan units tends to be somewhat lower than that discharged from the Francis units, on the same day;
- DO and temperature measured at Station 643 are very similar to the DO and temperature conditions measured in the turbine discharge boils and along the downstream transects. Thus, Station 643, is a good, representative location for monitoring compliance with state standards;

- State DO standards were met or exceeded 100% of the time during the period May 1 through October 31, 2010.

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TABLE 3-1: LOCATIONS OF EIGHT TRANSECTS (5 IN CONOWINGO POND AND 3 DOWNSTREAM OF CONOWINGO DAM) SAMPLED FOR WATER QUALITY PARAMETERS, APRIL-OCTOBER 2010.

Transect Name and Point Numbers	Location Number (Mid-Point Bold)	Average Depth (ft)	Waypoint Locations				
			West Shoreline	Point between mid-point and west shoreline	Mid-Point*	Point between mid-point and east shoreline	East Shoreline
Fishing Creek	101	15.3	39.780718N 76.28041W				
101,102,103	**102**	12.3			**39.785497N 76.273943W**		
	103	7.7					39.790550N 76.269030W
Burkin's Run	201	13.8	39.743799N 76.252617W				
201,202,203,204,205	202	7.8		39.746456N 76.248051W			
	203	14.4			**39.749014N 76.24324W**		
	204	15.5				39.751576N 76.238676W	
	205	4.1					39.755660N 76.235800W
Williams Tunnel	301	23.3	39.733799N 76.242465W				
301,302,303,304	302	10.6		39.734734N 76.237444W			
	303	13.6			**39.735864N 76.232788W**		
	304	27.9					39.736712N 76.228448W
State Line	401	6.8	39.719573N 76.240804W				
401,402,403,404	**402**	20.8			**39.719514N 76.236362W**		
	403	14.7				39.719585N 76.230928W	
	404	40.4					39.719336N 76.22649W
Lower Pond	501	42.8	39.661438N 76.185619W				
501,502,503	**502 (611)**	50.3			**39.665462N 76.182695W**		
	503	43.0					39.668883N 76.179542W
Shure's Landing	601	1 to 10 (3.1)	39.652224N 76.166301W				
601,602,603	**602**	1 to 10 (3.3)			**39.653911N 76.164522W**		
	603	1 to 6 (2.3)					39.655598N 76.162743W
Lee's Ferry	701	1 to 10 (3.5)	39.636949N 76.158944W				
701,702,703	**702**	1 to 10 (5.3)			**39.638928N 76.156808W**		
	703	1 to 10 (3.3)					39.640907N 76.154672W
The Pool	801	2 to 10 (5.3)	39.620898N 76.149753W				
801,802,803	**802**	1 to 10 (4.7)			**39.622122N 76.148105W**		
	803	1 to 10 (6.0)					39.623346N 76.146457W

* - Even number transect mid-point determined by greatest depth of the two points near the middle of the river for a given transect.

TABLE 4-1: INCOMING RIVER FLOWS (2010 AND HISTORICAL DAILY AVERAGES AT HOLTWOOD DAM, PPL) AND METEOROLOGICAL CONDITIONS DURING TRANSECT SAMPLING EVENTS (30) IN CONOWINGO POND AND DOWNSTREAM OF CONOWINGO DAM, APRIL-OCTOBER 2010.

Date sampled	Holtwood		Long Term Averages (1952-2009)		Wind Speed**			
	2010 Flow (cfs)	Water Temp (°F)	River Flow (cfs)	Water Temp (°F)	Range MPH	Gust MPH	Average MPH	Prevailing Direction
6-Apr	63,900	57.8	104,874	47.8	0-11	18	N/A	North
13-Apr	37,700	59.7	76,710	49.6	0-15	45	N/A	North
20-Apr	25,300	58.4	67,071	54.4	0-4	12	N/A	North
27-Apr	26,800	60.6	59,210	57.3	0-7	22	2.3	NNE
4-May	45,400	69.2	30,249	60.3	0-8	19	N/A	North
11-May	26,300	63.2	47,297	62.7	0-7	24	1.7	North
17-May	43,500	66.7	52,366	64.3	0-4	10	N/A	North
24-May	30,300	69.6	43,323	67.3	0-4	9	0.4	North
1-Jun	20,000	77.3	36,394	70.3	0-6	14	2.4	North
8-Jun	15,100	79.1	33,184	72.7	0-6	20	2.3	North
15-Jun	22,400	77.0	24,659	75.8	0-3	8	N/A	North
22-Jun	13,800	81.0	33,290	76.6	0-6	13	N/A	North
29-Jun	9,200	84.9	28,891	78.6	0-3	10	1.3	North
7-Jul	8,000	83.8	18,298	79.7	0-3	8	0.9	North
13-Jul	12,800	N/A*	15,948	81.0	0-5	13	N/A	NNE
20-Jul	8,700	N/A*	14,278	82.1	0-4	12	1.2	North
27-Jul	8,600	N/A*	15,069	82.0	0-4	10	N/A	North
2-Aug	8,600	N/A*	15,300	82.0	0-6	13	N/A	North
10-Aug	5,800	83.9	13,464	81.8	0-4	7	N/A	North
16-Aug	7,700	81.1	12,505	81.0	0-4	16	N/A	NNE
24-Aug	6,600	79.7	11,955	80.2	0-2	6	N/A	North
31-Aug	11,500	79.4	10,655	79.5	0-3	4	N/A	North
7-Sep	6,200	78.7	11,886	78.2	0-7	14	2.8	North
14-Sep	4,500	74.0	12,504	75.7	0-6	17	N/A	North
20-Sep	4,600	71.8	20,707	73.2	0-4	15	N/A	North
28-Sep	5,300	71.7	23,663	70.0	0-9	22	N/A	NNE
5-Oct	68,900	60.7	16,300	66.4	0-2	11	N/A	NE
11-Oct	41,200	61.6	18,156	64.3	0-3	10	0.8	NNE
19-Oct	22,200	56.6	19,826	61.2	0-2	6	N/A	NE
26-Oct	16,300	55.7	24,419	58.2	0-6	15	2.9	North

Holtwood river flow (cfs) and water temperature data supplied by PPL (Long term river flow 1952-2009; water temperature 1956-2009).
* Suspect recorder malfunction
**Wind speed measured at US-1 at Conowingo, MD; data provided by MDDOT through weather underground.com

TABLE 4-2: FECAL COLIFORM SAMPLES COLLECTED FROM CONOWINGO POND AND BELOW CONOWINGO DAM, APRIL-OCTOBER 2010.

Sample Collected		Sample Analyzed		Analytical results per 100 ml							
				Pennsylvania station locations				Maryland station locations			
Date	Time	Date	Time	102	203	303	402	502	602	702	802
6-Apr	10:50-12:00	7-Apr	1920	4	2	5	2	2	5	3	9
4-May	11:09-13:28	5-May	2031	240	99	7	14	<1	<1	<1	<1
1-Jun	09:45-13:04	2-Jun	2055	4	1/70 ml	2/80 ml	2	1	11	4	9
13-Jul	10:10-12:18	14-Jul	1910	1	11	19	22	2	170	85	33
10-Aug	09:57-13:42	11-Aug	1943	1	<1	<10	2	<1	16	6	3
7-Sep	10:42-13:48	8-Sep	1950	<1	<1	2	<1	1	16/81 ml	8/91 ml	4/91 ml
5-Oct	09:55-12:51	6-Oct	2025	250	350	270	210	110	230	290	200

Notes:

1) Analytical Reports produced by Lancaster Laboratories using the SM20 9222 D Method.

2) The Pennsylvania Department of Environmental Protection (PADEP, 1999, p.16) fecal coliform standard for bathing (full body contact) is 200 and the U.S. Environmental Protection Agency (USEPA) have the same set of criteria for fecal coliform levels, on the basis of water use. For bathing (full body contact) in recreational freshwater, on the basis of a statistically sufficient number of samples (generally not less than five samples equally spaced over a 30-day period), the geometric mean of the indicated bacterial densities of fecal coliform should not exceed 200 colonies/100 ml during the swimming season (May 1 through September 30) and should not exceed 2,000 colonies/100 ml for the remainder of the year.

TABLE 4-3: NUMBER OF HOURLY DO AND WATER TEMPERATURE MEASUREMENTS TAKEN IN EACH OPERATING TURBINE DISCHARGE BOIL IN JULY AND AUGUST, 2010.

	Date of Boil Measurements																				Total Number of Measurements
Unit #	**2-Jul**	**3-Jul**	**4-Jul**	**5-Jul**	**14-Jul**	**15-Jul**	**16-Jul**	**17-Jul**	**30-Jul**	**31-Jul**	**1-Aug**	**2-Aug**	**13-Aug**	**14-Aug**	**15-Aug**	**16-Aug**	**25-Aug**	**26-Aug**	**27-Aug**	**28-Aug**	
1					7	10	5	4			4			3			7				40
2	13	13	13	13	13	13	13	12			4	11	13	13	13	13	7	13	11	12	213
3			1		7	10	6	4	2	3	3			3			7	3	3		52
4			1		7		5		2	3				2		6		3	3		32
5	13	13	13	13					13	13	13	13		1	1	6	13				125
6					7		6	12		3				1		6					35
7					13	13	13		2					1		6		3			51
8			1		7	6	6	4			3			2			6	2			37
9					2	6	5	2	2					2			6	2			27
10																			4	8	12
11					3	6								2							11
Total	**26**	**26**	**29**	**26**	**66**	**64**	**59**	**38**	**21**	**22**	**27**	**24**	**13**	**30**	**14**	**37**	**46**	**26**	**21**	**20**	**635**

TABLE 4-4: AVEAGE HOURLY WATER TEMPERATURE (°F) OF OPERATING TURBINE BOILS (0600-1800 HOUR) AT CONOWINGO DAM ON FERC SELECTED DATES IN JULY-AUGUST 2010. FOR COMPARISON, AVERAGE WATER TEMPERATURE VALUES RECORDED 1 HOUR LATER AT STATION 643 DOWNSTREAM OF CONOWINGO DAM (0700-1900 HOUR) FOR THE SAME DATES ARE ALSO GIVEN.

Unit #	Dates																			
	2-Jul	3-Jul	4-Jul	5-Jul	14-Jul	15-Jul	16-Jul	17-Jul	30-Jul	31-Jul	1-Aug	2-Aug	13-Aug	14-Aug	15-Aug	16-Aug	25-Aug	26-Aug	27-Aug	28-Aug
1					86.6	86.2	85.7	85.8			88.1			88.0			84.3			
2	84.8	84.3	84.2	84.7	86.5	86.2	85.8	84.9			88.1	87.7	85.8	88.0	87.2	85.7	84.4	82.1	84.0	83.4
3			84.2		86.4	86.1	85.9	85.6	89.2	89.1	88.2			88.1			84.3	84.0	83.8	
4			84.6		86.3		85.7		89.2	89.2				88.1		85.5		83.9	83.8	
5	84.7	84.4	84.3	84.9					88.4	89.1	88.1	87.7		87.6	87.3	85.6	84.2			
6					86.2		85.7	84.7		89.1				88.0		85.6				
7					86.1	86.0	85.8		89.3					88.0		85.4		83.9		
8			84.2		85.9	86.0	85.9	85.7			88.4			88.1			84.3	83.3		
9					86.4	85.8	85.5	85.7	88.5					88.0			84.4	83.3		
10																			83.6	83.7
11					86.0	86.0								88.1						
Average Boil Water Temp.	84.8	84.4	84.3	84.8	86.3	86.0	85.8	85.4	88.9	89.1	88.2	87.7	85.8	88.0	87.3	85.6	84.3	83.4	83.8	83.6
Station 643	84.2	84.1	84.4	84.7	87.1	87.1	86.6	86.6	88.4	88.7	88.1	87.4	86.6	87.1	86.0	86.3	84.2	84.1	83.7	83.1
Average Conowingo discharge (kcfs)*	5.73	5.61	8.76	6.08	30.96	32.98	24.02	16.06	10.65	10.02	12.74	6.87	5.85	13.28	5.92	17.71	21.37	12.83	9.99	10.11

* - Recorded at Conowingo USGS gage no. 01578310

TABLE 4-5: AVERAGE HOULTY DO (MG/L) OF OPERATING TURBINE BOILS (0600-1800 HOUR) AT CONOWINGO DAM ON FERC SELECTED DATES IN JULY-AUGUST 2010. FOR COMPARISION, AVERAGE DO VALUES AT STATION 643 DOWNSTREAM OF CONOWINGO DAM (0700-1900 HOUR) FOR THE SAME DATES ARE ALSO GIVEN.

	Dates																			
Unit #	2-Jul	3-Jul	4-Jul	5-Jul	14-Jul	15-Jul	16-Jul	17-Jul	30-Jul	31-Jul	1-Aug	2-Aug	13-Aug	14-Aug	15-Aug	16-Aug	25-Aug	26-Aug	27-Aug	28-Aug
1					7.2	7.3	7.2	7.3			6.7			6.3			7.0			
2	8.5	8.3	8.0	8.1	7.8	7.7	7.9	7.9			7.2	8.2	7.5	7.1	7.5	7.3	7.4	7.8	7.7	8.0
3			7.0		7.2	7.2	7.3	6.8	6.8	6.9	6.3			6.9			6.7	7.2	7.5	
4			7.0		6.9		7.2		6.9	6.8				6.2		6.5		7.0	7.2	
5	8.4	8.2	7.8	7.8					7.3	7.2	7.1	7.8		6.6	7.9	7.2	7.4			
6					6.7		6.7	5.5		6.7				5.7		6.6				
7					7.2	7.0	7.2		6.7					6.6		6.7		6.9		
8			6.0		6.2	5.9	6.2	6.0			5.4			5.1			5.8	6.4		
9					6.0	5.1	5.8	6.3	5.9					5.3			5.6	6.4		
10																			7.5	7.4
11					5.4	4.8								4.3						
Daily Avg. DO (mg/l)	8.5	8.3	7.2	8.0	6.7	6.4	6.9	6.6	6.7	6.9	6.5	8.0	7.5	6.0	7.7	6.9	6.7	7.0	7.5	7.7
Station 643	8.6	8.9	8.0	8.5	7.4	7.6	7.9	8.1	6.9	7.0	6.7	8.0	6.6	7.4	7.7	7.5	7.0	7.5	7.3	7.6
Average Conowingo discharge (kcfs)*	5.73	5.61	8.76	6.08	30.96	32.98	24.02	16.06	10.65	10.02	12.74	6.87	5.85	13.28	5.92	17.71	21.37	12.83	9.99	10.11

* - Recorded at Conowingo USGS gage no. 01578310

TABLE 4-6: DIFFERENCES BETWEEN AVERAGE STATION 643 DO AND AVERAGE DISCHARGE BOIL DO WITH AND WITHOUT KAPLAN TURBINE OPERATION ON FERC SELECTED DATES IN JULY-AUGUST 2010.

		2-Jul	3-Jul	4-Jul	5-Jul	14-Jul	15-Jul	16-Jul	17-Jul	30-Jul	31-Jul	1-Aug	2-Aug	13-Aug	14-Aug	15-Aug	16-Aug	25-Aug	26-Aug	27-Aug	28-Aug	Overall
Kaplan off	Mean 643 DO	8.63	8.90	8.08	8.46	7.87	7.80	8.25	8.37	6.80	6.96	6.82	7.90	6.54	7.56	7.66	7.46	7.41	7.61	7.31	7.16	7.69
	N	12	13	12	13	6	7	7	8	11	13	10	13	13	11	13	13	7	11	7	4	204
	Mean Boil DO	8.42	8.23	7.95	7.94	7.82	7.38	7.85	6.97	7.28	7.04	7.19	7.94	7.51	7.12	7.51	6.94	7.44	7.77	7.67	7.98	7.60
	N	21	26	23	26	12	22	14	16	11	22	12	23	13	13	14	37	10	14	9	4	342
	643 DO minus Boil DO	0.22	0.66	0.12	0.52	0.06	0.42	0.40	1.41	-0.48	-0.08	-0.37	-0.05	-0.96	0.44	0.16	0.53	-0.03	-0.16	-0.36	-0.82	0.10
Kaplan on	Mean 643 DO			7.78		7.18	7.80	7.60	7.71	7.29		6.37			7.20			6.55	7.06	7.38	7.69	7.69
	N			1		7	7	6	4	2		3			2			6	2	4	8	51
	Mean Boil DO			7.00		6.84	6.39	6.88	6.48	6.72		6.45			5.87			6.64	6.83	7.49	7.74	6.72
	N			5		54	42	45	22	10		15			17			36	12	12	16	286
	643 DO minus Boil DO			0.78		0.34	1.41	0.72	1.23	0.57		-0.08			1.33			-0.09	0.22	-0.11	-0.05	0.97

* Several instances occurred with two observations in the same hour at discharge boils, these were averaged. Total number of discharge boil measurements = 635.

TABLE 4-7: REGRESSION STATISTICS FOR RELATIONSHIPS BETWEEN WATER TEMPERATURES AT STATIONS 501-503 IN CONOWINGO POND AND STATION 643 DOWNSTREAM OF CONOWINGO DAM.

Station 501 versus Station 643	
	R^2 = 99.5% $S_{y.x}$ = 0.752 N = 25
Station 502 versus Station 643	
	R^2 = 99.4% $S_{y.x}$ = 0.791 N = 25
Station 503 versus Station 643	
	R^2 = 99.4% $S_{y.x}$ = 0.823 N = 25
Transect 5 (pooled) versus Station 643	
	R^2 = 99.5% $S_{y.x}$ = 0.78 N = 25

TABLE 4.8: REGRESSION STATISTICS FOR RELATIONSHIPS BETWEEN WATER TEMPERATURES AT STATIONS 601-603 (TRANSECT ACROSS STATION 643) AND STATION 643 DOWNSTREAM OF CONOWINGO DAM.

Station 601 versus Station 643	
	R^2 = 99.3% **$S_{y.x}$ = 0.840** **N = 26**
Station 602 versus Station 643	
	R^2 = 99.7% **$S_{y.x}$ = 0.522** **N = 26**
Station 603 versus Station 643	
	R^2 = 98.0% **$S_{y.x}$ = 1.467** **N = 26**
Transect 6 (pooled) versus Station 643	
	R^2 = 99.5% **$S_{y.x}$ = 0.729** **N = 26**

TABLE 4-9: NUMBER OF HOURS EACH FRANCIS (UNITS 1-7) KAPLAN (UNITS 8-11) TURBINE OPERATED AT CONOWINGO HYDROELECTRIC STATION, JULY-AUGUST 2005-2010.

			Unit 1		Unit 2		Unit 3		Unit 4		Unit 5	
			Hours Ran	% of available hours*	Hours Ran	% of available hours*	Hours Ran	% of available hours*	Hours Ran	% of available hours*	Hours Ran	% of available hours*
2005	July	Day (0800-1959)	174	47	169	45	122	33	191	51	0	0
		Night (2000-2359)	57	46	47	38	16	13	47	38	0	0
		Early Morning (2400-0759)	91	37	86	35	16	6	76	31	0	0
	August	Day (0800-1959)	84	23	323	87	8	2	6	2	0	0
		Night (2000-2359)	28	22	111	89	2	1	5	4	0	0
		Early Morning (2400-0759)	46	18	209	84	0	0	16	6	0	0
2006	July	Day (0800-1959)	363	98	221	60	208	56	311	84	304	88
		Night (2000-2359)	118	95	41	33	51	41	83	67	82	66
		Early Morning (2400-0759)	225	91	47	19	25	10	82	33	91	37
	August	Day (0800-1959)	173	47	41	11	184	49	149	40	302	81
		Night (2000-2359)	52	42	1	1	31	25	23	19	88	71
		Early Morning (2400-0759)	102	41	0	0	0	0	0	0	157	63
2007	July	Day (0800-1959)	34	9	0	0	49	13	32	9	372	100
		Night (2000-2359)	4	3	0	0	4	4	8	7	124	100
		Early Morning (2400-0759)	1	1	0	0	1	1	1	1	248	100
	August	Day (0800-1959)	92	25	1	0	129	35	158	42	365	98
		Night (2000-2359)	12	10	3	2	18	15	15	12	122	98
		Early Morning (2400-0759)	0	0	2	1	0	0	0	0	38	15
2008	July	Day (0800-1959)	62	17	0	0	165	44	145	39	372	100
		Night (2000-2359)	3	2	0	0	15	12	12	10	123	99
		Early Morning (2400-0759)	0	0	0	0	4	2	0	0	248	100
	August	Day (0800-1959)	32	9	0	0	95	25	83	22	367	99
		Night (2000-2359)	2	2	0	0	7	6	7	6	124	100
		Early Morning (2400-0759)	0	0	0	0	0	0	0	0	240	97
2009	July	Day (0800-1959)	136	37	327	88	88	24	213	57	175	47
		Night (2000-2359)	33	27	108	87	26	21	49	40	38	30
		Early Morning (2400-0759)	0	0	204	82	2	1	0	0	42	17
	August	Day (0800-1959)	191	51	292	79	190	51	103	28	236	63
		Night (2000-2359)	49	39	97	78	46	37	29	23	65	52
		Early Morning (2400-0759)	25	10	175	70	2	1	10	4	80	32
2010	July	Day (0800-1959)	55	15	315	85	71	19	44	12	209	56
		Night (2000-2359)	3	2	104	84	6	5	2	2	84	68
		Early Morning (2400-0759)	0	0	205	83	0	0	0	0	141	57
	August	Day (0800-1959)	40	11	293	79	43	12	60	16	134	36
		Night (2000-2359)	5	4	110	89	6	4	8	7	36	29
		Early Morning (2400-0759)	8	3	190	77	0	0	0	0	61	24

TABLE 4.9: CONTINUED.

			Unit 6		Unit 7		Unit 8		Unit 9		Unit 10	
			Hours Ran	**% of available hours***	**Hours Ran**	**% of available hours***	**Hours Ran**	**% of available hours***	**Hours Ran**	**% of available hours***	**Hours Ran**	**% of available hours***
2005	July	Day (0800-1959)	111	30	127	34	54	15	66	18	47	13
		Night (2000-2359)	24	19	18	14	1	1	1	1	1	1
		Early Morning (2400-0759)	29	12	16	6	0	0	0	0	0	0
	August	Day (0800-1959)	62	17	46	12	3	1	0	0	6	2
		Night (2000-2359)	25	20	18	14	0	0	0	0	0	0
		Early Morning (2400-0759)	46	18	32	13	0	0	0	0	0	0
2006	July	Day (0800-1959)	0	0	274	74	229	62	233	63	249	67
		Night (2000-2359)	0	0	52	42	49	39	44	36	40	33
		Early Morning (2400-0759)	0	0	64	26	46	18	53	21	57	23
	August	Day (0800-1959)	0	0	100	27	48	13	44	12	61	16
		Night (2000-2359)	0	0	5	4	1	1	1	1	2	2
		Early Morning (2400-0759)	0	0	0	0	0	0	0	0	0	0
2007	July	Day (0800-1959)	0	0	0	0	6	2	0	0	6	2
		Night (2000-2359)	0	0	0	0	1	1	0	0	0	0
		Early Morning (2400-0759)	0	0	0	0	0	0	0	0	0	0
	August	Day (0800-1959)	8	2	0	0	61	16	28	8	22	6
		Night (2000-2359)	2	2	0	0	9	7	3	3	2	2
		Early Morning (2400-0759)	0	0	0	0	0	0	0	0	0	0
2008	July	Day (0800-1959)	50	13	133	36	78	21	30	8	0	0
		Night (2000-2359)	4	3	2	2	1	1	0	0	0	0
		Early Morning (2400-0759)	0	0	2	1	0	0	0	0	0	0
	August	Day (0800-1959)	24	6	31	8	17	5	0	0	5	1
		Night (2000-2359)	7	5	3	2	2	2	0	0	0	0
		Early Morning (2400-0759)	8	3	0	0	0	0	0	0	1	0
2009	July	Day (0800-1959)	160	43	218	59	129	35	74	20	50	13
		Night (2000-2359)	32	26	36	29	29	24	11	9	4	3
		Early Morning (2400-0759)	0	0	0	0	2	1	0	0	0	0
	August	Day (0800-1959)	190	51	238	64	182	49	110	30	131	35
		Night (2000-2359)	50	40	61	49	63	50	32	26	33	26
		Early Morning (2400-0759)	18	7	27	11	18	7	1	0	9	4
2010	July	Day (0800-1959)	130	35	75	20	60	16	38	10	0	0
		Night (2000-2359)	45	36	9	7	1	1	1	1	0	0
		Early Morning (2400-0759)	76	31	20	8	0	0	0	0	0	0
	August	Day (0800-1959)	22	6	26	7	29	8	18	5	11	3
		Night (2000-2359)	3	3	3	3	0	0	0	0	5	4
		Early Morning (2400-0759)	0	0	0	0	0	0	0	0	1	0

TABLE 4.9: CONTINUED.

			Unit 11		Average
			Hours Ran	% of available hours*	Holtwood Flow
2005	July	Day (0800-1959)	43	12	12,490
		Night (2000-2359)	1	1	
		Early Morning (2400-0759)	0	0	
	August	Day (0800-1959)	0	0	4,894
		Night (2000-2359)	0	0	
		Early Morning (2400-0759)	0	0	
2006	July	Day (0800-1959)	261	70	51,713
		Night (2000-2359)	62	50	
		Early Morning (2400-0759)	68	27	
	August	Day (0800-1959)	66	18	14,552
		Night (2000-2359)	2	2	
		Early Morning (2400-0759)	0	0	
2007	July	Day (0800-1959)	0	0	6,594
		Night (2000-2359)	0	0	
		Early Morning (2400-0759)	0	0	
	August	Day (0800-1959)	1	0	9,526
		Night (2000-2359)	0	0	
		Early Morning (2400-0759)	0	0	
2008	July	Day (0800-1959)	0	0	11,219
		Night (2000-2359)	0	0	
		Early Morning (2400-0759)	0	0	
	August	Day (0800-1959)	0	0	7,710
		Night (2000-2359)	0	0	
		Early Morning (2400-0759)	0	0	
2009	July	Day (0800-1959)	51	14	20,342
		Night (2000-2359)	4	3	
		Early Morning (2400-0759)	0	0	
	August	Day (0800-1959)	123	33	27,577
		Night (2000-2359)	29	23	
		Early Morning (2400-0759)	9	4	
2010	July	Day (0800-1959)	12	3	9,448
		Night (2000-2359)	0	0	
		Early Morning (2400-0759)	0	0	
	August	Day (0800-1959)	6	2	8,065
		Night (2000-2359)	0	0	
		Early Morning (2400-0759)	0	0	

FIGURE 1-1: LOCATIONS OF POWER STATIONS IN THE LOWER SUSQUEHANNA RIVER 2010.

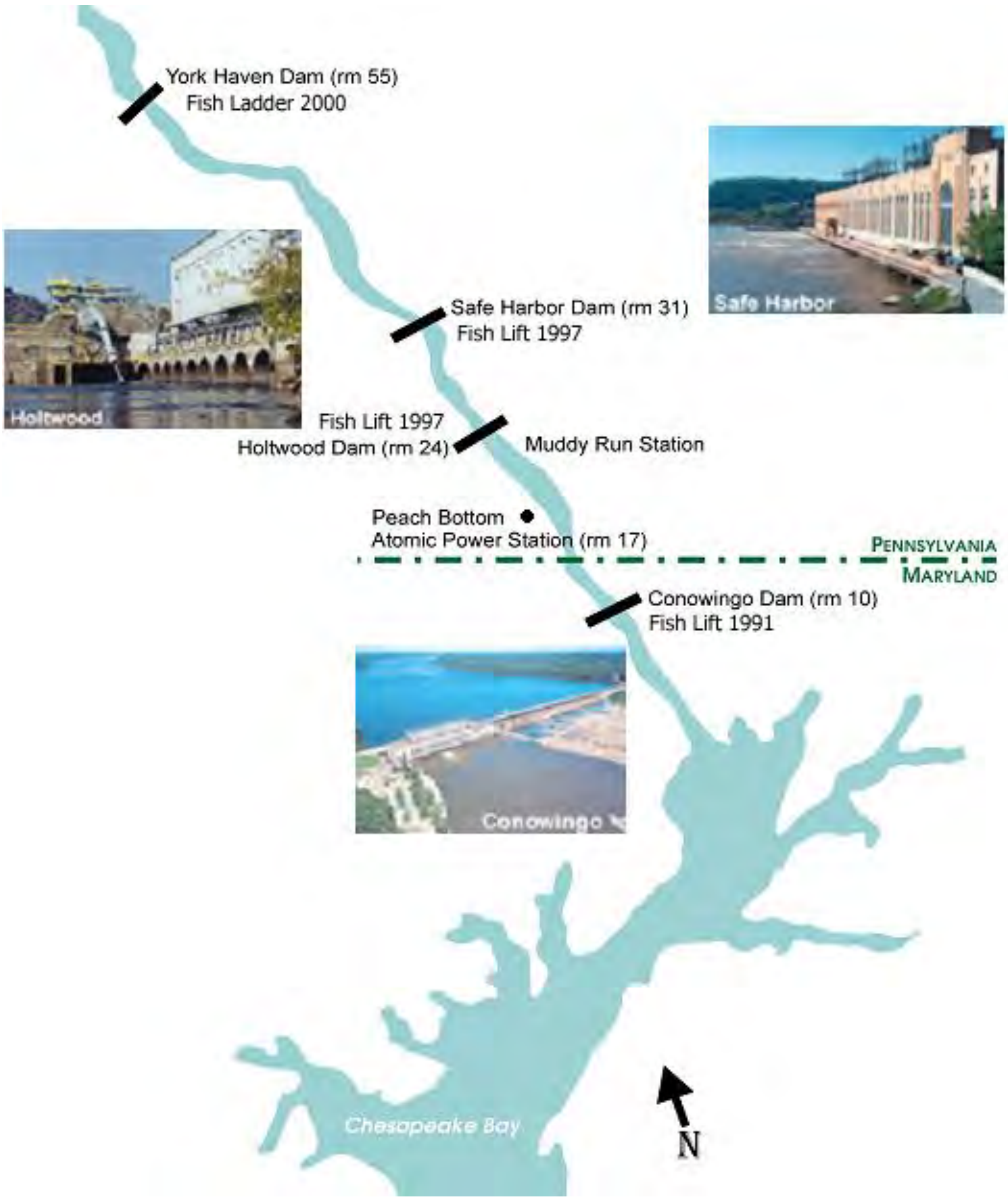


FIGURE 2-1: SCHEMATIC LOCATIONS OF CONOWINGO HYDROELECTRIC STATION FRANCIS TURBINE UNITS (1-7) AND KAPLAN TYPE UNITS (8-11) RELATIVE TO DOWNSTREAM (0.6 MI) WATER QUALITY MONITORING STATION 643.

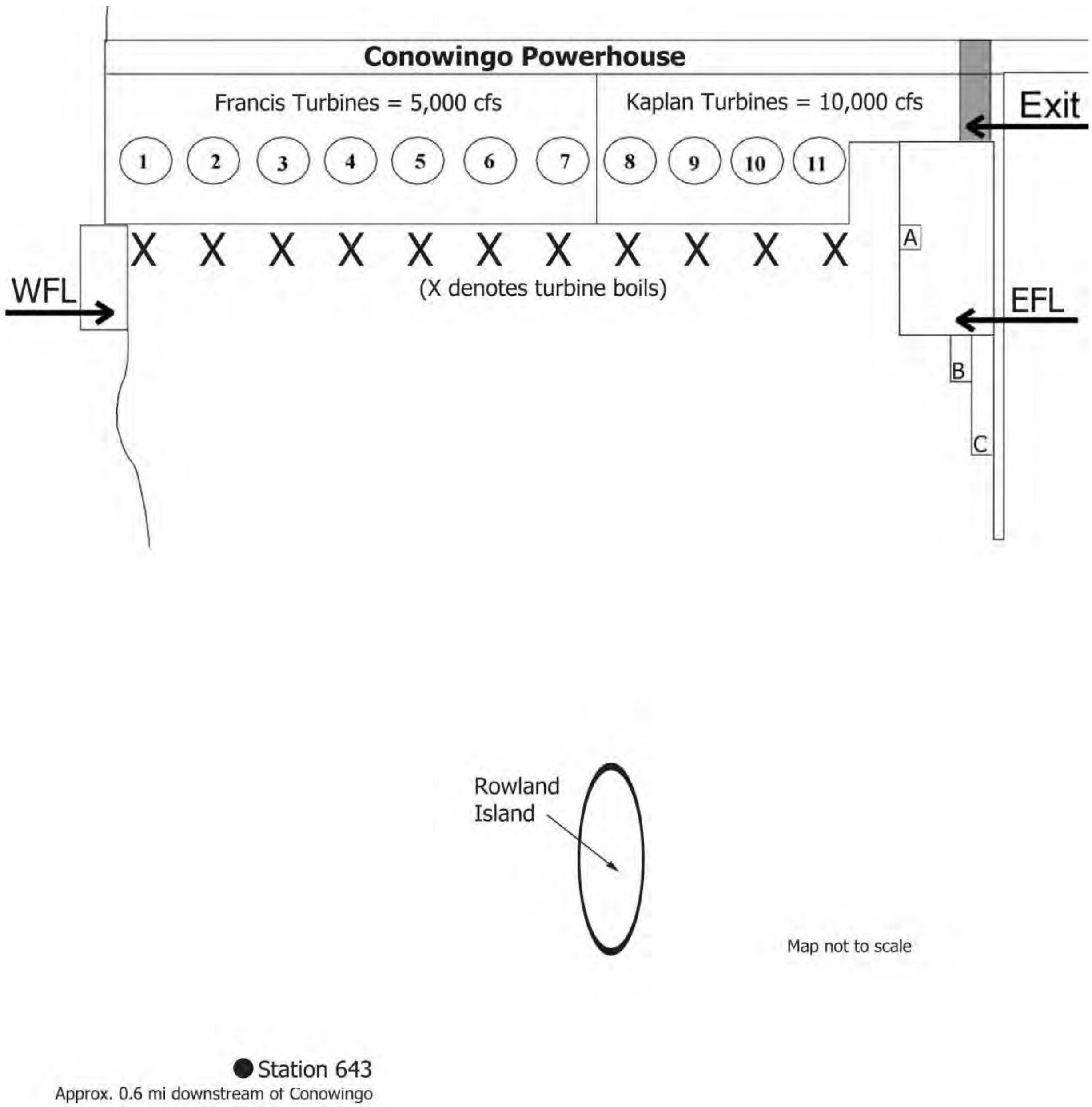
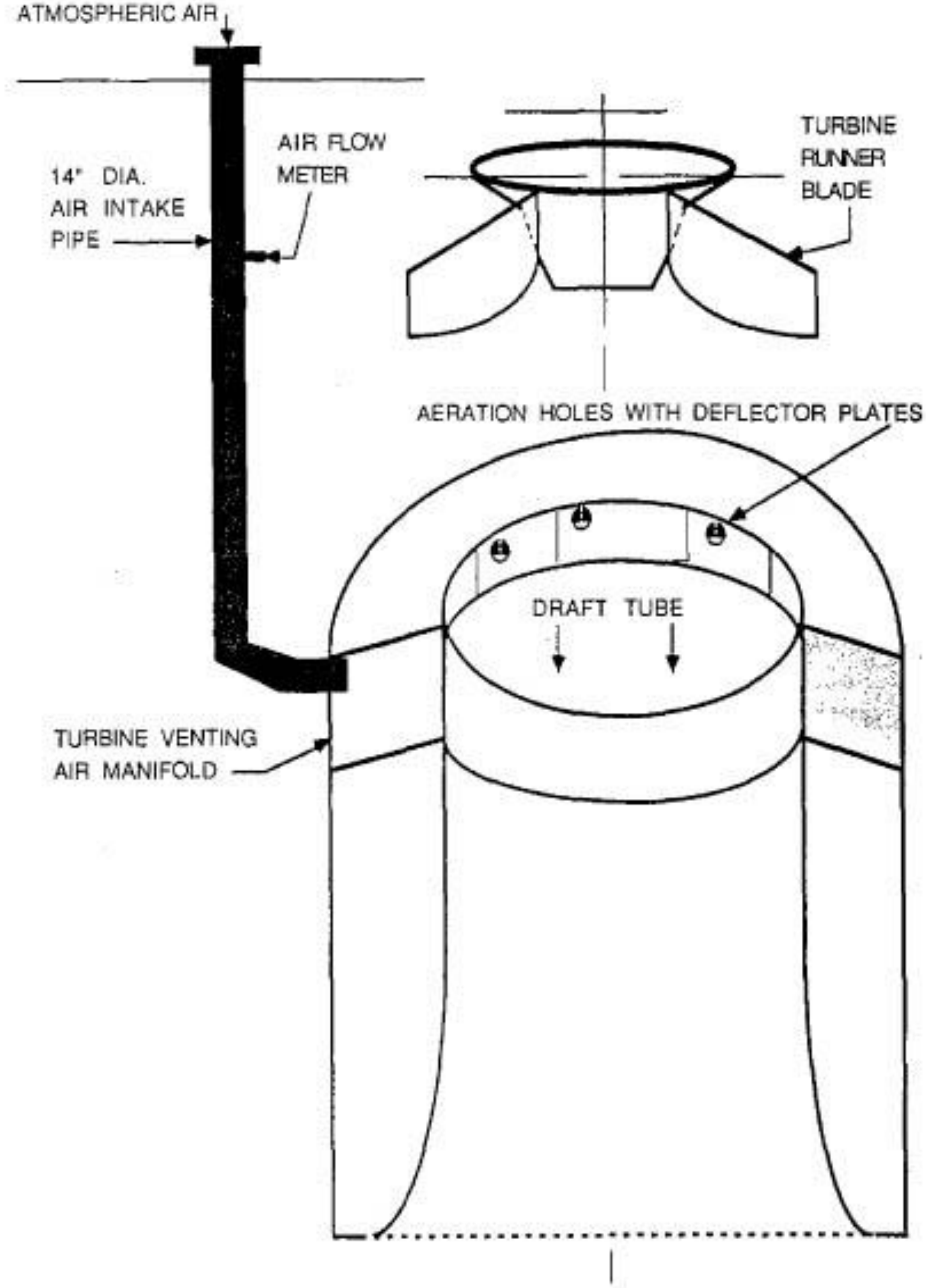


FIGURE 2-2: MODIFIED VENTING SYSTEM INSTALLED IN FRANCIS TURBINES AT CONOWINGO HYDROELECTRIC STATION. REPRODUCED FROM PECO (1990).



EXELON GENERATION COMPANY, LLC

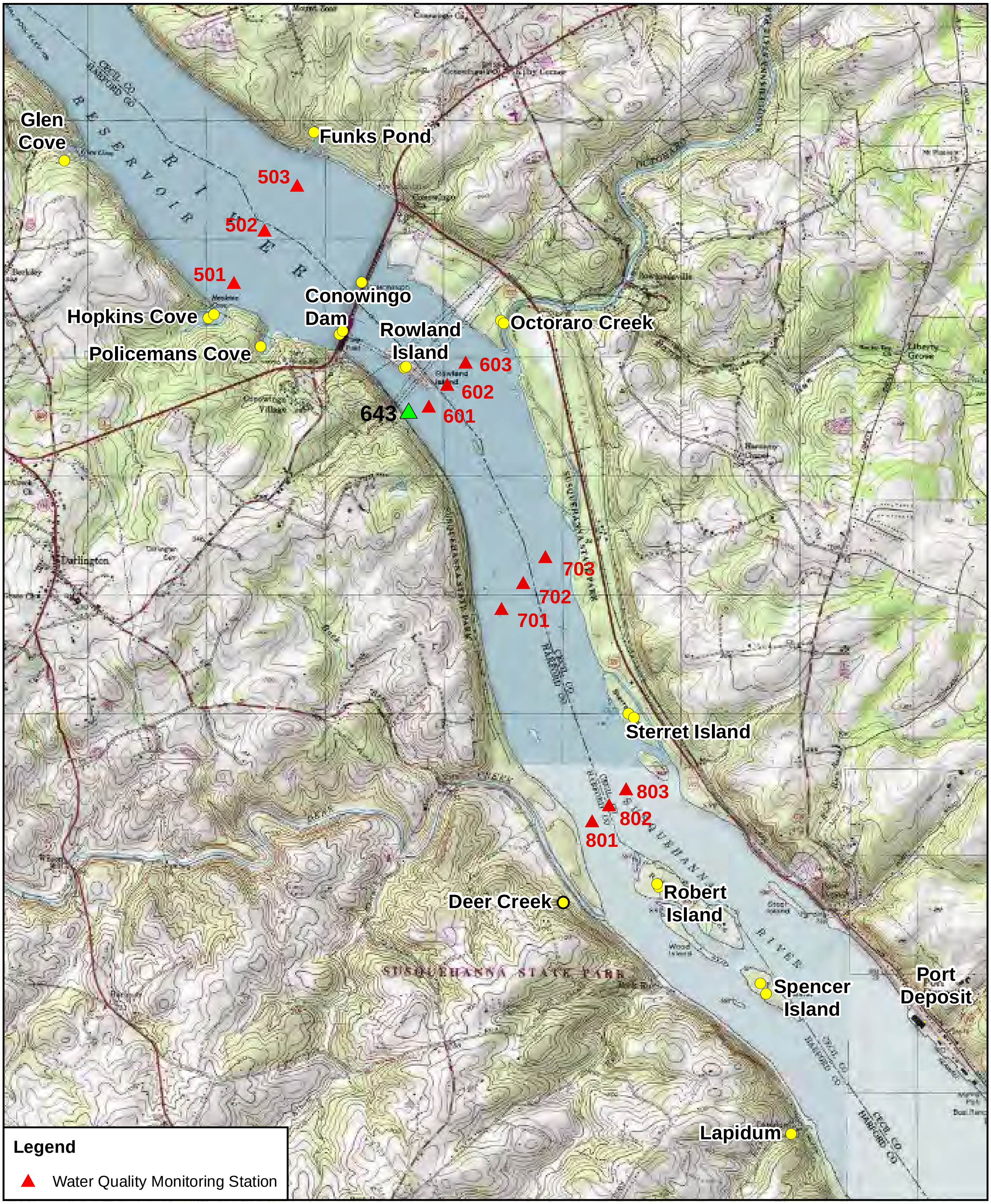
STUDY 3.1
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

1 inch = 1.5 miles

0 0.75 1.5 3 Miles

Figure 3-1:
Water Quality Sampling Transects in Conowingo Pond, April - October 2010

Path: X:\GISMaps\project_maps\rsp\conowingo\3_01_wq\Figure 3-1_Conowingo_WQ.mxd



EXELON GENERATION COMPANY, LLC

STUDY 3.1
CONOWINGO HYDROELECTRIC PROJECT
PROJECT NO. 405

1 inch = 0.7 miles

0 0.35 0.7 1.4 Miles

N

Figure 3-2:
Water Quality Sampling Transects and Station 643 downstream of Conowingo Dam, April - October 2010

Path: X:\GISMaps\project_maps\rsp\conowingo\3_01_wq\Figure 3-2_BelowConowingo_WQ.mxd

FIGURE 4-1: PLOT OF AVERAGE DAILY FLOW IN 2010 (APRIL-OCTOBER) AND LONG-TERM AVERAGE DAILY FLOW (1952-2009) AS MEASURED AT HOLTWOOD DAM, PPL.

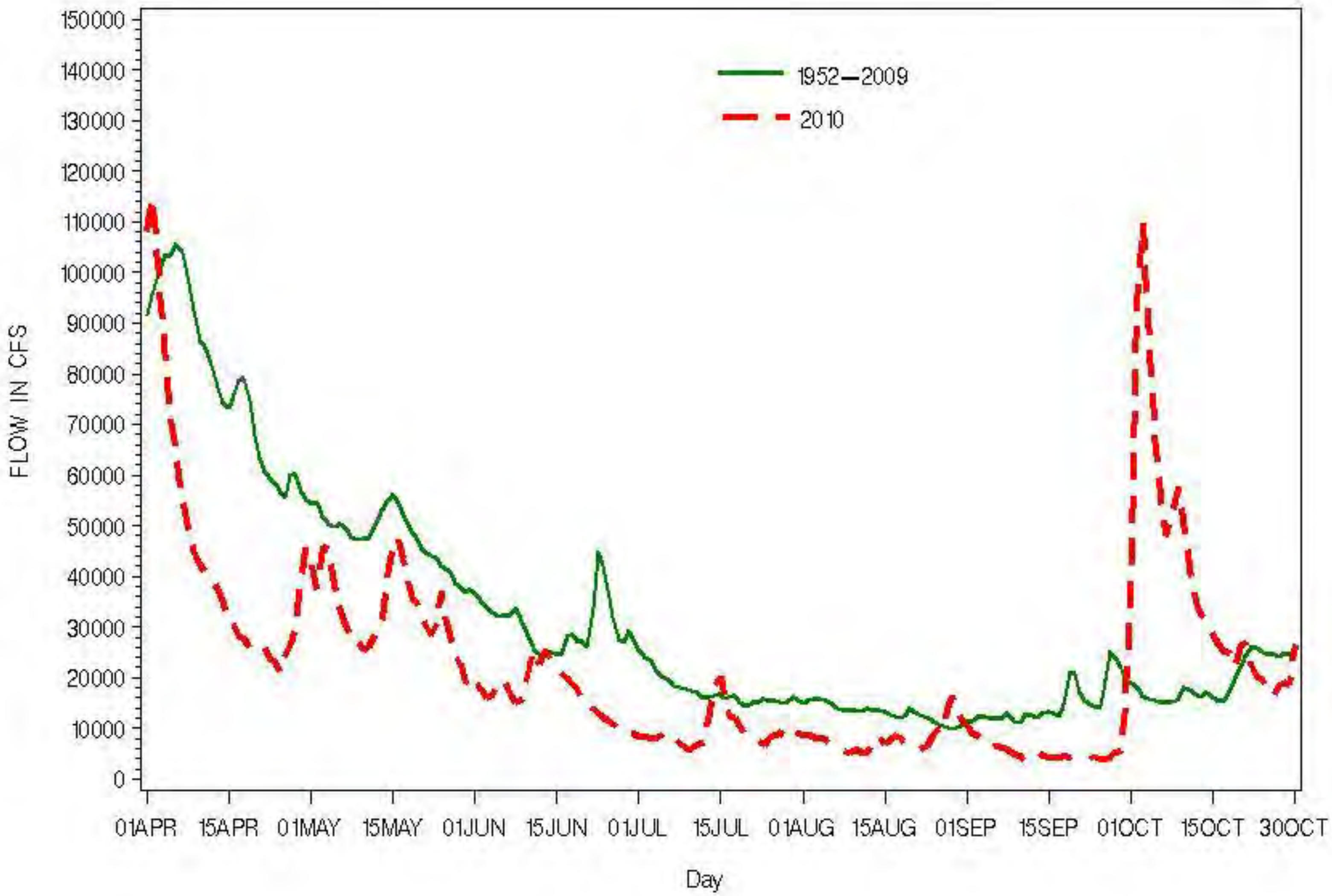


FIGURE 4-2: PROVIDES AN AVERAGE DAILY FLOW DURATION CURVE FOR THE PERIOD APRIL-OCTOBER, 2010, IN COMPARISON TO THE LONG-TERM (1952-2009) AVERAGE DAILY FLOW DURATION CURVE FOR THE SAME MONTHS.

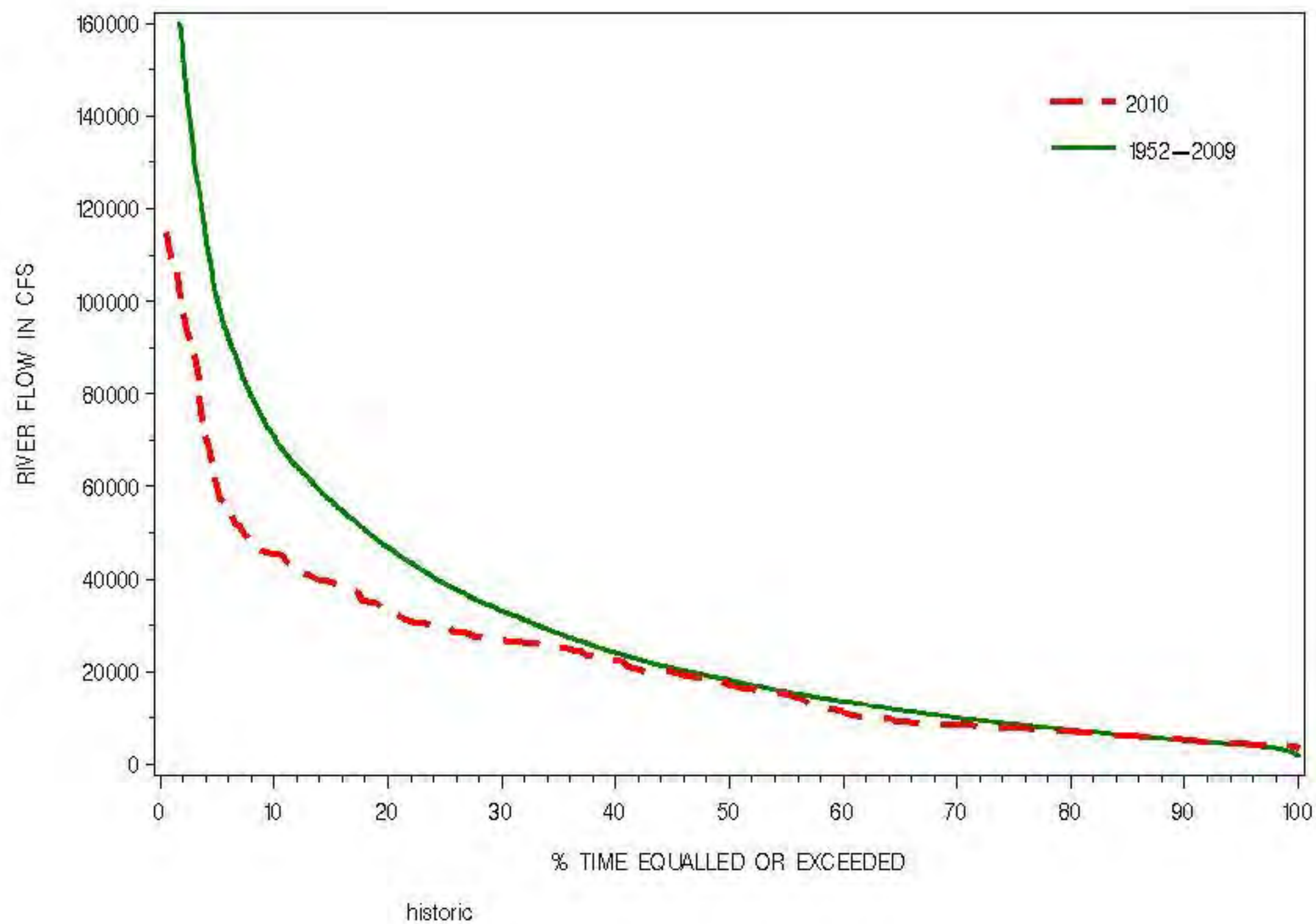


FIGURE 4-3: COMPARISON OF HISTORICAL (1952-2009) DAILY AVERAGE RIVER AND 2010 FLOW DURATION CURVES FOR APRIL.

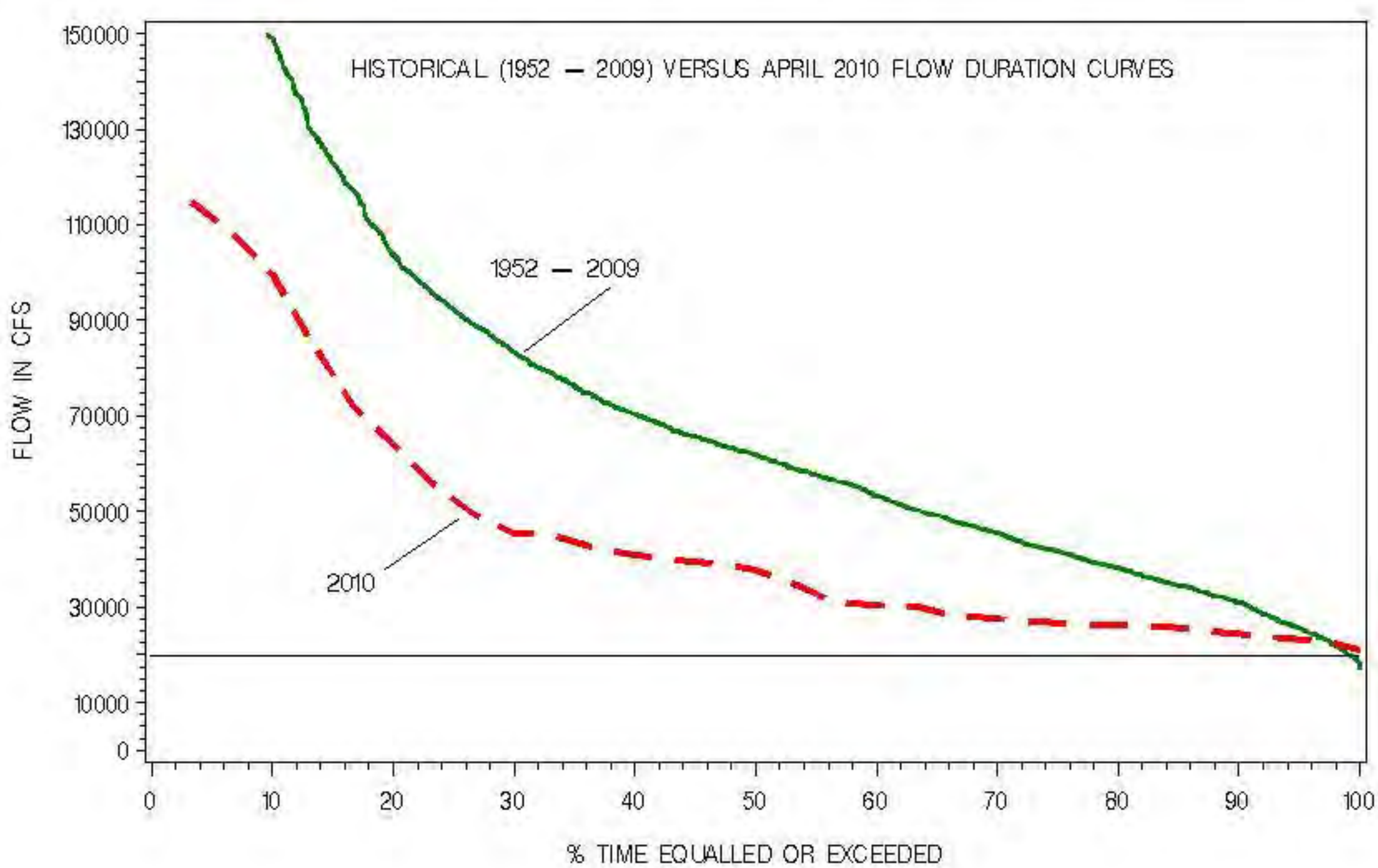


FIGURE 4-4: COMPARISON OF HISTORICAL (1952-2009) DAILY AVERAGE RIVER AND 2010 FLOW DURATION CURVES FOR MAY.

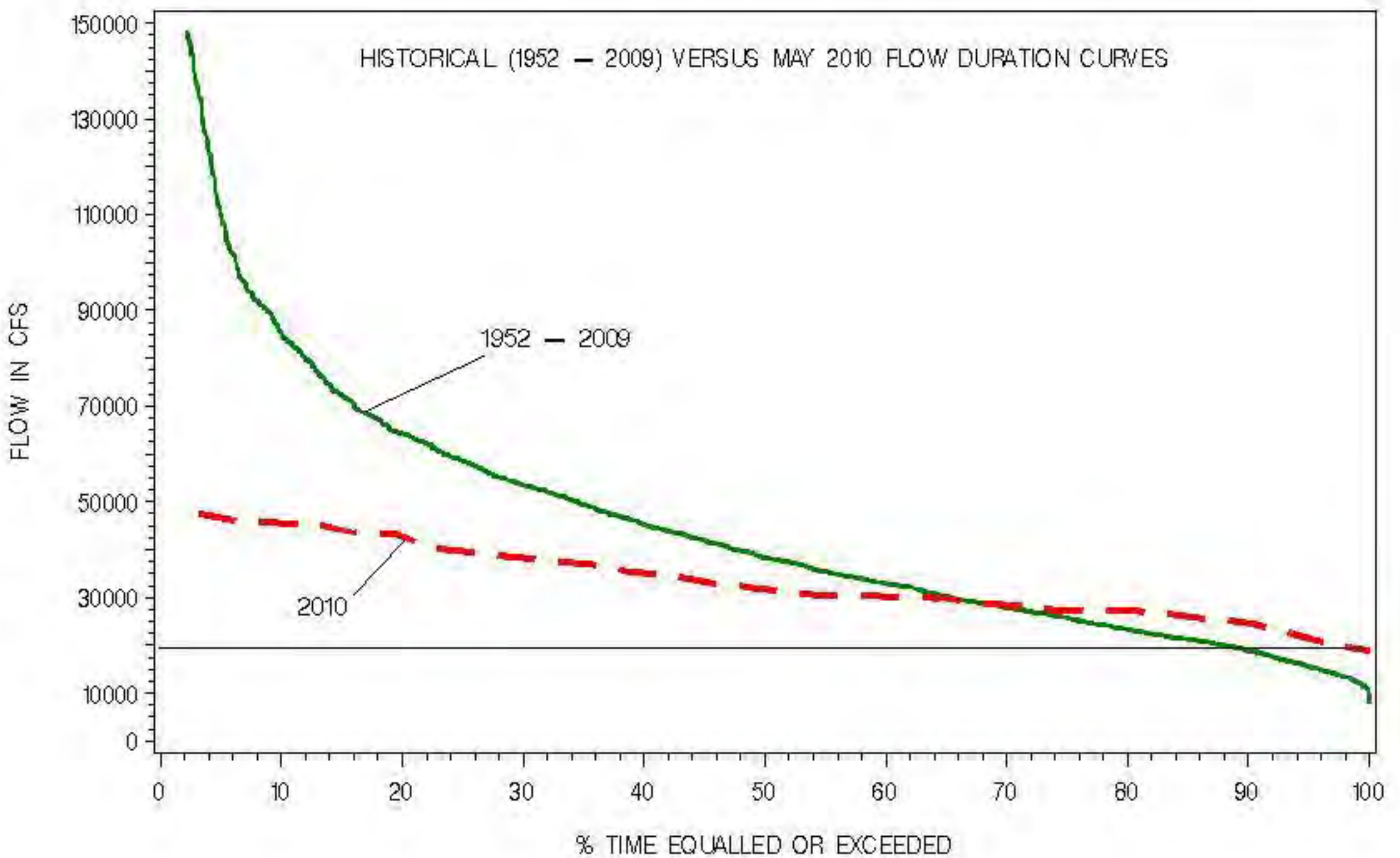


FIGURE 4-5: COMPARISON OF HISTORICAL (1952-2009) DAILY AVERAGE RIVER AND 2010 FLOW DURATION CURVES FOR JUNE.

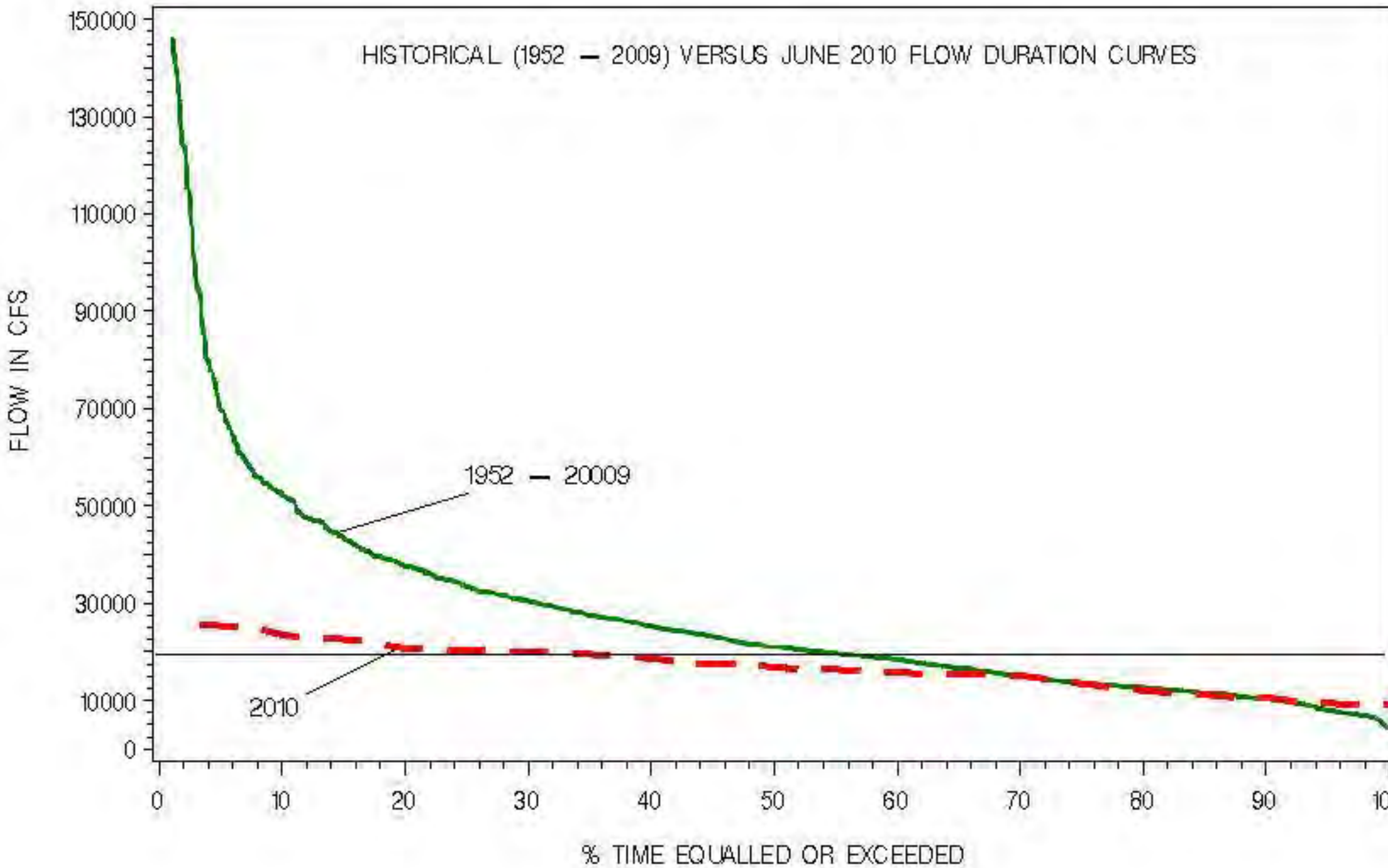


FIGURE 4-6: COMPARISON OF HISTORICAL (1952-2009) DAILY AVERAGE RIVER AND 2010 FLOW DURATION CURVES FOR JULY.

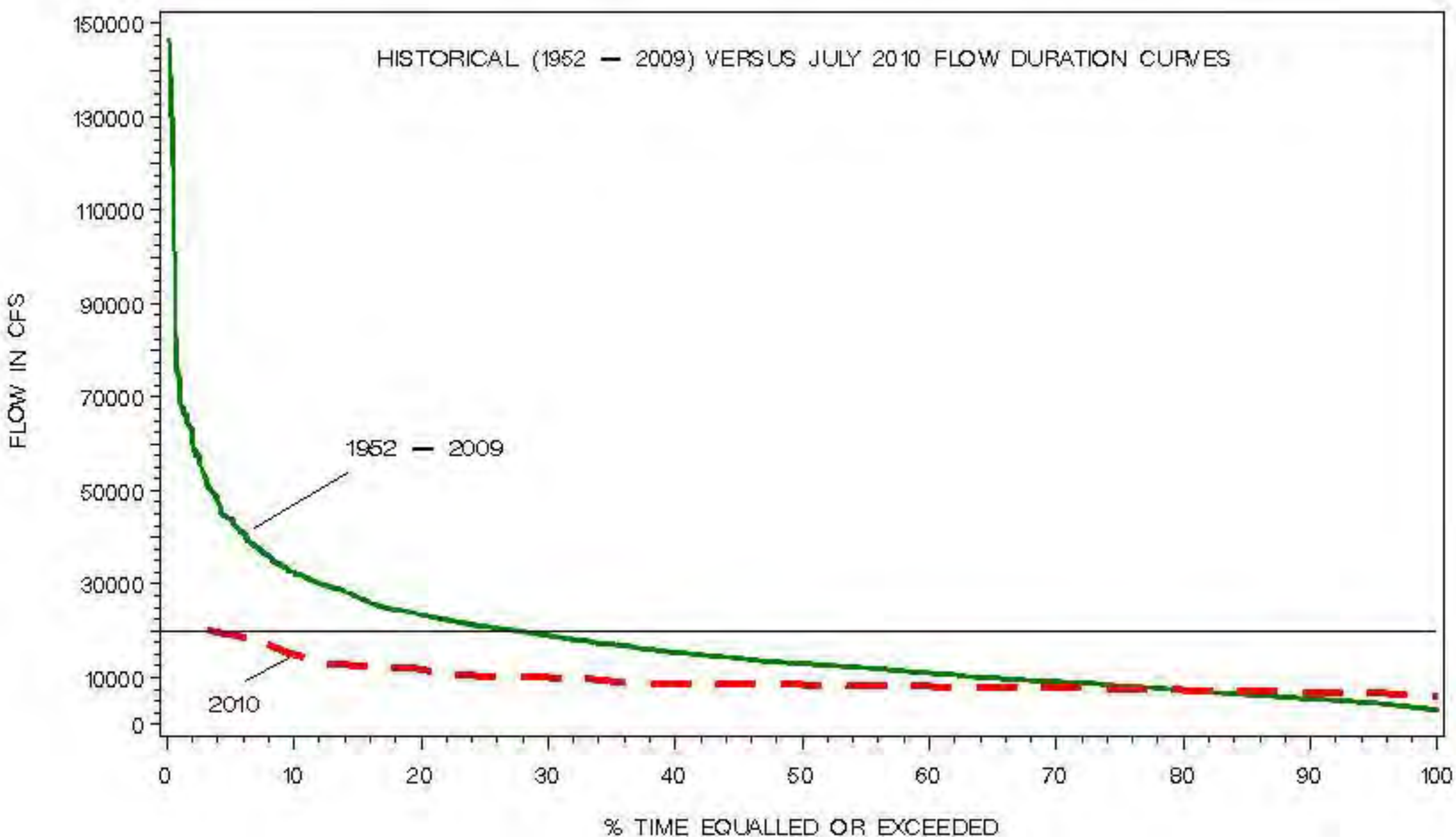


FIGURE 4-7: COMPARISON OF HISTORICAL (1952-2009) DAILY AVERAGE RIVER AND 2010 FLOW DURATION CURVES FOR AUGUST.

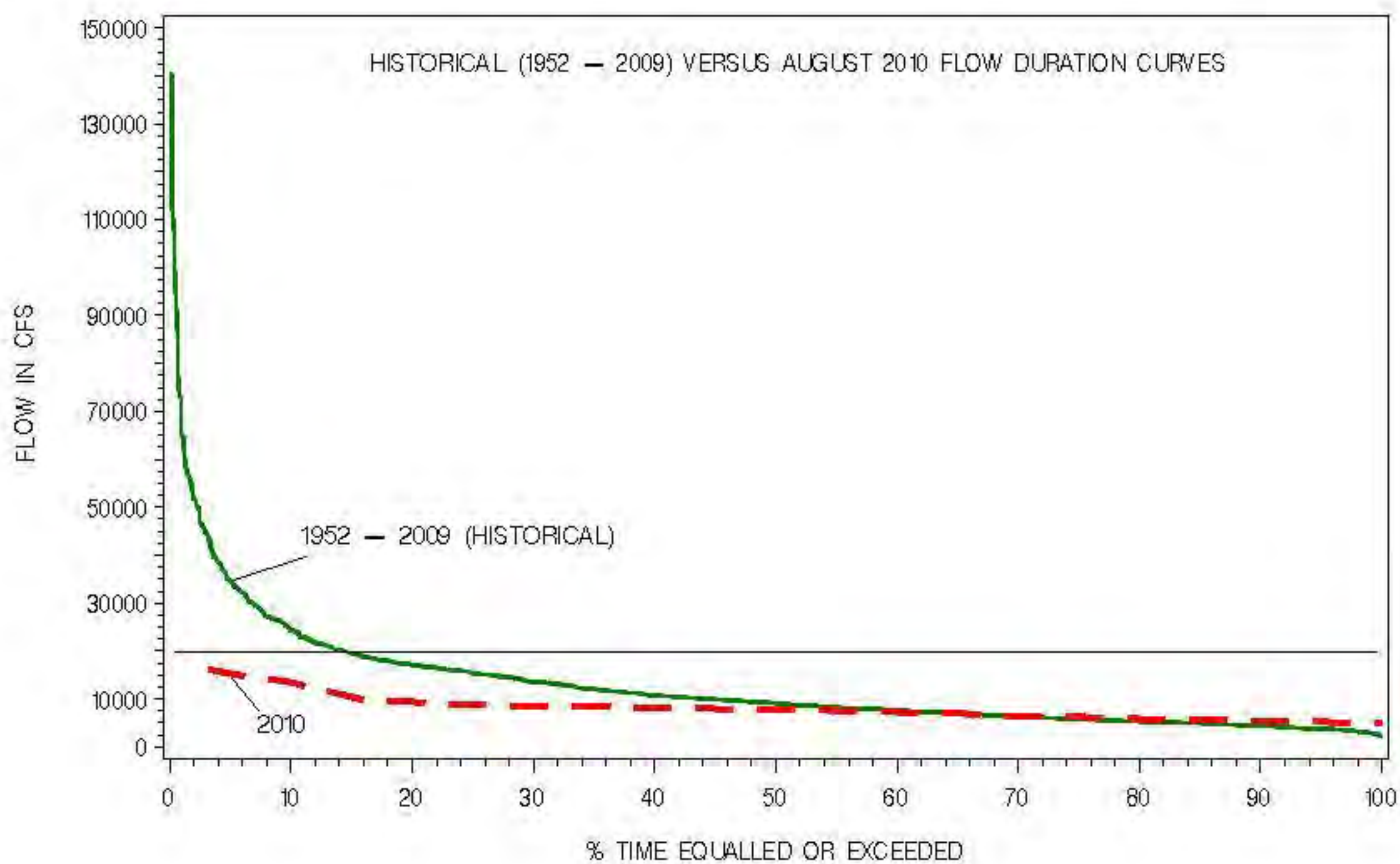


FIGURE 4-8: COMPARISON OF HISTORICAL (1952-2009) DAILY AVERAGE RIVER AND 2010 FLOW DURATION CURVES FOR SEPTEMBER.

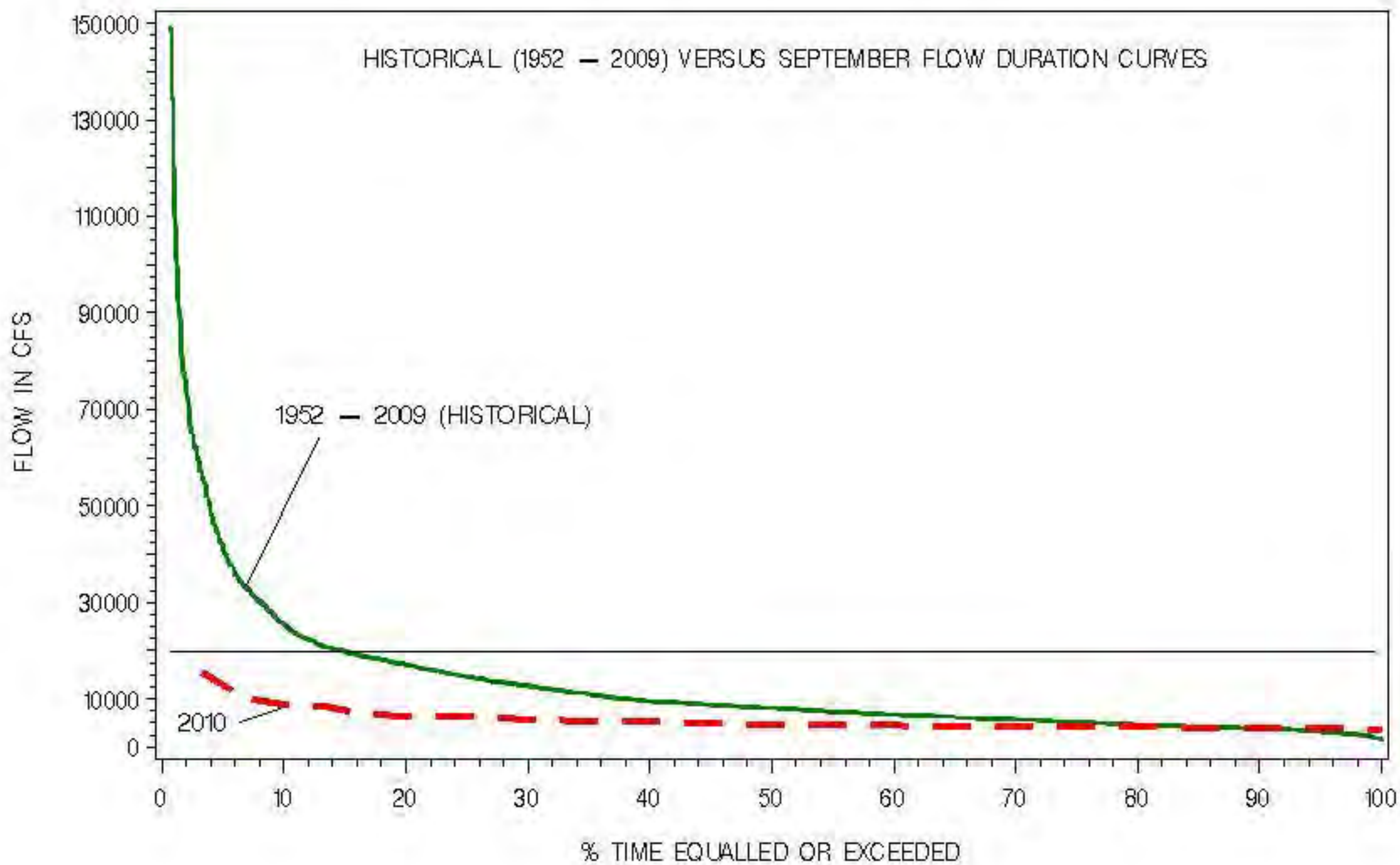


FIGURE 4-9: COMPARISON OF HISTORICAL (1952-2009) DAILY AVERAGE RIVER AND 2010 FLOW DURATION CURVES FOR OCTOBER.

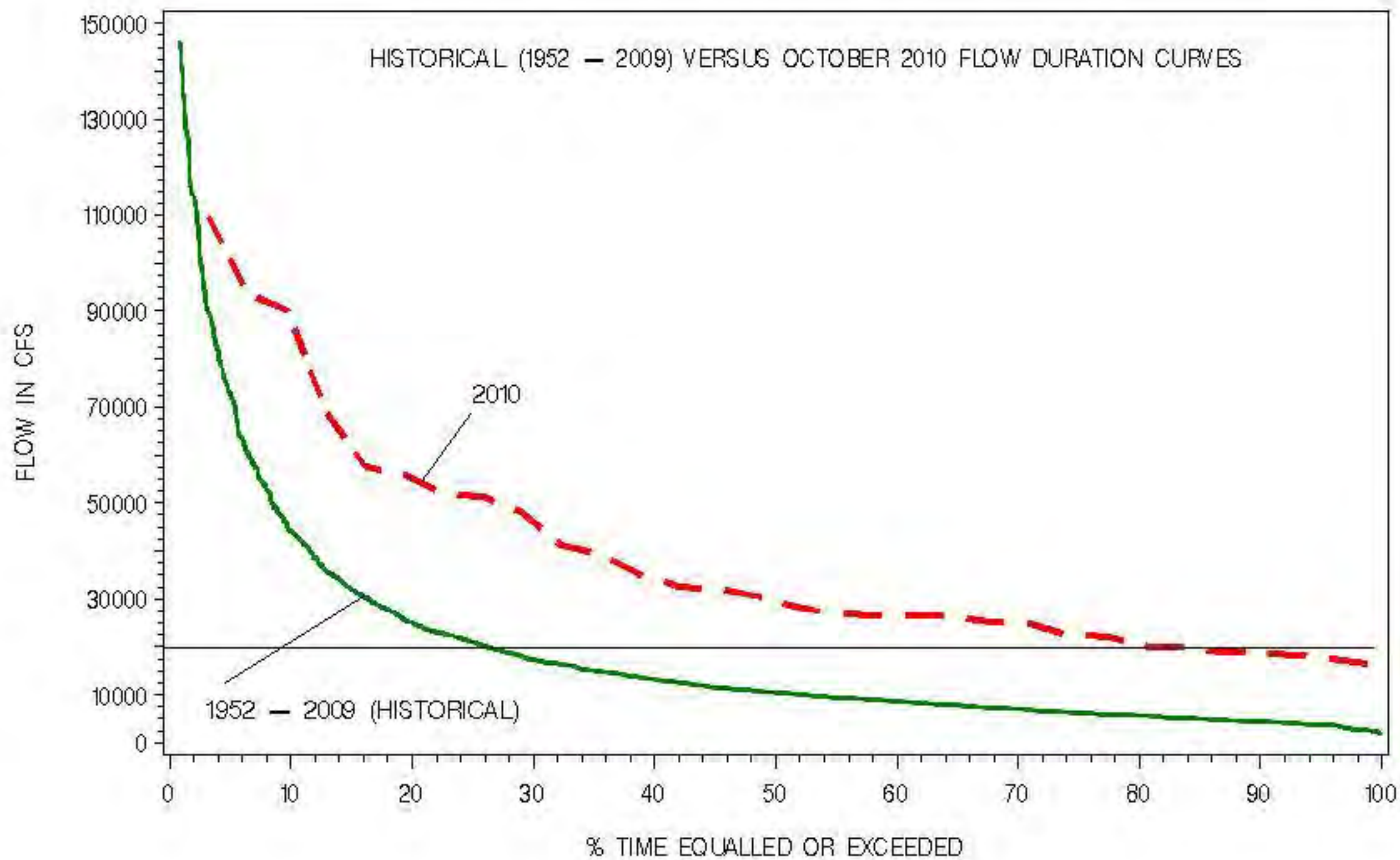


FIGURE 4-10: AVERAGE DAILY WATER TEMPERATURE AT HOLTWOOD IN 2010 AS COMPARED TO THE AVERGE DAILY WATER TEMPERATURE AT HOLTWOOD FOR THE PERIOD 1956-2009.

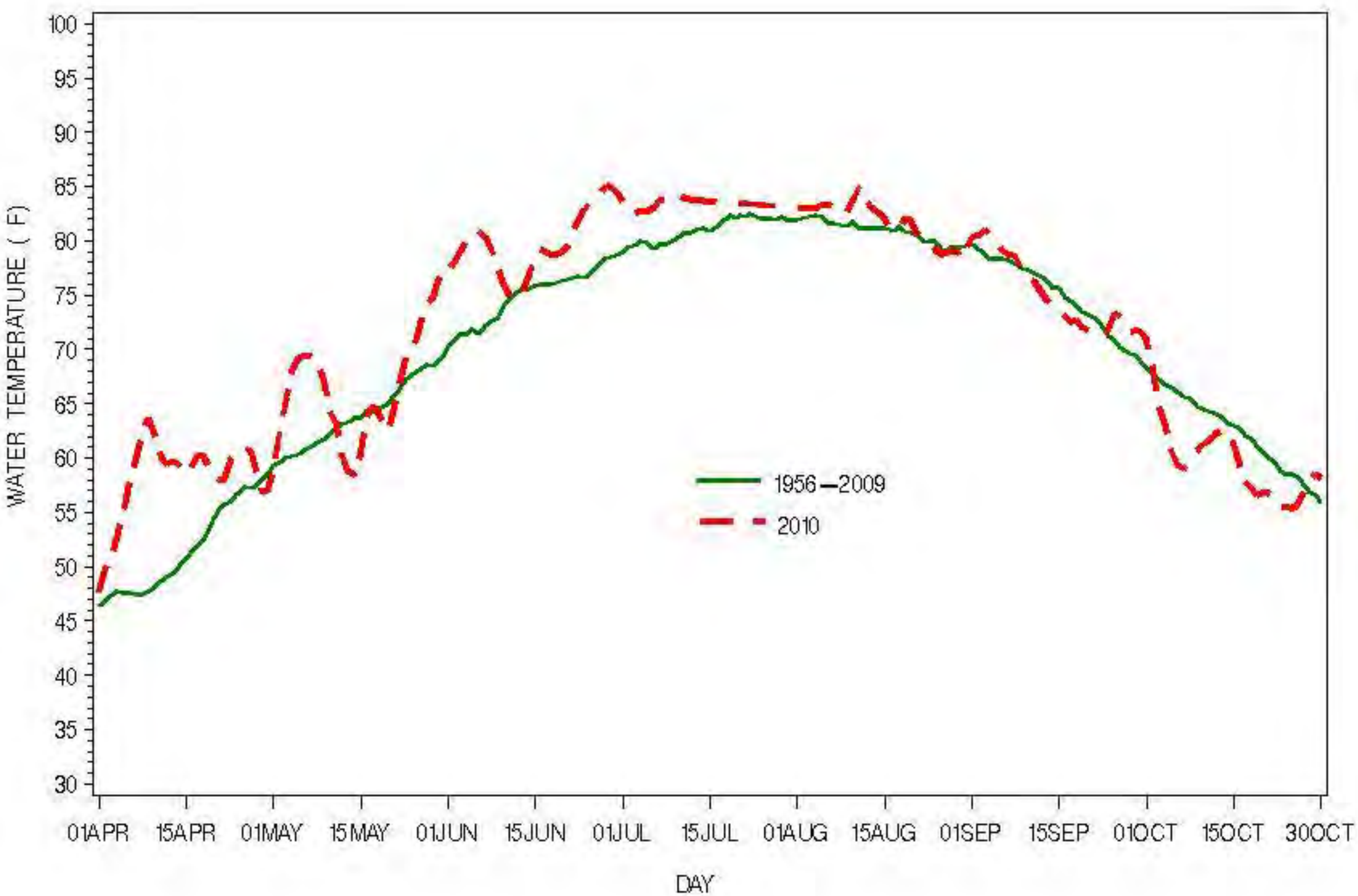


FIGURE 4-11: 2010 AVERAGE DAILY WATER TEMPERATURE DURATION CURVE FOR THE PERIOD APRIL-OCTOBER, 2010, IN COMPARISON TO THE LONG-TERM (1956-2009) AVERAGE DAILY TEMPERATURE DURATION CURVE FOR THOSE SAME MONTHS.

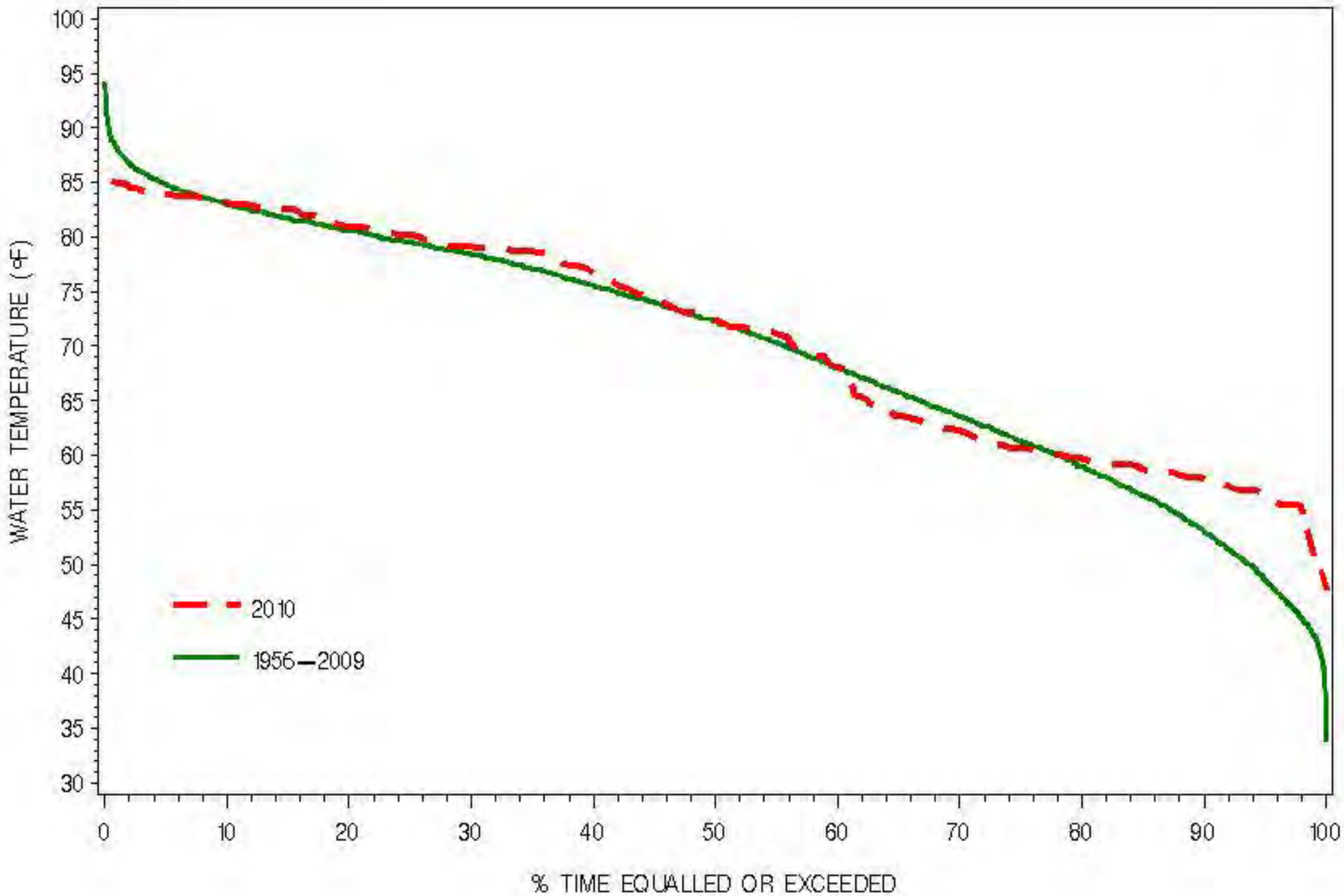


FIGURE 4-12: COMPARISON OF HISTORICAL (1956-2009) AND 2010 DAILY AVERAGE INCOMING WATER TEMPERATURE DURATION CURVES, APRIL.

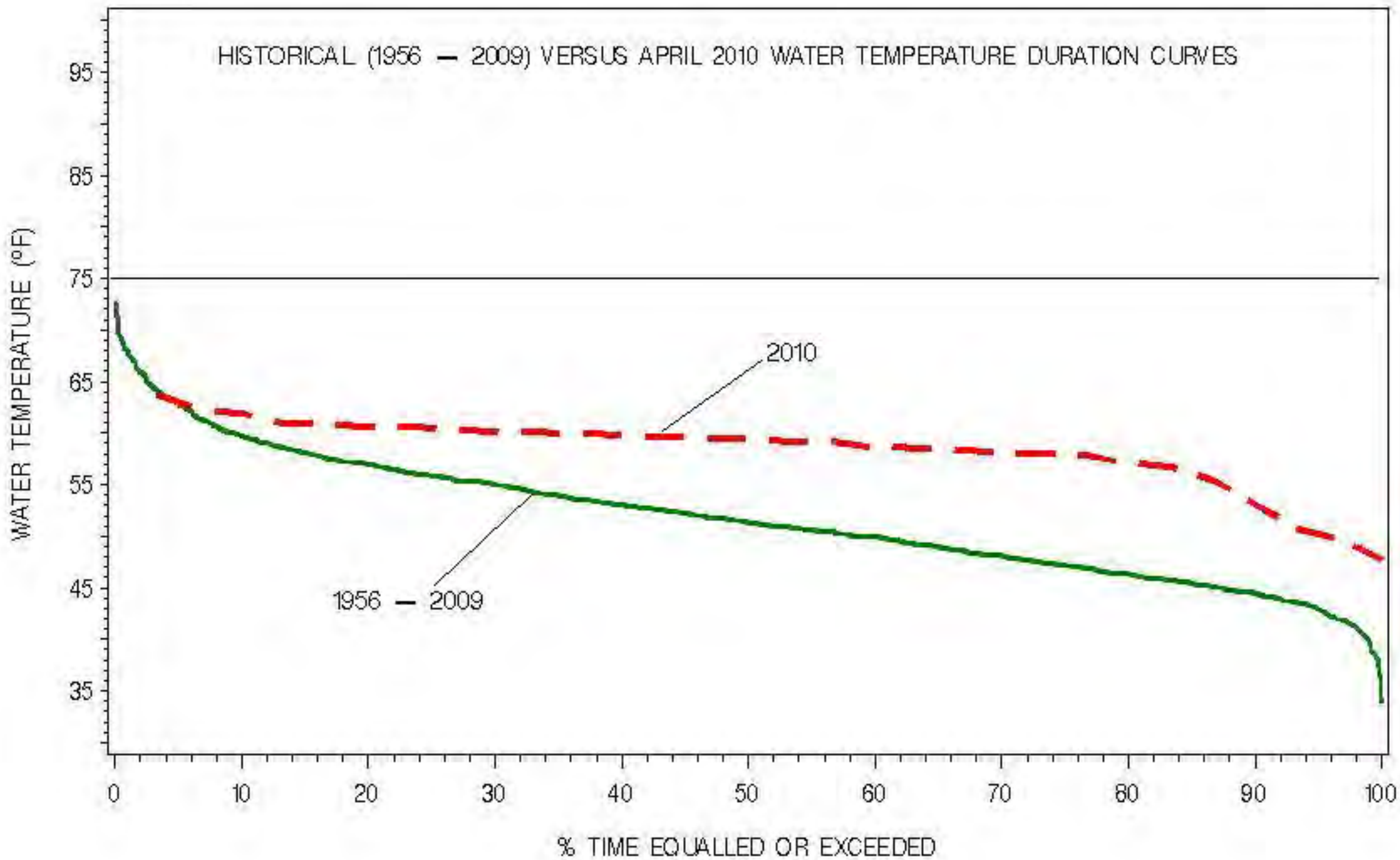


FIGURE 4-13: COMPARISON OF HISTORICAL (1956-2009) AND 2010 DAILY AVERAGE INCOMING WATER TEMPERATURE DURATION CURVES, MAY.

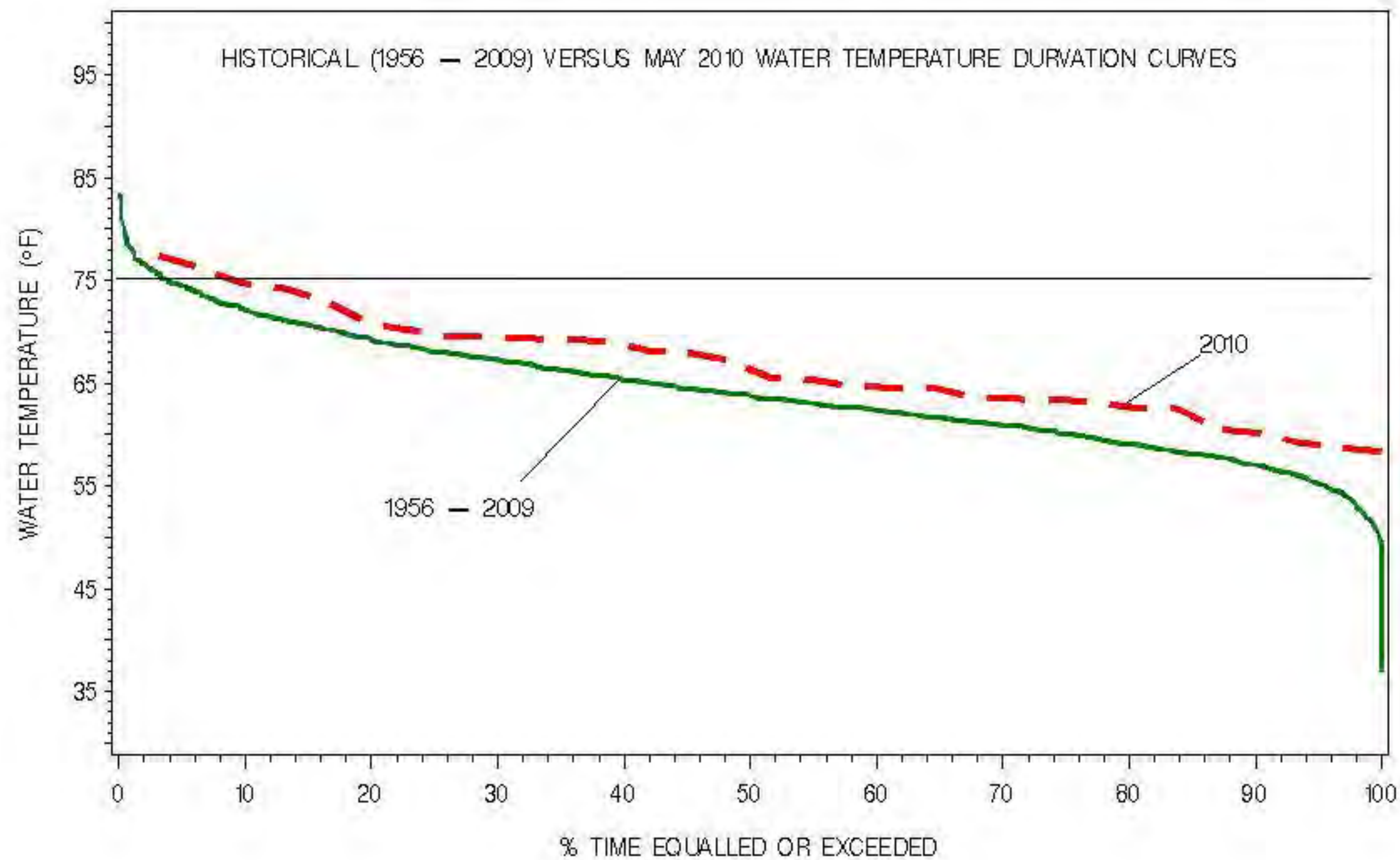


FIGURE 4-14: COMPARISON OF HISTORICAL (1956-2009) AND 2010 DAILY AVERAGE INCOMING WATER TEMPERATURE DURATION CURVES, JUNE.

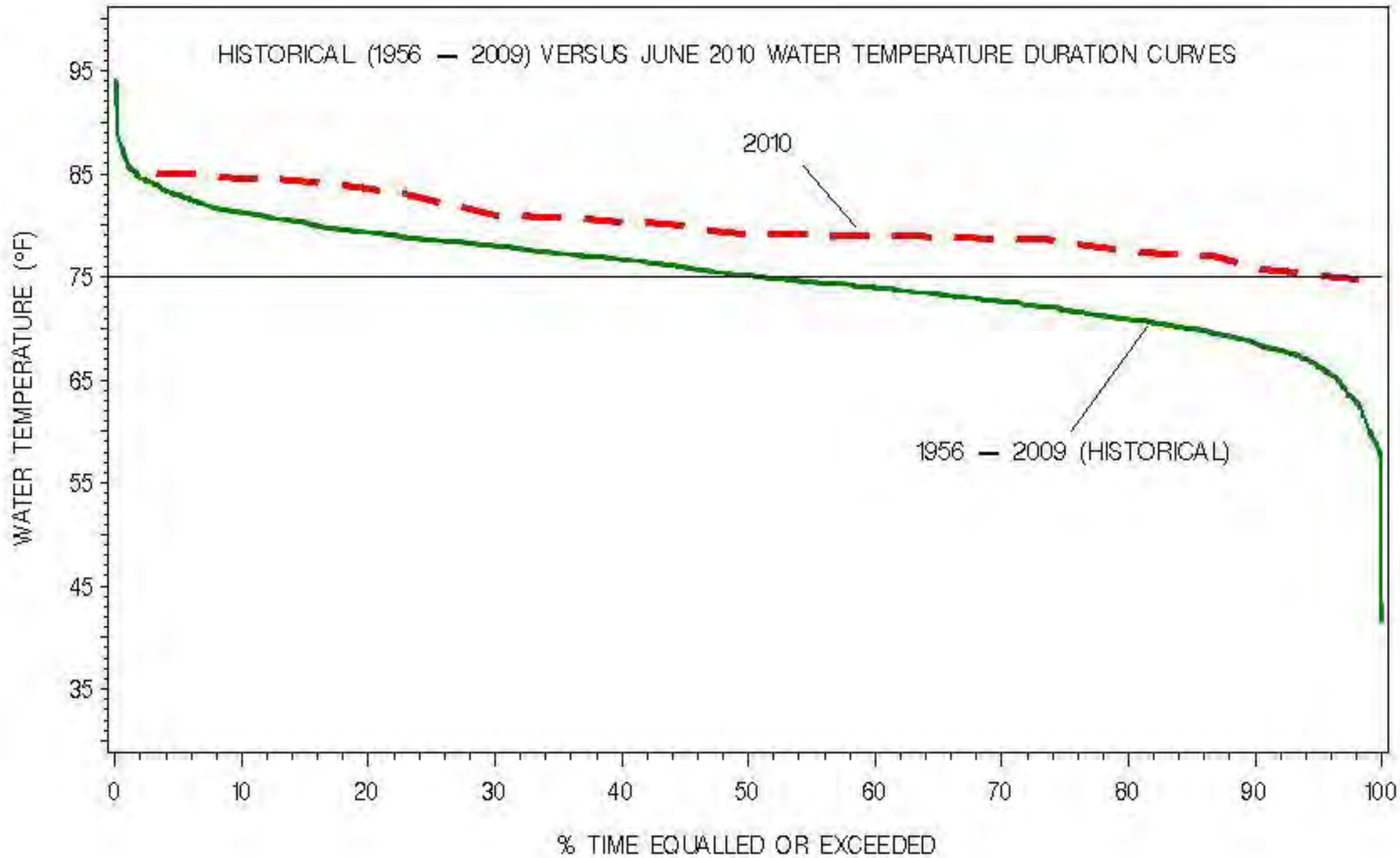


FIGURE 4-15: COMPARISON OF HISTORICAL (1956-2009) AND 2010 DAILY AVERAGE INCOMING WATER TEMPERATURE DURATION CURVES, JULY.

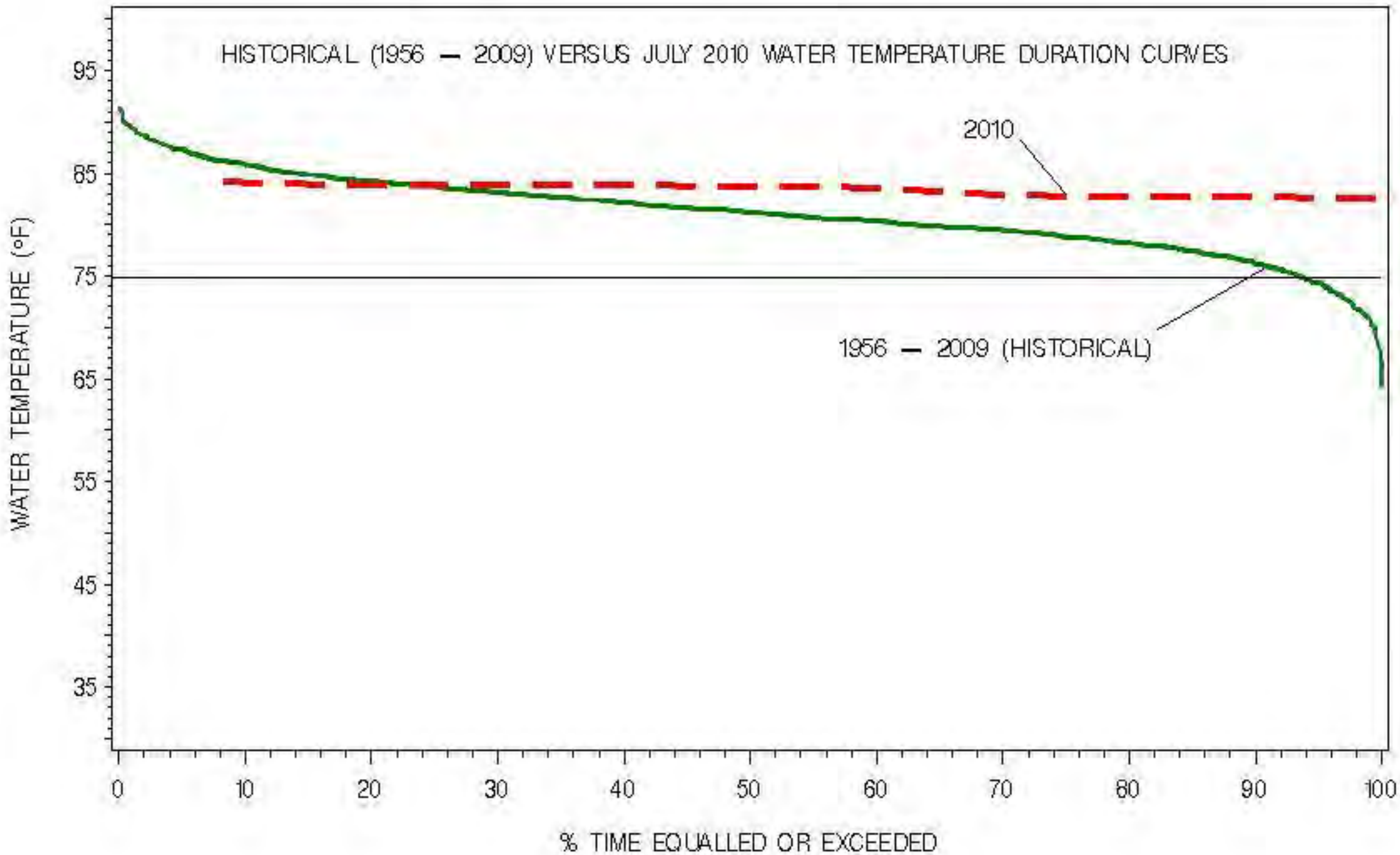


FIGURE 4-16: COMPARISON OF HISTORICAL (1956-2009) AND 2010 DAILY AVERAGE INCOMING WATER TEMPERATURE DURATION CURVES, AUGUST.

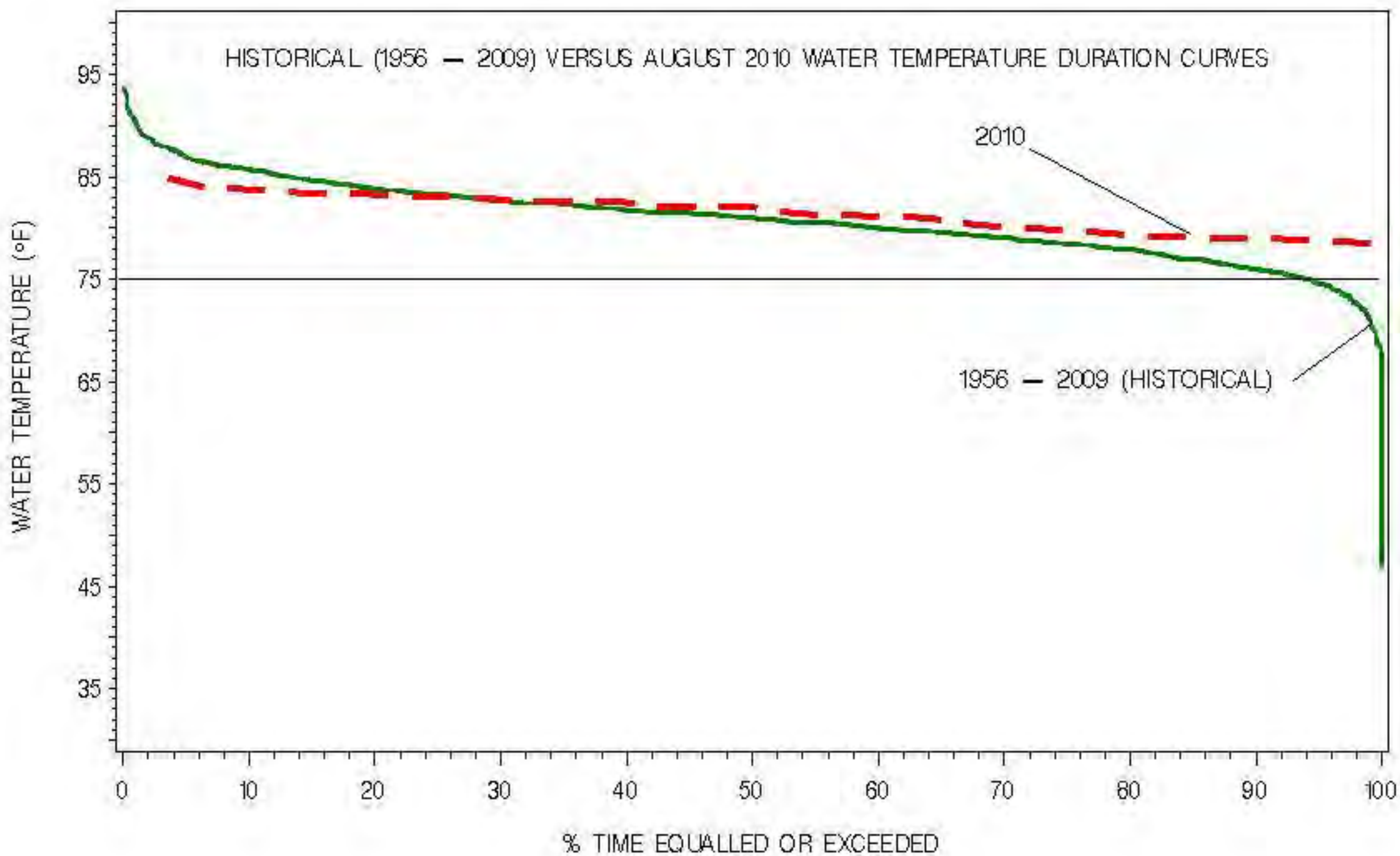


FIGURE 4-17: COMPARISON OF HISTORICAL (1956-2009) AND 2010 DAILY AVERAGE INCOMING WATER TEMPERATURE DURATION CURVES, SEPTEMBER.

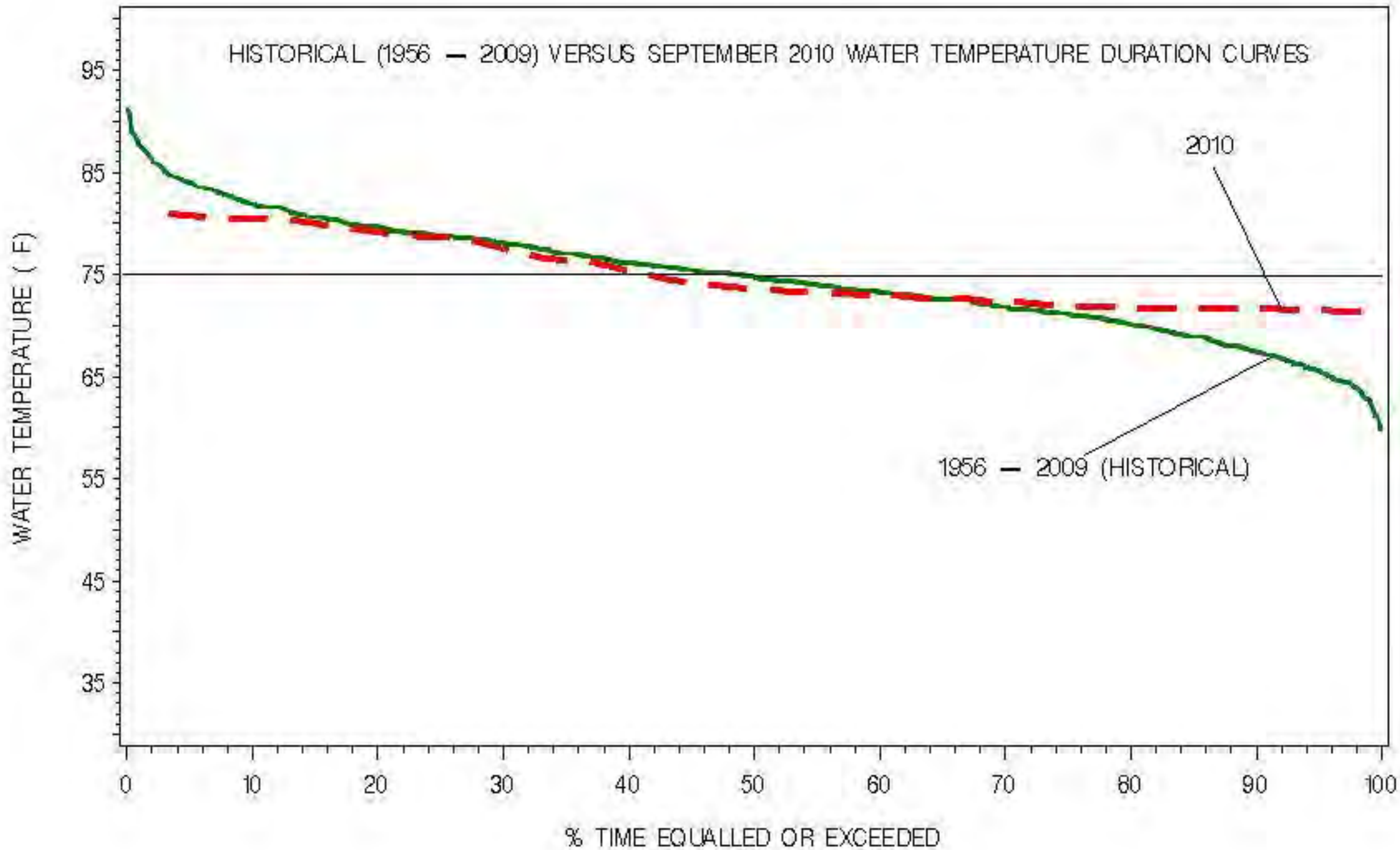


FIGURE 4-18: COMPARISON OF HISTORICAL (1956-2009) AND 2010 DAILY AVERAGE INCOMING WATER TEMPERATURE DURATION CURVES, OCTOBER.

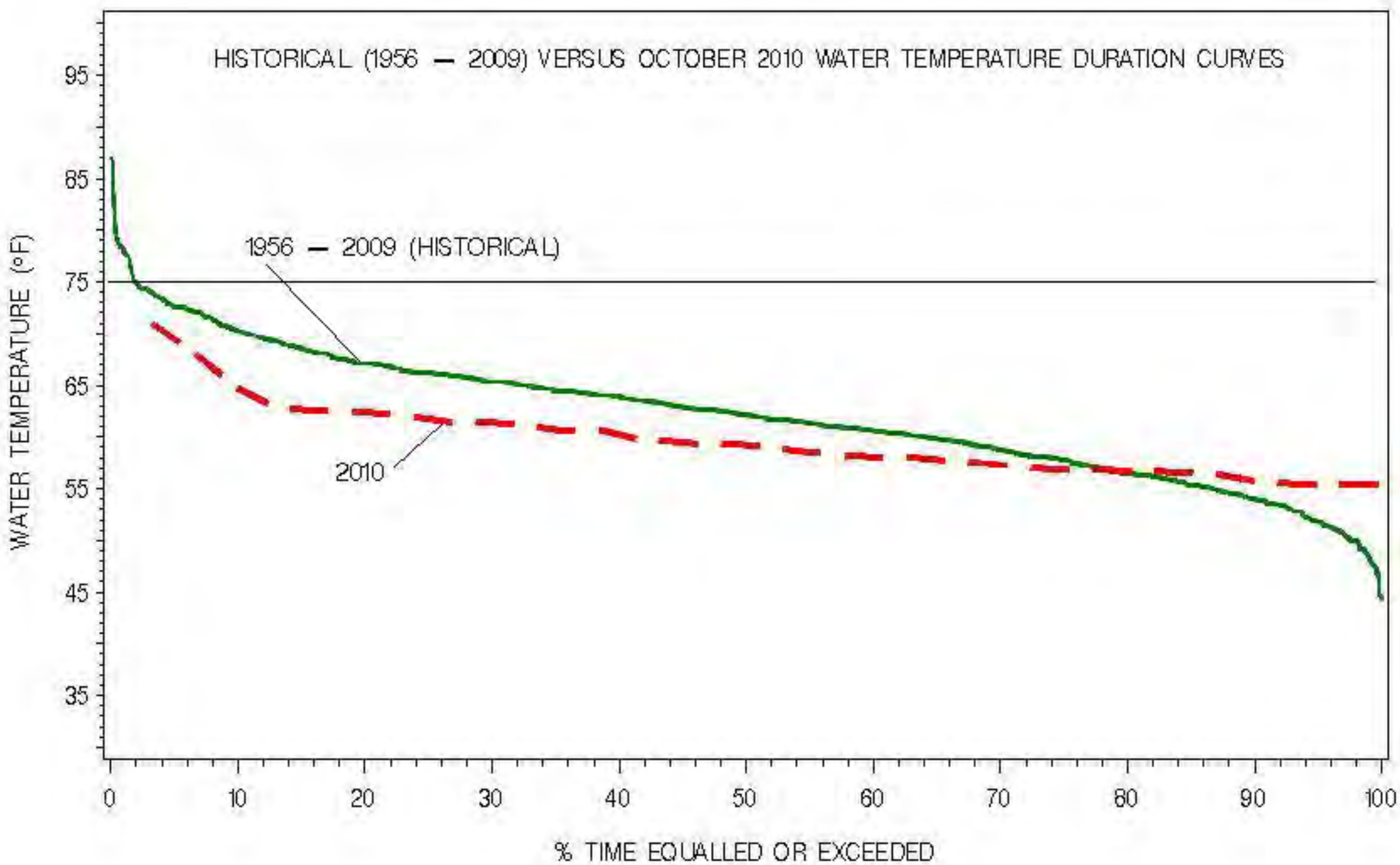


FIGURE 4-19: EXAMPLE OF VERTICAL WATER TEMPERATURE PROFILES AT STATION 502 (MID POINT) IN CONOWINGO POND, APRIL-OCTOBER 2010.

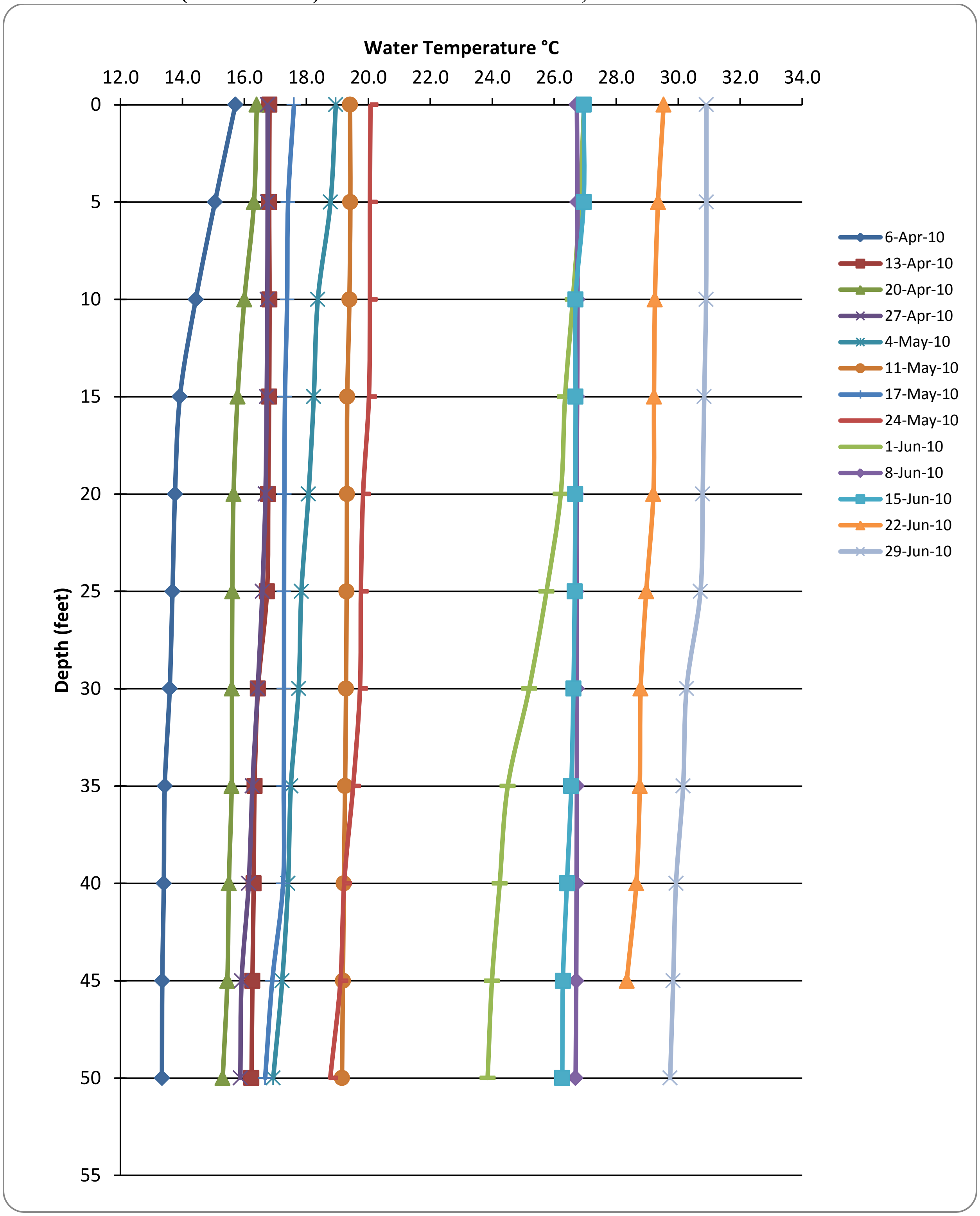


FIGURE 4-19: CONTINUED.

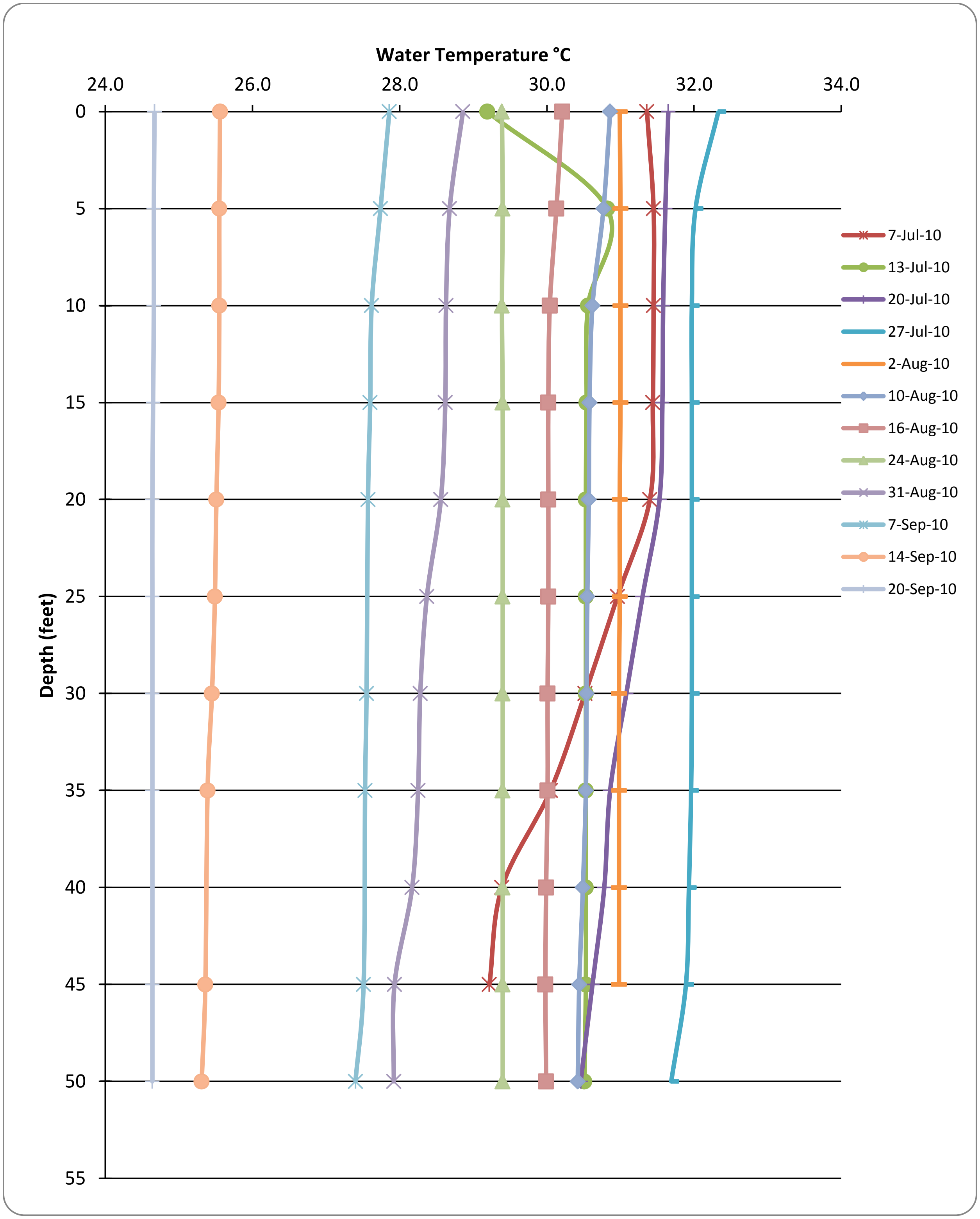


FIGURE 4-19: CONTINUED.

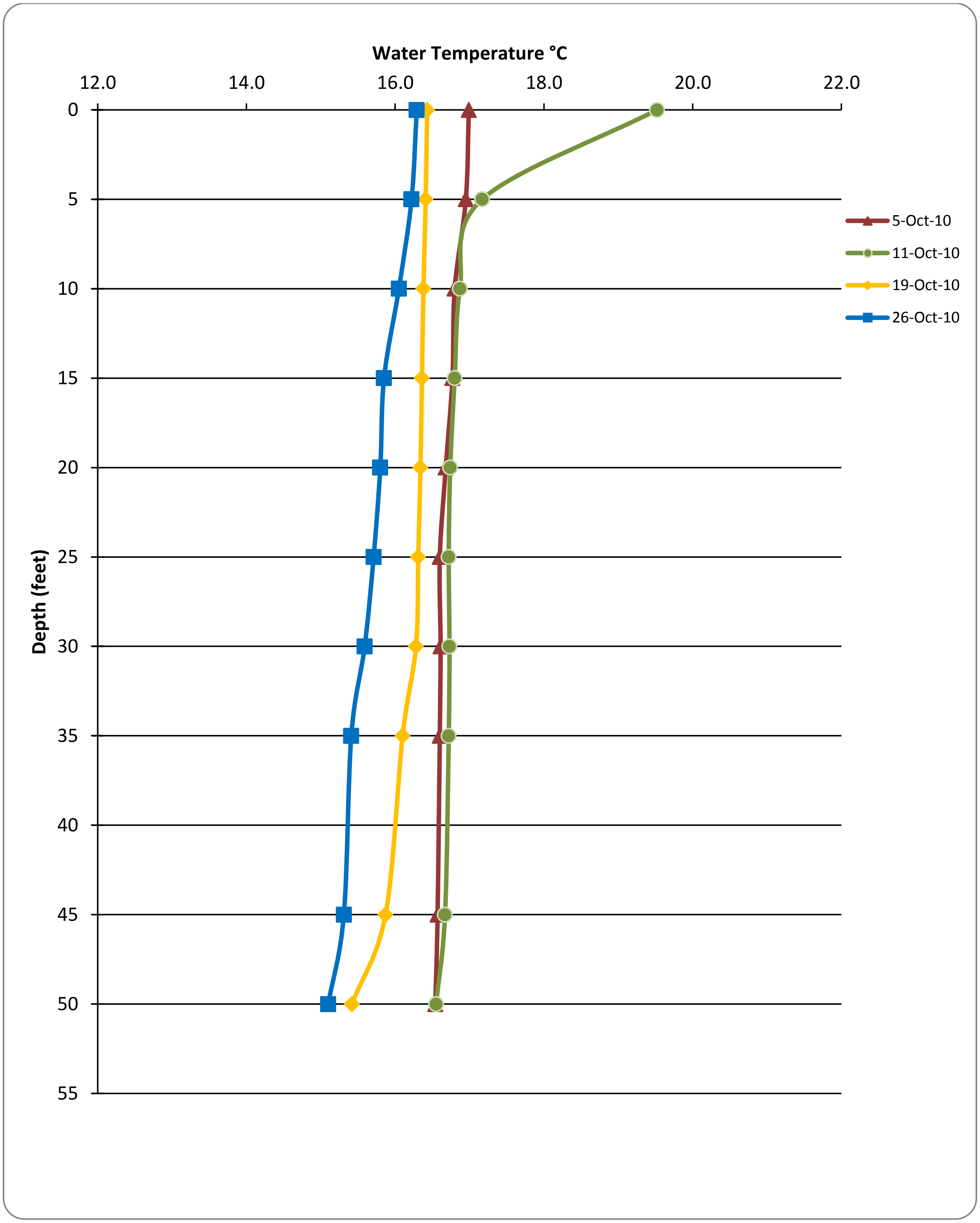


FIGURE 4-20: EXAMPLE OF DO VERTICAL DISTRIBUTION AT STATION 502 (MID POINT) IN CONOWINGO POND, APRIL-OCTOBER 2010.

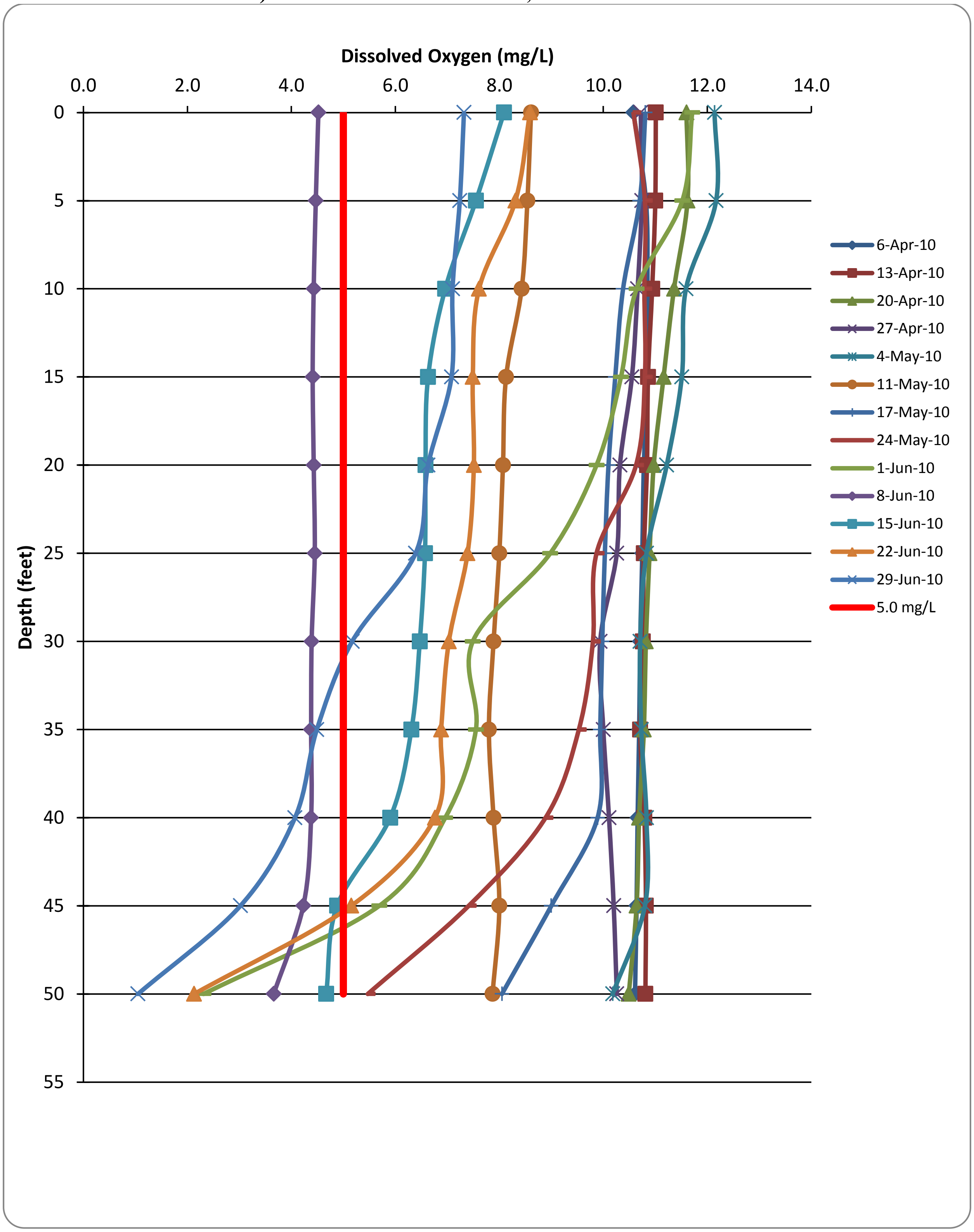


FIGURE 4-20: CONTINUED.

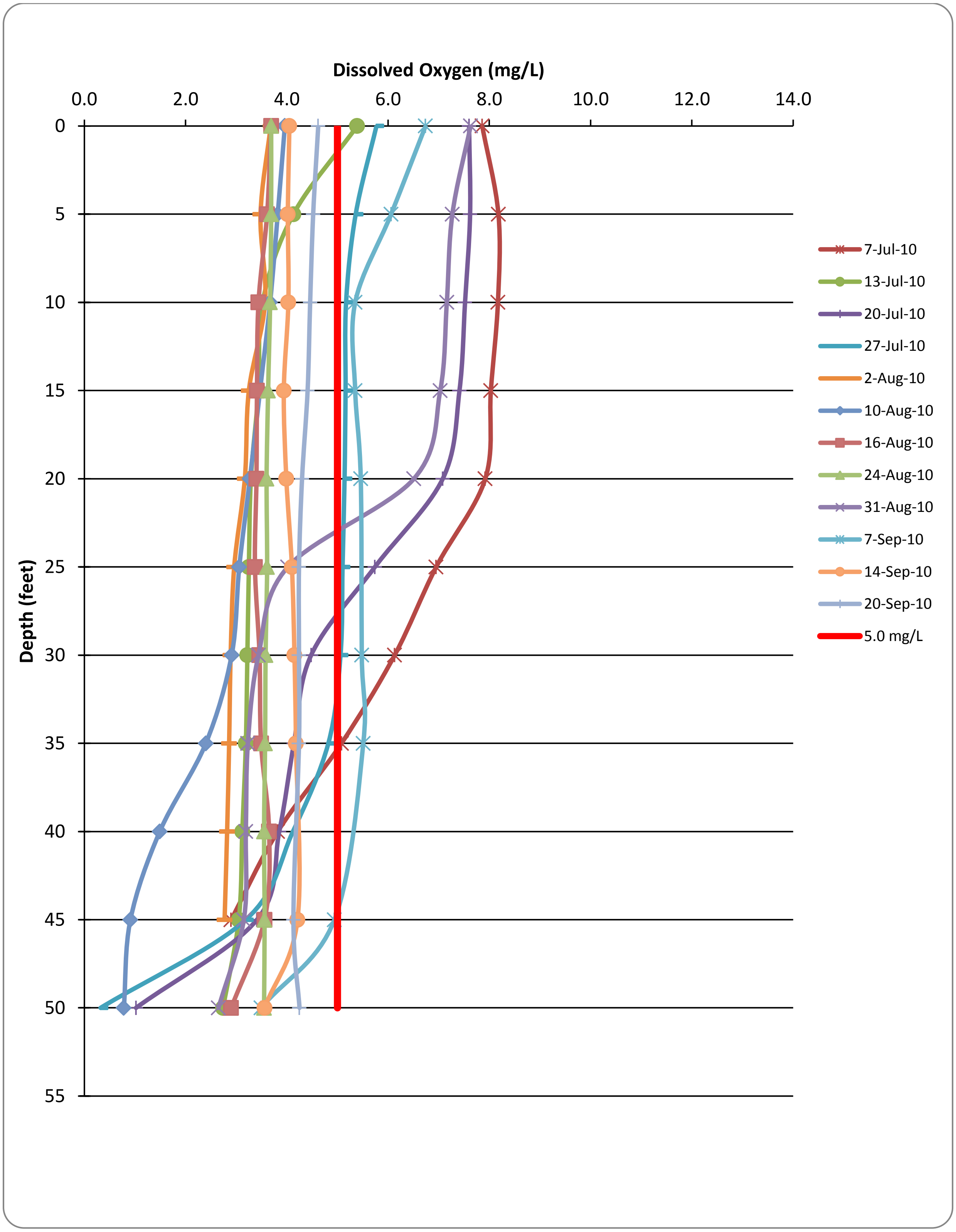


FIGURE 4-20: CONTINUED.

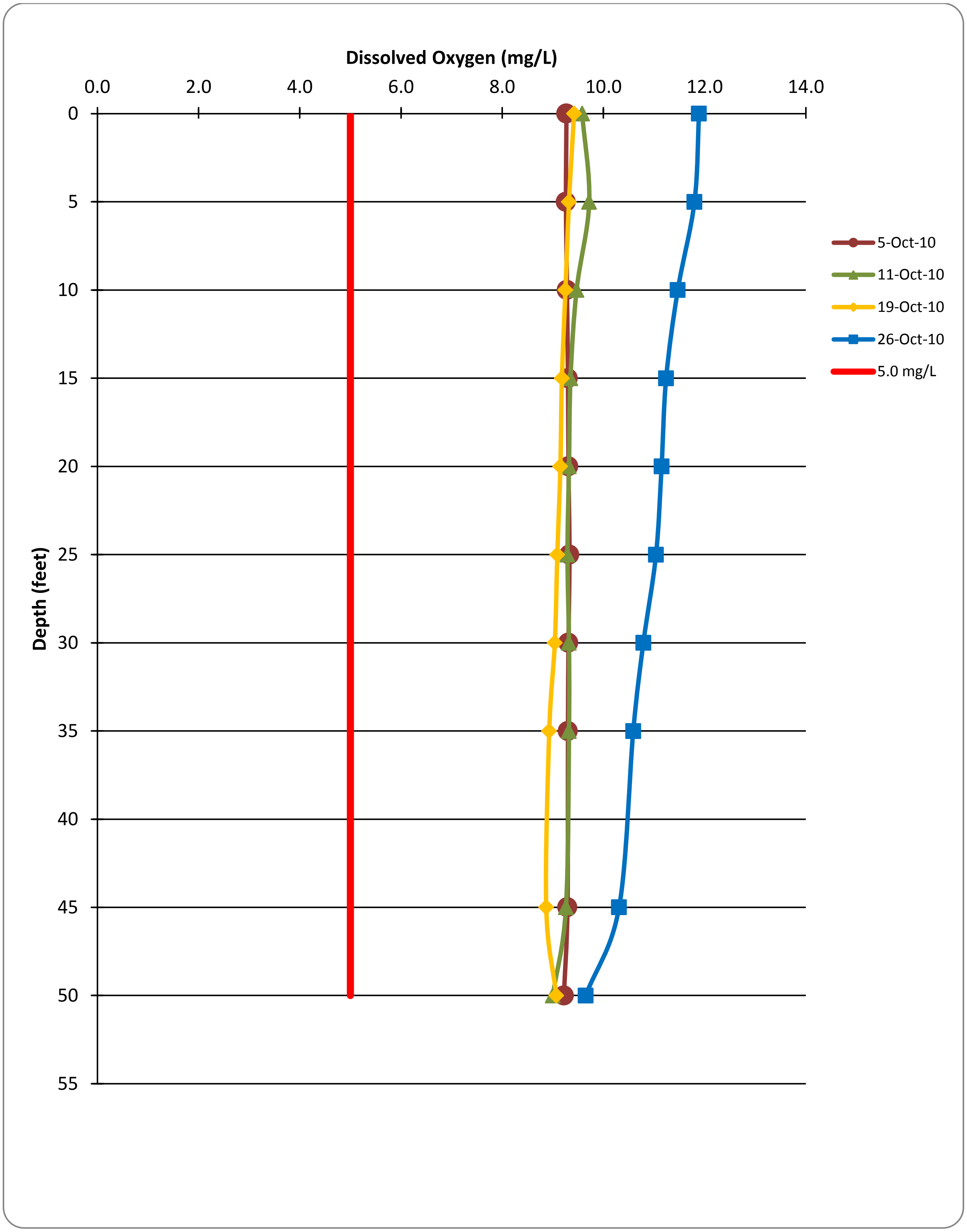


FIGURE 4-21: SEASONAL VARIATIONS IN SURFACE PH AT MID POINTS OF TRANSECTS IN CONOWINGO POND, APRIL-OCTOBER 2010.

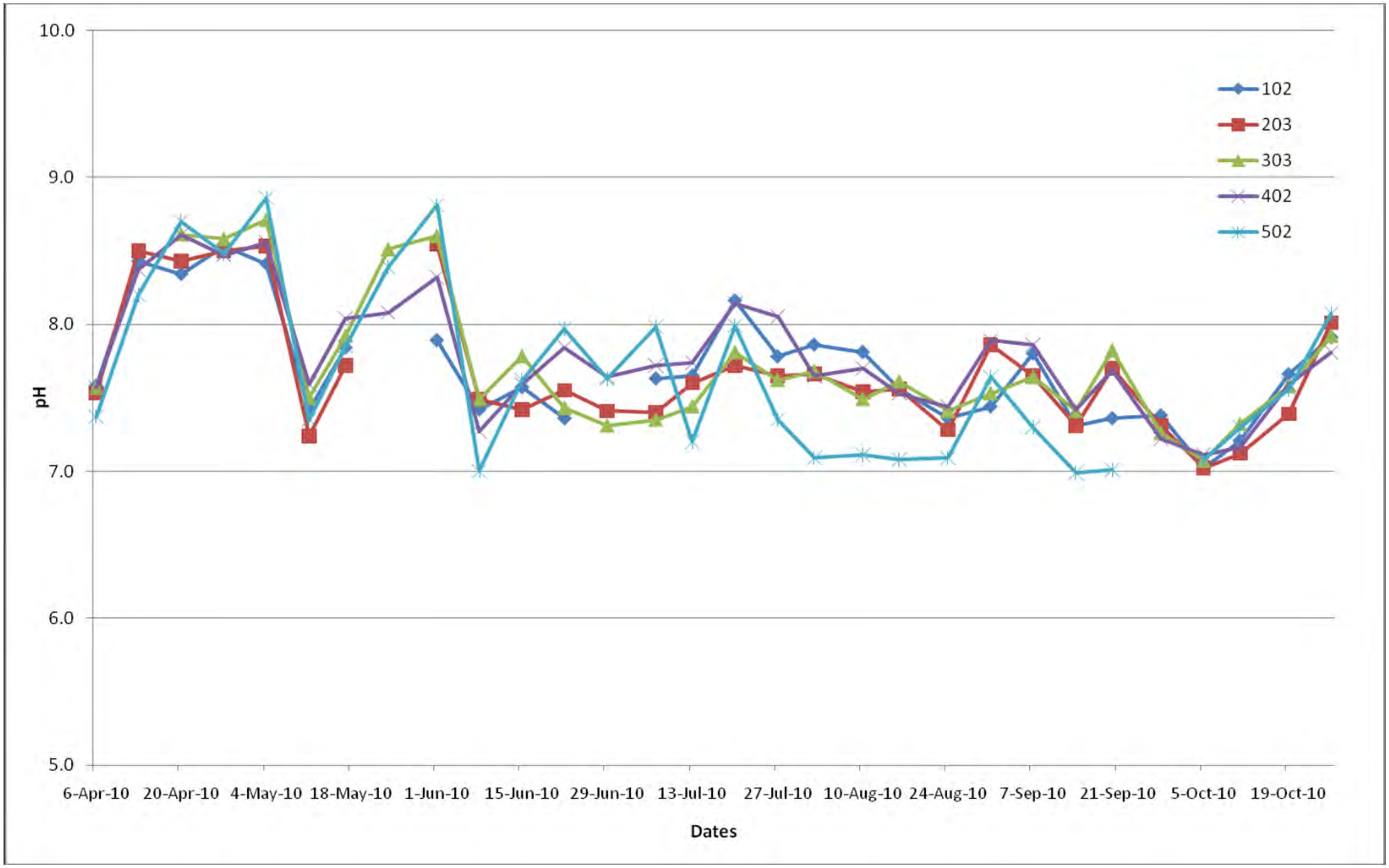


FIGURE 4-22: SEASONAL VARIATIONS IN SURFACE TURBIDITY AT MID POINTS OF TRANSECTS IN CONOWINGO POND, APRIL-OCTOBER 2010.

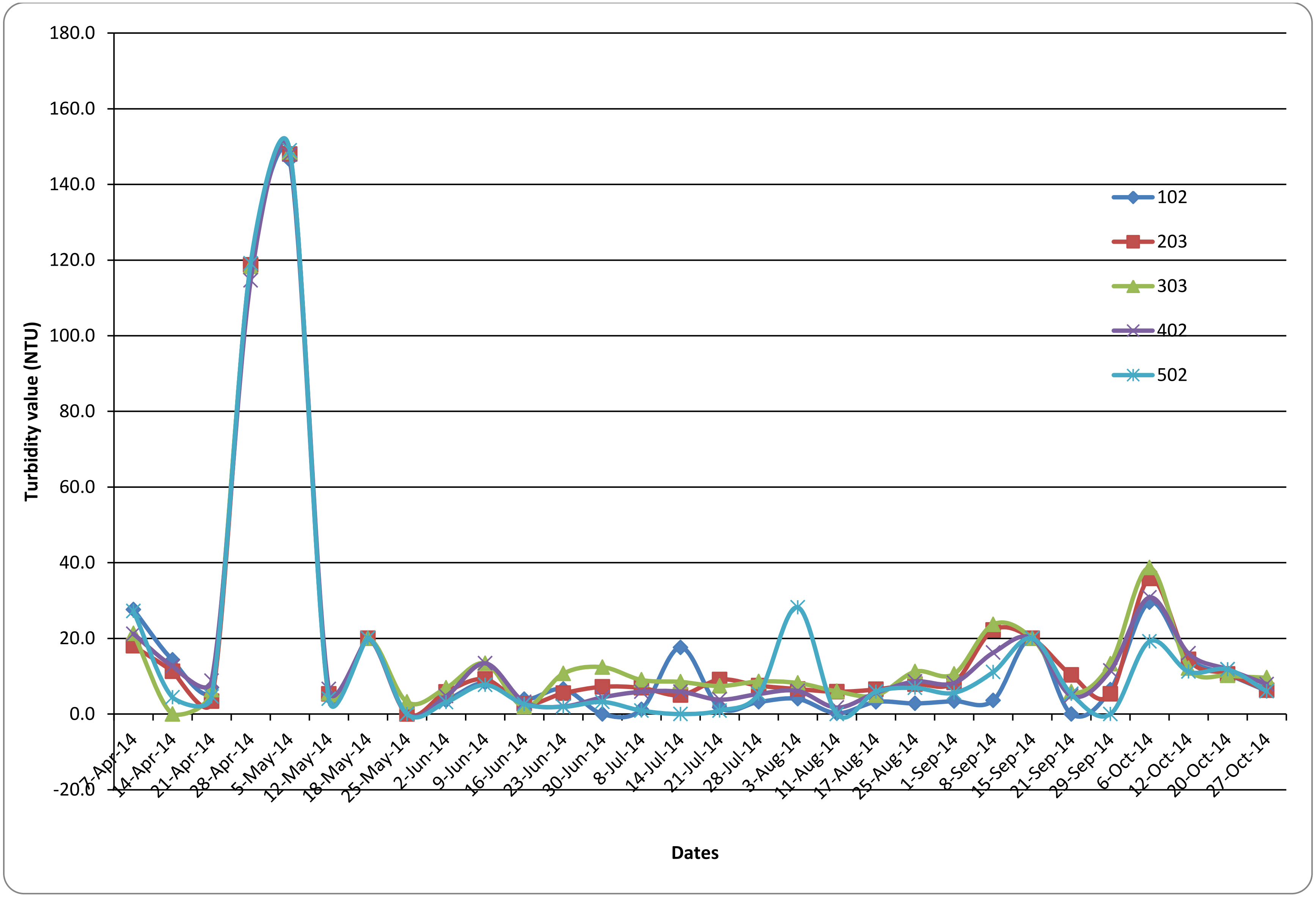


FIGURE 4-23: SEASONAL VARIATIONS IN SURFACE AND BOTTOM WATER TEMPERATURE (°C) AT TRANSECTS 6, 7, AND 8 DOWNSTREAM OF CONOWINGO DAM, APRIL-OCTOBER 2010.

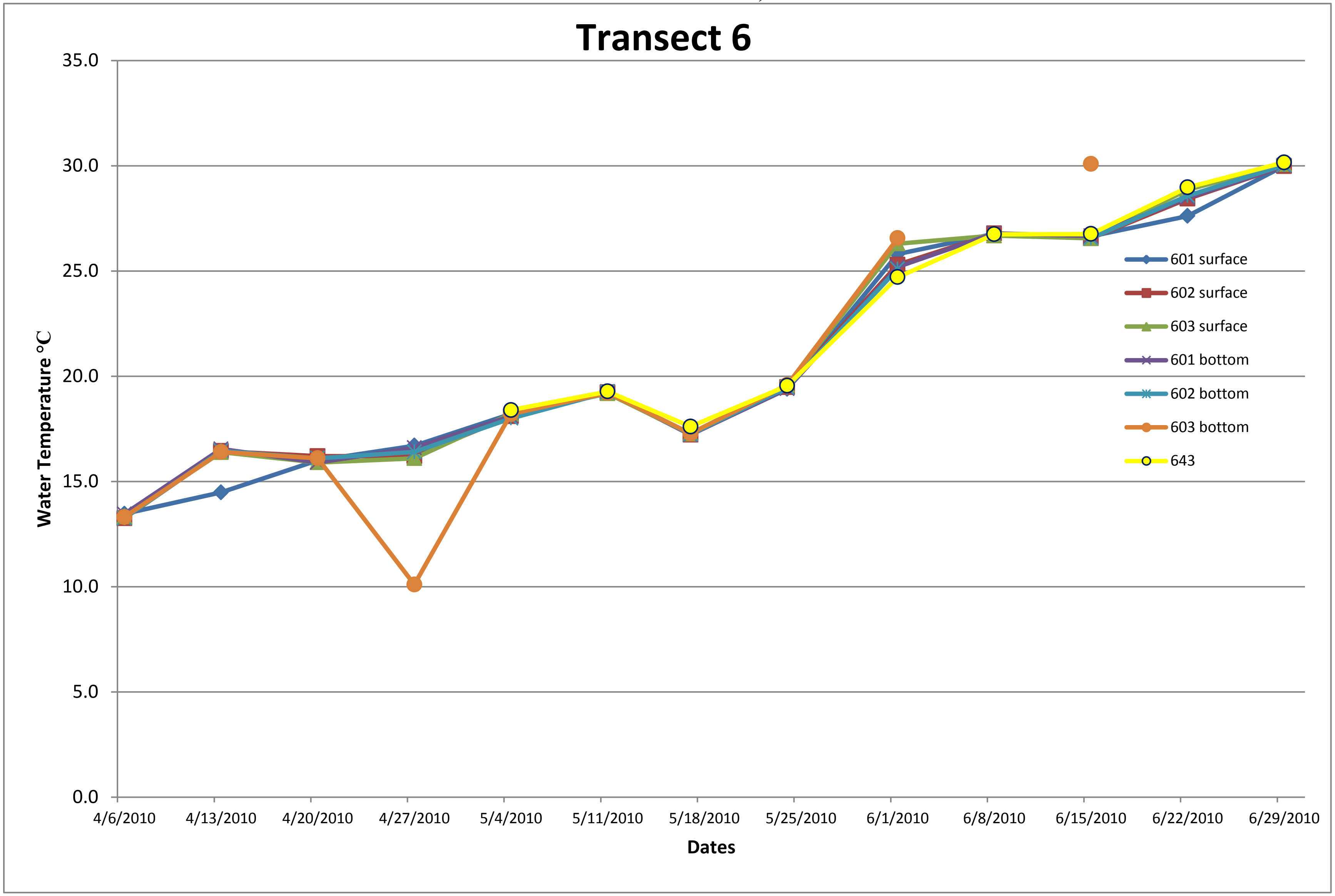


FIGURE 4-23: CONTINUED.

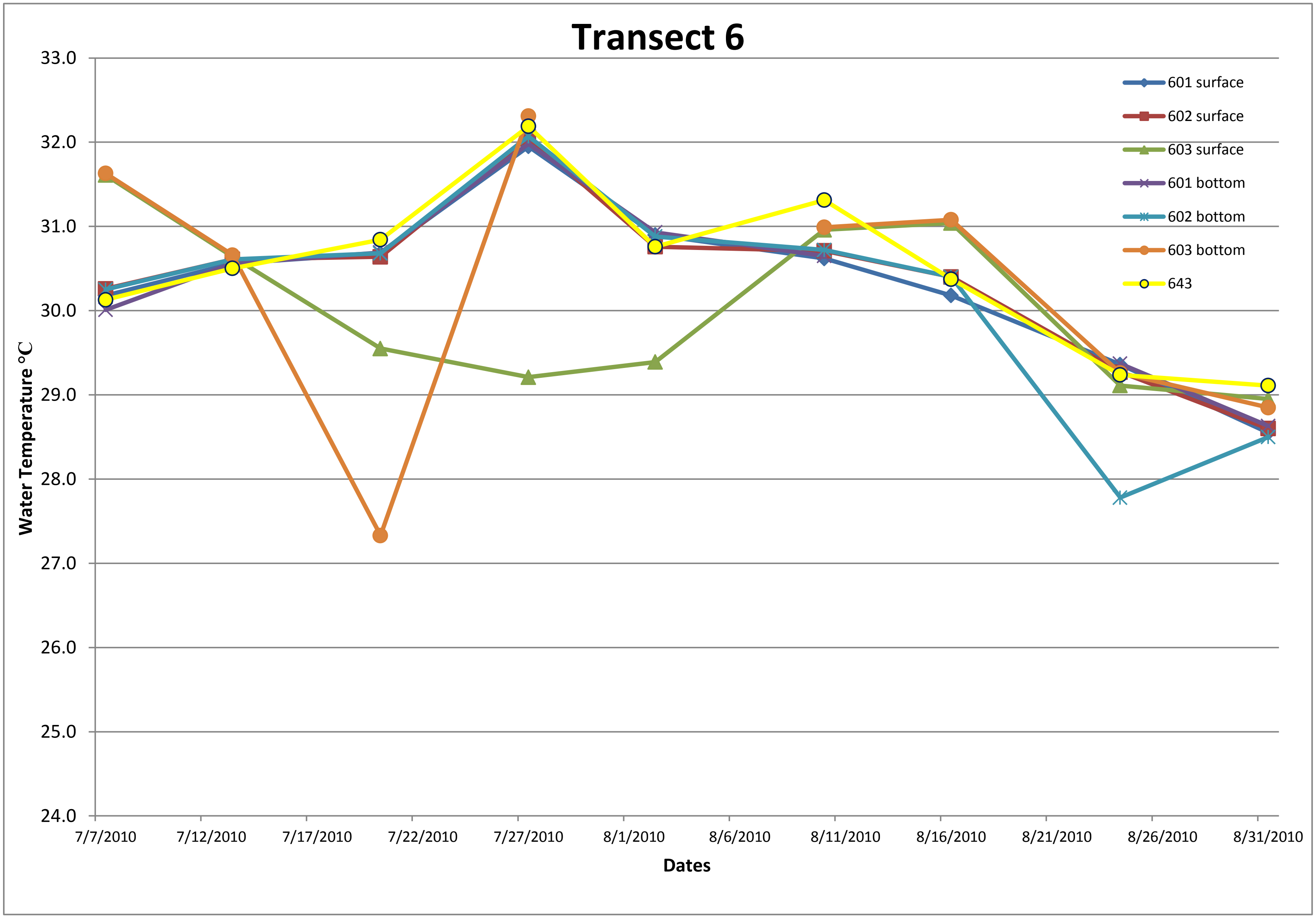


FIGURE 4-23: CONTINUED.

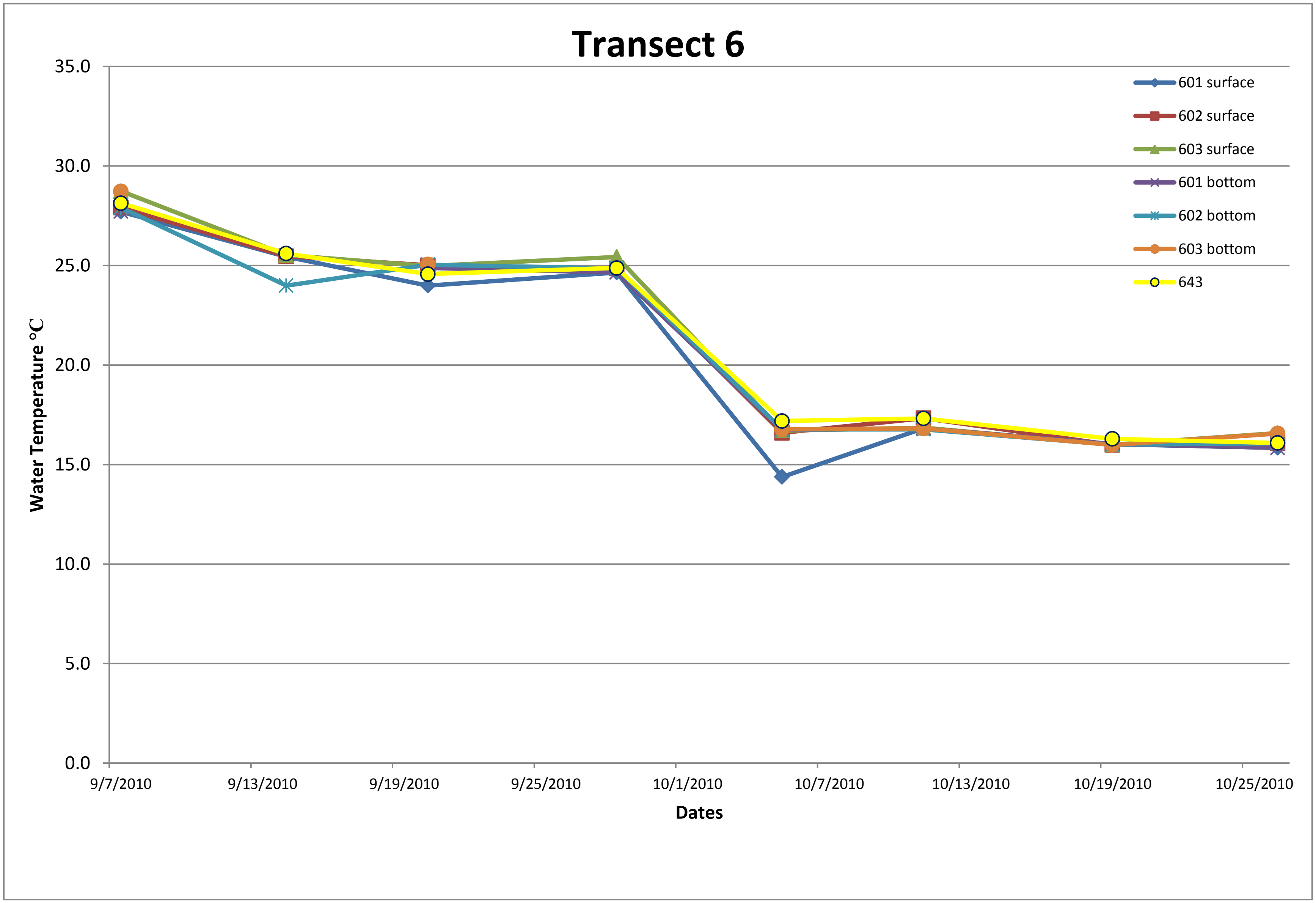


FIGURE 4-23: CONTINUED.

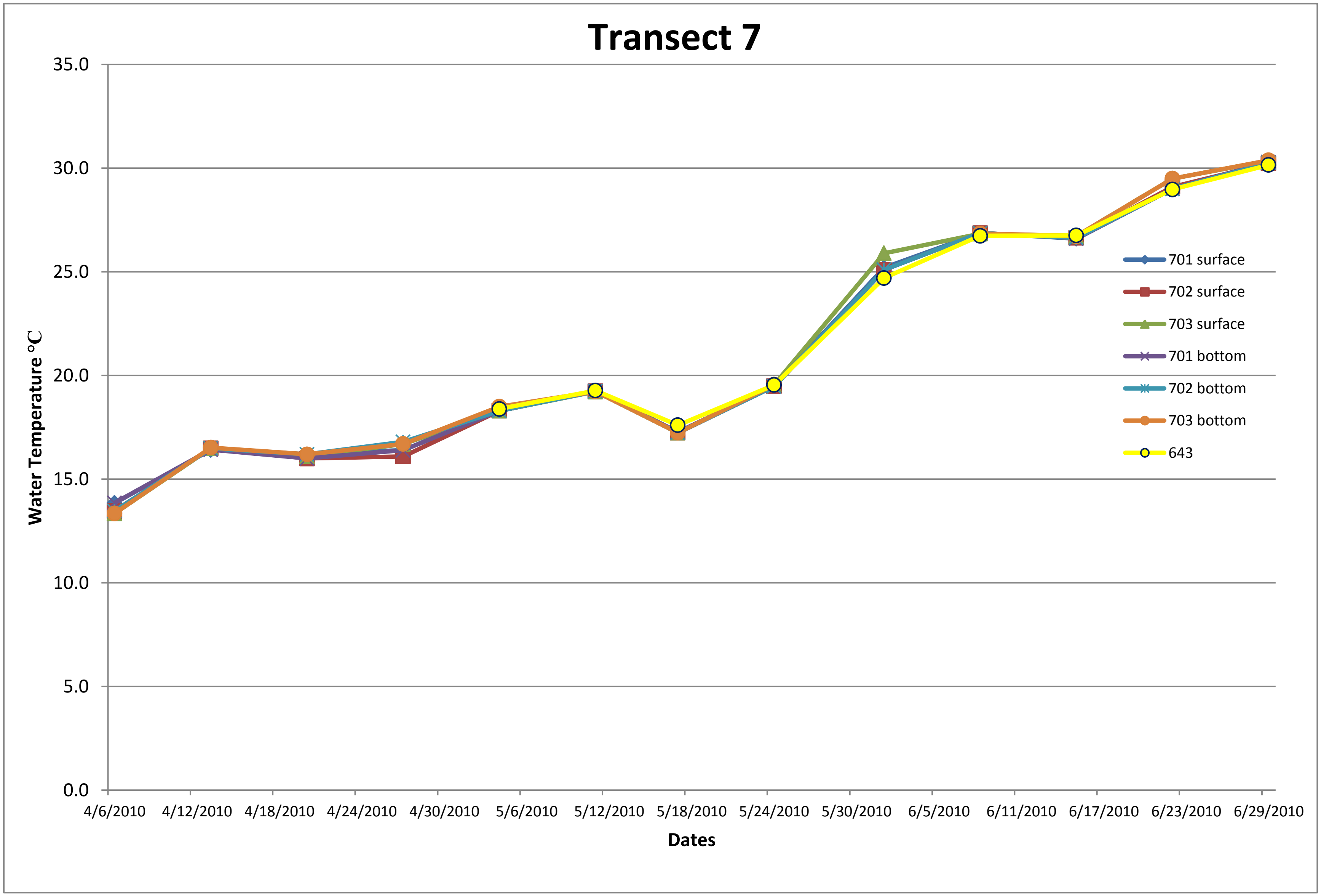


FIGURE 4-23: CONTINUED.

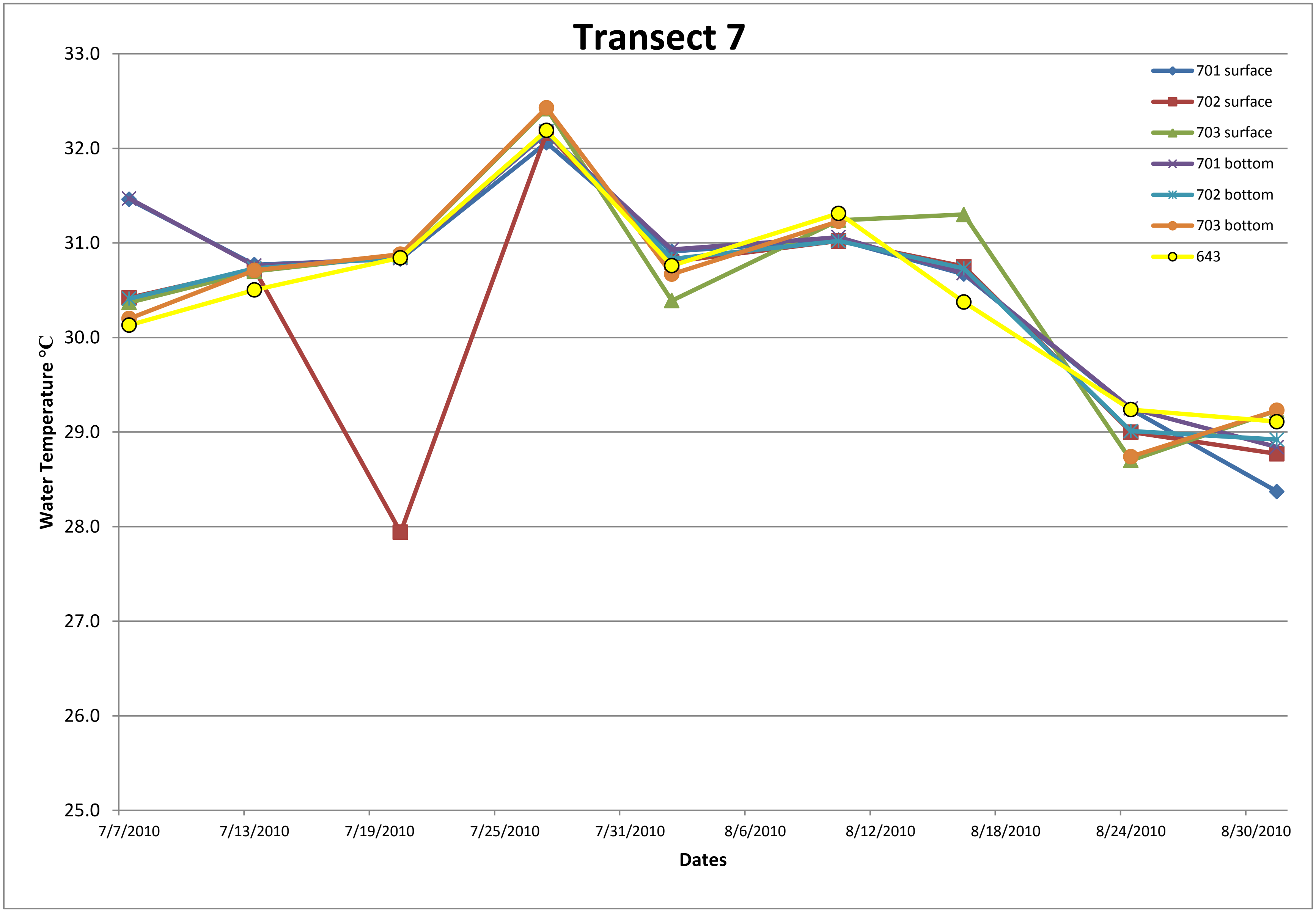


FIGURE 4-23: CONTINUED.

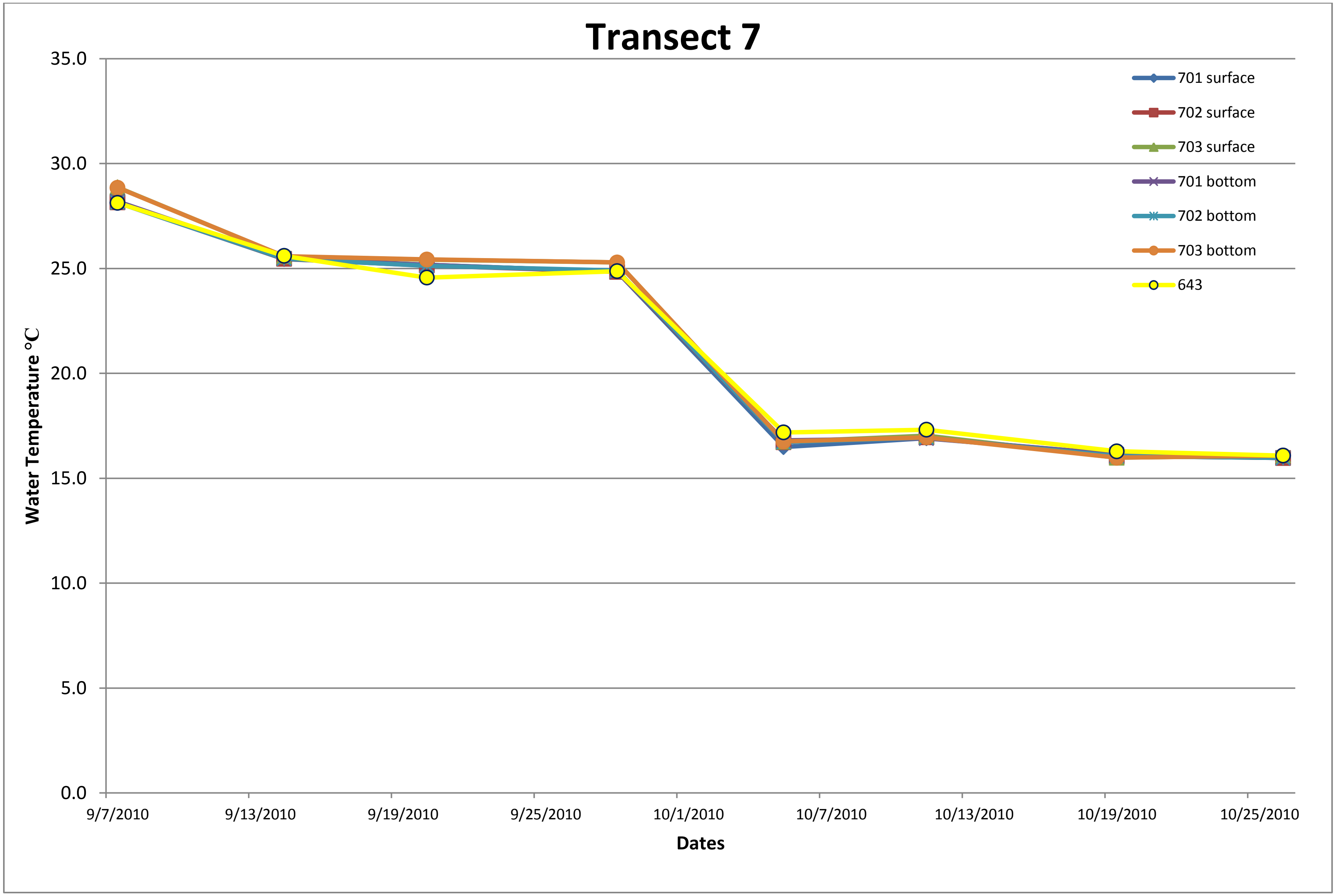


FIGURE 4-23: CONTINUED.

FIGURE 4-23: CONTINUED.

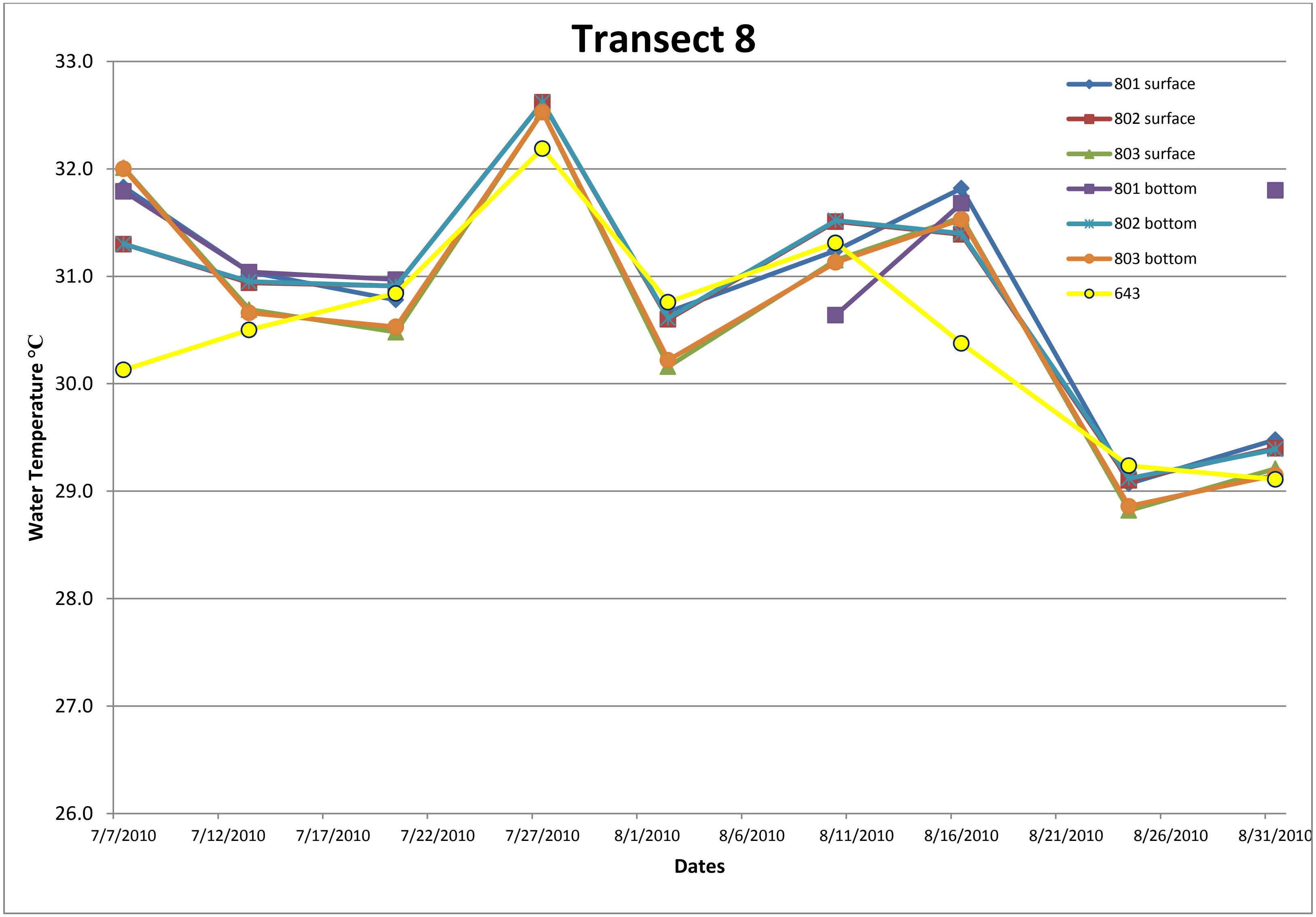


FIGURE 4-23: CONTINUED.

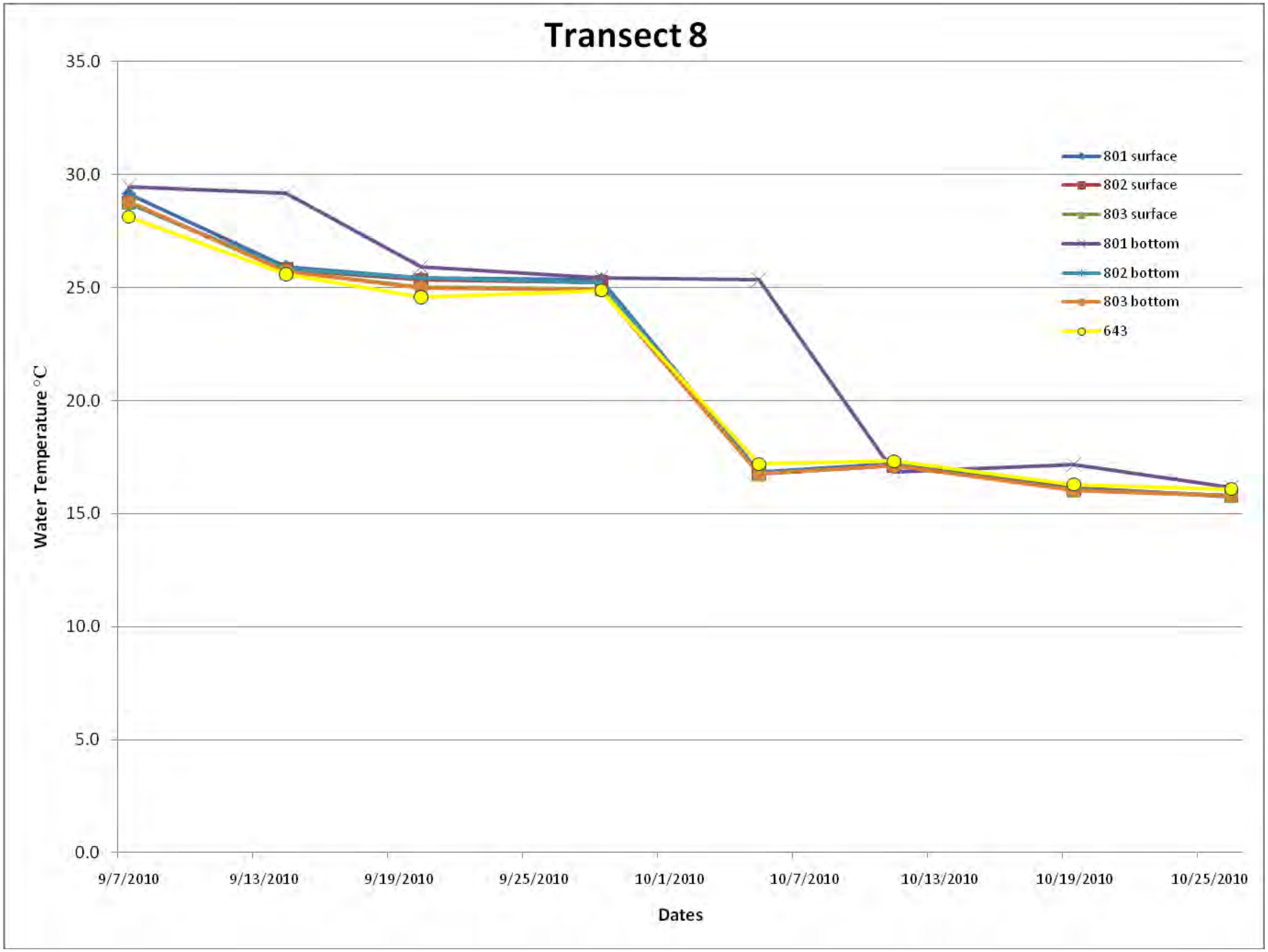


FIGURE 4-24: SURFACE AND BOTTOM DO AT TRANSECTS 6, 7, AND 8 DOWNSTREAM OF CONOWINGO DAM, APRIL-OCTOBER 2010.

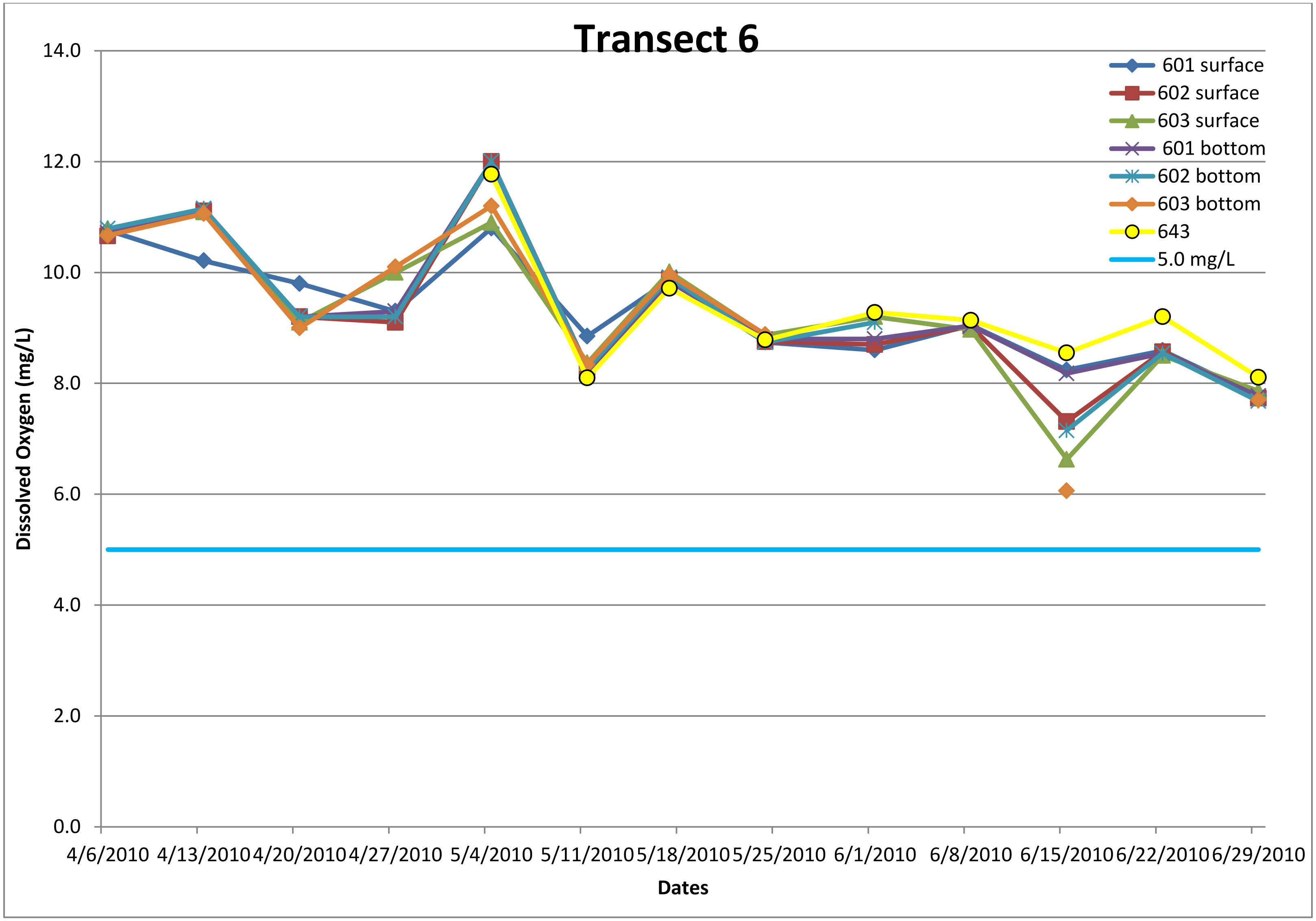


FIGURE 4-24: CONTINUED.

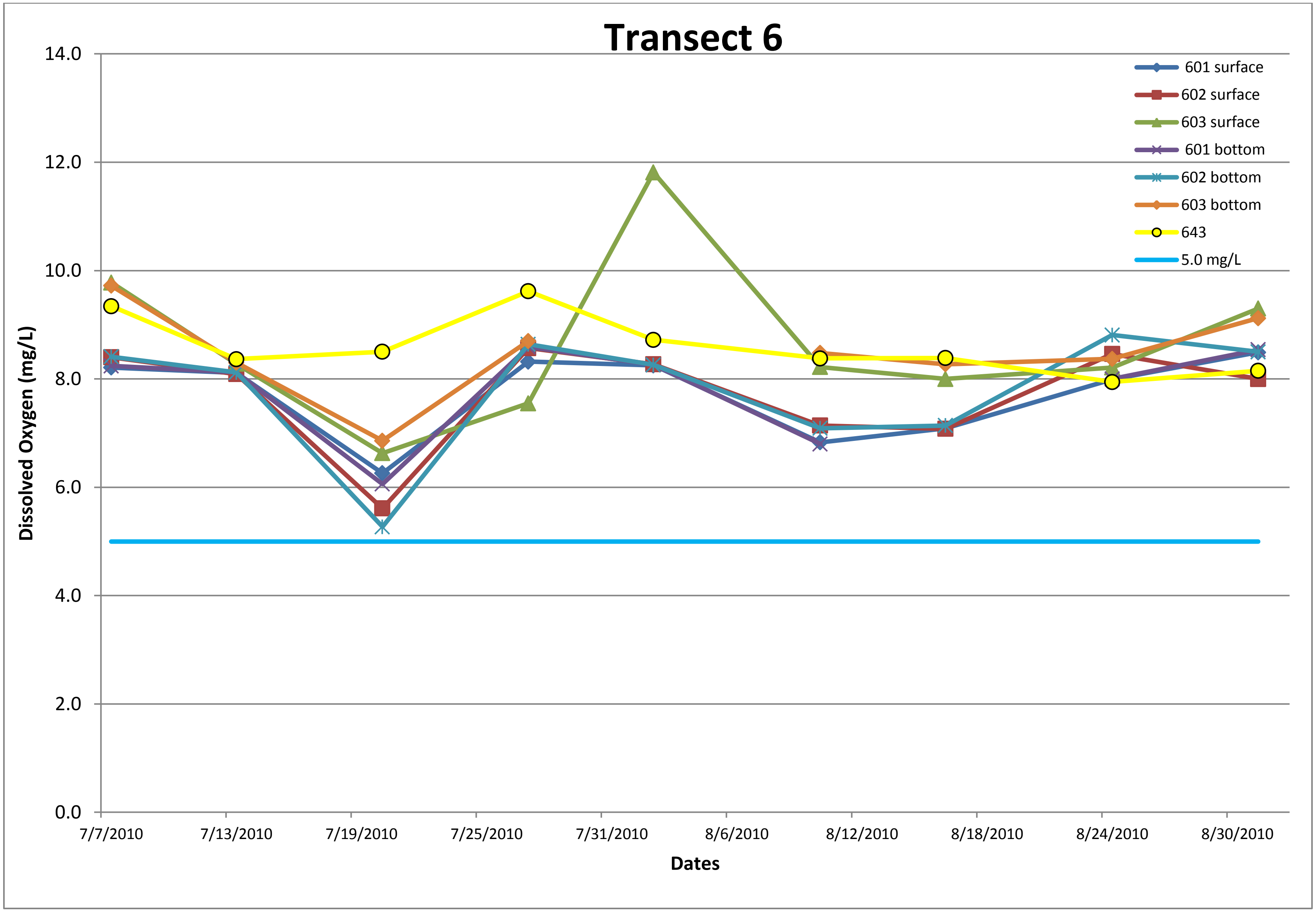


FIGURE 4-24: CONTINUED.

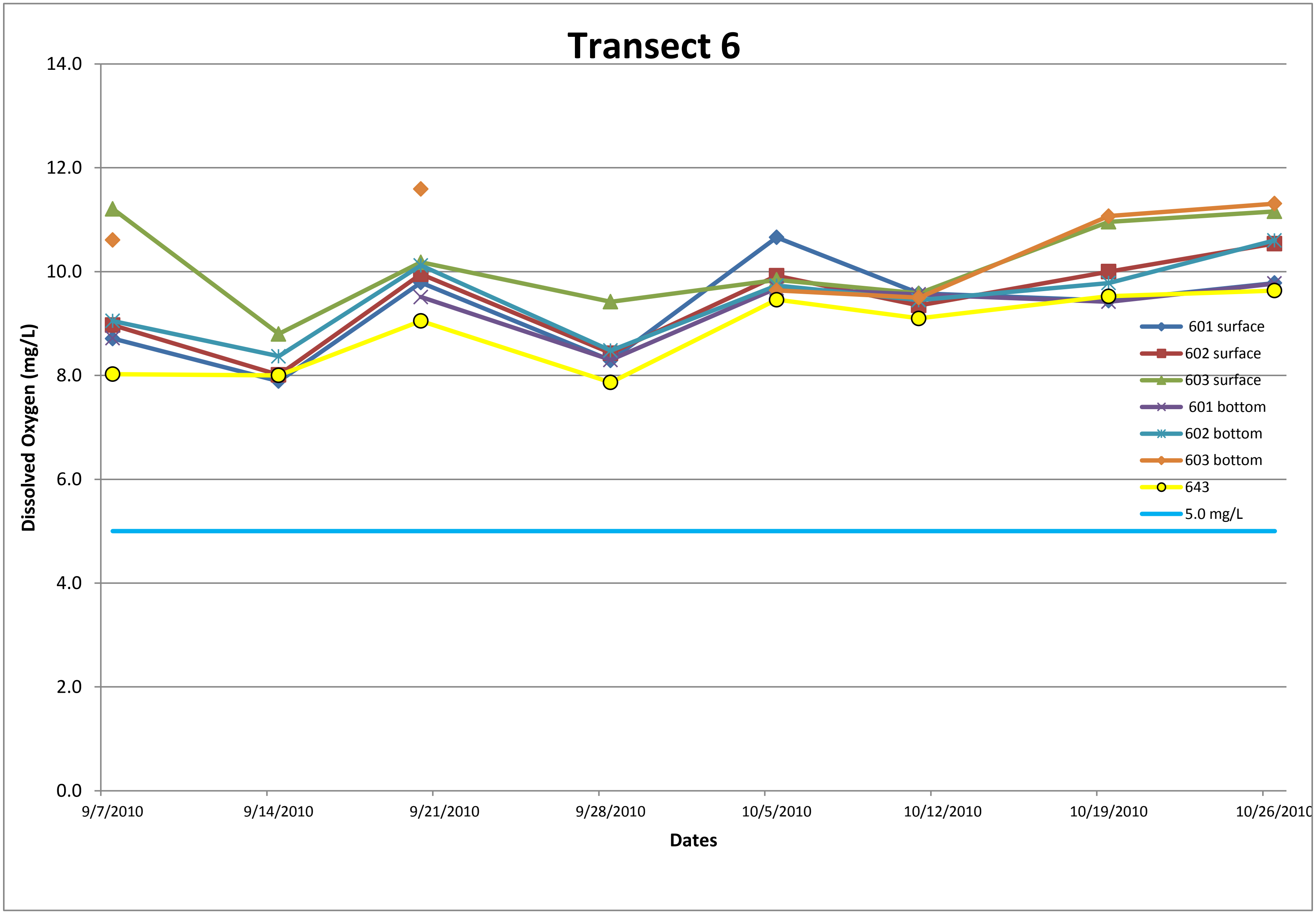


FIGURE 4-24: CONTINUED.

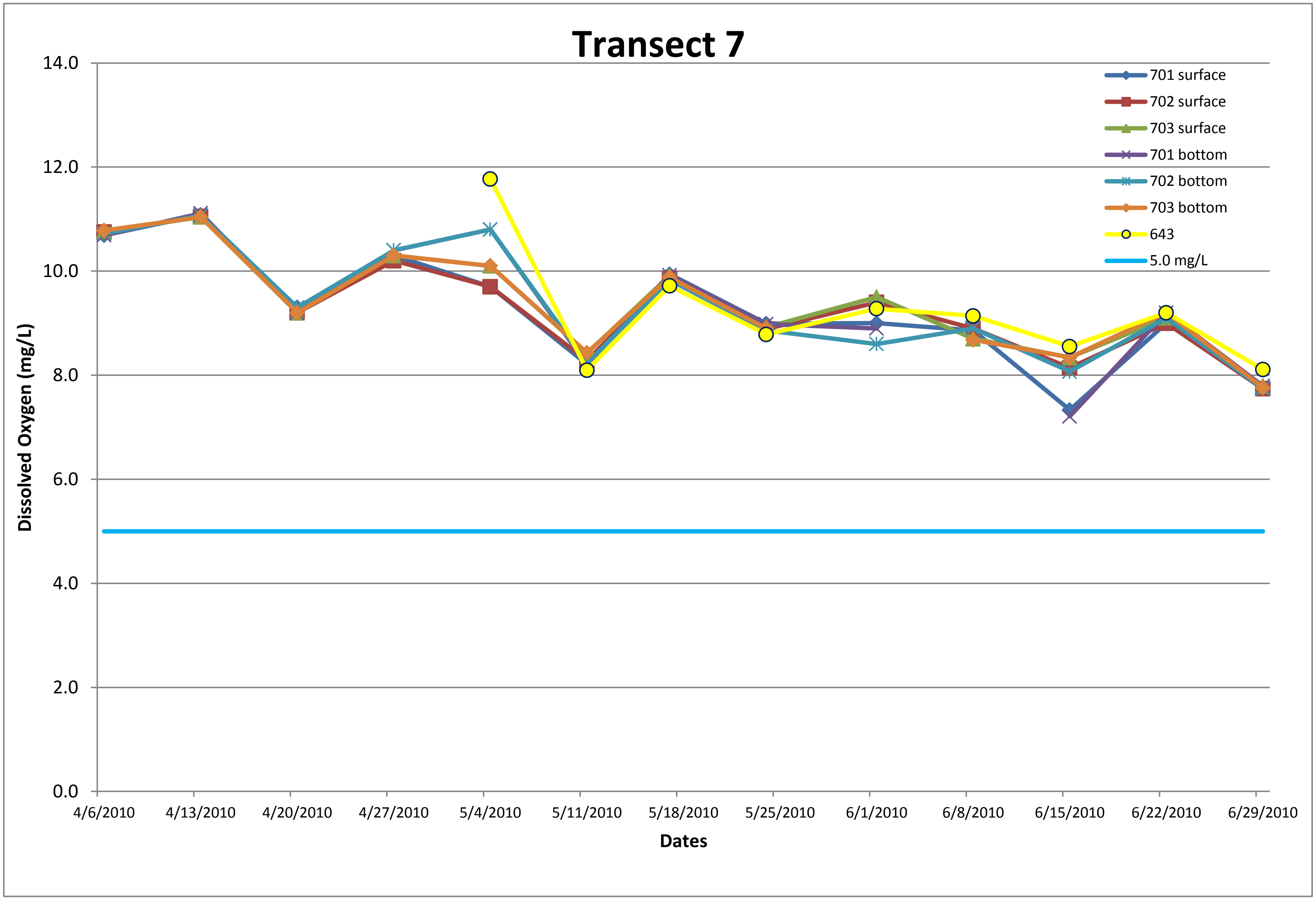


FIGURE 4-24: CONTINUED.

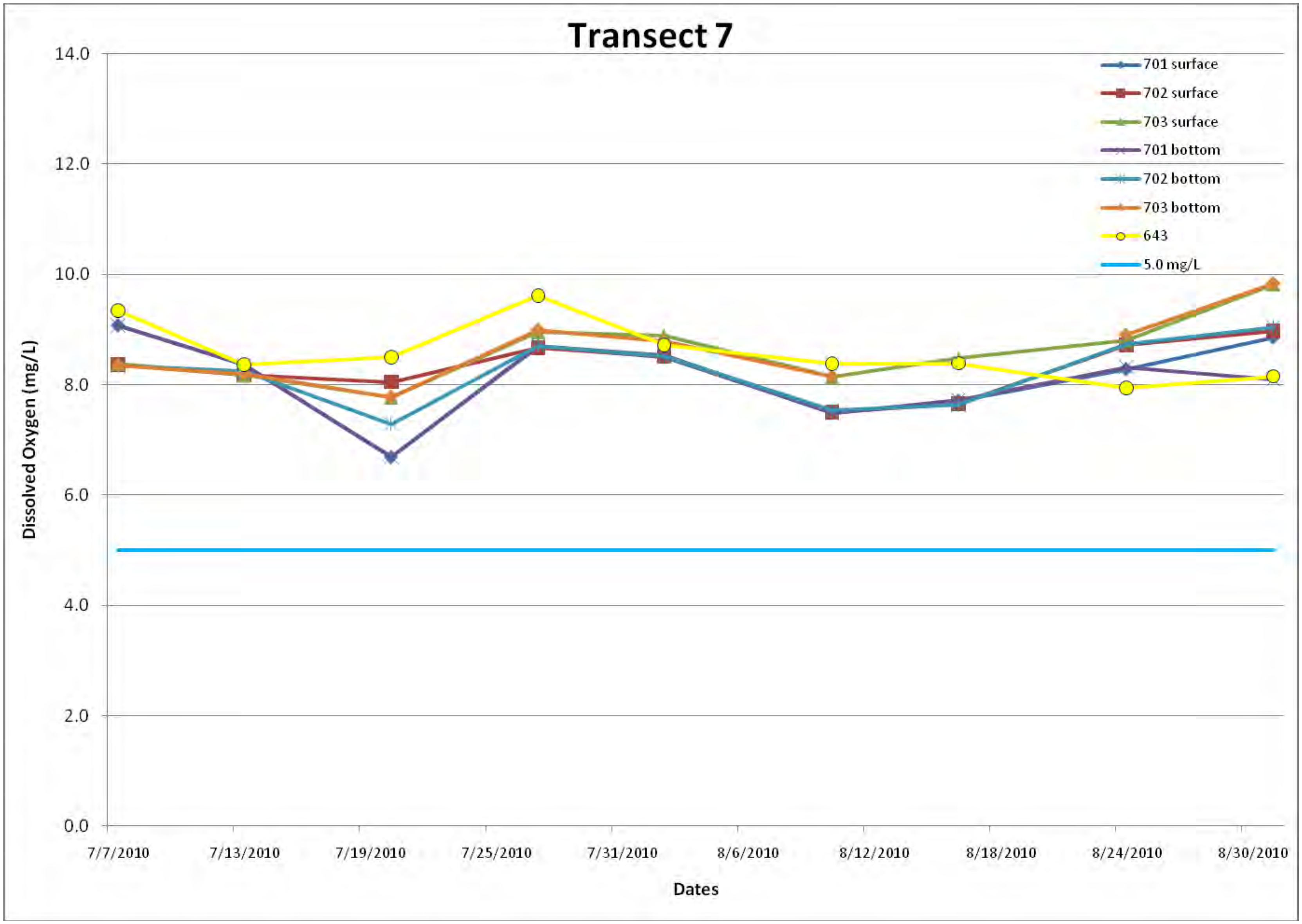


FIGURE 4-24: CONTINUED.

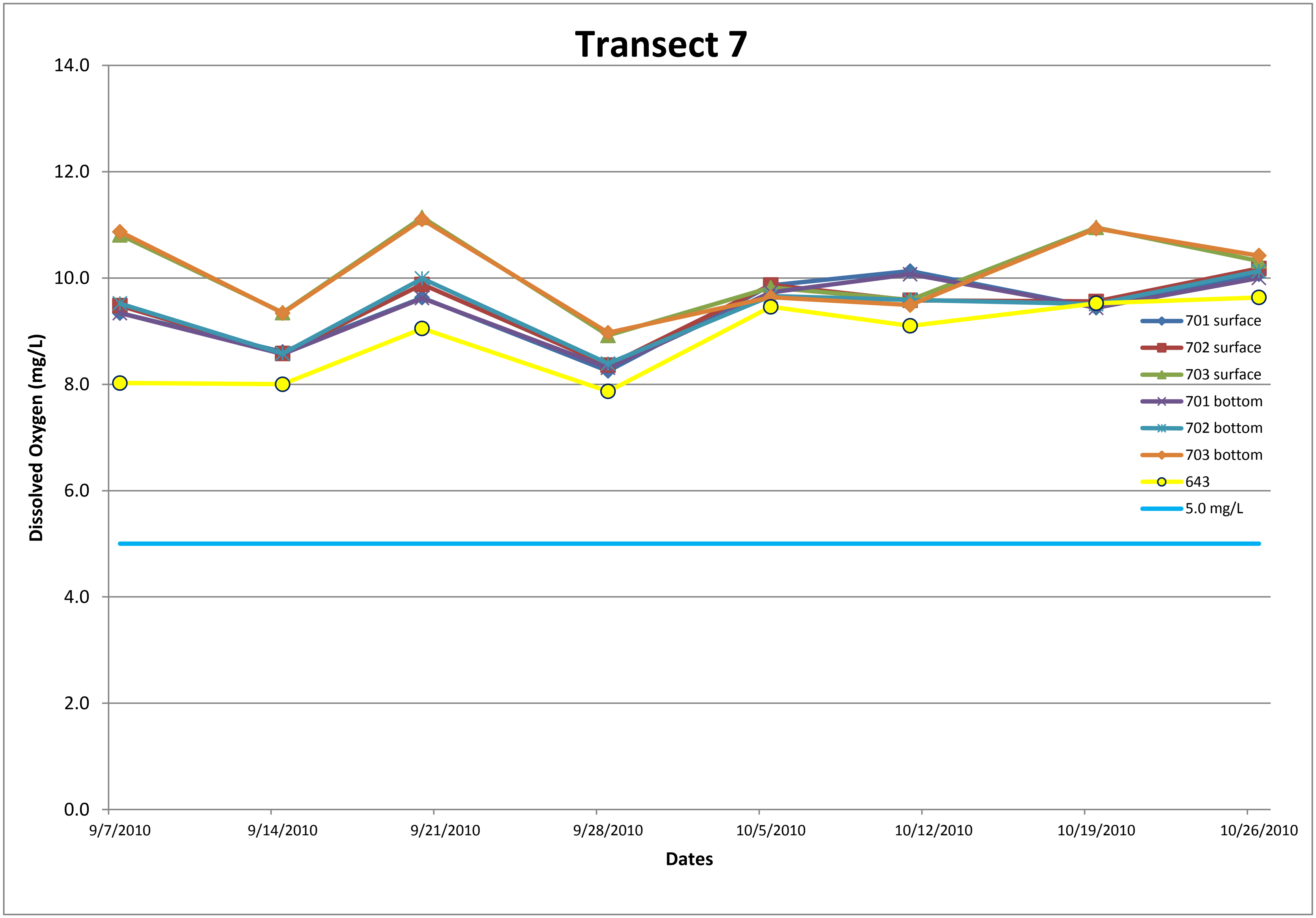


FIGURE 4-24: CONTINUED.

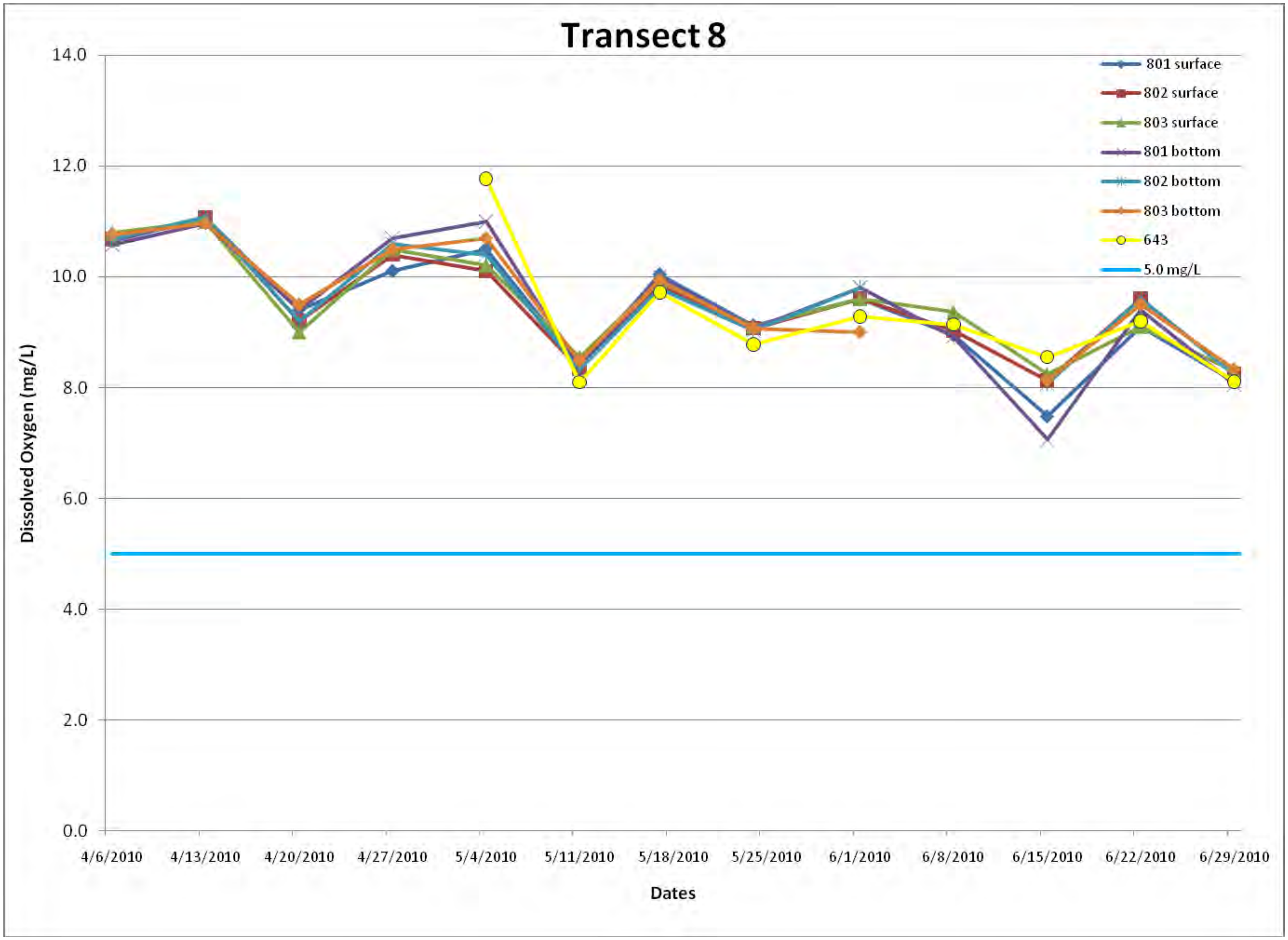


FIGURE 4-24: CONTINUED.

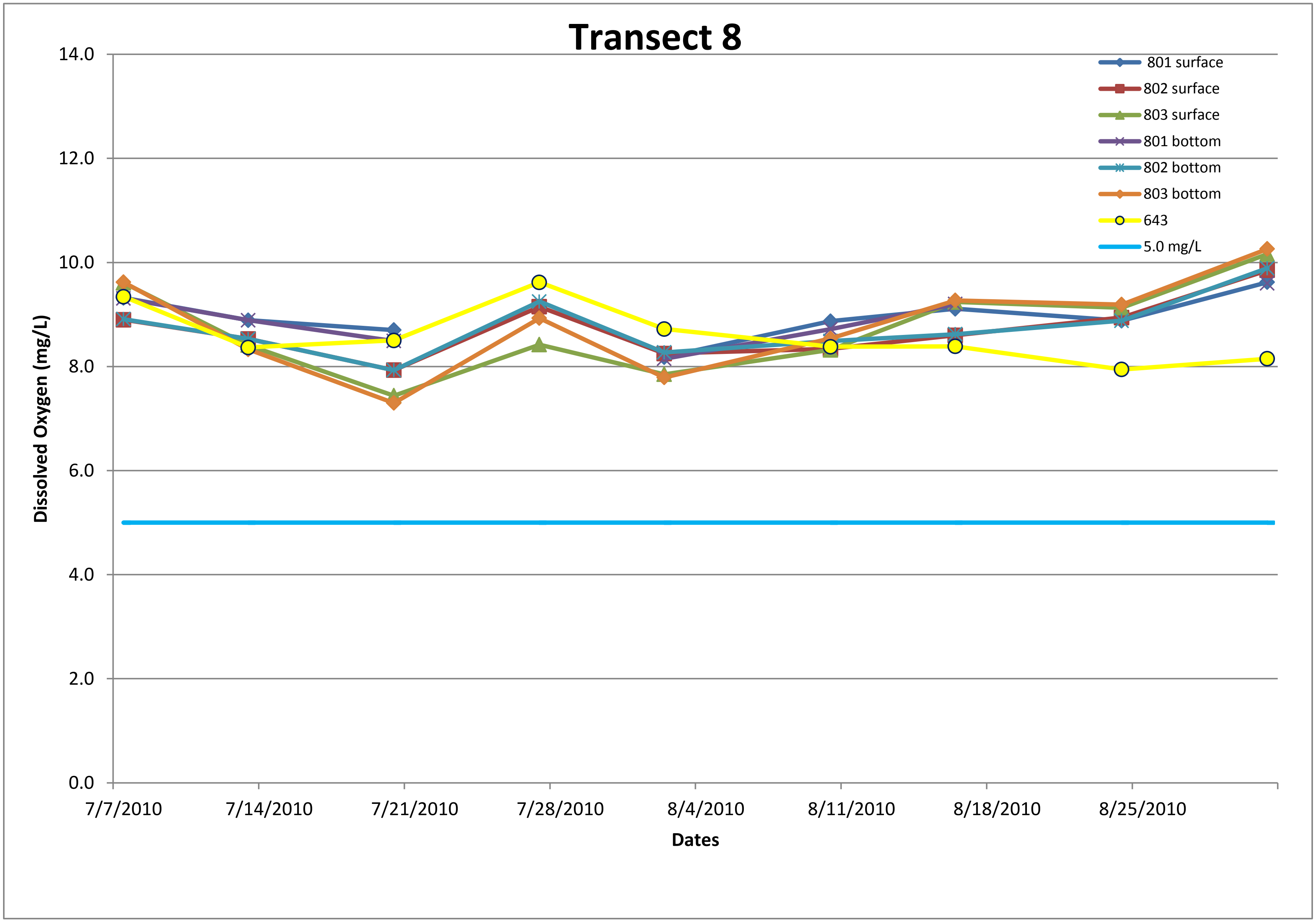


FIGURE 4-24: CONTINUED.

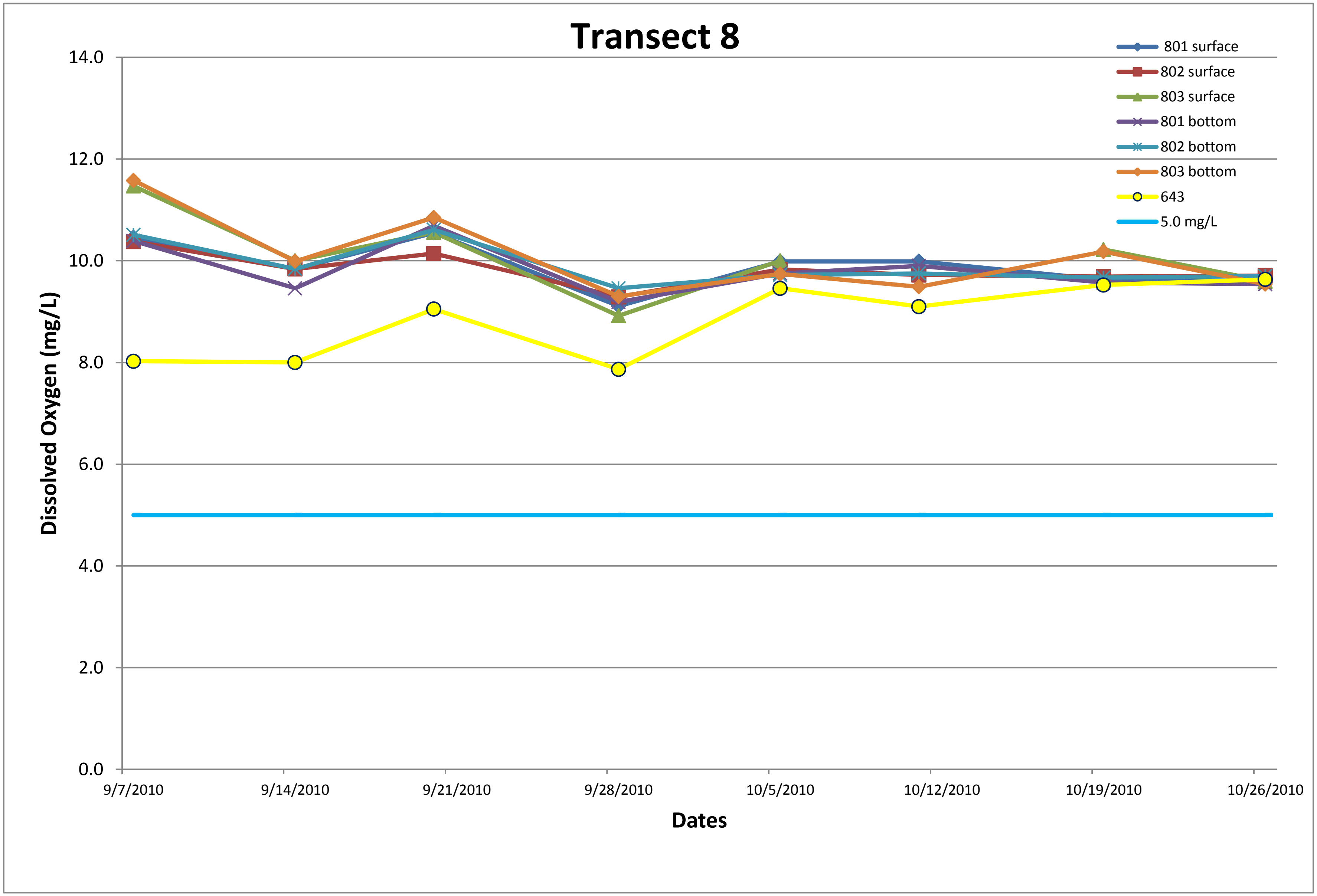
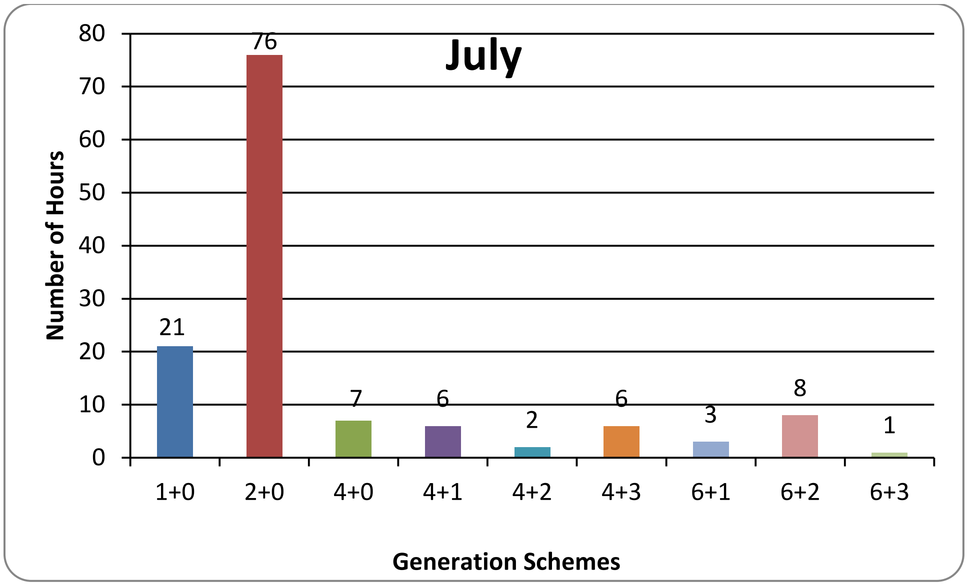
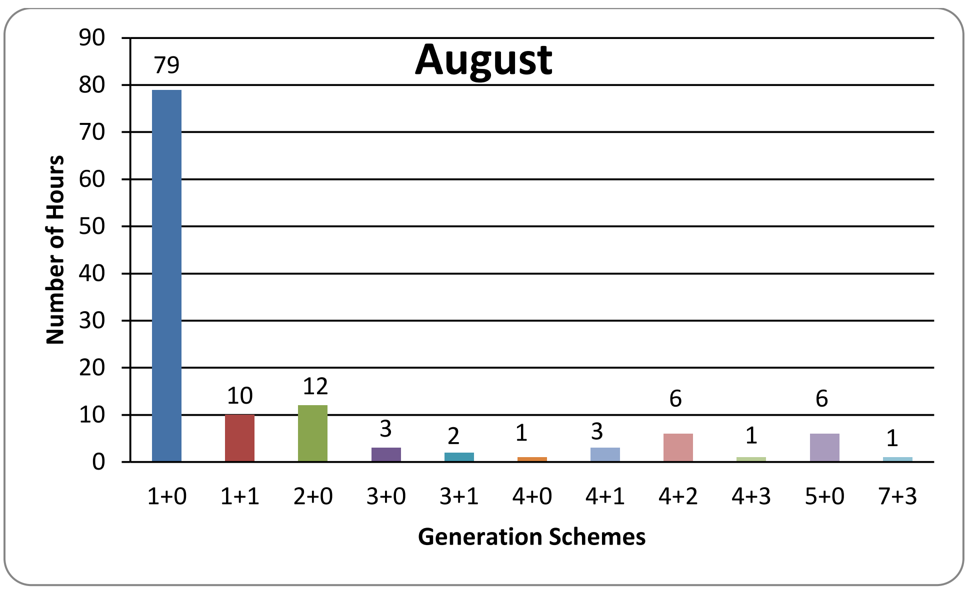


FIGURE 4-25: NUMBER OF HOURLY TURBINE BOIL SAMPLES COLLECTED DURING PERIODS OF VARIOUS COMBINATIONS OF SMALL AND LARGE TURBINES OPERATING AT CONOWINGO IN JULY-AUGUST 2010.





Note: On the x axis lables, the first number indicates the number of small units operating and the second number indicates the number of large units operating. For example the bar labeled 1+0 indicates the number of hours of turbine discharge boil sampling was conducted during the sampling season when one small unit and no large units were operating. As further examples, 1+1 indicates the number of samples taken when one small unit and one large unit were operating, and 7+3 indicates when 7 small units and 3 large units were operating.

FIGURE 4-26: PLOT OF HOURLY TEMPERATURE MEASUREMENTS (°F) OF OPERATING TURBINE DISCHARGE BOILS ON THE FERC SELECTED DATES AT CONOWINGO DAM, JULY-AUGUST 2010.

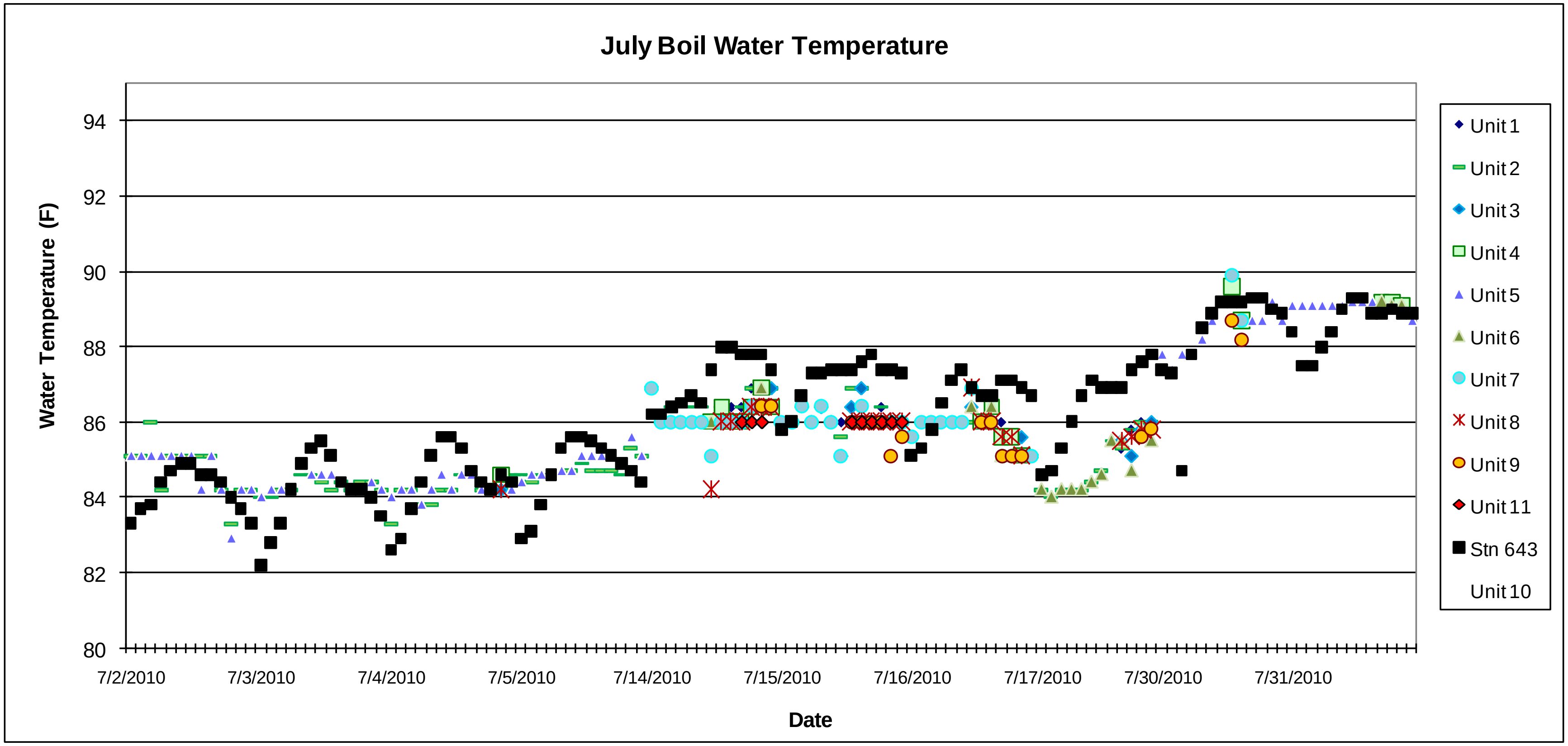


FIGURE 4-26: CONTINUED.

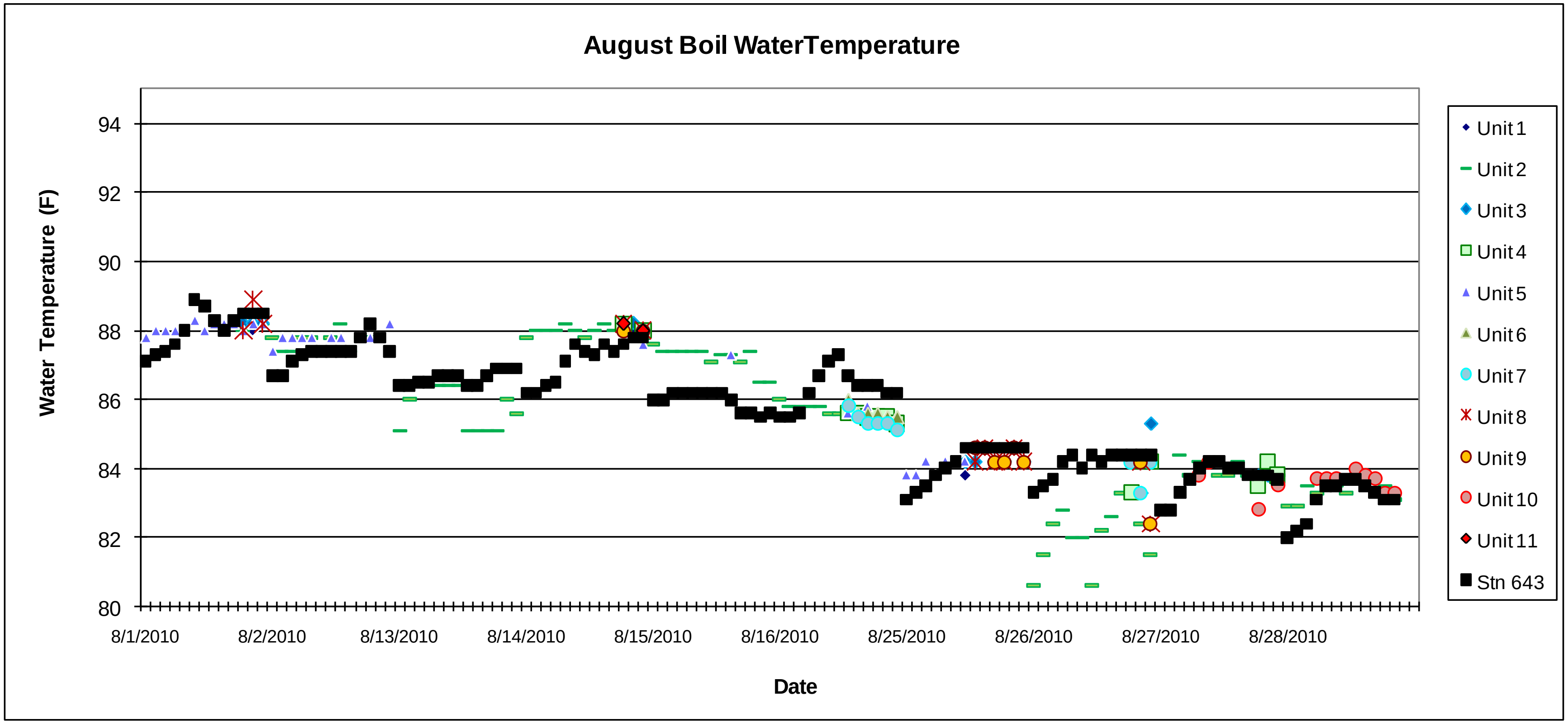


FIGURE 4-27: PLOT OF HOURLY DO MEASUREMENTS (MG/L) OF OPERATING TURBINE DISCHARGE BOILS ON THE FERC SELECTED DATES AT CONOWINGO DAM, JULY-AUGUST 2010.

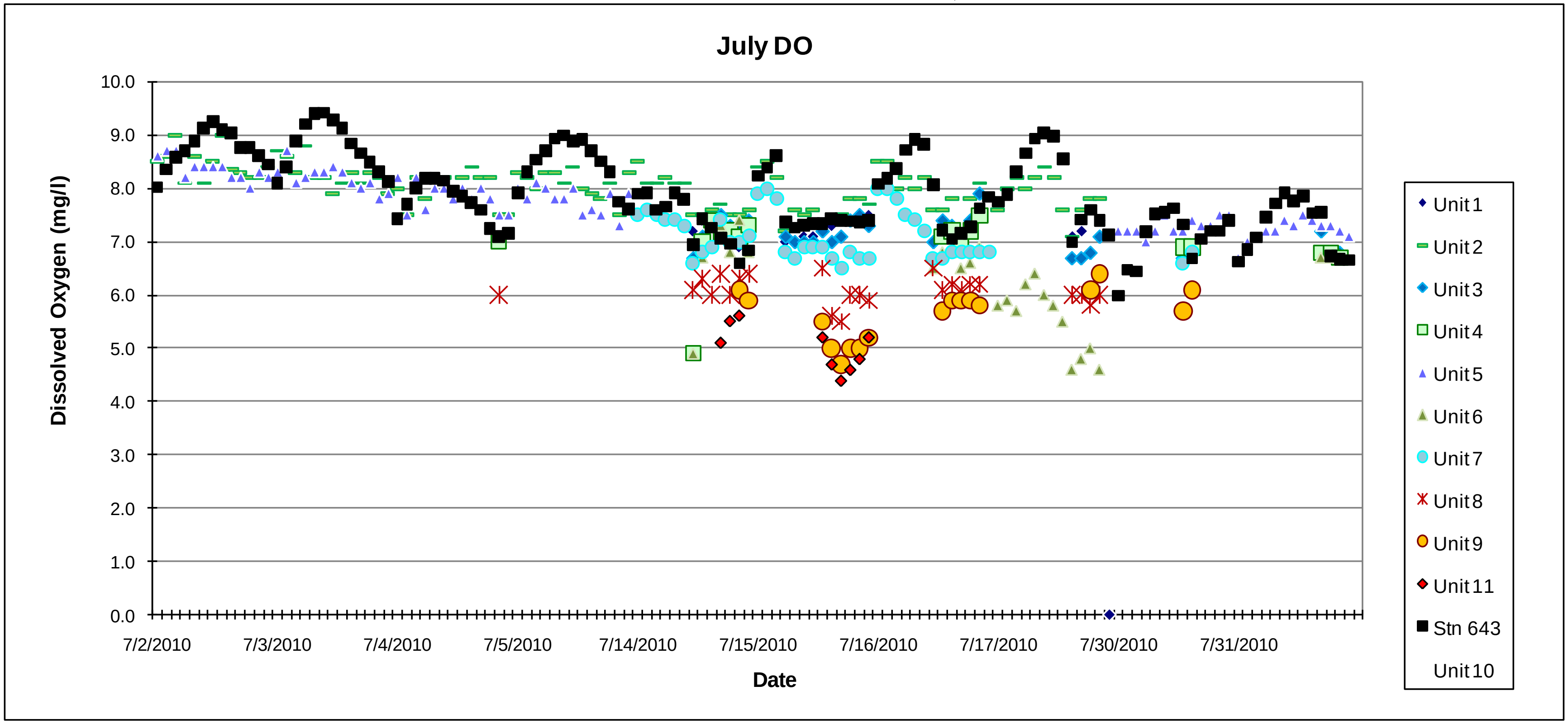


FIGURE 4-27: CONTINUED.

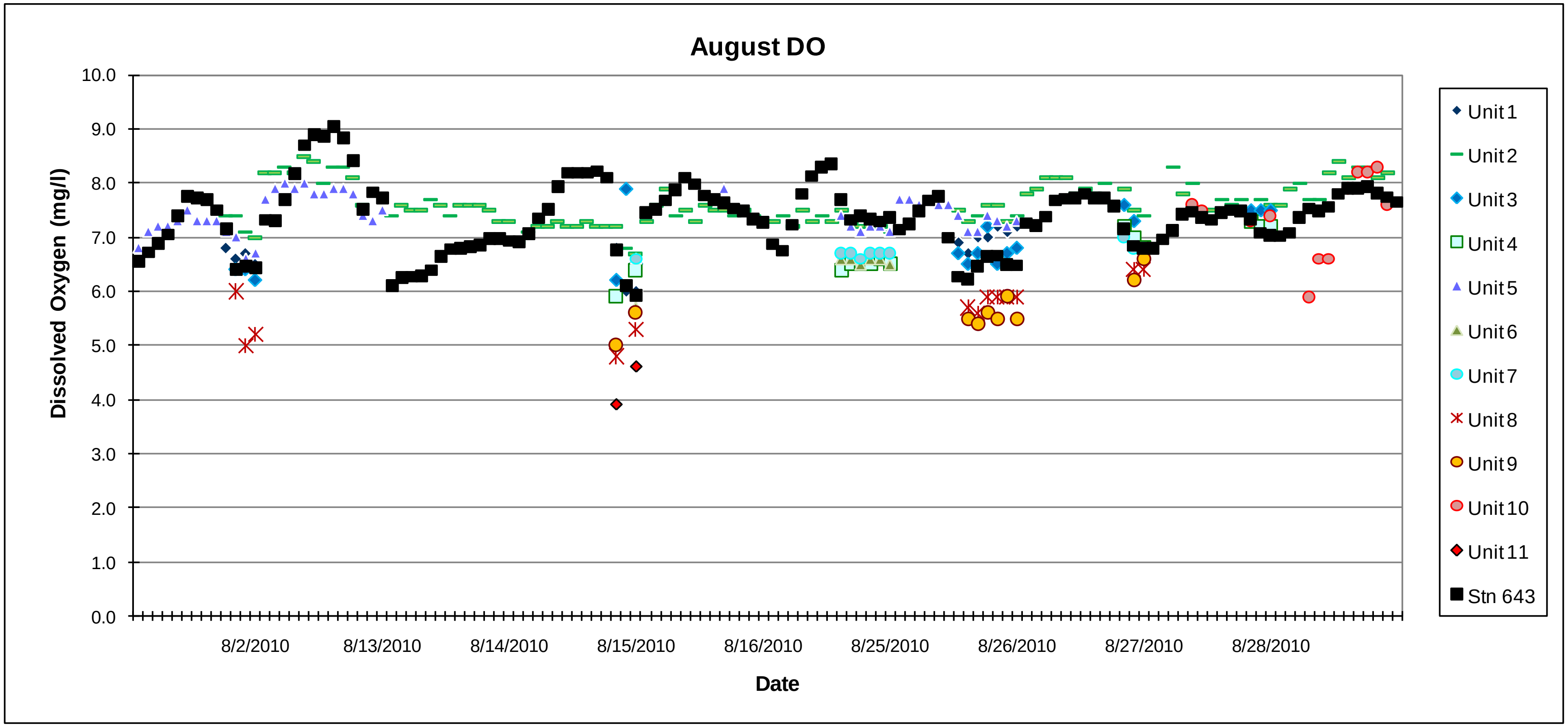


FIGURE 4-28: HOURLY TEMPERATURE MEASUREMENTS AT STATION 643 DOWNSTREAM OF CONOWINGO DAM, MAY-OCTOBER 2010.

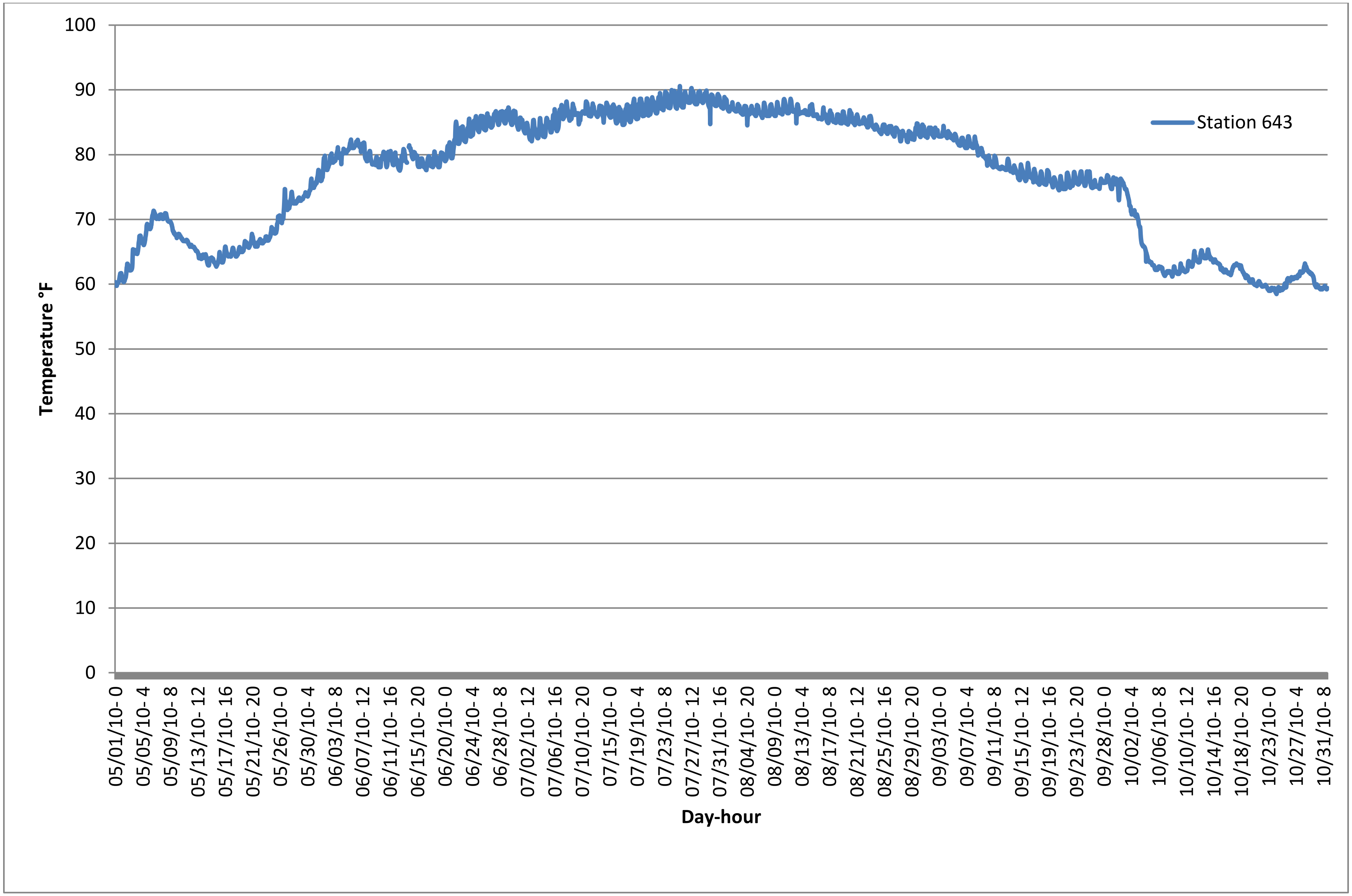


FIGURE 4-29: CONOWINGO POND TRANSECTS 5 AND LOWER RIVER STATION 643 WATER TEMPERATURE.

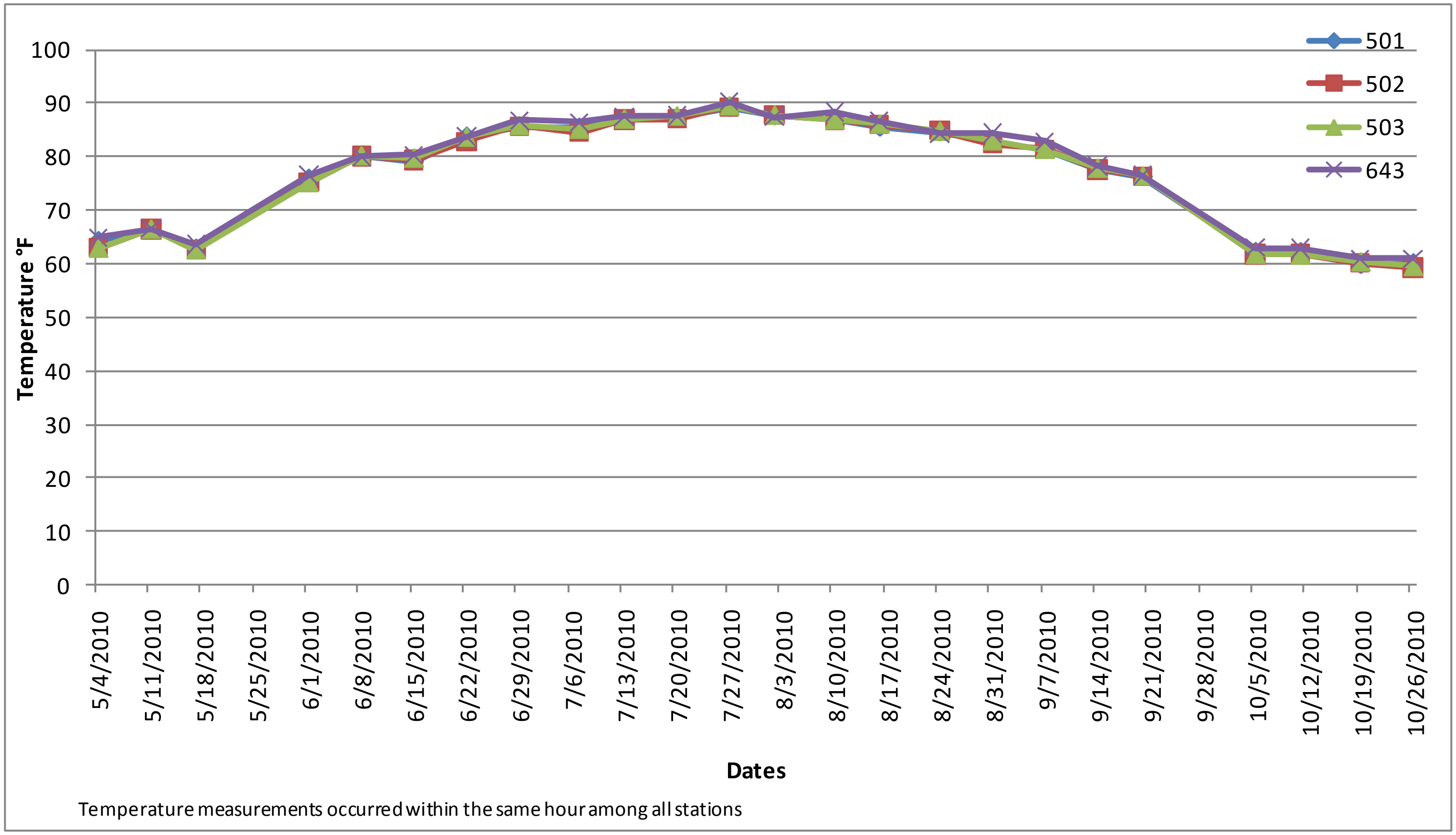


FIGURE 4-30: EXAMPLES OF DIURNAL VARIATIONS IN HOURLY WATER TEMPERATURE AT STATION 643 DOWNSTREAM OF CONOWINGO DAM ON JULY 14-16 AND AUGUST 14-16.

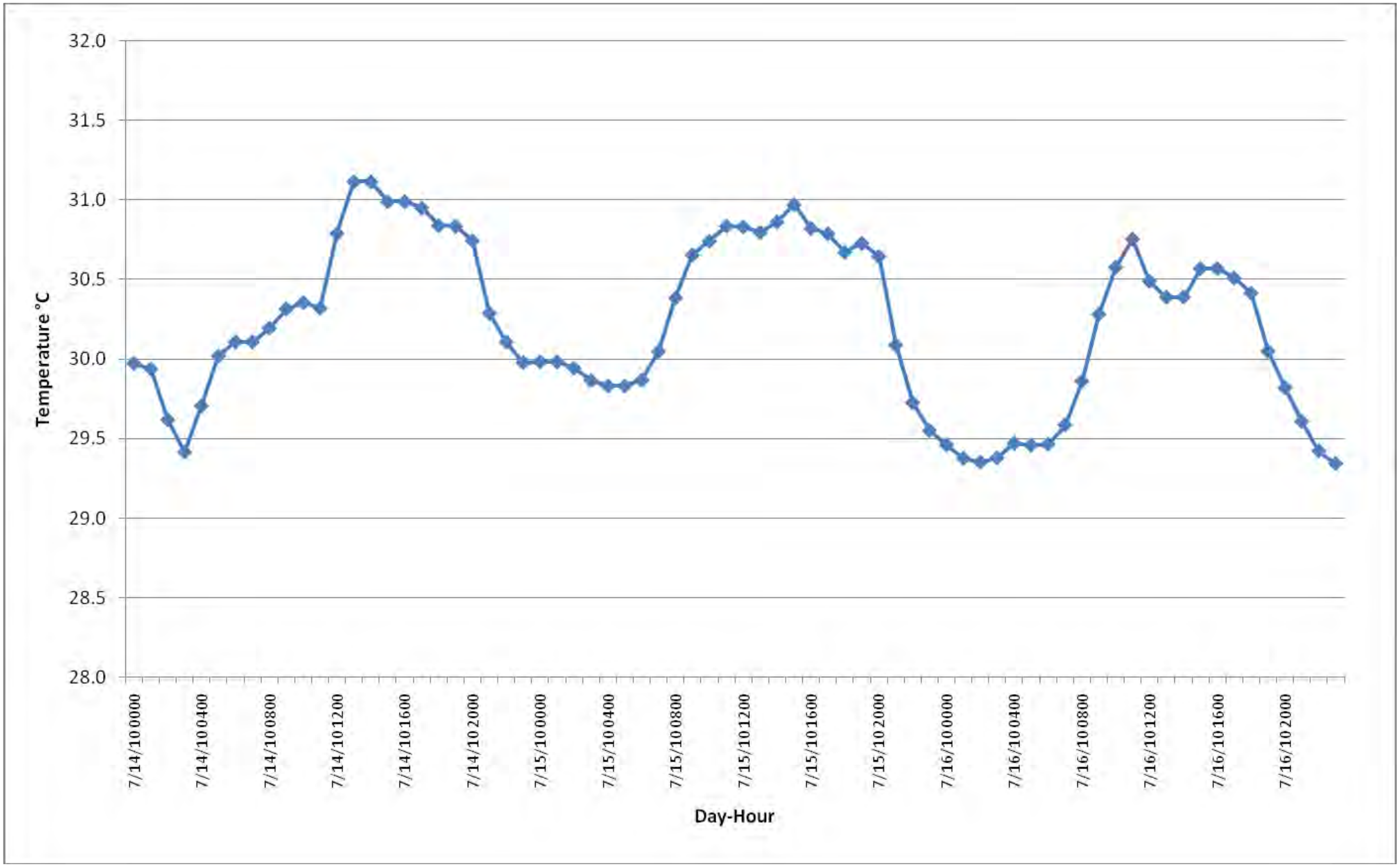


FIGURE 4-30: CONTINUED.

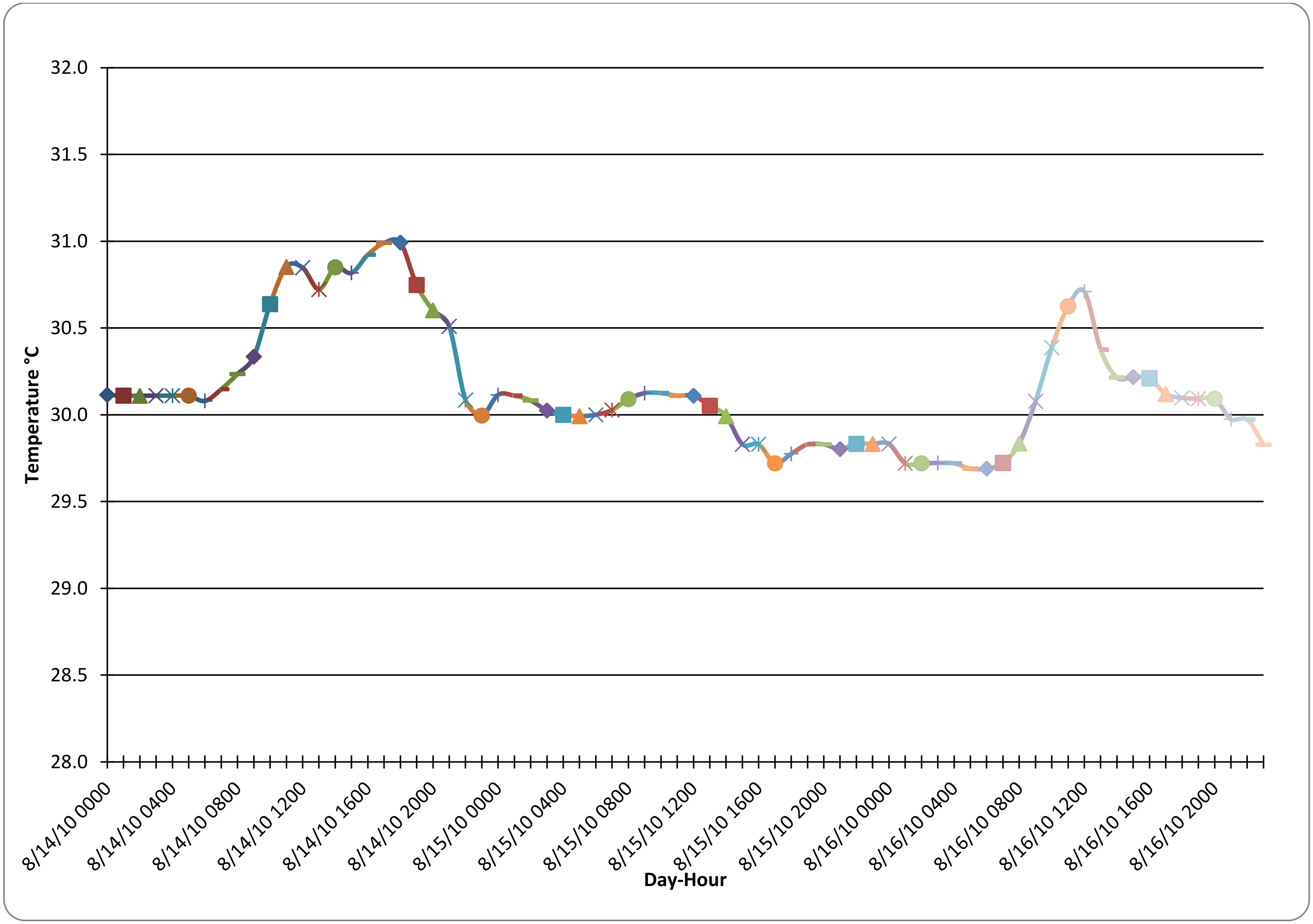


FIGURE 4-31: HOURLY DO MEASUREMENTS AT STATION 643 DOWNSTREAM OF CONOWINGO DAM, MAY 1-OCTOBER 31, 2010.

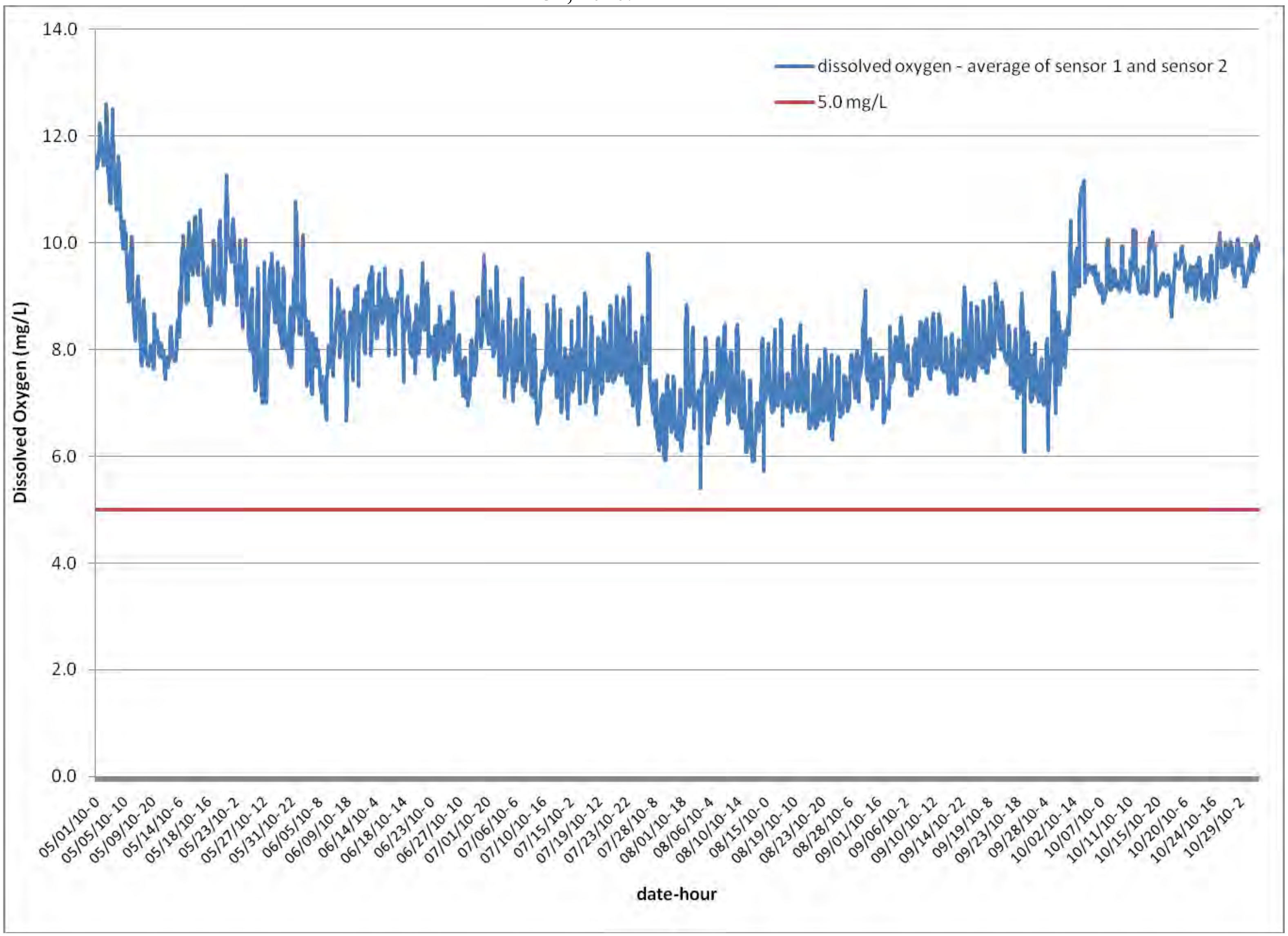


FIGURE 4-32: EXAMPLES OF DIURNAL VARIATIONS IN DO AT STATION 643 ON SELECTED DATES IN JULY AND AUGUST 2010.

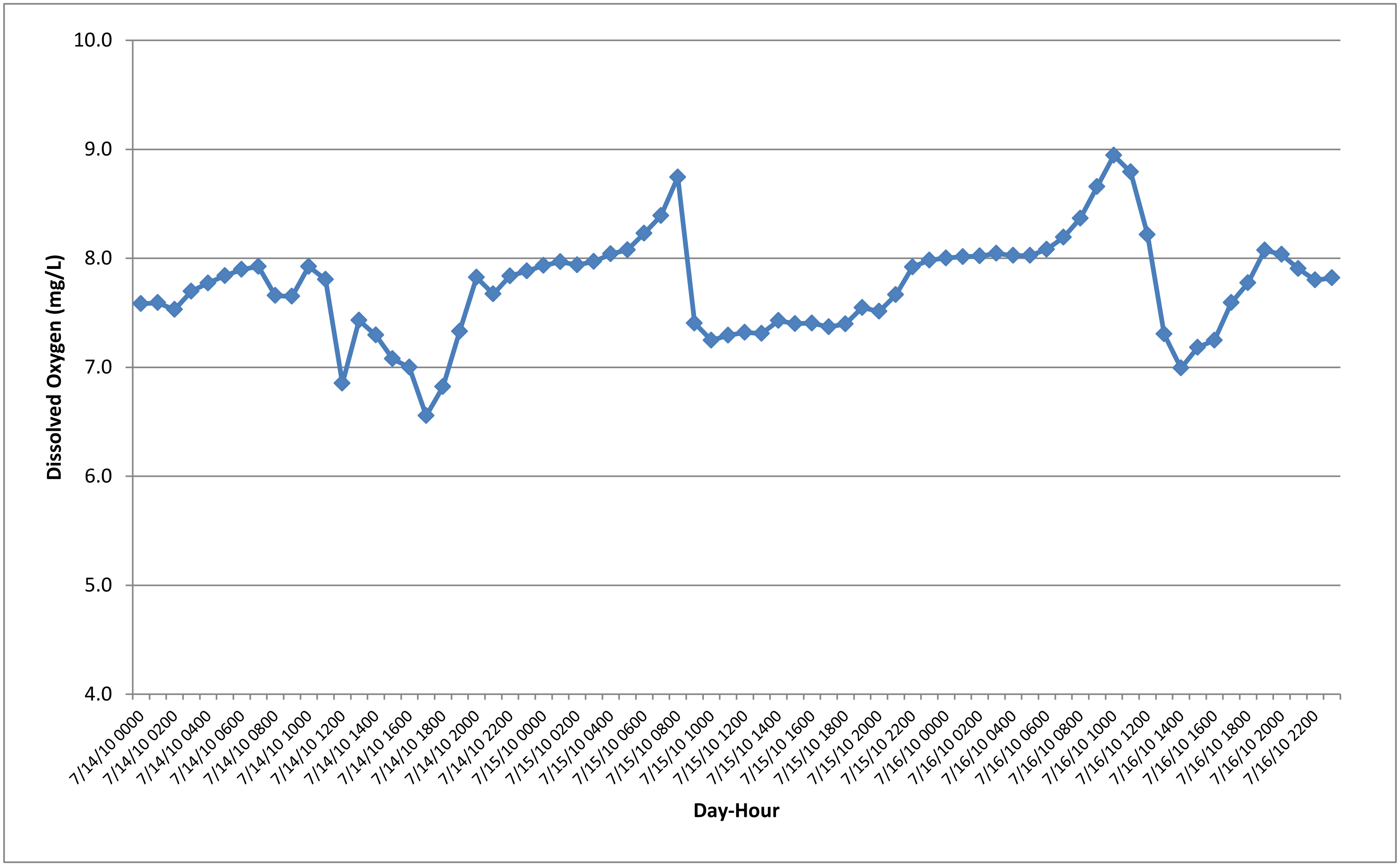


FIGURE 4-32: CONTINUED.

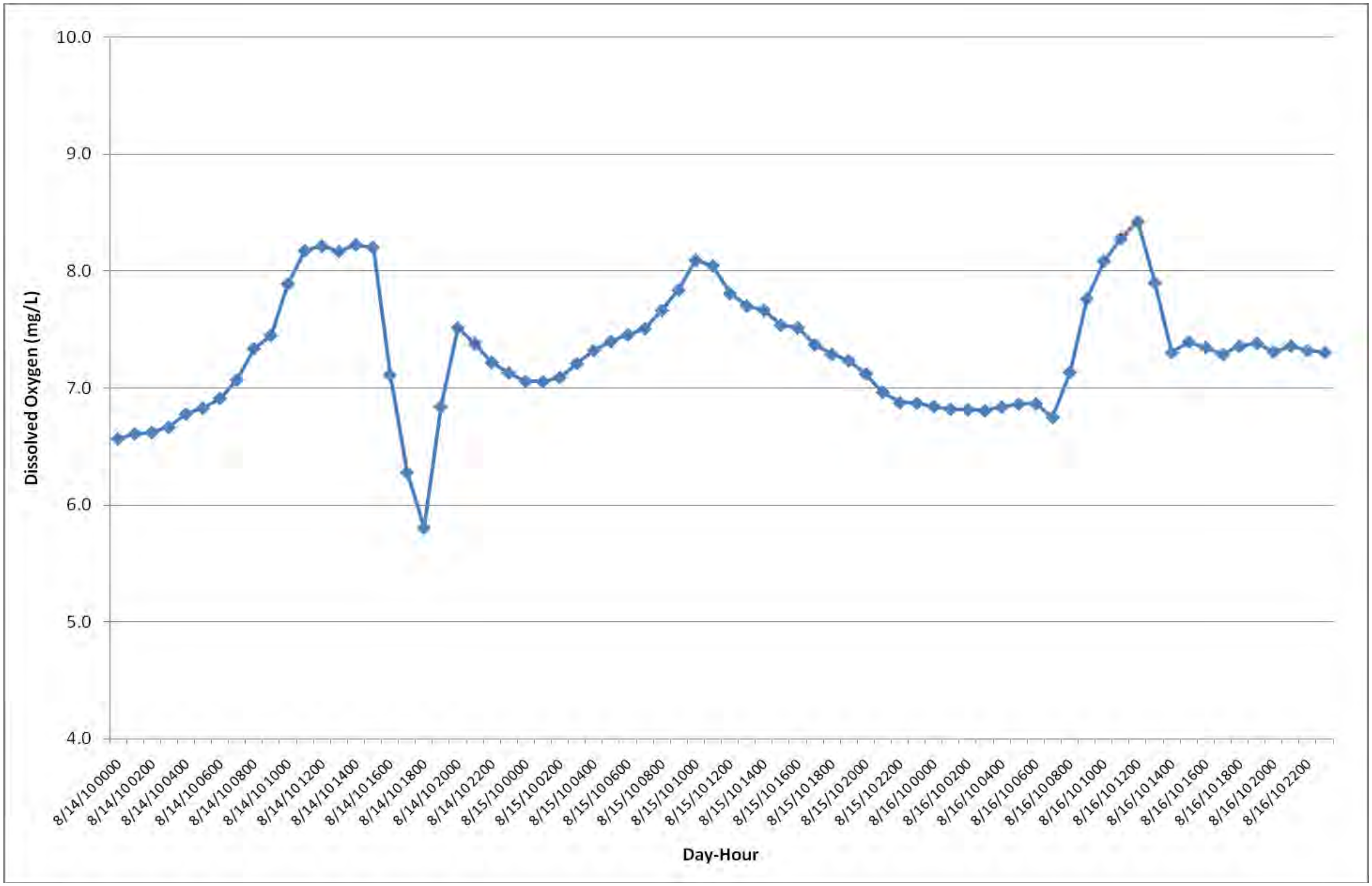


FIGURE 4-33: FREQUENCY DISTRIBUTION OF DIFFERENCES IN AVERAGE HOURLY DO VALUES OF OPERATING TURBINES ON FERC SELECTED SATES AT CONOWINGO DAM AND AVERAGE DO RECORDED 1 HOUR LATER AT STATION 643 DOWNSTREAM OF CONOWINGO DAM, JULY-AUGUST 2010.

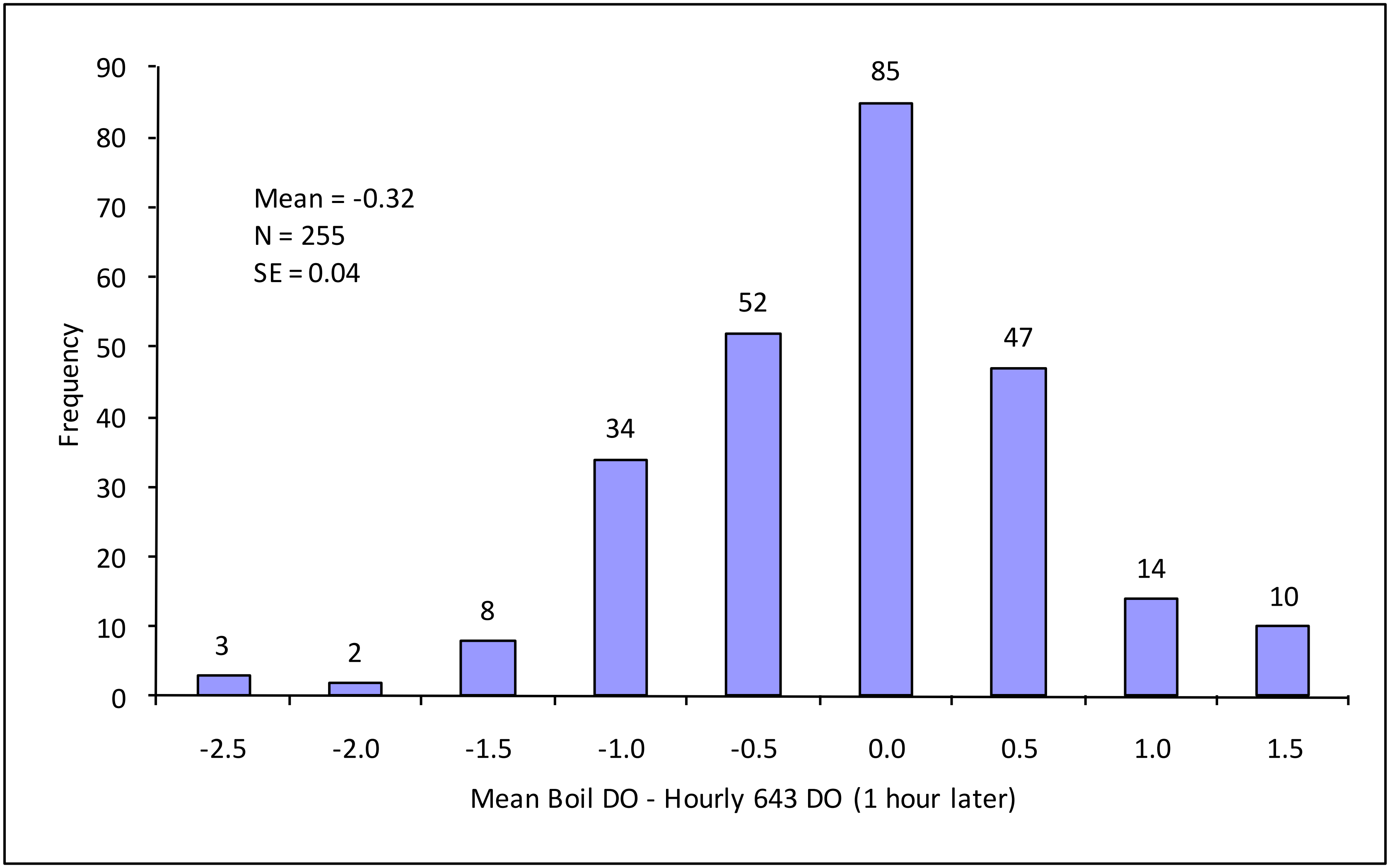


FIGURE 4-34 COMPARISON OF SEASONAL WATER TEMPERATURES (≥40 FT DEPTH) ON TRANSECT 5 IN CONOWINGO POND AT STATIONS 501, 502, AND 503 WITH TEMPERATURES RECORDED AT STATION 643 DOWNSTREAM OF CONOWINGO DAM ON SAME DATES, MAY-OCTOBER 2010.

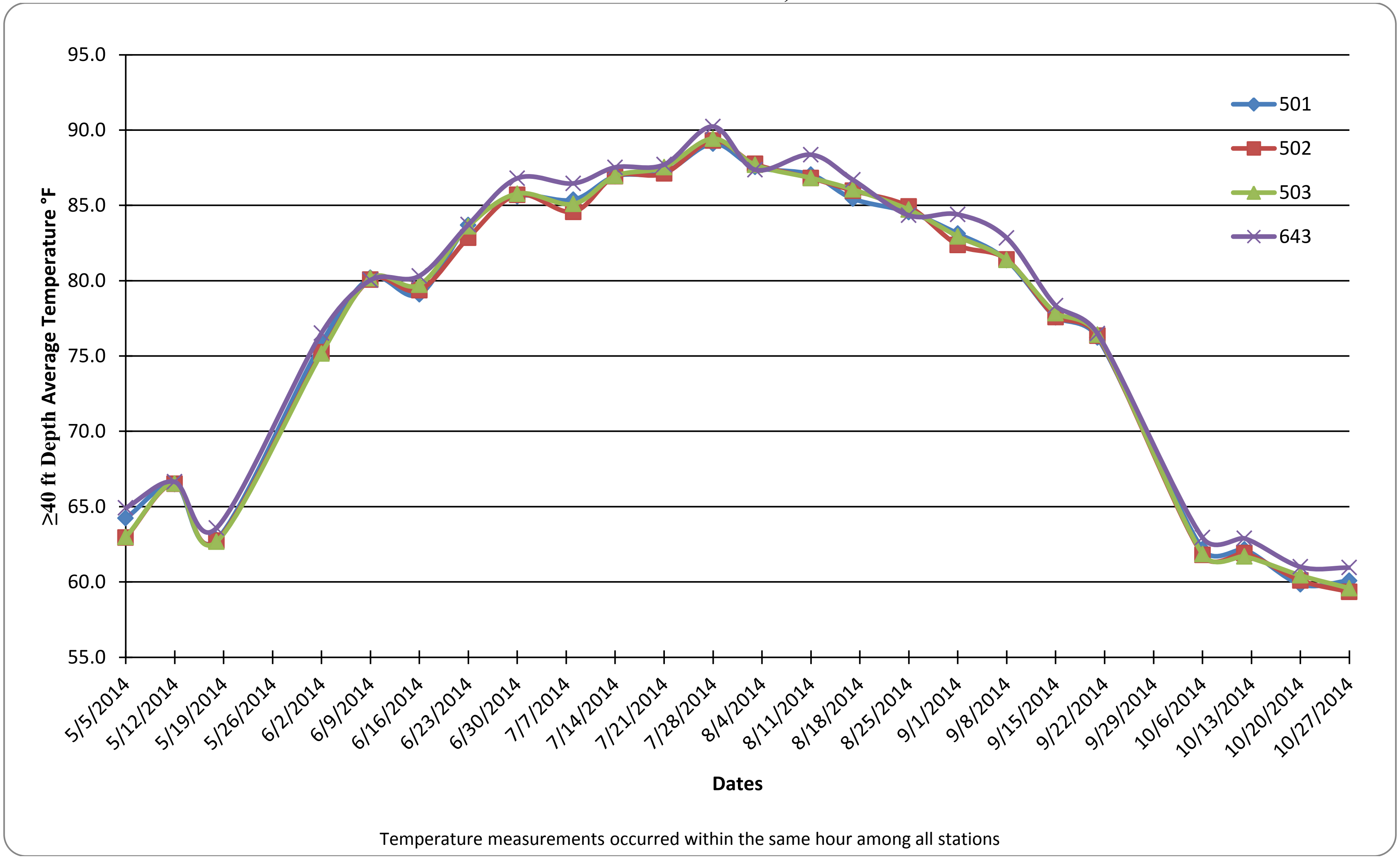


FIGURE 4-35: RELATIONSHIP OF WATER TEMPERATURE AT TRANSECT 5 AND INDIVIDUAL STATIONS ON TRANSECT 5 IN CONOWINGO POND AND POOLED WITH WATER TEMPERATURE AT STATION 643 DOWNSTREAM OF CONOWINGO DAM, MAY-OCTOBER 2010.

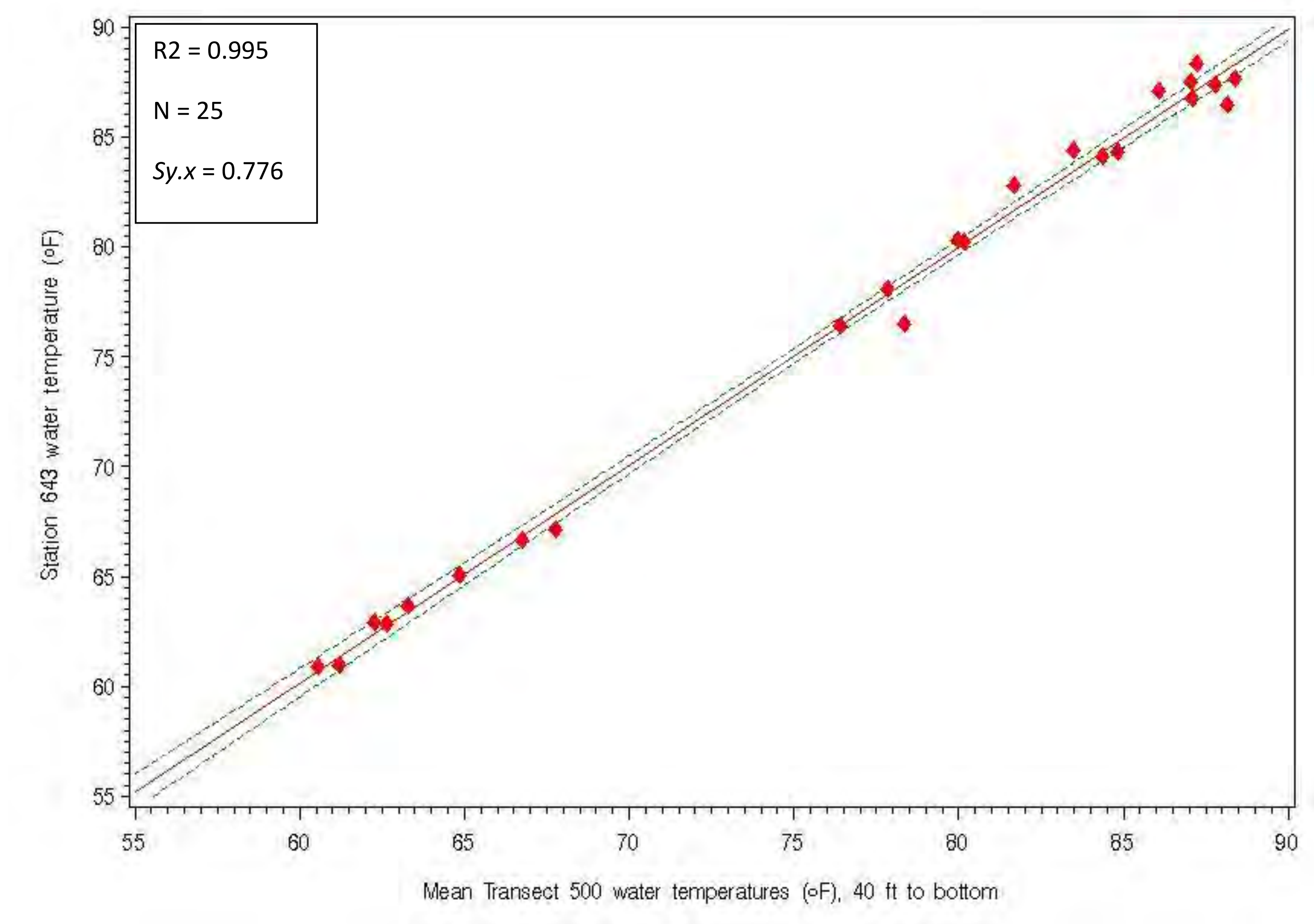


FIGURE 4-35: CONTINUED.

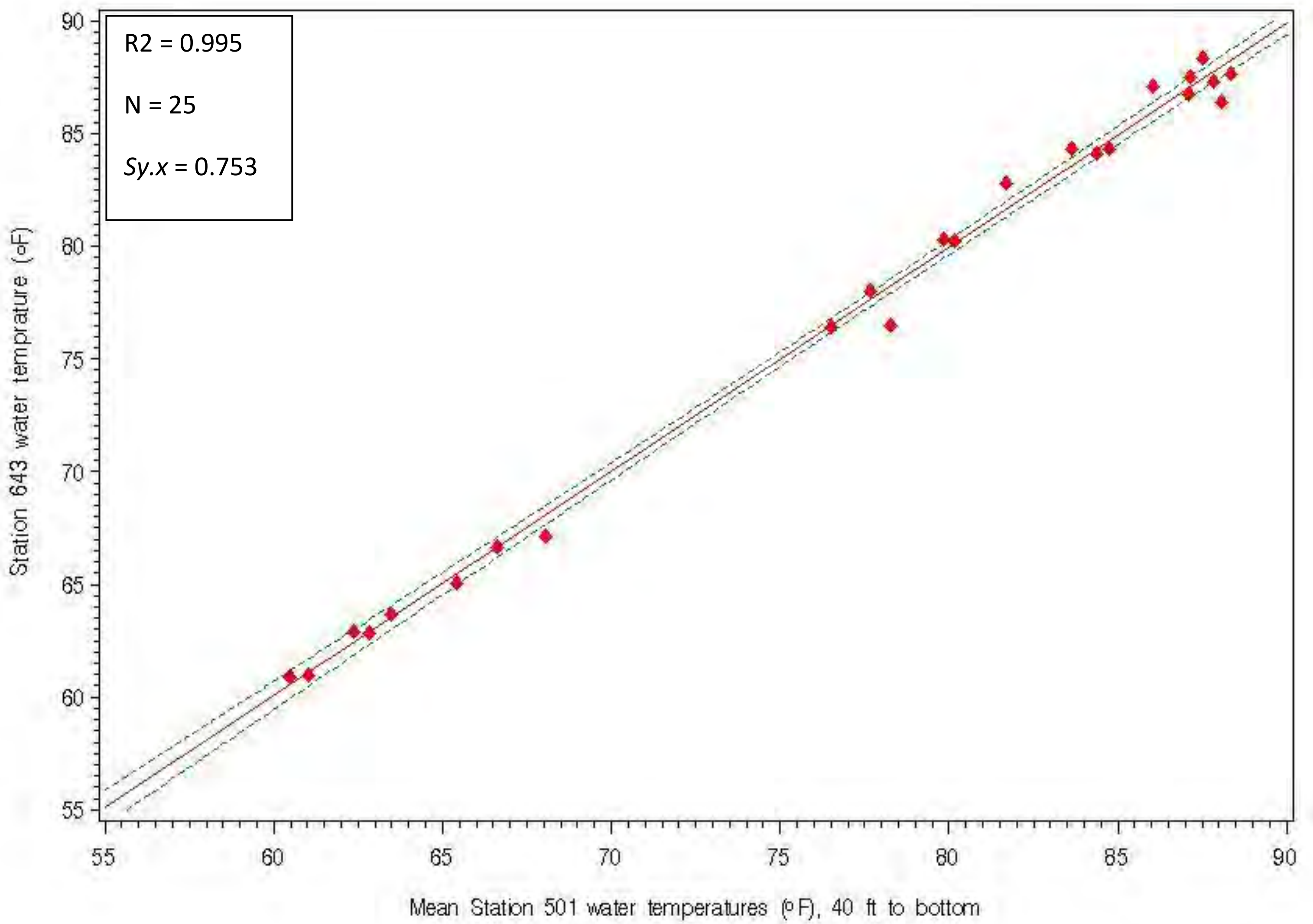


FIGURE 4-35: CONTINUED.

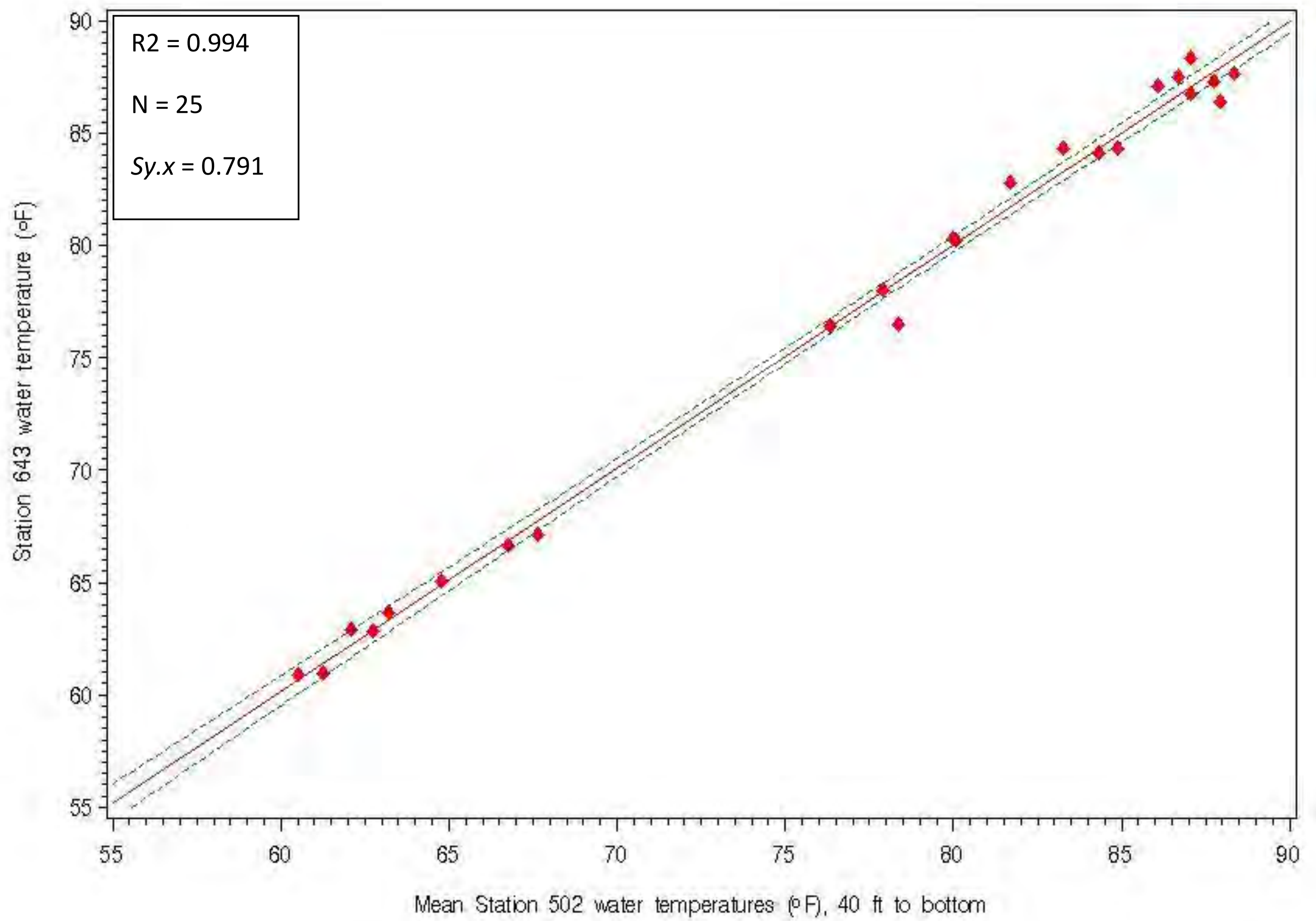


FIGURE 4-35: CONTINUED.

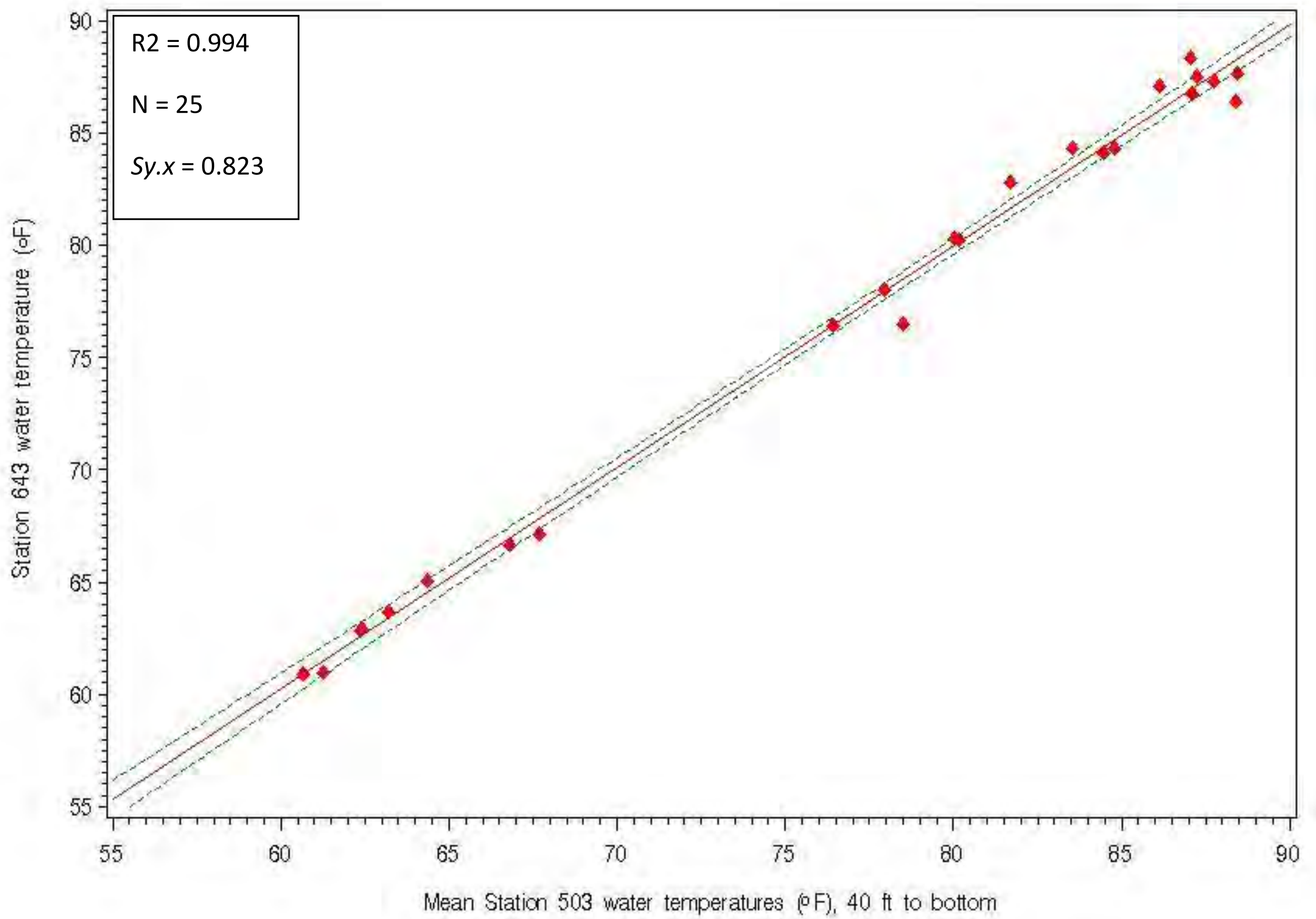


FIGURE 4-36: COMPARISON OF PREDICTED AND OBSERVED WATER TEMPERATURES AT STATION 643. PREDICTIONS MADE FROM WATER TEMPERATURE AT ≥ 40 FT DEPTH STATION 502.

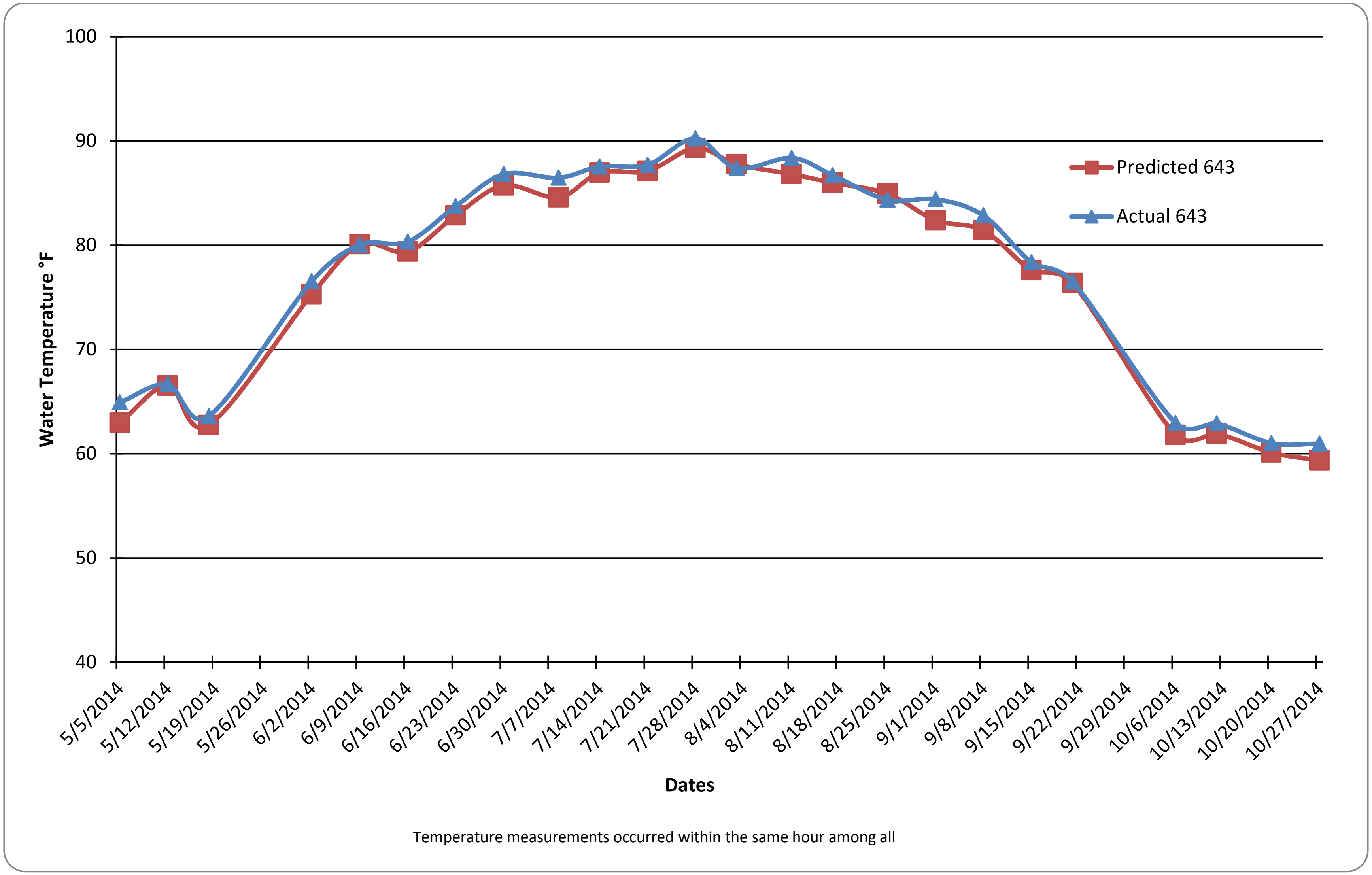
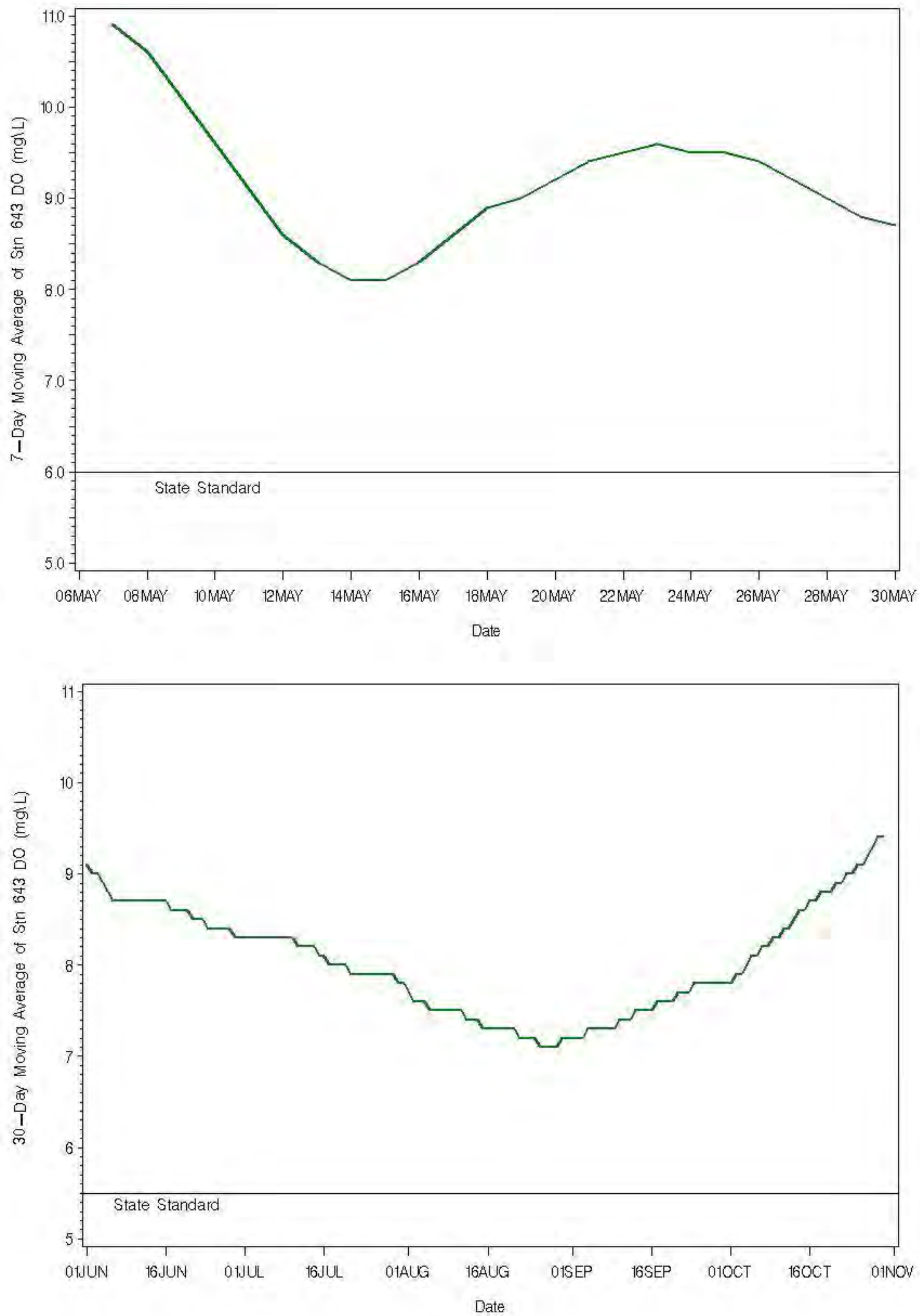


FIGURE 4-37: COMPARISON OF DO (MG/L) VALUES (7-DAY AVERAGE AND 30-DAY AVERAGE) MEASURED AT STATION 643 WITH THE MARYLAND STATE STANDARD IN MAY-OCTOBER 2010.



APPENDIX A-1: CALIBRATION RECORDS FOR PROFILE DATA.

APPENDIX A-1: SPECIFICATIONS OF EQUIPMENT USED IN SAMPLING WATER QUALITY PARAMETERS IN CONOWINGO POND AND DOWNSTREAM OF CONOWINGO DAM, APRIL-OCTOBER 2010, ALONG WITH THE CALIBRATION RECORDS FOR PROFILE DATA.

HACH HYDROLAB UNIT	Outer Diameter	Length	Weight
DS5X Data Sonde	8.9 cm (3.5 in)	58.4 cm (23 in)	3.35 kg (7.4 lbs)
MS5 Data Sonde	4.4 cm (1.75 in)	53.3 cm (21 in)	1.0 kg (2.2 lbs)
Surveyor	Width-109 mm (4.3 in)	270 mm (1.062 in)	Depth-70 mm (2.75 in)
Model/Parameter	**Range**	**Accuracy**	**Resolution**
Hydrolab DS5X / Temperature	-5 to 50 °C	± 0.10 °C	0.01 °C
Hydrolab DS5X / LDO	0 to 30 mg/L	± 0.1 mg/L	0.01 mg/L
Hydrolab DS5X / pH	0 to 14 units	± 0.2 units	0.01 units
Hydrolab DS5X / Specific Conductance	0 to 100 mS/cm	±0.001 mS/cm	0.0001 units
Hydrolab MS5 / Temperature	-5 to 50 °C	± 0.10 °C	0.01 °C
Hydrolab MS5 / LDO	0 to 30 mg/L	± 0.1 mg/L	0.01 mg/L
Hydrolab MS5 / pH	0 to 14 units	± 0.2 units	0.01 units
Hydrolab MS5 / Specific Conductance	0 to 100 mS/cm	±0.001 mS/cm	0.0001 units
Hydrolab MS5 / Self-cleaning Turbidity	0 to 3000 NTU	± 1% up to 100 NTU ± 3% from 100-400	0.1 up to 400 NTU
Hydrolab MS5 / Depth	0 to 100 m	±0.05 m	0.01 m
YSI Model 57 with stirrer / DO	0 to 20 mg/L	± 0.1 mg/L	0.1 mg/L
YSI Model 57 / Temperature	-5 to 45 °C	± 0.50 °C	0.25 °C

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7/2/10 Calibration Time: 0550
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 18.5 °C DO Solubility 9.35 ppm
Meter Water Temperature 18.5 °C Meter DO 9.10 ppm
Meter Water Temp. adjusted to 18.5 °C Meter DO adjusted to 9.35 ppm

Calibration Date: 7/2/10 Calibration Time: 0848
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 19.5 °C DO Solubility 9.10 ppm
Meter Water Temperature 20.0 °C Meter DO 9.3 ppm
Meter Water Temp. adjusted to 19.5 °C Meter DO adjusted to 9.10 ppm

Calibration Date: 7/2/10 Calibration Time: 0645
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 18.5 °C DO Solubility 9.35 ppm
Meter Water Temperature 18.5 °C Meter DO 9.35 ppm
Meter Water Temp. adjusted to – °C Meter DO adjusted to – ppm

Calibration Date: 7/2/10 Calibration Time: 0945
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.5 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to – °C Meter DO adjusted to – ppm

Calibration Date: 7/2/10 Calibration Time: 0742
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 18.5 °C DO Solubility 9.35 ppm
Meter Water Temperature 18.5 °C Meter DO 9.35 ppm
Meter Water Temp. adjusted to – °C Meter DO adjusted to – ppm

Calibration Date: 7/2/10 Calibration Time: 1042
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.5 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to – °C Meter DO adjusted to – ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7/2/10 Calibration Time: 1155
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 23.5 °C DO Solubility 8.5 ppm

Meter Water Temperature 23.5 °C Meter DO 8.5 ppm

Meter Water Temp. adjusted to – °C Meter DO adjusted to – ppm

Calibration Date: 7/2/10 Calibration Time: 1253
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 23.5 °C DO Solubility 8.5 ppm

Meter Water Temperature 23.5 °C Meter DO 8.4 ppm

Meter Water Temp. adjusted to – °C Meter DO adjusted to 8.5 ppm

Calibration Date: 7/2/10 Calibration Time: 1349
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 23.0 °C DO Solubility 8.5 ppm

Meter Water Temperature 23.0 °C Meter DO 8.5 ppm

Meter Water Temp. adjusted to – °C Meter DO adjusted to – ppm

Calibration Date: 7/2/10 Calibration Time: 1448
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 23.0 °C DO Solubility 8.5 ppm

Meter Water Temperature 23.0 °C Meter DO 8.5 ppm

Meter Water Temp. adjusted to – °C Meter DO adjusted to – ppm

Calibration Date: 7/2/10 Calibration Time: 1549
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 23.0 °C DO Solubility 8.5 ppm

Meter Water Temperature 23.0 °C Meter DO 8.5 ppm

Meter Water Temp. adjusted to – °C Meter DO adjusted to – ppm

Calibration Date: 7/2/10 Calibration Time: 1655
Meter Type: ______ YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 23.0 °C DO Solubility 8.5 ppm

Meter Water Temperature 23.0 °C Meter DO 8.5 ppm

Meter Water Temp. adjusted to – °C Meter DO adjusted to – ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07-03-10 Calibration Time: 5:55 Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 17.9 °C DO Solubility 9.5 ppm Meter Water Temperature 17.9 °C Meter DO 9.4 ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 9.5 ok ppm	Calibration Date: 07-03-10 Calibration Time: 6:50 Meter Type: ___ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 17.0 °C DO Solubility 9.7 ppm Meter Water Temperature 17.0 °C Meter DO 9.0 ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 9.7 ok ppm
Calibration Date: 07-03-10 Calibration Time: 7:47 Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 18.7 °C DO Solubility 9.3 ppm Meter Water Temperature 18.7 °C Meter DO 9.7 ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 9.3 ok ppm	Calibration Date: 07-03-10 Calibration Time: 8:48 Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 20.0 °C DO Solubility 9.1 ok ppm Meter Water Temperature 20.0 °C Meter DO 9.1 ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to NA ppm
Calibration Date: 07-03-10 Calibration Time: 9:49 Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 20.8 °C DO Solubility 8.9 ppm Meter Water Temperature 20.8 °C Meter DO 8.9 ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to NA ppm	Calibration Date: 07-03-10 Calibration Time: 10:52 Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 22.5 °C DO Solubility 8.6 ppm Meter Water Temperature 22.5 °C Meter DO 8.5 ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 8.6 ok ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07-03-10 Calibration Time: 11:50
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm
Meter Water Temperature 24.0 °C Meter DO 8.3 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to 8.4 ok ppm

Calibration Date: 07-03-10 Calibration Time: 12:56
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 25.0 °C DO Solubility 8.24 ppm
Meter Water Temperature 25.0 °C Meter DO 8.4 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to 8.24 ok ppm

Calibration Date: 07-03-10 Calibration Time: 13:50
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm
Meter Water Temperature 24.0 °C Meter DO 8.4 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to N/A ppm

Calibration Date: 07-03-10 Calibration Time: 14:51
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm
Meter Water Temperature 240 °C Meter DO 8.4 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to N/A ppm

Calibration Date: 07-03-10 Calibration Time: 15:50
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm
Meter Water Temperature 24.0 °C Meter DO 8.3 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to 8.4 ok ppm

Calibration Date: 07-03-10 Calibration Time: 16:52
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm
Meter Water Temperature 24.0 °C Meter DO 8.5 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to 84 ok ppm

Calibration Date: 07-03-10 Calibration Time: 17:51
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temp. 24.0° C DO Solubility 8.4 ppm
Meter Water Temp. 24.0° C Meter DO 8.5 ppm
Meter Water Temp Adjusted To ____ C Meter DO adjusted to 8.4 ppm ok

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date:	07-04-10	Calibration Time:	5:47
Meter Type:	✓ YSI (meter # PH91-M2)		Hach MS5
Calibration Water Temperature	18.5 °C	DO Solubility	9.3 ppm
Meter Water Temperature	18.8 °C	Meter DO	9.5 ppm
Meter Water Temp. adjusted to	18.5 °C	Meter DO adjusted to	9.3 ppm

Calibration Date:	07-04-10	Calibration Time:	0653
Meter Type:	✓ YSI (meter # PH91-M2)		Hach MS5
Calibration Water Temperature	18.5 °C	DO Solubility	9.3 ppm
Meter Water Temperature	18.4 °C	Meter DO	9.5 ppm
Meter Water Temp. adjusted to	18.5 °C	Meter DO adjusted to	9.3 ppm

Calibration Date:	07-04-10	Calibration Time:	0750
Meter Type:	✓ YSI (meter # PH91-M2)		Hach MS5
Calibration Water Temperature	18.5 °C	DO Solubility	9.3 ppm
Meter Water Temperature	18.5 °C	Meter DO	8.6 ppm
Meter Water Temp. adjusted to	N/A °C	Meter DO adjusted to	9.3 ppm

Calibration Date:	07-04-10	Calibration Time:	0846
Meter Type:	✓ YSI (meter # PH91-M2)		Hach MS5
Calibration Water Temperature	19.8 °C	DO Solubility	9.2 ppm
Meter Water Temperature	20.0 °C	Meter DO	9.5 ppm
Meter Water Temp. adjusted to	19.8 °C	Meter DO adjusted to	9.2 ppm

Calibration Date:	07-04-10	Calibration Time:	0952
Meter Type:	✓ YSI (meter # PH91-M2)		Hach MS5
Calibration Water Temperature	21.5 °C	DO Solubility	8.8 ppm
Meter Water Temperature	21.5 °C	Meter DO	8.5 ppm
Meter Water Temp. adjusted to	N/A °C	Meter DO adjusted to	8.8 ppm

Calibration Date:	07-04-10	Calibration Time:	1050
Meter Type:	✓ YSI (meter # PH91-M2)		Hach MS5
Calibration Water Temperature	23.0 °C	DO Solubility	8.5 ppm
Meter Water Temperature	23.0 °C	Meter DO	8.5 ppm
Meter Water Temp. adjusted to	N/A °C	Meter DO adjusted to	N/A ppm

07-04-10 KJT

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07-04-10 Calibration Time: 1150
Meter Type: ✓ YSI (meter # PH91-MZ) ____ Hach MS5

Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm

Meter Water Temperature 24.0 °C Meter DO 8.4 ppm

Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

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Calibration Date: 07-04-10 Calibration Time: 1255
Meter Type: ✓ YSI (meter # PH91-MZ) ____ Hach MS5

Calibration Water Temperature 24.8 °C DO Solubility 8.3 ppm

Meter Water Temperature 24.8 °C Meter DO 8.2 ppm

Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.3 ppm

---

Calibration Date: 07-04-10 Calibration Time: 1355
Meter Type: ✓ YSI (meter # PH91-M2) ____ Hach MS5

Calibration Water Temperature 24.5 °C DO Solubility 8.3 ppm

Meter Water Temperature 24.8 °C Meter DO 8.3 ppm

Meter Water Temp. adjusted to 24.5 °C Meter DO adjusted to N/A ppm

---

Calibration Date: 07-04-10 Calibration Time: 1450
Meter Type: ✓ YSI (meter # PH91-M2) ____ Hach MS5

Calibration Water Temperature 25.0 °C DO Solubility 8.2 ppm

Meter Water Temperature 25.0 °C Meter DO 8.2 ppm

Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

---

Calibration Date: 07-04-10 Calibration Time: 1545
Meter Type: ✓ YSI (meter # PH91-MZ) ____ Hach MS5

Calibration Water Temperature 24.5 °C DO Solubility 8.3 ppm

Meter Water Temperature 24.8 °C Meter DO 8.3 ppm

Meter Water Temp. adjusted to 24.5 °C Meter DO adjusted to N/A ppm

---

Calibration Date: 07-04-10 Calibration Time: 1650
Meter Type: ✓ YSI (meter # PH91-MZ) ____ Hach MS5

Calibration Water Temperature 24.5 °C DO Solubility 8.3 ppm

Meter Water Temperature 24.5 °C Meter DO 8.2 ppm

Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.3 ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07-0410 Calibration Time: 1750
Meter Type: ✓ YSI (meter #PH91-M2) ______ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm
Meter Water Temperature 24.0 °C Meter DO 8.5 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.4 ppm

Calibration Date: ______ Calibration Time: ______
Meter Type: ______ YSI (meter #______) ______ Hach MS5
Calibration Water Temperature ______ °C DO Solubility ______ ppm
Meter Water Temperature ______ °C Meter DO ______ ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

Calibration Date: ______ Calibration Time: ______
Meter Type: ______ YSI (meter #______) ______ Hach MS5
Calibration Water Temperature ______ °C DO Solubility ______ ppm
Meter Water Temperature ______ °C Meter DO ______ ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

Calibration Date: ______ Calibration Time: ______
Meter Type: ______ YSI (meter #______) ______ Hach MS5
Calibration Water Temperature ______ °C DO Solubility ______ ppm
Meter Water Temperature ______ °C Meter DO ______ ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

Calibration Date: ______ Calibration Time: ______
Meter Type: ______ YSI (meter #______) ______ Hach MS5
Calibration Water Temperature ______ °C DO Solubility ______ ppm
Meter Water Temperature ______ °C Meter DO ______ ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

Calibration Date: ______ Calibration Time: ______
Meter Type: ______ YSI (meter #______) ______ Hach MS5
Calibration Water Temperature ______ °C DO Solubility ______ ppm
Meter Water Temperature ______ °C Meter DO ______ ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

CALIBRATIONS FOR QCQA 07-04-10 KJT

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07-04-10 Calibration Time: 0955
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm
Meter Water Temperature 22.0 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.7 ppm

Calibration Date: 07-04-10 Calibration Time: 1155
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm
Meter Water Temperature 24.0 °C Meter DO 8.4 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 07-04-10 Calibration Time: 1349
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 24.5 °C DO Solubility 8.3 ppm
Meter Water Temperature 24.2 °C Meter DO 8.3 ppm
Meter Water Temp. adjusted to 24.5 °C Meter DO adjusted to N/A ppm

Calibration Date: 07-04-10 Calibration Time: 1550
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 24.5 °C DO Solubility 8.3 ppm
Meter Water Temperature 24.5 °C Meter DO 8.3 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 07-04-10 Calibration Time: 1755
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm
Meter Water Temperature 24.0 °C Meter DO 8.5 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.4 ppm

Calibration Date: ____ Calibration Time: ____
Meter Type: ____ YSI (meter # ____) ____ Hach MS5
Calibration Water Temperature ____ °C DO Solubility ____ ppm
Meter Water Temperature ____ °C Meter DO ____ ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to ____ ppm

- THIS METER SEEMS TO HOLD CALIBRATION RATHER WELL :)
WORKS WELL + MATCHES SOND'S WHEN WE USE FOR H_2O QUAL. ON C.P. ALSO.

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07-05-10 Calibration Time: 5:54

Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 18.5 °C DO Solubility 9.26 ppm

Meter Water Temperature 18.5 °C Meter DO 10.0 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to (approx) 9.26 ok ppm

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Calibration Date: ______ Calibration Time: ______

Meter Type: ______ YSI (meter # ______) ______ Hach MS5

Calibration Water Temperature ______ °C DO Solubility ______ ppm

Meter Water Temperature ______ °C Meter DO ______ ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

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Calibration Date: -0 Calibration Time: ______

Meter Type: X YSI (meter # ______) ______ Hach MS5

Calibration Water Temperature ______ °C DO Solubility ______ ppm

Meter Water Temperature ______ °C Meter DO ______ ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

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Calibration Date: ______ Calibration Time: ______

Meter Type: ______ YSI (meter # ______) ______ Hach MS5

Calibration Water Temperature ______ °C DO Solubility ______ ppm

Meter ater Temperature ______ °C Meter DO ______ ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

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Calibration Date: ______ Calibration Time: 9.50

Meter Type: ______ YSI (meter # ______) ______ Hach MS5

Calibration Water Temperature 22 °C DO Solubility 2 ppm

Meter Water Temperature 22 °C Meter DO 8 7 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ pm

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Calibration Date: 07-05-10 Calibration Time: 10:50

Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm

Meter Water Temperature 24.0 °C Meter DO 8.3 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 8.4 ok ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07-05-10 Calibration Time: 11:50
Meter Type X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 25.5 °C DO Solubility 8.09 pm
Meter Water Temperature 25.5 °C Meter DO 8.2 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 8.1 ppm ok

Calibration Date: 07-05-10 Calibration Time: 12:55
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 27 °C DO Solubility 7.95 ppm
Meter Water Temperature 27 °C Meter DO 8.0 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

Calibration Date: 07-05-10 Calibration Time: [illegible]
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 27.0 °C DO Solubility 7.95 ppm
Meter Water Temperature 27.0 °C Meter DO 7.5 ppm
Meter Water Temp. adjusted to ______ °C . Meter DO adjusted to 8.0 ppm

Calibration Date: 07-05-10 Calibration Time: 14:5[illegible]
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 28.0 °C DO Solubility 7.81 ppm
Meter Water Temperature 28.0 °C Meter DO 7.9 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 7.8 ok ppm

Calibration Date: 07-05-10 Calibration Time: [illegible]
Meter Type X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 28.0 °C DO Solubility 7.81 ppm
Meter Water Temperature 28.0 °C Meter DO 7.8 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

Calibration Date: 07-05-10 Calibration Time: 16:51
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 28.0 °C DO Solubility 7.81 ppm
Meter Water Temperature 28.0 °C Meter DO 7.8 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

Calibration Date: 07-05-10 Calibration Time: [illegible]
Meter Type: X YSI (Meter # PH91-M2) ______ Hach MS5
Calibration Water Temp 27.0 °C DO Solubility 7.95 ppm
Meter Water Temp 27.0 °C Meter DO 7.8 ppm
Meter Water Temp adjusted to ______ °C Meter DO adjusted to 8.0 ok ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7-14-10	Calibration Time: 0553
Meter Type: ✓ YSI (meter # 10983)	___ Hach MS5
Calibration Water Temperature 21.0 °C	DO Solubility 8.9 ppm
Meter Water Temperature 20.8 °C	Meter DO 8.9 ppm
Meter Water Temp. adjusted to 21.0 °C	Meter DO adjusted to OK ppm

Calibration Date: 7-14-10	Calibration Time: 0850
Meter Type: ✓ YSI (meter # 10983)	___ Hach MS5
Calibration Water Temperature 20.5 °C	DO Solubility 9.0 ppm
Meter Water Temperature 20.5 °C	Meter DO 9.0 ppm
Meter Water Temp. adjusted to OK °C	Meter DO adjusted to OK ppm

Calibration Date: 07-14-10	Calibration Time: 0653
Meter Type: ___ YSI (meter # 10983)	___ Hach MS5
Calibration Water Temperature 20.5 °C	DO Solubility 9.0 ppm
Meter Water Temperature 21.0 °C	Meter DO 8.9 ppm
Meter Water Temp. adjusted to 20.5 °C	Meter DO adjusted to 9.0 ppm

Calibration Date: 7-14-10	Calibration Time: 0950
Meter Type: ✓ YSI (meter # 10983)	___ Hach MS5
Calibration Water Temperature 20.5 °C	DO Solubility 9.0 ppm
Meter Water Temperature 20.5 °C	Meter DO 9.0 ppm
Meter Water Temp. adjusted to OK °C	Meter DO adjusted to OK ppm

Calibration Date: 07-14-10	Calibration Time: 0750
Meter Type: ___ YSI (meter # 10983)	___ Hach MS5
Calibration Water Temperature 20.5 °C	DO Solubility 9.0 ppm
Meter Water Temperature 20.5 °C	Meter DO 9.0 ppm
Meter Water Temp. adjusted to OK °C	Meter DO adjusted to OK ppm

Calibration Date: 7-14-10	Calibration Time: 1050
Meter Type: ✓ YSI (meter # 10983)	___ Hach MS5
Calibration Water Temperature 20.5 °C	DO Solubility 9.0 ppm
Meter Water Temperature 20.5 °C	Meter DO 8.9 ppm
Meter Water Temp. adjusted to OK °C	Meter DO adjusted to 9.0 OK ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7-14-10 Calibration Time: 1150
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.0 ppm
Meter Water Temperature 20.5 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to 20.0 °C Meter DO adjusted to 9.0 ppm

Calibration Date: 7-14-10 Calibration Time: 1250
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

Calibration Date: 7-14-10 Calibration Time: 1350
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

Calibration Date: 7-14-10 Calibration Time: 1450
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

Calibration Date: 7-14-10 Calibration Time: 1550
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.2 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to 9.1 ppm

Calibration Date: 7-14-10 Calibration Time: 1650
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.0 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to 9.1 ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7-14-10 Calibration Time: 1750
Meter Type: ✓ YSI (meter # 18983) ____ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

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Calibration Date: ________ Calibration Time: ________
Meter Type: ____ YSI (meter # ________) ____ Hach MS5
Calibration Water Temperature ________ °C DO Solubility ________ ppm
Meter Water Temperature ________ °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ____ ppm

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Calibration Date: ________ Calibration Time: ________
Meter Type: ____ YSI (meter # ________) ____ Hach MS5
Calibration Water Temperature ________ °C DO Solubility ________ ppm
Meter Water Temperature ________ °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ____ ppm

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Calibration Date: ________ Calibration Time: ________
Meter Type: ____ YSI (meter # ________) ____ Hach MS5
Calibration Water Temperature ________ °C DO Solubility ________ ppm
Meter Water Temperature ________ °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ____ ppm

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Calibration Date: ________ Calibration Time: ________
Meter Type: ____ YSI (meter # ________) ____ Hach MS5
Calibration Water Temperature ________ °C DO Solubility ________ ppm
Meter Water Temperature ________ °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ____ ppm

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Calibration Date: ________ Calibration Time: ________
Meter Type: ____ YSI (meter # ________) ____ Hach MS5
Calibration Water Temperature ________ °C DO Solubility ________ ppm
Meter Water Temperature ________ °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ____ ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7-14-10 Calibration Time: 0554
Meter Type: ✓ YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.9 ppm
Meter Water Temperature 20.8 °C Meter DO 9.0 ppm
Meter Water Temp. adjusted to 21.0 °C Meter DO adjusted to 8.9 ppm

Calibration Date: 7-14-10 Calibration Time: 1150
Meter Type: ✓ YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.5 °C Meter DO 9.0 ppm
Meter Water Temp. adjusted to 20.0 °C Meter DO adjusted to 9.1 ppm

Calibration Date: 7-14-10 Calibration Time: 0750
Meter Type: ✓ YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 20.5 °C DO Solubility 9.0 ppm
Meter Water Temperature 20.5 °C Meter DO 9.0 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

Calibration Date: ____ Calibration Time: 1350
Meter Type: ____ YSI (meter # ____) ____ Hach MS5
Calibration Water Temperature ____ °C DO Solubility 9.1 ppm
Meter Water Temperature ____ °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to OK ppm

Calibration Date: 7-14-10 Calibration Time: 0950
Meter Type: ✓ YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 20.5 °C DO Solubility 9.0 ppm
Meter Water Temperature 20.5 °C Meter DO 9.0 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

Calibration Date: ____ Calibration Time: 1550
Meter Type: ____ YSI (meter # ____) ____ Hach MS5
Calibration Water Temperature ____ °C DO Solubility 9.1 ppm
Meter Water Temperature ____ °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to OK ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7-15-10 Calibration Time: 0550
Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.3 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to 9.1 ok ppm

Calibration Date: 7-15-10 Calibration Time: 0850
Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.9 ppm
Meter Water Temperature 21.0 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

Calibration Date: 7-15-10 Calibration Time: 0650
Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.0 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to 9.1 ok ppm

Calibration Date: 7-15-10 Calibration Time: 0950
Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5
Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm
Meter Water Temperature 22.0 °C Meter DO 8.6 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to 8.7 ok ppm

Calibration Date: 7-15-10 Calibration Time: 0750
Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5
Calibration Water Temperature 20.5 °C DO Solubility 9.0 ppm
Meter Water Temperature 20.5 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to 9.0 ok ppm

Calibration Date: 7-15-10 Calibration Time: 1050
Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5
Calibration Water Temperature 23.0 °C DO Solubility 8.56 ppm
Meter Water Temperature 23.5 °C Meter DO 8.5 ppm
Meter Water Temp. adjusted to 23.0 °C Meter DO adjusted to 8.56 OK ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7-15-10 Calibration Time: 1150
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm
Meter Water Temperature 24.0 °C Meter DO 8.4 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

Calibration Date: 7-15-10 Calibration Time: 1250
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 24.5 °C DO Solubility 8.3 ppm
Meter Water Temperature 24.0 °C Meter DO 8.4 ppm
Meter Water Temp. adjusted to 24.5 °C ok Meter DO adjusted to 8.3 OK ppm

Calibration Date: 7-15-10 Calibration Time: 1350
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 25.0 °C DO Solubility 8.24 ppm
Meter Water Temperature 25.0 °C Meter DO 8.24 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

Calibration Date: 7-15-10 Calibration Time: 1450
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 25.0 °C DO Solubility 8.24 ppm
Meter Water Temperature 25.2 °C Meter DO 8.1 ppm
Meter Water Temp. adjusted to 25.0 °C OK Meter DO adjusted to 8.24 OK ppm

Calibration Date: 7-15-10 Calibration Time: 1550
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 25.0 °C DO Solubility 8.24 ppm
Meter Water Temperature 25.0 °C Meter DO 8.2 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to 8.24 OK ppm

Calibration Date: 7-15-10 Calibration Time: 1650
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 25.0 °C DO Solubility 8.24 ppm
Meter Water Temperature 25.0 °C Meter DO 8.2 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to 8.24 OK ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7-15-10　Calibration Time: 1750
Meter Type: ✓ YSI (meter # 10983)　____ Hach MS5
Calibration Water Temperature 24.0 °C　DO Solubility 8.4 ppm
Meter Water Temperature 24.0 °C　Meter DO 8.4 ppm
Meter Water Temp. adjusted to OK °C　Meter DO adjusted to OK ppm

Calibration Date: ____　Calibration Time: ____
Meter Type: ____ YSI (meter # ____)　____ Hach MS5
Calibration Water Temperature ____ °C　DO Solubility ____ ppm
Meter Water Temperature ____ °C　Meter DO ____ ppm
Meter Water Temp. adjusted to ____ °C　Meter DO adjusted to ____ ppm

Calibration Date: ____　Calibration Time: ____
Meter Type: ____ YSI (meter # ____)　____ Hach MS5
Calibration Water Temperature ____ °C　DO Solubility ____ ppm
Meter Water Temperature ____ °C　Meter DO ____ ppm
Meter Water Temp. adjusted to ____ °C　Meter DO adjusted to ____ ppm

Calibration Date: ____　Calibration Time: ____
Meter Type: ____ YSI (meter # ____)　____ Hach MS5
Calibration Water Temperature ____ °C　DO Solubility ____ ppm
Meter Water Temperature ____ °C　Meter DO ____ ppm
Meter Water Temp. adjusted to ____ °C　Meter DO adjusted to ____ ppm

Calibration Date: ____　Calibration Time: ____
Meter Type: ____ YSI (meter # ____)　____ Hach MS5
Calibration Water Temperature ____ °C　DO Solubility ____ ppm
Meter Water Temperature ____ °C　Meter DO ____ ppm
Meter Water Temp. adjusted to ____ °C　Meter DO adjusted to ____ ppm

Calibration Date: ____　Calibration Time: ____
Meter Type: ____ YSI (meter # ____)　____ Hach MS5
Calibration Water Temperature ____ °C　DO Solubility ____ ppm
Meter Water Temperature ____ °C　Meter DO ____ ppm
Meter Water Temp. adjusted to ____ °C　Meter DO adjusted to ____ ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7-15-10 Calibration Time: 0550 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm Meter Water Temperature 19.5 °C Meter DO 9.4 ppm Meter Water Temp. adjusted to 20.0 °C Meter DO adjusted to 9.1 ppm OK	Calibration Date: 7-15-10 Calibration Time: 1150 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 24.0 °C DO Solubility 8.4 ppm Meter Water Temperature 24.0 °C Meter DO 8.4 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm
Calibration Date: 7-15-10 Calibration Time: 0750 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 20.5 °C DO Solubility 9.0 ppm Meter Water Temperature 20.5 °C Meter DO 9.1 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to 9.0 ppm OK	Calibration Date: 7-15-10 Calibration Time: 1350 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 25.0 °C DO Solubility 8.24 ppm Meter Water Temperature 25.0 °C Meter DO 8.2 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to 8.24 ppm OK
Calibration Date: 7-15-10 Calibration Time: 0950 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO 8.7 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm	Calibration Date: 7-15-10 Calibration Time: 1550 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 25.0 °C DO Solubility 8.24 ppm Meter Water Temperature 25.0 °C Meter DO 8.3 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to 8.24 ppm OK

RED & WHITE COOLER

Dissolved Oxygen and Water Temperature Meter Calibration Sheet (QC METER)

Calibration Date: 07-16-10 Calibration Time: 0555 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 18.5 °C DO Solubility 9.3 ppm Meter Water Temperature 18.5 °C Meter DO 9.5 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 9.3 ppm	Calibration Date: 07-16-10 Calibration Time: 0755 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 19.5 °C DO Solubility 9.1 ppm Meter Water Temperature 19.5 °C Meter DO 8.8 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 9.1 ppm
Calibration Date: 07-16-10 Calibration Time: 0955 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO 8.5 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.7 ppm	Calibration Date: 07-16-10 Calibration Time: 1154 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 24.5 °C DO Solubility 8.3 ppm Meter Water Temperature 24.5 °C Meter DO 8.3 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm
Calibration Date: 07-16-10 Calibration Time: 1352 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 25.5 °C DO Solubility 8.1 ppm Meter Water Temperature 25.5 °C Meter DO 7.9 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.1 ppm	Calibration Date: 07-16-10 Calibration Time: 1551 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 25.5 °C DO Solubility 8.1 ppm Meter Water Temperature 26.0 °C Meter DO 8.1 ppm Meter Water Temp. adjusted to 25.5 °C Meter DO adjusted to N/A ppm

WOODEN BOX

Dissolved Oxygen and Water Temperature Meter Calibration Sheet (USED FOR DATA)

Calibration Date: 07-16-10 Calibration Time: 0551 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 18.5 °C DO Solubility 9.3 ppm Meter Water Temperature 18.2 °C Meter DO 9.3 ppm Meter Water Temp. adjusted to 18.5 °C Meter DO adjusted to N/A ppm	Calibration Date: 07-16-10 Calibration Time: 0647 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 19.0 °C DO Solubility 9.2 ppm Meter Water Temperature 19.0 °C Meter DO 9.5 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 9.2 ppm
Calibration Date: 07-16-10 Calibration Time: 0748 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 19.5 °C DO Solubility 9.1 ppm Meter Water Temperature 19.5 °C Meter DO 9.5 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 9.1 ppm	Calibration Date: 07-16-10 Calibration Time: 0855 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 20.5 °C DO Solubility 9.0 ppm Meter Water Temperature 20.5 °C Meter DO 9.0 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm
Calibration Date: 07-16-10 Calibration Time: 0955 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO 8.7 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm	Calibration Date: 07-16-10 Calibration Time: 1055 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 23.5 °C DO Solubility 8.5 ppm Meter Water Temperature 23.5 °C Meter DO 8.5 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

* JUST NOTICED ON INSIDE THE METER IS LABELED # 10983 IN 2 PLACES. ON OUTSIDE OF BOX METER IS # 10984 IN 2 PLACES. I USED THE # ON METER, NOT BOX.

WOODEN BOX (USED FOR DATA)

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07-16-10 Calibration Time: 1154
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 24.5 °C DO Solubility 8.3 ppm
Meter Water Temperature 24.5 °C Meter DO 8.3 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 07-16-10 Calibration Time: 1248
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 25.0 °C DO Solubility 8.2 ppm
Meter Water Temperature 25.2 °C Meter DO 8.2 ppm
Meter Water Temp. adjusted to 25.0 °C Meter DO adjusted to N/A ppm

Calibration Date: 07-16-10 Calibration Time: 1352
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 25.5 °C DO Solubility 8.1 ppm
Meter Water Temperature 25.5 °C Meter DO 8.0 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.1 ppm

Calibration Date: 07-16-10 Calibration Time: 1458
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 25.5 °C DO Solubility 8.1 ppm
Meter Water Temperature 26.0 °C Meter DO 8.1 ppm
Meter Water Temp. adjusted to 25.5 °C Meter DO adjusted to N/A ppm

Calibration Date: 07-16-10 Calibration Time: 1551
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 25.5 °C DO Solubility 8.1 ppm
Meter Water Temperature 25.5 °C Meter DO 8.0 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.1 ppm

Calibration Date: 07-16-10 Calibration Time: 1657
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 26.0 °C DO Solubility 8.0 ppm
Meter Water Temperature 26.0 °C Meter DO 8.0 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07/17/10 Calibration Time: 0655
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature 19.0 °C DO Solubility 9.26 ppm

Meter Water Temperature 19.0 °C Meter DO 9.4 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 9.5 ppm ok

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Calibration Date: 07/17/10 Calibration Time: 0750
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature 20 °C DO Solubility 9.07 ppm

Meter Water Temperature 20 °C Meter DO 9.1 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

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Calibration Date: 07/17/10 Calibration Time: 0850
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature 21° °C DO Solubility 8.9 ppm

Meter Water Temperature 21° °C Meter DO 8.9 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

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Calibration Date: 07/17/10 Calibration Time: 0951
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature 23° °C DO Solubility 8.56 ppm

Meter Water Temperature 23° °C Meter DO 8.55 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

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Calibration Date: 07/17/10 Calibration Time: 1050
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature 25 °C DO Solubility 8.24 ppm

Meter Water Temperature 25 °C Meter DO 8.1 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 8.25 ppm ok

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Calibration Date: 07/17/10 Calibration Time: 1150
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature 27 °C DO Solubility 7.95 ppm

Meter Water Temperature 27 °C Meter DO 8.1 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 8.0 ppm ok

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07/17/10 Calibration Time: 13:52
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature 28 °C DO Solubility 7.81 ppm

Meter Water Temperature 28 °C Meter DO 8.0 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 7.8 ok ppm

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Calibration Date: 07/17/10 Calibration Time: 1447
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature 28 °C DO Solubility 7.81 ppm

Meter Water Temperature 28 °C Meter DO 7.8 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

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Calibration Date: 07/17/10 Calibration Time: 1555
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature 28 °C DO Solubility 7.81 ppm

Meter Water Temperature 28 °C Meter DO 7.7 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 7.8 ok ppm

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Calibration Date: 07/17/10 Calibration Time: 1648
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature 28 °C DO Solubility 7.81 ppm

Meter Water Temperature 28 °C Meter DO 7.9 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 7.8 ok ppm

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Calibration Date: 07/17/10 Calibration Time: 17:47
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature 28 °C DO Solubility 7.81 ppm

Meter Water Temperature 28 °C Meter DO 7.8 ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

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Calibration Date: 07/17/10 Calibration Time: ______
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature ______ °C DO Solubility ______ ppm

Meter Water Temperature ______ °C Meter DO ______ ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

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Calibration Date: 07/17/10 Calibration Time: ______
Meter Type: X YSI (meter # 10983) ______ Hach MS5

Calibration Water Temperature ______ °C DO Solubility ______ ppm

Meter Water Temperature ______ °C Meter DO ______ ppm

Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

Q.C. METER - RAW COOLER

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07-30-10 Calibration Time: 0650
Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.8 °C Meter DO 8.6 ppm
Meter Water Temp. adjusted to 21.5 °C Meter DO adjusted to 8.8 ppm

Calibration Date: 07-30-10 Calibration Time: 0848
Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.9 ppm
Meter Water Temperature 21.0 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 07-30-10 Calibration Time: 1054
Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 23.0 °C DO Solubility 8.5 ppm
Meter Water Temperature 23.0 °C Meter DO 8.6 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.5 ppm

Calibration Date: 07-30-10 Calibration Time: 1247
Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 23.5 °C DO Solubility 8.5 ppm
Meter Water Temperature 23.5 °C Meter DO 8.4 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.5 ppm

Calibration Date: 07-30-10 Calibration Time: 1550
Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 23.0 °C DO Solubility 8.5 ppm
Meter Water Temperature 23.0 °C Meter DO 8.6 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.5 ppm

Calibration Date: 07-30-10 Calibration Time: 50
Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.5 °C Meter DO 8.6 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.8 ppm

WOODEN BOX

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07-30-10 Calibration Time: 0552
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm
Meter Water Temperature 21.5 °C Meter DO 8.2 ppm
Meter Water Temp. adjusted to 22.0 °C Meter DO adjusted to 8.7 ppm

Calibration Date: 07-30-10 Calibration Time: 0650
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.5 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.8 ppm

Calibration Date: 07-30-10 Calibration Time: 0751
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 20.5 °C DO Solubility 9.0 ppm
Meter Water Temperature 20.5 °C Meter DO 9.0 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 07-30-10 Calibration Time: 0848
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.9 ppm
Meter Water Temperature 20.8 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to 21.0 °C Meter DO adjusted to N/A ppm

Calibration Date: 07-30-10 Calibration Time: 0944
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 21.8 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.8 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 07-30-10 Calibration Time: 1054
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 23.0 °C DO Solubility 8.5 ppm
Meter Water Temperature 23.0 °C Meter DO 8.5 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

W00

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 07-30-10 Calibration Time: 1150
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5

Calibration Water Temperature 23.8 °C DO Solubility 8.4 ppm

Meter Water Temperature 23.8 °C Meter DO 8.5 ppm

Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.4 ppm

Calibration Date: 07-30-10 Calibration Time: 1247
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5

Calibration Water Temperature 23.5 °C DO Solubility 8.5 ppm

Meter Water Temperature 23.5 °C Meter DO 8.3 ppm

Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.5 ppm

Calibration Date: 07-30-10 Calibration Time: 1352
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5

Calibration Water Temperature 23.5 °C DO Solubility 8. ppm

Meter Water Temperature 5 °C Meter DO 8 ppm

Meter Water Temp. adjusted to N/A °C Meter DO adjusted to ____ ppm

Calibration Date: 07-30-10 Calibration Time: 5
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5

Calibration Water Temperature 23.0 °C DO Solubility ____ ppm

Meter Water Temperature 23.0 °C Meter DO ____ ppm

Meter Water Temp. adjusted to N/A °C Meter DO adjusted to ____ ppm

Calibration Date: 07-30 10 Calibration Time: 6 7
Meter Type: ✓ YSI (meter # 83) ____ Hach MS5

Calibration Water Temperature ____ °C DO Solubility 7 ppm

Meter Water Temperature 0 °C Meter DO 8.5 ppm

Meter Water Temp. adjusted to N/A °C Meter DO adjusted to ____ ppm

Calibration Date: 07-30-10 Calibration Time: 1750
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5

Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm

Meter Water Temperature 21.5 °C Meter DO ____ ppm

Meter Water Temp. adjusted to N/A °C Meter DO adjusted to ____ ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7/31/10 Calibration Time 6:54
Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.3 ppm
Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 8.9 ok ppm

Calibration Date: 7/31/10 Calibration Time: 7:48
Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.85 ppm
Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 8.9 ok ppm

Calibration Date: 7/31/10 Calibration Time: 8:50
Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 8.9 ok ppm

Calibration Date: 7/31/10 Calibration Time: 9:52
Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 22.0 °C DO Solubility 8.72 (8.7) ppm
Meter Water Temperature 22.0 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 8.7 ok ppm

Calibration Date: 7/31/10 Calibration Time: 10:50
Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 23.0 °C DO Solubility 8.56 (8.5) ppm
Meter Water Temperature 23.0 °C Meter DO 8.6 ppm
Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 8.6 ppm

Calibration Date: 7/31/10 Calibration Time: 11:51
Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.40 ppm
Meter Water Temperature 24.0 °C Meter DO 8.4 ppm
Meter Water Temp. adjusted to ___ °C Meter DO adjusted to N/A ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 7/31/10 Calibration Time: 12:52
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.40 ppm
Meter Water Temperature 24.0 °C Meter DO 8.3 ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to 8.4 ok ppm

Calibration Date: 7/31/10 Calibration Time: 13:53
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.40 ppm
Meter Water Temperature 24.0 °C Meter DO 8.4 ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to N/A ppm

Calibration Date: 7/31/10 Calibration Time: 14:52
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.40 ppm
Meter Water Temperature 24.0 °C Meter DO 8.4 ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to N/A ppm

Calibration Date: 7/31/10 Calibration Time: 16:54
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.40 ppm
Meter Water Temperature 24.0 °C Meter DO 8.5 ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to 8.4 ok ppm

Calibration Date: 7/31/10 Calibration Time: 17:52
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 24.0 °C DO Solubility 8.40 ppm
Meter Water Temperature 24.0 °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ______ ppm

Calibration Date: ________ Calibration Time: ________
Meter Type: ______ YSI (meter # ________) ______ Hach MS5
Calibration Water Temperature ________ °C DO Solubility ________ ppm
Meter Water Temperature ________ °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ______ ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8/1/10 Calibration Time: 6:53
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.4 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to 8.9 ok ppm

Calibration Date: 8/1/10 Calibration Time: 7:53
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.07 (9.1) ppm
I don't know how it went down but it did!
Meter Water Temperature 20.0 °C Meter DO 8.95 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to 9.1 ok ppm

Calibration Date: 8/1/10 Calibration Time: 8:52
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.07 (9.1) ppm
Meter Water Temperature 20.0 °C Meter DO 9.15 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to 9.1 ok ppm

Calibration Date: 8/1/10 Calibration Time: 9:52
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.07 (9.1) ppm
Meter Water Temperature 20.0 °C Meter DO ____ ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to ____ ppm

Calibration Date: 8/1/10 Calibration Time: 10:54
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9 ppm
Meter Water Temperature 0 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to 9.1 ppm

Calibration Date: 8/1/10 Calibration Time: 11:
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature ____ °C DO Solubility ____ ppm
Meter Water Temperature ____ °C Meter DO ____ ppm
Meter Water Temp. adjusted to ____ °C Meter DO adjusted to ____ ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8/1/10 Calibration Time: 12:57
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 22.0 °C DO Solubility 8.72 (8.7) ppm

Meter Water Temperature 22.0 °C Meter DO 8.7 ppm

Meter Water Temp. adjusted to ________ °C Meter DO adjusted to N/A ppm

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Calibration Date: 8/1/10 Calibration Time: 13:52
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 23.0 °C DO Solubility 8.56 (8.55) ppm

Meter Water Temperature 23.0 °C Meter DO 8.5 ppm

Meter Water Temp. adjusted to ________ °C Meter DO adjusted to 8.55 ok ppm

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Calibration Date: 8/1/10 Calibration Time: 14:52
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 23.0 °C DO Solubility 8.56 (8.55) ppm

Meter Water Temperature 23.0 °C Meter DO 8.55 ppm

Meter Water Temp. adjusted to ________ °C Meter DO adjusted to N/A ppm

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Calibration Date: 8/1/10 Calibration Time: 16:53
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5

Calibration Water Temperature 23.0 °C DO Solubility 8.56 (8.5) ppm

Meter Water Temperature 23.0 °C Meter DO 8.5 ppm

Meter Water Temp. adjusted to ________ °C Meter DO adjusted to NA ppm

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Calibration Date: 8/1/10 Calibration Time: 17:50
Meter Type: X YSI (meter # PH91 M2) ______ Hach MS5

Calibration Water Temperature 3 °C DO Solubility 8 ppm

Meter Water Temperature 30 °C Meter DO 8.6 ppm

put ' between 8.5 & 8.6

Meter Water Temp. adjusted to ________ °C Meter DO adjusted to 8.55 ppm

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Calibration Date: ________ Calibration Time: ________
Meter Type: ______ YSI (meter # ________) ______ Hach MS5

Calibration Water Temperature ________ °C DO Solubility ________ ppm

Meter Water Temperature ________ °C Meter DO ________ ppm

Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ______ ppm

R+W COOLER (QC)

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 08-02-10 Calibration Time: 0552 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO 8.7 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm	Calibration Date: 08-02-10 Calibration Time: 0748 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 21.8 °C DO Solubility 8.8 ppm Meter Water Temperature 21.8 °C Meter DO 8.7 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.8 ppm
Calibration Date: 08-02-10 Calibration Time: 0942 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO 8.6 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.7 ppm	Calibration Date: 08-02-10 Calibration Time: 1151 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO 8.8 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.7 ppm
Calibration Date: 08-02-10 Calibration Time: 1355 Meter Type: ✓ YSI (meter # P M) ___ Hach MS5 Calibration Water Temperature 2 °C DO Solubility 8.7 ppm Meter Water Temperature ___ °C Meter DO 8.7 ppm Meter Water Temp. adjusted to °C Meter DO adjusted to N/A ppm	Calibration Date: 08-02-10 Calibration Time: 1448 Meter Type: ✓ YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO 8.9 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.7 ppm

✓	PH91-M2	1659
	21.5	8.8
	21.2	8.7
	21.5	8.8

WOODEN BOX

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 08-02-10 Calibration Time: 0552 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO ___ ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to ___ ppm	Calibration Date: 08-02-10 Calibration Time: 0653 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO 8.7 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm
Calibration Date: 08-02-10 Calibration Time: 0748 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 21.8 °C DO Solubility 8.8 ppm Meter Water Temperature 21.9 °C Meter DO 8.8 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm	Calibration Date: 08-02-10 Calibration Time: 0854 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO 8.7 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm
Calibration Date: 08-02-10 Calibration Time: 0942 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8. ppm Meter Water Temperature 22.0 °C Meter DO 8.6 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.7 ppm	Calibration Date: 08-2-10 Calibration Time: 1058 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO 8.7 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

WOODEN BOX

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 08-02-10 Calibration Time: 1151
Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5
Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm
Meter Water Temperature 22.0 °C Meter DO 8.7 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 08-02-10 Calibration Time: 1258
Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5
Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm
Meter Water Temperature 22.0 °C Meter DO 8.7 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 08-02 Calibration Time: ___
Meter Type: ✓ YSI (meter # ___) ___ Hach MS5
Calibration Water Temperature ___ °C DO Solubility ___ ppm
Meter Water Temperature 2 °C Meter DO 8 ppm
Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 7 ppm

Calibration Date: 08-02-10 Calibration Time: 1448
Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5
Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm
Meter Water Temperature 22.0 °C Meter DO 8.7 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 08-02-10 Calibration Time: 1553
Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.5 °C Meter DO 8.6 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.8 ppm

Calibration Date: 08-02-10 Calibration Time: 1659
Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.5 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

08-02-10 1755
✓ YSI
8.8
8.7
8.8

Dissolved Oxygen and Water Temperature Meter Calibration Sheet 8-13-10

 SJC/GAB

Calibration Date: 8-13-10 Calibration Time: 6:52 Meter Type: YSI YSI (meter # 10983) ______ Hach MS5 Calibration Water Temperature 20.8 °C DO Solubility 8.9 ppm Meter Water Temperature 20.8 °C Meter DO 8.9 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm	Calibration Date: 8-13-10 Calibration Time: 7:54 Meter Type: ______ YSI (meter #__________) ______ Hach MS5 Calibration Water Temperature 20.8 °C DO Solubility 8.9 ppm Meter Water Temperature 20.8 °C Meter DO 8.9 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm
Calibration Date: 8-13-10 Calibration Time: 8:54 Meter Type: ______ YSI (meter #__________) ______ Hach MS5 Calibration Water Temperature 20.8 °C DO Solubility 8.9 ppm Meter Water Temperature 20.8 °C Meter DO 9.0 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to 8.9 ppm	Calibration Date: 8-13-10 Calibration Time: 9:54 Meter Type: ______ YSI (meter #__________) ______ Hach MS5 Calibration Water Temperature 20.9 °C DO Solubility 8.9 ppm Meter Water Temperature 20.9 °C Meter DO 8.8 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to 8.9 ppm
Calibration Date: 8-13-10 Calibration Time: 10:53 Meter Type: ______ YSI (meter #__________) ______ Hach MS5 Calibration Water Temperature 21.0 °C DO Solubility 8.9 ppm Meter Water Temperature 21.1 °C Meter DO 8.9 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm	Calibration Date: 8-13-10 Calibration Time: 11:53 Meter Type: ______ YSI (meter #__________) ______ Hach MS5 Calibration Water Temperature 21.2 °C DO Solubility 8.9 ppm Meter Water Temperature 21.2 °C Meter DO 9.0 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to 8.9 ppm

STC/[illegible]

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8-13-10 Calibration Time: 1250 hrs	Calibration Date: 8/13/10 Calibration Time: 1350 hrs
Meter Type: YSI YSI (meter # 10983) ____ Hach MS5	Meter Type: YSI YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm	Calibra ion Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.5 °C Meter DO 8.8 ppm	Meter Water Temperature 21.5 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm	Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm
Calibration Date: 8/13/10 Calibration Time: 1453 hrs	Calibration Date: 8/13/10 Calibration Time: 1550 hrs
Meter Type: YSI YSI (meter # 10983) ____ Hach MS5	Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm	Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.5 °C Meter DO 8.8 ppm	Meter Water Temperature 21.5 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm	Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm
Calibration Date: 8/13/10 Calibration Time: 1648 hrs	Calibration Date: 8/13/10 Calibration Time: 1745
Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5	Meter Type: ✓ YSI (meter # 10983) ____ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm	Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.5 °C Meter DO 8.8 ppm	Meter Water Temperature 21.5 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm	Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

OWL

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8/14/10 Calibration Time: 6:54 Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.72 (8.7) ppm Meter Water Temperature 22.0 °C Meter DO 8.2 ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 8.7 ok ppm	Calibration Date: 8/14/10 Calibration Time: 7:57 Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm Meter Water Temperature 21.0 °C Meter DO 8.7 ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 8.9 ok ppm
Calibration Date: 8/14/10 Calibration Time: 8:52 Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm Meter Water Temperature 21.0 °C Meter DO 8.9 ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to N/A ppm	Calibration Date: 8/14/10 Calibration Time: 9:52 Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm Meter Water Temperature 21.0 °C Meter DO ___ ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to ___ ppm
Calibration Date: 8/14/10 Calibration Time: 10:50 Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.72 (8.7) ppm Meter Water Temperature 22.0 °C Meter DO 8.1 ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 8.7 ok ppm	Calibration Date: 8/14/10 Calibration Time: 11:52 Meter Type: X YSI (meter # PH91-M2) ___ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.72 (8.7) ppm Meter Water Temperature 22.0 °C Meter DO 8.6 ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to 8.7 ok ppm

I turned the AC up so that is probably the cause of the 1° temp drop. (22° to 21°C)

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8/ 10 Calibration Time: 12:52
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 22.0 °C DO Solubility 8.72 (8.7) ppm
Meter Water Temperature 22.0 °C Meter DO 8.6 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 8.7 ppm

Calibration Date: 8/14/10 Calibration Time: 13:55
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 23.0 °C DO Solubility 8.56 (8.5) ppm
Meter Water Temperature 23.0 °C Meter DO ______ ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

Calibration Date: 8/14/10 Calibration Time: 14:54
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 23.0 °C DO Solubility 8.56 (8.5) ppm
Meter Water Temperature 23.0 °C Meter DO 8.5 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

Calibration Date: 8/14/10 Calibration Time: 15:53
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 23.0 °C DO Solubility 8.56 (8.5) ppm
Meter Water Temperature 23.0 °C Meter DO 8.5 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

Calibration Date: 8/14/10 Calibration Time: 17:50
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 23.0 °C DO Solubility 8.56 (8.5) ppm
Meter Water Temperature 23.0 °C Meter DO 8.5 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

Calibration Date: ______ Calibration Time: ______
Meter Type: ______ YSI (meter # ______) ______ Hach MS5
Calibration Water Temperature ______ °C DO Solubility ______ ppm
Meter Water Temperature ______ °C Meter DO ______ ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8/15/10 Calibration Time: 6:
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 22.0 °C DO Solubility 8.72 (8.7) ppm
Meter Water Temperature 22.0 °C Meter DO 8.1 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 8.7 ok ppm

Calibration Date: 8/15/10 Calibration Time: 7:55
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO ______ ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

Calibration Date: 8/15/10 Calibration Time: 8:53
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

Calibration Date: 8/15/10 Calibration Time: 9:50
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to N/A ppm

Calibration Date: 8/15/10 Calibration Time: 10:55
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO ______ ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

Calibration Date: 8/15/10 Calibration Time: 11:54
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.07 (9.1) ppm
Meter Water Temperature 20.0 °C Meter DO ______ ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: ________ Calibration Time: ________
Meter Type: __X__ YSI (meter #________) ______ Hach MS5
Calibration Water Temperature ________ °C DO Solubility ________ ppm
Meter Water Temperature ________ °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ______ ppm

Calibration Date: ________ Calibration Time: ________
Meter Type: ______ YSI (meter #________) ______ Hach MS5
Calibration Water Temperature ________ °C DO Solubility ________ ppm
Meter Water Temperature ________ °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ______ ppm

Calibration Date: ________ Calibration Time: ________
Meter Type: ______ YSI (meter #________) ______ Hach MS5
Calibration Water Temperature ________ °C DO Solubility ________ ppm
Meter Water Temperature ________ °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ______ ppm

Calibration Date: ________ Calibration Time: ________
Meter Type: ______ YSI (meter #________) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to N/A ppm

Calibration Date: 8/15/10 Calibration Time: 17:50
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.9 ok ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to N/A ppm

Calibration Date: ________ Calibration Time: ________
Meter Type: ______ YSI (meter #________) ______ Hach MS5
Calibration Water Temperature ________ °C DO Solubility ________ ppm
Meter Water Temperature ________ °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ______ ppm

EK

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8-16-10 Calibration Time: 0550
Meter Type: YSI YSI (meter # PH-91-M2) ______ Hach MS5

Calibration Water Temperature 22.5 °C DO Solubility 8.65 ppm

Meter Water Temperature 22.45 °C Meter DO 8.70 ppm

Meter Water Temp. adjusted to 22.5 °C Meter DO adjusted to 8.65 ppm

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Calibration Date: 8-16-10 Calibration Time: 0650
Meter Type: YSI YSI (meter # PH 91 M2) ______ Hach MS5

Calibration Water Temperature 22.5 °C DO Solubility 8.65 ppm

Meter Water Temperature 22.5 °C Meter DO 8.6 ppm

Meter Water Temp. adjusted to 22.5 °C Meter DO adjusted to 8.65 ppm

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Calibration Date: 8-16-10 Calibration Time: 0750
Meter Type: YSI YSI (meter # PH91 M2) ______ Hach MS5

Calibration Water Temperature 22.5 °C DO Solubility 8.65 ppm

Meter Water Temperature 22.5 °C Meter DO 8.70 ppm

Meter Water Temp. adjusted to OK °C Meter DO adjusted to 8.65 ppm

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Calibration Date: 8-16-10 Calibration Time: 0850
Meter Type: YSI YSI (meter # PH91M2) ______ Hach MS5

Calibration Water Temperature 22.9 °C DO Solubility 8.6 ppm

Meter Water Temperature 22.9 °C Meter DO 8.6 ppm

Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

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Calibration Date: 8-16-10 Calibration Time: 0950
Meter Type: YSI YSI (meter # PH91M2) ______ Hach MS5

Calibration Water Temperature 23.0 °C DO Solubility 8.56 ppm

Meter Water Temperature 23.2 °C Meter DO 8.56 ppm

Meter Water Temp. adjusted to 23.0 °C Meter DO adjusted to OK ppm

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Calibration Date: 8-16-10 Calibration Time: 1050
Meter Type: YSI YSI (meter # PH-91M2) ______ Hach MS5

Calibration Water Temperature 25.0 °C DO Solubility 8.24 ppm

Meter Water Temperature 25.1 °C Meter DO 8.30 ppm

Meter Water Temp. adjusted to 25.0 °C Meter DO adjusted to 8.24 ppm

EK

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8-16-10 Calibration Time: 1150
Meter Type: YSI YSI (meter #PH91M2) ______ Hach MS5
Calibration Water Temperature 25.5 °C DO Solubility 8.2 ppm
Meter Water Temperature 25.5 °C Meter DO 8.2 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

Calibration Date: 8-16-10 Calibration Time: 1450
Meter Type: YSI YSI (meter #PH91M2) ______ Hach MS5
Calibration Water Temperature 26.3 °C DO Solubility 8.05 ppm
Meter Water Temperature 26.3 °C Meter DO 8.10 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to 8.05 ppm

Calibration Date: 8-16-10 Calibration Time: 1250
Meter Type: YSI YSI (meter #PH91M2) ______ Hach MS5
Calibration Water Temperature 26.0 °C DO Solubility 8.1 ppm
Meter Water Temperature 26.0 °C Meter DO 8.1 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

Calibration Date: 8-16-10 Calibration Time: 1550
Meter Type: YSI YSI (meter #PH91M2) ______ Hach MS5
Calibration Water Temperature 26.0 °C DO Solubility 8.1 ppm
Meter Water Temperature 26.0 °C Meter DO 8.1 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm

Calibration Date: 8-16-10 Calibration Time: 1350
Meter Type: YSI YSI (meter #PH91M2) ______ Hach MS5
Calibration Water Temperature 26.2 °C DO Solubility 8.05 ppm
Meter Water Temperature 26.2 °C Meter DO 8.1 ppm
Meter Water Temp. adjusted to OK °C Meter DO adjusted to 8.05 ppm

Calibration Date: 8-16-10 Calibration Time: 1650
Meter Type: YSI YSI (meter #PH91M2) ______ Hach MS5
Calibration Water Temperature 26.0 °C DO Solubility 8.1 ppm
Meter Water Temperature 26.0 °C Meter DO 8.2 ppm
Meter Water Temp. adjusted to ______ °C Meter DO adjusted to 8.1 ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Page __ of ____

Calibration Date: 8-16-10 Calibration Time: 1750 Meter Type: YSI YSI (meter # PH91M2) ______ Hach MS5 Calibration Water Temperature 25.2 °C DO Solubility 8.2 ppm Meter Water Temperature 25.2 °C Meter DO 8.2 ppm Meter Water Temp. adjusted to OK °C Meter DO adjusted to OK ppm	Calibration Date: ________ Calibration Time: ________ Meter Type: ______ YSI (meter #__________) ______ Hach MS5 Calibration Water Temperature ______ °C DO Solubility ______ ppm Meter Water Temperature ______ °C Meter DO ______ ppm Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm
Calibration Date: ________ Calibration Time: ________ Meter Type: ______ YSI (meter #__________) ______ Hach MS5 Calibration Water Temperature ______ °C DO Solubility ______ ppm Meter Water Temperature ______ °C Meter DO ______ ppm Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm	Calibration Date: ________ Calibration Time: ________ Meter Type: ______ YSI (meter #__________) ______ Hach MS5 Calibration Water Temperature ______ °C DO Solubility ______ ppm Meter Water Temperature ______ °C Meter DO ______ ppm Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm
Calibration Date: ________ Calibration Time: ________ Meter Type: ______ YSI (meter #__________) ______ Hach MS5 Calibration Water Temperature ______ °C DO Solubility ______ ppm Meter Water Temperature ______ °C Meter DO ______ ppm Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm	Calibration Date: ________ Calibration Time: ________ Meter Type: ______ YSI (meter #__________) ______ Hach MS5 Calibration Water Temperature ______ °C DO Solubility ______ ppm Meter Water Temperature ______ °C Meter DO ______ ppm Meter Water Temp. adjusted to ______ °C Meter DO adjusted to ______ ppm

RED + WHT COOLER

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 08-25-10 Calibration Time: 0615
Meter Type: ✓ YSI (meter #PH91-M2) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.0 ppm
Meter Water Temperature 19.8 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to 20.0 °C Meter DO adjusted to 9.0 ppm

Calibration Date: 08-25-10 Calibration Time: 0750
Meter Type: ✓ YSI (meter #PH91-M2) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.0 ppm
Meter Water Temperature 19.9 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to 20.0 °C Meter DO adjusted to 9.0 ppm

Calibration Date: 08-25-10 Calibration Time: 0955
Meter Type: ✓ YSI (meter #PH91-M2) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.9 ppm
Meter Water Temperature 21.0 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 08-25-10 Calibration Time: 1150
Meter Type: ✓ YSI (meter #PH91-M2) ______ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.5 °C Meter DO 8.7 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.8 ppm

Calibration Date: 08-25-10 Calibration Time: 1345
Meter Type: ✓ YSI (meter #PH91-M2) ______ Hach MS5
Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm
Meter Water Temperature 21.5 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 08-25-10 Calibration Time: 1550
Meter Type: ✓ YSI (meter #PH91-M2) ______ Hach MS5
Calibration Water Temperature 20.5 °C DO Solubility 9.0 ppm
Meter Water Temperature 20.5 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 9.0 ppm

1750 HRS 20 9.0
8.9
N A

WOODEN BOX

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 08-25-10 Calibration Time: 0615
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.0 ppm
Meter Water Temperature 19.8 °C Meter DO 9.2 ppm
Meter Water Temp. adjusted to 20.0 °C Meter DO adjusted to 9.0 ppm

Calibration Date: 08-25-10 Calibration Time: 0651
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 20.1 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to 20.1 °C Meter DO adjusted to N/A ppm

Calibration Date: 08-25-10 Calibration Time: 0750
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.0 ppm
Meter Water Temperature 20.0 °C Meter DO 9.0 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm

Calibration Date: 08-25-10 Calibration Time: 0851
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 20.2 °C DO Solubility 9.0 ppm
Meter Water Temperature 20.4 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to 20.2 °C Meter DO adjusted to 9.0 ppm

Calibration Date: 08-25-10 Calibration Time: 0955
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.9 ppm
Meter Water Temperature 20.8 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to 21.0 °C Meter DO adjusted to N/A ppm

Calibration Date: 08-25-10 Calibration Time: 1047
Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.9 ppm
Meter Water Temperature 21.0 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.9 ppm

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Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 08-25-10 Calibration Time: 1150 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm Meter Water Temperature 21.5 °C Meter DO 8.8 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to N/A ppm	Calibration Date: 08-25-10 Calibration Time: 1249 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm Meter Water Temperature 21.5 °C Meter DO 8.7 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.8 ppm
Calibration Date: 08-25-10 Calibration Time: 1345 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 21.5 °C DO Solubility 8.8 ppm Meter Water Temperature 21.5 °C Meter DO 8.7 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.8 ppm	Calibration Date: 08-25-10 Calibration Time: 1449 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 21.0 °C DO Solubility 8.9 ppm Meter Water Temperature 21.2 °C Meter DO 8.8 ppm Meter Water Temp. adjusted to 21.0 °C Meter DO adjusted to 8.9 ppm
Calibration Date: 08-25-10 Calibration Time: 1550 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 20.5 °C DO Solubility 9.0 ppm Meter Water Temperature 20.5 °C Meter DO 8.9 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 9.0 ppm	Calibration Date: 08-25-10 Calibration Time: 1644 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 20.0 °C DO Solubility 9.0 ppm Meter Water Temperature 19.8 °C Meter DO 9.1 ppm Meter Water Temp. adjusted to 20.0 °C Meter DO adjusted to 9.0 ppm

1750 HRS

20.0°C 9.0
20.2°C 9.0
20.0°C N/A

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8/26/10 Calibration Time: 0555
Meter Type: X YSI (meter # PH91-m2) ____ Hach MS5
Calibration Water Temperature 19.9 °C DO Solubility 9.0 ppm
Meter Water Temperature 20.1 °C Meter DO 9.8 ppm
Meter Water Temp. adjusted to 19.9 °C Meter DO adjusted to 9.0 ppm

Calibration Date: 8/26/10 Calibration Time: 0645
Meter Type: X YSI (meter # PH91-m2) ____ Hach MS5
Calibration Water Temperature 19.9 °C DO Solubility 9.07 ppm
Meter Water Temperature 19.9 °C Meter DO 8.7 ppm
Meter Water Temp. adjusted to — °C Meter DO adjusted to 9.0 ppm

Calibration Date: 8/26/10 Calibration Time: 0751
Meter Type: X YSI (meter # PH91-m2) ____ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.07 ppm
Meter Water Temperature 20.0 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to — °C Meter DO adjusted to 9.0 ppm

Calibration Date: 8/26/10 Calibration Time: 0848
Meter Type: X YSI (meter # ____) ____ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to — °C Meter DO adjusted to — ppm

Calibration Date: 8/26/10 Calibration Time: 0947
Meter Type: X YSI (meter # ____) ____ Hach MS5
Calibration Water Temperature 20.8 °C DO Solubility 8.9 ppm
Meter Water Temperature — °C Meter DO — ppm
Meter Water Temp. adjusted to — °C Meter DO adjusted to ____ ppm

Calibration Date: 8/26/10 Calibration Time: 1048
Meter Type: X YSI (meter # ____) ____ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 21.0 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to — °C Meter DO adjusted to — ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8/26/10 Calibration Time: 1140
Meter Type: X YSI (meter #________) ____ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 21.0 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to — °C Meter DO adjusted to — ppm

Calibration Date: 8/26/10 Calibration Time: 1237
Meter Type: ____ YSI (meter #________) ____ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 21.0 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to — °C Meter DO adjusted to — ppm

Calibration Date: 8/26/10 Calibration Time: 1348
Meter Type: X YSI (meter #________) ____ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 21.0 °C Meter DO 8.9 ppm
Meter Water Temp. adjusted to — °C Meter DO adjusted to 9.1 ppm

Calibration Date: 8/26/10 Calibration Time: 1448
Meter Type: X YSI (meter #________) ____ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 21.0 °C Meter DO 9.0 ppm
Meter Water Temp. adjusted to — °C Meter DO adjusted to — ppm

Calibration Date: 8/26 Calibration Time: 1545
Meter Type: X YSI (meter #________) ____ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to — °C Meter DO adjusted to — ppm

Calibration Date: 8/26 Calibration Time: 1640
Meter Type: X YSI (meter #________) ____ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.1 ppm
Meter Water Temperature 20.0 °C Meter DO 9.1 ppm
Meter Water Temp. adjusted to — °C Meter DO adjusted to — ppm

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Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8/27/10 Calibration Time: 0810 Meter Type: X YSI (meter # 1098.3) ______ Hach MS5 Calibration Water Temperature 19.0 °C DO Solubility 9.3 ppm Meter Water Temperature 19.5 °C Meter DO 8.6 ppm Meter Water Temp. adjusted to 19.0 °C Meter DO adjusted to 9.26 ppm	Calibration Date: 8/27/10 Calibration Time: 0840 Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5 Calibration Water Temperature 19.5 °C DO Solubility 9.1 ppm Meter Water Temperature 19.5 °C Meter DO 9.8 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 9.5 ppm
Calibration Date: 08-27-10 Calibration Time: 0951 Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5 Calibration Water Temperature 22.6 °C DO Solubility 8.7 ppm Meter Water Temperature 22.0 °C Meter DO 8.9 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 8.7 ppm	Calibration Date: 8-27-10 Calibration Time: 1055 Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5 Calibration Water Temperature 22.0 °C DO Solubility 8.7 ppm Meter Water Temperature 21.8 °C Meter DO 8.9 ppm Meter Water Temp. adjusted to 22.0 °C Meter DO adjusted to 8.7 ppm
Calibration Date: 8-27-10 Calibration Time: 1148 Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5 Calibration Water Temperature 21.0 °C DO Solubility 8.9 ppm Meter Water Temperature 21.5 °C Meter DO 9.0 ppm Meter Water Temp. adjusted to 21.0 °C Meter DO adjusted to 8.9 ppm	Calibration Date: 08-27-10 Calibration Time: 1253 Meter Type: ✓ YSI (meter # 10983) ______ Hach MS5 Calibration Water Temperature 20.5 °C DO Solubility 9.0 ppm Meter Water Temperature 20.8 °C Meter DO 8.8 ppm Meter Water Temp. adjusted to 20.5 °C Meter DO adjusted to 9.0 ppm

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Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 08-27-10 Calibration Time: 1350 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 20.0 °C DO Solubility 9.0 ppm Meter Water Temperature 19.8 °C Meter DO 8.9 ppm Meter Water Temp. adjusted to 20.0 °C Meter DO adjusted to 9.0 ppm	Calibration Date: 08-27-10 Calibration Time: 1448 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 19.0 °C DO Solubility 9.2 ppm Meter Water Temperature 19.2 °C Meter DO 8.7 ppm Meter Water Temp. adjusted to 19.0 °C Meter DO adjusted to 9.2 ppm
Calibration Date: 08-27-10 Calibration Time: 1552 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 19.0 °C DO Solubility 9.2 ppm Meter Water Temperature 19.0 °C Meter DO 9.0 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 9.2 ppm	Calibration Date: 08-27-10 Calibration Time: 1641 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 18.8 °C DO Solubility 9.3 ppm Meter Water Temperature 18.5 °C Meter DO 9.0 ppm Meter Water Temp. adjusted to 18.8 °C Meter DO adjusted to 9.3 ppm
Calibration Date: 08-27-10 Calibration Time: 1743 Meter Type: ✓ YSI (meter # 10983) ___ Hach MS5 Calibration Water Temperature 19.0 °C DO Solubility 9.2 ppm Meter Water Temperature 19.0 °C Meter DO 9.0 ppm Meter Water Temp. adjusted to N/A °C Meter DO adjusted to 9.2 ppm	Calibration Date: ___ Calibration Time: ___ Meter Type: ___ YSI (meter # ___) ___ Hach MS5 Calibration Water Temperature ___ °C DO Solubility ___ ppm Meter Water Temperature ___ °C Meter DO ___ ppm Meter Water Temp. adjusted to ___ °C Meter DO adjusted to ___ ppm

RAW WATER

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8/27/10   Calibration Time: 0840
Meter Type: ✓ YSI (meter # PH91-M2)   ____ Hach MS5
Calibration Water Temperature 19.5 °C   DO Solubility 9.1 ppm
Meter Water Temperature 19.5 °C   Meter DO 8.5 ppm
Meter Water Temp. adjusted to N/A °C   Meter DO adjusted to 9.1 ppm

Calibration Date: 8-27-10   Calibration Time: 1055
Meter Type: ✓ YSI (meter # PH91-M2)   ____ Hach MS5
Calibration Water Temperature 22.0 °C   DO Solubility 8.7 ppm
Meter Water Temperature 22.0 °C   Meter DO 8.3 ppm
Meter Water Temp. adjusted to N/A °C   Meter DO adjusted to 8.7 ppm

Calibration Date: 8-27-10   Calibration Time: 1253
Meter Type: ✓ YSI (meter # PH92-M2)   ____ Hach MS5
Calibration Water Temperature 20.5 °C   DO Solubility 9.0 ppm
Meter Water Temperature 20.2 °C   Meter DO 8.8 ppm
Meter Water Temp. adjusted to 20.5 °C   Meter DO adjusted to 9.0 ppm

Calibration Date: 08-27-10   Calibration Time: 1448
Meter Type: ✓ YSI (meter # PH91-M2)   ____ Hach MS5
Calibration Water Temperature 19.0 °C   DO Solubility 9.2 ppm
Meter Water Temperature 19.2 °C   Meter DO 9.5 ppm
Meter Water Temp. adjusted to 19.0 °C   Meter DO adjusted to 9.2 ppm

Calibration Date: 08-27-10   Calibration Time: 1641
Meter Type: ✓ YSI (meter # P________)   ____ Hach MS5
Calibration Water Temperature 18.8 °C   DO Solubility ________ ppm
Meter Water Temperature 18.5 °C   Meter DO ________ ppm
Meter Water Temp. adjusted to 18.8 °C   Meter DO adjusted to ____ ppm

Calibration Date: ________   Calibration Time: ________
Meter Type: ____ YSI (meter # ________)   ____ Hach MS5
Calibration Water Temperature ________ °C   DO Solubility ________ ppm
Meter Water Temperature ________ °C   Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C   Meter DO adjusted to ____ ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8/28/10 Calibration Time: 6:55
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 18.0 °C DO Solubility 9.45 (9.5) ppm
Meter Water Temperature 18.0 °C Meter DO 9.6 ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to 9.5 ok ppm

Calibration Date: 8/28/10 Calibration Time: 7:54
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 19.0 °C DO Solubility 9.26 (9.3) ppm
Meter Water Temperature 19.0 °C Meter DO 9.4 ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to 9.3 ok ppm

Calibration Date: 8/28/10 Calibration Time: 8:54
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.07 (9.1) ppm
Meter Water Temperature 20.0 °C Meter DO 9.2 ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to 9.1 ok ppm

Calibration Date: 8/28/10 Calibration Time: 9:54
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to 8.9 ok ppm

Calibration Date: 8/28/10 Calibration Time: 10:
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.8 ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to 8.9 ok ppm

Calibration Date: 8/28/10 Calibration Time: 11:51
Meter Type: X YSI (meter # PH91-M2) ____ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.9 ppm
Meter Water Temperature 21.0 °C Meter DO 8.9 ok ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to N/A ppm

Dissolved Oxygen and Water Temperature Meter Calibration Sheet

Calibration Date: 8/28/10 Calibration Time: 12:53
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.9 ok ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to N/A ppm

Calibration Date: 8/28/10 Calibration Time: 1[illegible]:54
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.7 ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to 8.9 ok ppm

Calibration Date: 8/28/10 Calibration Time: 15:56
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 21.0 °C DO Solubility 8.90 ppm
Meter Water Temperature 21.0 °C Meter DO 8.9 ok ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ______ ppm

Calibration Date: 8/28/10 Calibration Time: 16:55
Meter Type: X YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.07 (9.1) ppm
Meter Water Temperature 20.0 °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ______ ppm

Calibration Date: 8/28/10 Calibration Time: 17:54
Meter Type: ✓ YSI (meter # PH91-M2) ______ Hach MS5
Calibration Water Temperature 20.0 °C DO Solubility 9.07 (9.1) ppm
Meter Water Temperature 20.0 °C Meter DO 9.1 ok ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to N/A ppm

Calibration Date: ________ Calibration Time: ________
Meter Type: ______ YSI (meter # ________) ______ Hach MS5
Calibration Water Temperature ________ °C DO Solubility ________ ppm
Meter Water Temperature ________ °C Meter DO ________ ppm
Meter Water Temp. adjusted to ________ °C Meter DO adjusted to ______ ppm

APPENDIX A-2: FECAL COLIFORM SAMPLING AND ANALYSIS PROCEDURES.

Lancaster Laboratories

Uncontrolled Copy

Modification
Fecal Coliform by Membrane Filtration

Approvals:

Prepared by: ____________________ Date: 7/9/10
Microbiologist

Approved by: ____________________ Date: 7-13-10
Environmental Microbiology Management

Approved by: ____________________ Date: 07/14/10
Quality Assurance

Revision Log:

Revision: 08	Effective Date: This Version	
Section	**Justification**	**Changes**
Document Number (Header)	Combine Documents	Added analysis 11028
Revision Log	Formatting requirement per LOM-SOP-LAB-201	Removed revision logs up to the previous version
Cross Reference	Reflect applicable documents	Replaced OMC-PM-045 with OMC-MCV-002 and added OMC-PS-012
Basic Principles	To reflect current practices	Removed sentence pertaining to normal volume filtered and minor wording changes
Interferences	Clarification To reflect requirements	Removed ">50ppm" Chlorine residual not required for QC samples
Safety Precautions and Waste Handling	Formatting requirement per LOM-SOP-LAB-201	Added required verbiage
Personnel Training and Qualifications	Formatting requirement per LOM-SOP-LAB-201	Added required verbiage
Sample Collection, Preservation, and Handling	Added applicable analysis Clarification on analysis hold time	Added analysis 11028 for non-NPDES permit samples Incorporated PA # 1 (dated 08/18/08) – Changed 2nd paragraph
Apparatus and Equipment	To reflect current practices Addition Clarification	Removed 10- and 1-mL pipettes Added disposable pipettes to sterile pipette tips Removed glass funnels, UV sterilizer, and sterile filters, renumbered section accordingly
Calibration	Formatting requirement per LOM-SOP-LAB-201	Added as new, added reference to OMC-PS-012
Procedure	To reflect current practices	Added direction for testing chlorine positive samples
Procedure A.	Clarification	Added requirement for use of calibrated micropipettors
Procedure A.1.b.	To reflect current practices	Added that it is acceptable to use the client designation if the sample number has not yet been generated
Procedure A.6.	To reflect current requirements	Added use of continuous flow of sterile water for rinsing
Procedure A.10.	To reflect current practices	Added new recording time step, renumbered section accordingly
Procedure A.16. (Previously A.15.)	Clarification on temperature excursions	Incorporated PA #3 (dated 02/18/09) – Added text regarding temperature excursion
Procedure A.17. (Previously A.16.)	To reflect current requirements Clarification To reflect current requirements	Added use of magnifying lens Added rounding requirements Added requirement of recording total counts and TNTC result if there are >200 total CFU
Procedure B.	Clarification	Added table illustrating possible dilution scheme and noted the acceptable use of direct filtration
Procedure B.1.	Correction	Incorporated PA #2 (dated 12/03/08) – Updated to include effluents

Revision: 08	Effective Date:	This version
Procedure B.2.	Correction Information moved	Incorporated PA #2 (dated 12/03/08) – Updated to remove effluents Deleted information regarding dilution scheme, added to note at beginning of section
Procedure B.3.	Clarification	Added units to sample weights
Procedure B.4.	Clarification Clarification	Added reference to Attachment I Added units to sample weights
Procedure C.	To reflect current practices	Deleted section, glass funnels no longer in use
Data Entry 1.	To reflect current practices	Added review of collection information during data entry stage
Data Entry 4.	To reflect current requirements	Added new entry information for plates with >200 total CFU
Quality Assurance/ Quality Control	To reflect current practices	Changed volume of *E. coli* from 1.0 mL to 0.5 mL

Revision: 07	Effective Date: 06/23/08	
Section	Justification	Changes
Cross Reference	To reflect documents currently applicable	Removed Analysis #0302 and #2378; added OMC-PM-045
Scope	Information moved to appropriate section Duplication of information found in Sample Handling section	Moved LOQ information to Calculations section and wastewater effluent sample information to Sample Handling section Removed statement of 24 hour completion if verification not needed
Definitions	For informational purposes	Addition of influent, effluent, NPDES, bathing beach and monitoring well definitions
Personnel Training and Qualifications	Clarification No longer applicable	Removed sections pertaining to aseptic technique and pipette aid use; added general statement about aseptic technique and pipette aid use, about training and what training records should contain, and about data entry; minor wording changes Removed reference to Analysis #0302
Interferences	No longer applicable	Removed reference to Analysis #2378; minor wording changes
Safety Precautions and Waste Handling	UV lamps being removed from testing	Removed section about testing UV lamps
Sample Handling	Information moved to appropriate section	Added wastewater effluent sample information
Apparatus and Equipment	NELAC requirement Testing material change	Added requirement for use of calibrated pipettes Added sterile pipette tips and presterilized disposable filter units
Reagents and Standards	Clarification	Added *E. coli* and *S. marcescens*; minor wording changes
Procedure	Clarification Applicable information	Rearranged section; removed reference to UV lamps; totally reconstructed testing steps; added use of purchased presterilized disposable filter units; made minor wording changes Added reference to use of client parameters

Revision: 07	Effective Date: 06/23/08	
Procedure B.	Provide direction for balance calibration	Added reference to OMC-PM-045
Calculations	Informational purposes	Added example for calculation
Data Entry	Incorporation of PA #1 (dated 03/28/08)	Entire section rewritten
Quality Assurance/ Quality Control	New testing step	Step 3. - added negative control information
	Direction for lot comparison testing	Step 4. - added procedure reference for lot comparison testing
	Applicable information	Step 5. – added to provide monthly duplicate counts information
		Step 6. - added testing steps for monthly verification
	Testing material change	Removed section for checking sterility of each funnel

Reference:

1. *Standard Methods for the Examination of Water and Wastewater*, Section 9222D, Current Edition.

2. "Direct Membrane Filter (MF) Method," *Microbiological Methods for Monitoring the Environment - Water and Wastes*, 1978, p. 124. Environmental Protection Agency (EPA).

3. Draft Method 1680: *Fecal Coliform in Biosolids by Multiple-Tube Fermentation and Membrane Filter Procedures*, July, 1998. Environmental Protection Agency (EPA).

4. *Environmental Quality Policy Manual*, Lancaster Laboratories, Current Version.

5. *Chemical Hygiene Plan,* Lancaster Laboratories, current version.

Cross Reference:

Document	Document Title
Analysis #0416	Modification DPD Free Chlorine Residual In Water (Presence/Absence)
Analysis #6477, 6479, 8161	Total Coliform and E. coli Analysis Potable Water (Presence/Absence), 6477 Swimming Pool Samples, 6479 Potable Water (Quantitative), 8161
OMC-MCV-002	Laboratory Balances
OMC-PS-012	Mechanical Pipettes
SOP-PM-001	Preparation Manual
SOP-PM-041	Quality Control/Quality Assurance Procedure for Environmental Microbiology

Scope:

This method is performed at Lancaster Laboratories by Environmental Microbiology. Membrane filtration is the most commonly used method to detect and enumerate fecal coliforms present in effluents, influents, bathing beaches, and monitoring wells. This method is also used for sludge samples for compliance to Federal 503 Regulations and for biosolid enumeration.

Basic Principles:

Some samples may have the potential to have high bacteria counts. In this case, a dilution series is filtered for the sample. The filter is then placed on a growth media and incubated. After incubation, colonies exhibiting typical growth for fecal coliform are counted.

Reference Modifications:

Standard Methods reference 9222D is a modification of the standard membrane filtration method for total coliform, 9222B. It involves using a different growth medium and incubation temperature to isolate fecal coliform organisms. Lancaster Laboratories is adhering to the published modifications. Biosolid samples are tested after a special set of preparation steps that involve blending a larger sample volume than is routinely used.

Definitions:

1. CFU - Colony-forming units. Colonies may arise from pairs, chains, clusters or single cells. All of these are included in the term colony-forming unit

2. Influent – Wastewater sample that goes into the processing system. Contamination is common for influent samples

3. Effluent – Wastewater sample that is discharged from the processing system. This is processed water and should be clean

4. NPDES – National Pollutant Discharge Elimination System

5. Bathing Beach – Any area of a stream, lake, ocean, impoundment, or hot spring that is used for recreation

6. Monitoring Well – A sampling well used for collecting ground water samples at a site

7. DOC – Demonstration of Capability

Interferences:

High levels of settleable solids or turbidity may interfere with the filtration process and/or counting of membrane filters. The presence of high levels of heterotrophic bacteria may also interfere with counting the membrane filters. Analysis 8161 may be substituted, depending upon the client requirements. Another alternative may be to dilute the sample or filter multiple sub-samples. Example, instead of filtering a 100-mL sample, two 50-mL or four 25-mL sub-samples would be filtered and the counts combined.

High levels of free chlorine that exceed the quenching capacity of the sodium thiosulfate present in the Lancaster Laboratories 024-sample container will invalidate the sample. This is examined with Analysis #0416. Analysis #0416 is not applicable to quality control samples.

Safety Precautions and Waste Handling:

All laboratory waste is accumulated, managed, and disposed of in accordance with all federal, state, and local laws and regulations. See *Chemical Hygiene Plan* for general information regarding employee safety, waste management, and pollution prevention.

1. Follow general safety precautions, good laboratory practices, and use aseptic technique.

2. Wear safety glasses and appropriate protective clothing.

3. Use a bulb or similar pipetting aid for all pipetting.

4. Sterilize all biological waste including disposable equipment and inoculated media before disposal.

5. The blender container must be covered with a plastic container or beaker during the blending step. This will contain broken glass if the container shatters.

Personnel Training and Qualifications:

All personnel performing this procedure must have documentation of reading, understanding and agreeing to follow the current version of this SOP and a documented Demonstration of Capability.

Training in this procedure will be conducted by a qualified trainer as designated by management. Training may be performed by any or all of the following items: review of the procedure by the trainee, observation by the trainee of the procedure being performed, direct observation of the trainee by the trainer during performance of the procedure.

The trainee may also have additional basic training as core TRNs performed upon initial starting in the test area. Basic skills such as aseptic technique, use of the pipette aid, and dilution preparation will be reviewed as part of the training in how they pertain specifically to the analysis.

The analyst training records should document, at a minimum, the following items:

1. Reading and understanding of this SOP

2. Performance of analysis - The analyst must demonstrate he/she can perform a membrane filtration analysis by performing at least three positive/negative control sets. Documentation of this work will be maintained in the analyst's training record.

3. Counting plates

4. Data Entry

5. Colony verification

Sample Collection, Preservation, and Handling:

Generally samples are analyzed within 24 hours of collection in order to minimize changes that may occur in bacteria populations (non-NPDES permit samples – analysis 11028). This is particularly critical with water samples. This hold time applies if verification of fecal coliforms that were detected is not required.

Wastewater Effluent Samples for NPDES Permit Requirements (Analysis 0199) - The sample hold-time is generally 24 hours. Samples for NPDES compliance must be shipped to the lab within 6 hours and tested within 8 hours of collection in order to meet the requirements. If a client requests that a sample be run beyond this time limit, a comment stating that the holding time for the analysis was exceeded must appear on the report (comment #0677).

Water samples are collected in sterile containers, and if the sample has been chlorinated, sodium thiosulfate addition is required to quench the action of the chlorine. The 024 container supplied by the laboratory contains sodium thiosulfate.

Solid samples may be submitted in Whirl-pak™ bags, new or chemically-clean glass containers.

A minimum of 125 mL water or 50 grams of solid sample is required, depending on the type of sample and expected reporting limit. Most solid samples are reported on a dry-weight basis, so additional sample for moisture is required. Samples must be cool (<10°C) and are held refrigerated at 1°-5°C if not processed immediately

Apparatus and Equipment:

1. Water bath, 44.5° ± 0.2°C or equivalent

2. Stereoscope, 10-15x, with light source (fluorescent source optional) or equivalent

3. Calibrated micropipettors or equivalent

4. Sterile pipette tips or disposable pipets

5. Presterilized 0.45-µm disposable filter funnel units or equivalent

6. Filter manifold or equivalent

7. Smooth-tipped forceps

8. Presterilized Petri dishes with pads, 47-mm, or equivalent

9. Sterile inoculation equipment

10. Laboratory balance

11. Bact-incinerator

12. Blender

13. Sterile blender blades

Reagents and Standards:

Refer to the number in parenthesis for directions of preparation, shelf life and storage conditions in SOP-PM-001 (where applicable).

1. mFC broth in pre-packaged sterile 2-mL vials or equivalent (Media #397)

2. Purchased sterile phosphate buffered dilution water or equivalent (Media #097)

3. Sterile rinse water (Media #104) or equivalent

4. LST (single strength, Media #398) or equivalent

5. Purchased sterile EC broth or equivalent (Media #401)

6. *Escherichia coli* (ATCC #8739) or equivalent

7. *Serratia marcescens* (ATCC #43862) or equivalent

Calibration:

All micropipettors must be calibrated per OMC-PS-012.

Procedure:

Turn on the bact-incinerator at least 10 minutes before it is needed.

Disinfect the bench with germicide and sterilize the forceps to be used for testing.

Check the printed sample label against the client label, if one is present. The information should be identical. If there is a difference, confirm the change with Sample Administration.

Analysis #0416 must be performed on all liquid samples and the results recorded in the appropriate data record book. If a sample is chlorine positive (any shade of pink), that sample is not acceptable for testing, unless otherwise directed by the client. Another appropriately collected container or sample must be chlorine checked, then analyzed.

Before beginning the analysis, check for client parameters. If a client parameter is not available, follow guidelines for sample in appropriate section of this procedure.

Turn on the vacuum source prior to starting testing.

A. Preparation and Filtration

NOTE: Calibrated micropipettors must be used to perform any preparation or filtration step. If a micropipettor is not available, disposable pipets may be used, but must have been checked per NELAC requirements.

1. Set out and label the appropriate number of petri dishes.

   a. Use one plate for each dilution or amount of sample tested.

   b. Label the plate with at least the last four digits of the sample number and the dilution or amount of sample being tested. If the sample number has not been assigned, the client designation may be used.

2. Dispense the mFC broth into each dish (approximately 2 mL). Pour off excess.

3. Place filter funnel unit onto manifold.

4. Mix water sample by shaking thoroughly.

5. Filter the appropriate dilution or amount of sample by dispensing into a filter funnel unit and opening the vacuum to the port of the manifold. If a client parameter is not available, check the sample description and follow the appropriate dilution scheme from Procedure section B.

   If 10 mL or less is to be filtered, add approximately 10 mL of sterile dilution water or rinse water to the filter unit prior to adding the sample. This aids in uniform dispersion over the entire filtering surface.

6. Rinse insides of filter unit three times with, or with a continuous flow of, sterile rinse water. Filter each rinse as above.

7. Place the tip of the forceps into the bact-incinerator for a few seconds. Allow the forceps to cool before transferring the filter.

8. Aseptically transfer filter to the appropriate petri dish with a rolling motion to avoid air pockets.

9. Close the vacuum to the port of the manifold

10. Record the time that the last dilution of the sample was filtered.

11. Repeat Procedure steps A.3. through A.10. for each dilution or amount of sample to be tested.

12. Perform a negative control for each batch following Procedure steps A.3. through A.9. using an uninoculated bottle of dilution water.

13. Turn off vacuum source after testing is complete.

14. Invert sample plates and place into a watertight WHIRL-PAK™ bag.

15. Submerge the bag in the 44.5°C water bath and incubate for 24 ± 2 hours. Document the temperature and the start time of the incubation in the databook.

    Sample plates **must be** incubated **within 30 minutes** of filtration.

16. At the end of the incubation period, document the temperature, date and time that the plates are removed from the water bath. If a temperature excursion occurred during incubation, the client must be notified to assess the potential impact on the test result. If the data will be reported, a note will be added to the report describing the excursion.

17. Count plates within ½ hour of removal from incubation using magnification (i.e. a 10-15x lens).

    a. The standard counting range is 20 to 60 fecal coliform colonies per filter. For counts below 10 CFU, round to the whole number. For counts between 10 and 99 CFU, record whole number. For counts greater than 100 CFU, round to 2 significant figures.

    b. Fecal coliform colonies are a shade of blue on this media.

    c. Record the total number of colonies observed on each plate. If the total number of colonies (coliform and non-coliform) exceeds 200 per plate, record the number as TNTC. See Data Entry for specific instruction on reporting.

B. Dilution Schemes

NOTE: Check for a client parameter sheet. If a parameter sheet is not available, follow the appropriate dilution scheme if the source of the sample can be determined by the sample description.

Volumes can be directly filtered or diluted as below by filtering 10mL from each dilution bottle:

Sample	Volume added to 99mL Sterile Dilution Water (mL)	Volume of Original Sample Filtered (mL)
Direct	11	1.0mL (A)
A	11	0.1mL (B)

1. Effluents, bathing beaches and other potentially low-count samples

   100 mL and 10 mL are filtered for these samples.

2. Influents and other samples with suspected high fecal counts

   10 mL of the original sample and 10 mL of a 1:10 dilution (A) are filtered for these samples.

3. Solid samples (e.g. soils)

   a. Weigh 11 g. of sample into a sterile WHIRL-PAK™ bag. Perform weighing on a calibrated balance per OMC-MCV-002. Record the weight in the data notebook.

   b. Add one bottle of sterile dilution water to weighed sample.

      (1) Mix sample by shaking thoroughly.

      (2) Filter 5 mL of the sample mixture. This is a 1:2 dilution (0.5 g).

      (3) Filter 1 mL of the sample mixture. This is a 1:10 dilution (0.1 g).

      (4) Filter 0.1 mL of the sample mixture. This is a 1:100 dilution (0.01g).

   c. Transfer 1 mL of the sample mixture to a bottle of sterile dilution water labeled "A".

      (1) Mix sample by shaking thoroughly.

      (2) Filter 1 mL from dilution bottle "A". This is a 1:1,000 dilution (0.001 g).

      (3) Filter 0.1 mL from dilution bottle "A". This is a 1:10,000 dilution (0.0001 g).

d. Transfer 1 mL from dilution bottle "A" to a bottle of sterile dilution water labeled "B".

(1) Mix sample by shaking thoroughly.

(2) Filter 1 mL from dilution bottle "B". This is a 1:100,000 dilution (0.00001 g).

4. Biosolid samples for compliance to EPA 503 regulations (Class B). See Attachment I for dilution scheme flowchart.

a. Weigh 30 grams of sample into a sterile blending jar. Add sterile dilution water to a total weight of 300 grams. Perform weighing on a calibrated balance per OMC-MCV-002. Record the weight in the data notebook.

b. Blend for 2 minutes. Cover jar with a plastic container during blending.

c. Transfer 11 mL of sample mixture to a bottle of sterile dilution water labeled "A".

(1) Mix sample by shaking thoroughly.

(2) Filter 1 mL from dilution bottle "A". This is a 1:100 dilution (0.01g).

d. Transfer 1 mL from dilution bottle "A" to a bottle of sterile dilution water labeled "B".

(1) Mix sample by shaking thoroughly.

(2) Filter 10 mL from dilution bottle "B". This is a 1:1,000 dilution (0.001 g).

(3) Filter 1 mL from dilution bottle "B". This is a 1:10,000 dilution (0.0001 g).

e. Transfer 1 mL from dilution bottle "B" to a bottle of sterile dilution water labeled "C".

(1) Mix sample by shaking thoroughly.

(2) Filter 10 mL from dilution bottle "C". This is a 1:100,000 dilution (0.00001 g).

Calculations:

The following formula is used for a liquid sample:

$$\frac{\textit{MF colonies counted (or verified)}}{\textit{mL of sample}} \times 100 = \textit{CFU per 100 mL}$$

For a solid sample this formula is used:

$$\frac{\textit{MF colonies counted (orverified)}}{\textit{grams of sample}} = \textit{CFU/gram}$$

The computer calculates the result in a dry weight basis using the following formula:

$$D = 100 - \textit{moisture} / 100 \qquad \textit{Dry weight value} = \textit{As received value} / D$$

If no filter has a fecal coliform count in the 20-60 CFU range, total the fecal coliform counts on all filters and divide by the sum of all the volumes. For water samples multiply this number by 100.

Example:

A 10-mL and 1-mL filtration was performed for a sample. A count of 12 CFU was obtained on the 10-mL plate and 1 CFU on the 1-mL plate. The reported value would be (12 + 1) / (10 + 1) = 1.18; 1.18 (100) = 118. This would be rounded to two significant figures and reported as est. 120 CFU/100mL.

The limit of quantitation (LOQ) is 1 CFU/100 mL if a 100-mL volume is filtered, 10 CFU/100 mL if a 10-mL volume is filtered, and 2 CFU/gram if 5 mL of a 1:10 dilution is used as the initial dilution for a solid sample. The reporting range for fecal coliforms in bathing beach samples is from 1 to 600 CFU/100 mL. The reporting range of effluents is normally from 10 to 6000 CFU/100 mL. The reporting range for fecal coliforms in sludge samples is from 2 to 6,000,000 CFU/gram, as received. The reporting range for biosolids is from 100 to 6,000,000 CFU/gram, as received. Sludges and biosolids samples are usually reported on a dry weight basis.

Data Entry:

1. Enter data into the computer under the appropriate analysis and sample numbers. Check that the appropriate collection information is entered, including a collection date and time for the sample. Follow up with the Client Service Representative if any information is missing.

2. Enter the appropriate dilution in the dilution field.

3. Enter the result for each dilution that was plated. The program will automatically use the results that were entered for each dilution to calculate the final result. The final result will be reported from the dilution that had results in the countable range (20-60 CFU). If there are no results in the countable range the computer will determine the result based on the following logic:

   If there are no results within the countable range and there is one dilution with an estimated count, the estimated count should be used for the result, and the LOQ should be set to the value appropriate for that dilution.

If there are no results within the countable range and there are 2 or more dilutions with an estimated count, the result should be determined as follows:

The sum of the estimated counts is divided by the sum of the dilutions, and that value is multiplied by 100. The LOQ is 1.

A result can be designated TNTC (too numerous to count) by entering –2. If a dilution is TNTC but there is another dilution with a count, enter –2 for the TNTC dilution and the rest of the dilution counts should be processed as noted in 1-3 above.

If a result is TNTC and there are no dilutions with counts, the calculation should do the following:

If the TNTC is for the direct dilution (DF 100), the Final Result should be set to –2 and the LOQ should be 1 (the value appropriate for that dilution). If the TNTC is not for the direct dilution, or if more than one dilution is marked TNTC and the last dilution entered is not the direct dilution - then the upper limit should be set (so that the analysis can report as >UL).

4. Report TNTC counts due to bacterial interference if there are no plates within the countable range.

    a. If no typical colonies are observed, add comment 1104.

    b. If any typical colonies are observed, add comment 1235.

Statistical Information/Method Performance:

This method gives 93% accuracy in the differentiation between coliforms from warm-blooded animals and those from other sources. 95% confidence limits are assumed.

Quality Assurance/Quality Control:

1. The temperature in the water bath is monitored twice daily with at least 4 hours between checks if samples are in the water bath or on normal business days.

2. A negative control consisting of an uninoculated bottle of dilution water must be analyzed with each testing batch. If the negative control exhibits growth, samples in the batch that have growth must be evaluated to determine if the growth present is likely to be representative of the original sample or was introduced during testing. An investigation must be performed to document the justification as to whether the sample results are valid or invalid.

3. An *E. coli* positive organism and *S. marcescens* negative organism control are performed on each batch of media as a QC release. These controls may also be run with a testing batch per management discretion. An appropriate dilution of the positive organism should be used to obtain a countable range of 20-60 CFU. Typically, 0.5 mL of a 10^{-7} dilution of *E. coli* and 10 mL of a 10^{-3} dilution of *S. marcescens* are used for this testing.

4. Each new lot of mFC media, presterilized membrane filter units, and membrane filters are compared to a previous lot for satisfactory performance. See SOP-PM-041 for testing instruction.

5. Refer to SOP-PM-041 for applicable quality assurance/quality control requirements, including duplicate counts and DOC statements.

6. At least one fecal coliform sample per month is verified for quality assurance purposes. The following procedure steps can be followed or the verification can be performed by another approved method such as API 20E.

   a. A client sample with at least ten typical (blue) and two (maximum 5) atypical colony-types should be used for the monthly fecal verification.

b. Testing parameters

(1) Typical colonies

(a) Set up ten EC broth tubes and ten 1x LST tubes.

(b) One colony will be used for one set of EC and 1x LST tubes.

(c) Pick the colony to the EC tube first, and then using the sample loop inoculate the 1x LST tube.

(2) Atypical colonies

(a) Set up two EC broth tubes and two 1x LST tubes.

(b) One colony will be used for one set of EC and 1x LST tubes.

(c) Pick the colony to the EC tube first, and then using the sample loop inoculate the 1x LST tube.

(3) Incubation of Tubes

(a) EC broth

(i) Incubate for 24 hours at 44.5° ± 0.2°C.

(ii) Check for gas fermentation at the end of 24 hours.

(iii) Record results in the appropriate databook.

(b) 1x LST

(i) Incubate for 48 hours at 35° ± 0.5°C.

(ii) Check for gas fermentation.

(iii) Record results in the appropriate databook.

c. Tubes positive for 1x LST, but negative for EC

(a) Transfer from the 1x LST to a second EC tube.

(b) Incubate for 24 hours at 44.5° ± 0.2°C.

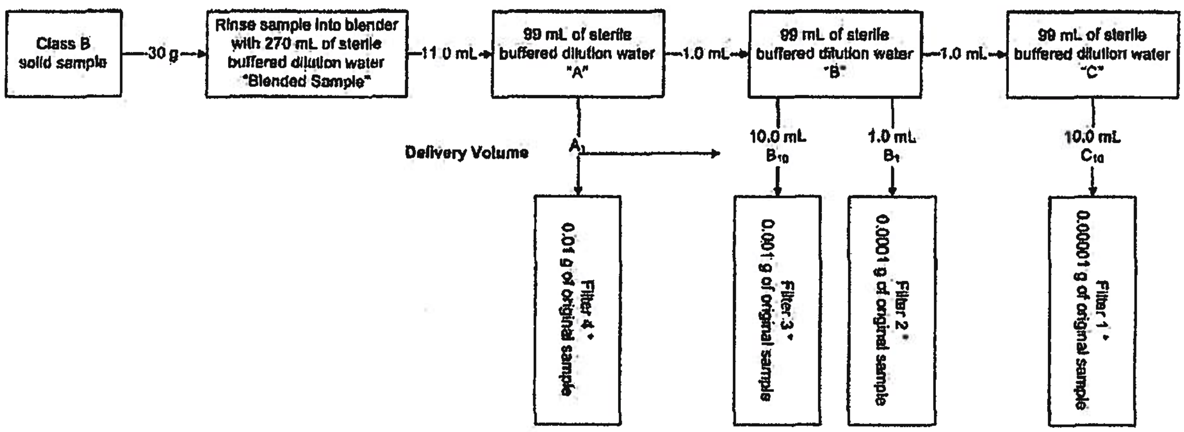
(c) Check for gas fermentation.

(d) Record results in the appropriate databook.

d. If there are positive reactions for the atypical colonies, contact the Group Leader for further instruction.

Attachment I

DILUTION AND FILTRATION SCHEME FOR CLASS B: SOLID (MEMBRANE FILTER)



* Samples should be filtered in order of highest dilution (least sample volume) first to avoid carry-over contamination. Filtration should take place in the following order: filter 1, 2, 3, and 4.

APPENDIX A-3: OPERATING TURBINE BOIL CALIBRATION SHEETS.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Cono Pond   Investigator: RAB/JCA

DATE 0 4 0 6 1 0 (m m d d y y)   PURPOSE 2   Weather Code 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt Rain 5=H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8)   Flow from Holtwood Evident: YES or NO (circle one)

2 YSI DO METER CALIBRATION:
Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0820 (prevailing, 24 hr) *

CAL Temp 23.0 °C   CAL DO 8.56 (mg/l)
Meter Temp 21.0 °C OK   Meter DO 8.8 (mg/l) OK
Meter adj. to 23.0 °C   Meter adj to 8.56 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)
Time 0810   Meter reading @ 7.00 su 7.00   @ 4.01 su ______   or @ 10.00 su 10.00 OK

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter		MS5 Monitor	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *
Data Download Location: ________ (Lab or Onsite)   Time of Download: ☐☐☐☐ (24 hr) *
Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (________________)

5 MONITOR CALIBRATION:
conductivity 500uS/cm OK 1412uS/cm OK

Turbidity calibrated at factory good for ~1 month

DO Calibration***   Method Used: 3   1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO SAT%

Cal Temp ________ (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 7.00 OK   @ 4.01 _____   @ 10.00 10.00 OK (Record OK for buffer(s) used)

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter		MS5 Monitor	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

7 Air Temperature 26.6 °C
Wind Conditions (Circle one): Calm **Light** Moderate Gusty Strong

Other Sampling Notes: ______________________

* Use 24 hour clock, e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Lower River **Investigator :** SWA / KJT

DATE 0 4 0 6 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0820 (prevailing, 24 hr) *

CAL Temp 23.0 °C **CAL DO** 8.56 (mg/l)
Meter Temp 18.0 °C Meter DO 9.2 (mg/l)
Meter adj. to 23.0 °C Meter adj to 8.56 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time 0810 Meter reading @ 7.00 su 7.00 @ 4.01 su ______ or @ 10.00 su 10.00 OK

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

	DO / pH Meter		MS5 Monitor	
Temp	☐☐☐	°C	______	°C **
DO	☐☐☐	mg/l	______	mg/l **
pH	☐☐☐☐	su	______	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *
Data Download Location: ________ (Lab or Onsite) Time of Download: ☐☐☐☐ (24 hr) *
Applicable Maintenance Performed: _____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (________________________)

5 MONITOR CALIBRATION:

2-pt conductivity calibrated OK

Turbidity calibrated at factory - good for 1 month.

DO Calibration* Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO SAT%

Cal Temp ________ (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 7.00 OK @ 4.01 _____ @ 10.00 10.00 (Record **OK** for buffer(s) used) OK

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time 0820 (prevailing, 24 hr) *

	DO / pH Meter		MS5 Monitor	
Temp	☐☐☐	°C	______	°C **
DO	☐☐☐	mg/l	______	mg/l **
pH	☐☐☐☐	su	______	su **

7 Air Temperature 19.8 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ________________________________

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Conowingo Pond CP-8 CP2a files Investigator: JCA/Chuck Barnes

DATE 0 4 1 3 1 0 (m m d d y y)

PURPOSE 2
1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

Weather Code 4
1=Clear 2=P. Cloudy 3=Overcast 4=Lt Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0845 (prevailing, 24 hr) *

CAL Temp 21.0 °C CAL DO 8.8 (mg/l)
Meter Temp 20.5 °C OK Meter DO 8.6 (mg/l) OK
Meter adj. to 21.0 °C Meter adj to 8.8 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)
Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter: Temp ☐☐☐ °C; DO ☐☐☐ mg/l; pH ☐☐☐☐ su

MS5 Monitor: Temp ______ °C **; DO ______ mg/l **; pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *
Data Download Location: ______ (Lab or Onsite) Time of Download: ☐☐☐☐ (24 hr) *
Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: Conductivity 500 µS/cm - OK 1412 µS/cm - OK

100% SAT method OK

DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 100% SAT

Cal Temp ______ (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 7.00 OK @ 4.01 ______ @ 10.00 10.00 OK (Record OK for buffer(s) used)

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter: Temp ☐☐☐ °C; DO ☐☐☐ mg/l; pH ☐☐☐☐ su

MS5 Monitor: Temp ______ °C **; DO ______ mg/l **; pH ______ su **

7 Air Temperature 10.0 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Lower River **Investigator:** SWA / KJT

DATE 0 4 1 3 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 4

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0845 (prevailing, 24 hr) *

CAL Temp 21.0 °C **CAL DO** 8.8 (mg/l)
Meter Temp 20.0 °C ok Meter DO 8.9 (mg/l) OK
Meter adj. to 21.0 °C Meter adj to 8.8 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)
Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter — Temp ☐☐☐ °C; DO ☐☐☐ mg/l; pH ☐☐☐☐ su
MS5 Monitor — Temp ______ °C **; DO ______ mg/l **; pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *
Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *
Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: conductivity - 500mS/ok 1412mS/cm - OK

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 100% SAT.

100% SAT METHOD **Cal Temp** ______ **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

OK **pH Calibration ***** @ 7.00 7.00 ok @ 4.01 ______ @ 10.00 10.00 (Record OK for buffer(s) used) OK

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter — Temp ☐☐☐ °C; DO ☐☐☐ mg/l; pH ☐☐☐☐ su
MS5 Monitor — Temp ______ °C **; DO ______ mg/l **; pH ______ su **

7 Air Temperature 10.0 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock, e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO. POND   Investigator: SWA/CAB

DATE 5 4 2 0 1 0 (m m d d y y)   PURPOSE 2   Weather Code 2

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8)   Flow from Holtwood Evident: YES or NO (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0830 (prevailing, 24 hr) *

CAL Temp 21.0 °C   CAL DO 8.9 (mg/l)
Meter Temp 20.5 °C   Meter DO 9.1 (mg/l)
Meter adj. to 21.0 °C   Meter adj to 8.9 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter: Temp ☐☐☐ °C; DO ☐☐☐ mg/l; pH ☐☐☐☐ su

MS5 Monitor: Temp ______ °C **; DO ______ mg/l **; pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite)   Time of Download: ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION:

CALIBRATED FOR MR RES. PROFILE ON 4-19-10

CALIBRATED 4-19-10 CALIBRATION GOOD FOR 1 MONTH BUT WILL DO WEEKLY

DO Calibration*** Method Used: 3   1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp ______ (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ______ @ 4.01 ______ @ 10.00 ______ (Record OK for buffer(s) used)

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter: Temp ☐☐☐ °C; DO ☐☐☐ mg/l; pH ☐☐☐☐ su

MS5 Monitor: Temp ______ °C **; DO ______ mg/l **; pH ______ su **

7 Air Temperature 15.5 °C   Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: NO DEAD FISH OBSERVED ON POND

* Use 24 hour clock, e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Conowingo Lower River Investigator: JCA

DATE 0 4 2 0 1 0 (m m d d y y)

PURPOSE 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

Weather Code 1

1=Clear 2=P. Cloudy 3=Overcast 4=Lt Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)

2 YSI DO METER CALIBRATION:

Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0830 (prevailing, 24 hr) *

CAL Temp 20.1 °C — CAL DO 7.10 (mg/l)

Meter Temp 20.1 °C — Meter DO 7.10 (mg/l)

Meter adj. to — °C — Meter adj to — (mg/l)

ph pen

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time 815 Meter reading @ 7.00 su 700 @ 4.01 su 4 or @ 10.00 su 1000

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter		MS5 Monitor	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ________ (Lab or Onsite) Time of Download: ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: _____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (____________)

5 MONITOR CALIBRATION:

DO Calibration*** Method Used: ☐ 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other ________

*

Cal Temp ________ (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 _____ @ 4.01 _____ @ 10.00 _____ (Record OK for buffer(s) used)

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter		MS5 Monitor	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

7 Air Temperature ______ °C

Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ____________________

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements.

*** May be done in Lab or Field just prior to deployment, experience to dictate location.

Normandeau Associates, Inc

* Sonde/Surveyor not working used ph pen, cond. pen turbidity meter
YSI BDX YSI Hand held

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator :** SWA/CAB

DATE 0 4 2 7 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 2

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

meter 10983

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0746 (prevailing, 24 hr) *

CAL Temp 21.0 °C **CAL DO** 8.9 (mg/l)
Meter Temp 22.2 °C OK Meter DO 8.5 (mg/l) OK
Meter adj. to 21.0 °C Meter adj to 8.9 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)
Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter		MS5 Monitor	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *
Data Download Location: ______ (Lab or Onsite) Time of Download: ☐☐☐☐ (24 hr) *
Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: CONDUCTIVITY - 714µS/cm - OK 1413µS/cm - OK

TURBIDITY CAL 1.0 - OK 20.0 - OK

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp ______ **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

TIME 0805 hr

pH Calibration *** @ 7.00 7.00 OK @ 4.01 ______ @ 10.00 10.00 OK (Record OK for buffer(s) used)

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter		MS5 Monitor	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

7 Air Temperature 17.5 **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong
Other Sampling Notes: ______

* Use 24 hour clock, e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Lower River Conowingo **Investigator:** JLA / KF

DATE 0 4 2 7 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 2

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)

meter 10984

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0755 (prevailing, 24 hr) *

CAL Temp	21.0 °C	CAL DO	8.9 (mg/l)
Meter Temp	20.8 °C O/C	Meter DO	8.0 (mg/l) O/C
Meter adj. to	21.0 °C	Meter adj to	8.9 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time 1 1 5 7 (prevailing, 24 hr) *

	DO / pH Meter Hand	MS5 Monitor Box
Temp	16.8 °C	16.8 °C **
DO	10.1 mg/l	10.1 mg/l **
pH	8.7 su	______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite) Time of Download: ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced, 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: conductivity - 714us/cm-OK 1413us/cm-OK

Turbidity cal 1.0 - OK 20.0 - OK

DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp ______ (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 7.00 OK @ 4.01 ______ @ 10.00 10.00 OK (Record OK for buffer(s) used)

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

	DO / pH Meter	MS5 Monitor
Temp	☐☐☐ °C	______ °C **
DO	☐☐☐ mg/l	______ mg/l **
pH	☐☐☐☐ su	______ su **

7 Air Temperature 21.1 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: 70°s

* Use 24 hour clock, e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONOWINGO POND **Investigator:** SWA/CAB

DATE 0 5 0 4 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0802 (prevailing, 24 hr) *

CAL Temp	26.0 °C	**CAL DO**	8.1 (mg/l)
Meter Temp	25.5 °C	Meter DO	8.2 (mg/l)
Meter adj. to	26.0 °C	Meter adj to	8.1 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter		**MS5 Monitor**	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: conductivity 74 µS/cm - OK 1413 µS/cm - OK

TURBIDITY
1 - OK
20 - OK

DO Calibration* ** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp ______ **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 7.0 OK @ 4.01 ______ @ 10.00 10.0 OK (Record OK for buffer(s) used)

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter		**MS5 Monitor**	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

7 Air Temperature 24.0 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Lower River Conowingo **Investigator:** JCA / KJT

DATE 05 09 10 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0815 (prevailing, 24 hr) *

Redline ok

CAL Temp	26.0 °C	**CAL DO**	7.6 (mg/l)
Meter Temp	25.5 °C	Meter DO	7.5 (mg/l) OK ✓
Meter adj. to	26.0 °C	Meter adj to	7.6 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ____ (prevailing, 24 hr) * Last

	DO / pH Meter		MS5 Monitor
Temp	18.1 °C	Temp	______ °C **
DO	10.5 mg/l	DO	______ mg/l **
pH	8.4 su	pH	______ su **

pH pen
conducting pen 718 test 720 in pen OK

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite) **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION:

Turbidity cal
1.0 - OK
20 0 - OK

DO Calibration* Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO-100% SAT

Cal Temp ______ **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ______ **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 700 ok @ 4.01 ______ @ 10.00 1000 ok (Record OK for buffer(s) used)

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ____ (prevailing, 24 hr) *

	DO / pH Meter		MS5 Monitor
Temp	____ °C	Temp	______ °C **
DO	____ mg/l	DO	______ mg/l **
pH	____ su	pH	______ su **

7 Air Temperature 21.9 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: Sunny

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: U River Cono Pond CP-6 Investigator : JCA / CAB

DATE 05/11/10 (mm dd yy) PURPOSE 2 Weather Code 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5=H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ____ (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 7:51 (prevailing, 24 hr) *
Meter #10983

CAL Temp	19 °C	CAL DO	9.26 (mg/l)
Meter Temp	19 °C	Meter DO	9.2 (mg/l)
Meter adj. to	N/A °C	Meter adj to	↑.06 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter		MS5 Monitor	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *
Data Download Location: ______ (Lab or Onsite) Time of Download: ____ (24 hr) *
Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION:

759.7 BP

DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LWO 100% SAT

Cal Temp 65.3F (°C) 18.5 >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ____ (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 OK @ 4.01 ____ @ 10.00 OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm OK @ 718µS/cm OK @ 1413µS/cm ____

Turbidity Calibration*** @ ~~0~~ .3 NTU OK @ 10 NTU ____ @ 20 NTU OK

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter		MS5 Monitor	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

7 Air Temperature 11 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: 51.8°C

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LOWER RIVER **Investigator :** SWA / KJT

DATE 0 5 1 1 1 0 (m m d d y y)

PURPOSE 2
1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

Weather Code 3
1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0755 (prevailing, 24 hr) *
10984

CAL Temp 19.0 °C
Meter Temp 18.8 °C
Meter adj. to 19.0 19.2 °C OK

CAL DO 9.26 (mg/l)
Meter DO 9.8 (mg/l)
Meter adj to 9.26 (mg/l) OK

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter
Temp ☐☐☐ °C
DO ☐☐☐ mg/l
pH ☐☐☐☐ su

MS5 Monitor
Temp ______ °C **
DO ______ mg/l **
pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP = 759.7

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 65.2°F **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 9.35 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 7.00 ok @ 4.01 ______ @ 10.00 10.00 ok (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm 74 OK @ 718µS/cm 718 OK @ 1413µS/cm ______

Turbidity Calibration*** @ 0 NTU 0.3 OK @ 10 NTU ______ @ 20 NTU 20. OK

~~Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr)~~ *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter
Temp ☐☐☐ °C
DO ☐☐☐ mg/l
pH ☐☐☐☐ su

MS5 Monitor
Temp ______ °C **
DO ______ mg/l **
pH ______ su **

7 Air Temperature 11 **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Cono Pond CP7 **Investigator :** JCA / CAB

DATE 0 5 1 2 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 3 + 4

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

meter # 10983

Time 0757 (prevailing, 24 hr) * **CAL Temp** 21.0 °C **CAL DO** 8.9 (mg/l)
Meter Temp 20.5 °C Meter DO 8.8 (mg/l)
Meter adj. to 21.0 °C ok Meter adj to 8.9 (mg/l) ok

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)
Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	**DO / pH Meter**	**MS5 Monitor**
1345 (prevailing, 24 hr) *	Temp 17.9 °C	Temp 18 °C **
	DO 10.9 mg/l	DO 10.9 mg/l **
	pH ______ su	pH 7.6 su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *
Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *
Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP 765

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 21.5 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.88 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 OK @ 4.01 ______ @ 10.00 OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm OK @ 718µS/cm OK @ 1413µS/cm ______

Turbidity Calibration*** @ 0 NTU ✓ .3 @ 10 NTU ______ @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	**DO / pH Meter**	**MS5 Monitor**
☐☐☐☐ (prevailing, 24 hr) *	Temp ______ °C	Temp ______ °C **
	DO ______ mg/l	DO ______ mg/l **
	pH ______ su	pH ______ su **

7 Air Temperature 14.5 **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: Rainy, Cloudy

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LOWER RIVER **Investigator :** SWA/KJT

DATE 0 5 1 7 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ____ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Meter 10984

Time 0759 (prevailing, 24 hr) *

CAL Temp 21.0 °C **CAL DO** 8.9 (mg/l)

Meter Temp 21.2 °C Meter DO 9.0 (mg/l)

Meter adj. to 21.0 °C OK Meter adj to 8.9 (mg/l) OK

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter: Temp ____ °C; DO ____ mg/l; pH ____ su

MS5 Monitor: Temp ____ °C **; DO ____ mg/l **; pH ____ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ____ **(Lab or Onsite)** **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (____)

5 MONITOR CALIBRATION:

BP=765

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 100% LDO SAT

Cal Temp 70.8 (21.5) **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.8.8 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 OK @ 4.01 ____ @ 10.00 OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 0 µS/cm OK @ 718µS/cm OK @ 1413µS/cm ____

Turbidity Calibration*** @ 0 NTU OK @ 10 NTU ____ @ 20 NTU OK

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter: Temp ____ °C; DO ____ mg/l; pH ____ su

MS5 Monitor: Temp ____ °C **; DO ____ mg/l **; pH ____ su **

7 Air Temperature 20.4 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ____

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CP-8 **Investigator :** JCA / check

DATE 052410 (m m d d y y) **PURPOSE** 1 **Weather Code** 1 → 1-4

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ____ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Meter # 10983

Time 0755 (prevailing, 24 hr) *

CAL Temp	24.0 °C	**CAL DO**	8.4 (mg/l)
Meter Temp	23.8 °C	Meter DO	8.2 (mg/l) OK
Meter adj. to	24.0 °C	Meter adj to	8.4 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ____ @ 4.01 su ____ or @ 10.00 su ____

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time 1515 (prevailing, 24 hr) *

DO / pH Meter		**MS5 Monitor**	
Temp	~~____~~ °C	Temp	~~____~~ °C **
DO	~~____~~ mg/l	DO	~~____~~ mg/l **
pH	~~____~~ su	pH	~~____~~ su **

Used YSI Box
temp-20.4
D.O.-9.6

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ____ **(Lab or Onsite)** **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (________)

5 MONITOR CALIBRATION:

DO Calibration* ** **Method Used:** 2 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 74.9 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 834 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ok ✓ @ 4.01 ____ @ 10.00 OK ✓ (Record OK for buffer(s) used)

Conductivity Calibration* ** @ ~~74~~ 0 µS/cm ✓ OK @ 718µS/cm ✓ ok @ 1413µS/cm ____

Turbidity Calibration* ** @ 0 NTU ok @ 10 NTU ____ @ 20 NTU OK

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter		**MS5 Monitor**	
Temp	____ °C	Temp	____ °C **
DO	____ mg/l	DO	____ mg/l **
pH	____ su	pH	____ su **

7 Air Temperature ____ **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ____

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

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ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LOWER RIVER **Investigator :** SWA / KJT

DATE 0 5 2 4 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1-4

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

meter #10984

Time 0800 (prevailing, 24 hr) *

CAL Temp	24.0 °C	**CAL DO**	8.4 (mg/l)
Meter Temp	23.2 °C ok	Meter DO	8.6 (mg/l) ok
Meter adj. to	24.0 °C	Meter adj to	8.4 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter		**MS5 Monitor**	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION:

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 100% LDO

Cal Temp 75.1 F (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.35 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ok @ 4.01 ______ @ 10.00 ✓ok (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 2µS/cm ✓ ok @ 718µS/cm ok ✓ @ 1413µS/cm ______

Turbidity Calibration*** @ 0 NTU ok ✓ @ 10 NTU ______ @ 20 NTU ok ✓

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter		**MS5 Monitor**	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

7 Air Temperature 20.4 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Cono Pond **Investigator:** CAB/SWA

DATE 0 6 0 1 1 0 (mm dd yy) **PURPOSE** 2 **Weather Code** 2

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ____ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Meter 10983

Time 0808 (prevailing, 24 hr) *	**CAL Temp** 26.0 °C	**CAL DO** 8.1 (mg/l)	
	Meter Temp 26.2 °C	Meter DO 8.0 (mg/l)	OK
	Meter adj. to 26.0 °C	Meter adj to 8.1 (mg/l)	

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ____ **(Lab or Onsite)** **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP= 744.9

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 75.8' **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO . 8 2 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓OK @ 4.01 / @ 10.00 ✓OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~074~~µS/cm / ✓OK @ 718µS/cm ✓OK @ 1413µS/cm /

Turbidity Calibration*** @ 0 NTU ✓OK @ 10 NTU ______ @ 20 NTU 0 ✓OK

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

7 Air Temperature ______ **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements

*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LOWER RIVER **Investigator :** JCA / KJT

DATE 0 6 0 1 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1 Slate lost cue

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Meter 10984

Time 0811 (prevailing, 24 hr) *	**CAL Temp** 26.0 °C	**CAL DO** 8.1 (mg/l)	
	Meter Temp 26.0 °C	Meter DO 8.0 (mg/l)	OK
	Meter adj. to OK °C	Meter adj to 8.1 (mg/l)	

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP=744.9

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 26.1 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

LDO
Cal DO 744.9 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

LDO mg/l 7.54

pH Calibration *** @ 7.00 ✓ OK @ ~~4.01~~ ______ @ 10.00 ✓ OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 0 µS/cm ✓ OK @ 718µS/cm ✓ OK @ 1413µS/cm ______

Turbidity Calibration*** @ ~~0~~ .3 NTU ✓ OK @ 10 NTU ______ @ 20 NTU ______

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

7 Air Temperature ~~70.5~~ 22.8 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: After heavy Rain previous Night

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Cono Pond **Investigator :** SWA/

DATE 0 6 0 8 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ____ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0746 (prevailing, 24 hr) * **CAL Temp** 24.0 °C **CAL DO** 8.4 (mg/l)

meter #10983 Meter Temp 24.0 °C Meter DO 8.3 (mg/l)

Meter adj. to OK °C Meter adj to 8.4 (mg/l) OK

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ______ (prevailing, 24 hr) *

DO / pH Meter: Temp ______ °C; DO ______ mg/l; pH ______ su

MS5 Monitor: Temp ______ °C **; DO ______ mg/l **; pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ______ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ______ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION:

BP=750.8

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 74.8 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.4 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 OK @ 4.01 ______ @ 10.00 OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm OK @ 718µS/cm OK @ 1413µS/cm ______

Turbidity Calibration*** @ 0 NTU OK @ 10 NTU ______ @ 20 NTU OK

Time that the monitor was redeployed in the Tailrace ______ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ______ (prevailing, 24 hr) *

DO / pH Meter: Temp ______ °C; DO ______ mg/l; pH ______ su

MS5 Monitor: Temp ______ °C **; DO ______ mg/l **; pH ______ su **

7 Air Temperature 19.9 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements

*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Lower River **Investigator :** JLA / CAB

DATE 0 6 0 8 1 0 (m m d d y y) **PURPOSE** - →2 3 5 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one) 2

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0807 (prevailing, 24 hr) * **CAL Temp** 23.5 °C **CAL DO** 8.4 (mg/l)

meter #10984 Meter Temp 23.5 °C Meter DO 8.5 (mg/l) OK

Meter adj. to OK °C Meter adj to 8.4 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ____ (prevailing, 24 hr) *

	DO / pH Meter	MS5 Monitor
Temp	9.0 °C	8.9 °C ** ✓
DO	27.0 mg/l	26.9 mg/l ** ✓
pH	____ su	7.1 su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP=750.8

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 25 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ____ **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ ok @ 4.01 ____ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm ✓ @ 718µS/cm ✓ @ 1413µS/cm ____

Turbidity Calibration*** @ 0 NTU ✓ @ 10 NTU ____ @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ____ (prevailing, 24 hr) *

	DO / pH Meter	MS5 Monitor
Temp	____ °C	____ °C **
DO	____ mg/l	____ mg/l **
pH	____ su	____ su **

7 Air Temperature 23.8 **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: Sonde still beeping after turned off

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator :** SWA / KJT

DATE 0 6 1 5 1 0
m m d d y y

PURPOSE 2
1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

Weather Code 2/3/4
1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ____ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0745 (prevailing, 24 hr) *
meter # 10983

CAL Temp	25.5 °C	**CAL DO**	8.15 (mg/l)
Meter Temp	25.5 °C OK	Meter DO	8.2 (mg/l) OK
Meter adj. to	OK °C	Meter adj to	8.15 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter		MS5 Monitor	
____ (prevailing, 24 hr) *	Temp	____ °C	Temp	____ °C **
	DO	____ mg/l	DO	____ mg/l **
	pH	____ su	pH	____ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ____ **(Lab or Onsite)** **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other ( )

5 MONITOR CALIBRATION: 0750 hr BP= 748.6

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 26.1 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.14 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 OK @ 4.01 ____ @ 10.00 OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~2~~0µS/cm OK @ 718µS/cm OK @ 1413µS/cm ____

Turbidity Calibration*** @ 0 NTU OK @ 10 NTU ____ @ 20 NTU OK

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter		MS5 Monitor	
____ (prevailing, 24 hr) *	Temp	____ °C	Temp	____ °C **
	DO	____ mg/l	DO	____ mg/l **
	pH	____ su	pH	____ su **

7 Air Temperature 24.0 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ____

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LR 6/15/10 **Investigator:** JCA / CAB

DATE 06 15 10 (mm dd yy) **PURPOSE** 2 **Weather Code** 2/3/4

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5=H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0749 (prevailing, 24 hr) *
Meter #10984

CAL Temp	25.5 °C	CAL DO	8.15 (mg/l)
Meter Temp	25.5 °C	Meter DO	8.3 (mg/l)
Meter adj. to	OK °C	Meter adj to	8.15 (mg/l) OK

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time 1340 (prevailing, 24 hr) *

	DO / pH Meter	MS5 Monitor
Temp	26.9 °C	26.7 °C **
DO	8.5 mg/l	8.1 mg/l **
pH	su	su **

END

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ______ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ______ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP = 748.6

DO Calibration* Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 26.1 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.14 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 ✓ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm ______ @ 718µS/cm ✓ @ 1413µS/cm ______

Turbidity Calibration*** @ 0 NTU OK @ 10 NTU ______ @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ______ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ______ (prevailing, 24 hr) *

	DO / pH Meter	MS5 Monitor
Temp	°C	°C **
DO	mg/l	mg/l **
pH	su	su **

7 Air Temperature 70's °C/ 23.3°F **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: Light Rain

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

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ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Cono Pond **Investigator:** SWA/KJT

DATE 0 6 2 2 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 2

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0748 (prevailing, 24 hr) * **CAL Temp** 26.0 °C **CAL DO** 8.1 (mg/l)

meter # 10983 Meter Temp 26.0 °C Meter DO 8.0 (mg/l) OK

Meter adj. to OK °C Meter adj to 8.1 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter: Temp ☐☐☐ °C; DO ☐☐☐ mg/l; pH ☐☐☐☐ su

MS5 Monitor: Temp ______ °C **; DO ______ mg/l **; pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: 0800 hr BP 751.75

DO Calibration* ** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 28.3 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.06 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 OK @ 4.01 ______ @ 10.00 OK (Record OK for buffer(s) used)

Conductivity Calibration* ** @ 74µS/cm OK @ 718µS/cm OK @ 1413µS/cm ______

Turbidity Calibration* ** @ 0 NTU OK @ 10 NTU ______ @ 20 NTU OK

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter: Temp ☐☐☐ °C; DO ☐☐☐ mg/l; pH ☐☐☐☐ su

MS5 Monitor: Temp ______ °C **; DO ______ mg/l **; pH ______ su **

7 Air Temperature ______ **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements.

*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LOWER RIVER 62210 **Investigator :** JCA / CAD

DATE 0 6 2 2 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ____ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0752 (prevailing, 24 hr) * **CAL Temp** 26.0 °C **CAL DO** 8.1 (mg/l)

meter #10984 Meter Temp 25.8 °C ok Meter DO 7.8 (mg/l) OK

Meter adj. to 26.0 °C Meter adj to 8.1 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter Temp ____ °C; DO ____ mg/l; pH ____ su

MS5 Monitor Temp ____ °C **; DO ____ mg/l **; pH ____ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (________)

5 MONITOR CALIBRATION:

BP = 751.75

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 27.0° (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ____ (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 OK ✓ @ 4.01 ____ @ 10.00 ✓OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 0 µS/cm OK ✓ @ 718µS/cm ✓OK @ 1413µS/cm ____

Turbidity Calibration*** @ 0 NTU ✓OK 0.3 @ 10 NTU ____ @ 20 NTU OK ✓

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter Temp ____ °C; DO ____ mg/l; pH ____ su

MS5 Monitor Temp 78.2 °C **; DO ____ mg/l **; pH ____ su **

7 Air Temperature ____ °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: Calibrated dosp in At DO

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONOWINGO POND **Investigator:** KJT, CMB

DATE 0 6 2 9 1 0 (m m d d y y) **PURPOSE** 1 CALIBRATE + COLLECT DATA **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

? No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

WAS STILL PRETTY GOOD FROM YESTERDAY

Time 0745 (prevailing, 24 hr) *	**CAL Temp** 25.5 °C	**CAL DO** 8.15 (mg/l)
	Meter Temp 25 °C	Meter DO 8.15 (mg/l)
	Meter adj. to 25.5 °C	Meter adj to N/A (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

N/A **Time** ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

1009.2 MB = 743.65 mm Hg

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite) Time of Download: ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP=743.65

DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 25.5 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.25 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 7.00 @ 4.01 N/A @ 10.00 10.00 (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm N/A @ 718µS/cm 718.0 @ 1413µS/cm N/A

Turbidity Calibration*** @ 0 NTU .03 NTU @ 10 NTU N/A @ 20 NTU 20 NTU

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

7 Air Temperature 32.0 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes:

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements.

*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LR 6/29/10 **Investigator :** JCx / COB

DATE 0 6 2 9 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ____ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time ______ (prevailing, 24 hr) *

CAL Temp 25.2 °C **CAL DO** 8.4 (mg/l)

Meter Temp 25.2 °C Meter DO 8.4 (mg/l)

Meter adj. to ~~Ø~~ °C Meter adj to ~~Ø~~ (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter		**MS5 Monitor**	
Temp	25.2 °C	Temp	______ °C **
DO	______ mg/l	DO	______ mg/l **
pH	______ su	pH	______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP = 743.65

DO Calibration* Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp ______ **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ____ **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 ______ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm ✓ @ 718µS/cm ✓ @ 1413µS/cm ______

Turbidity Calibration*** @ 0 NTU ✓ @ 10 NTU ______ @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter		**MS5 Monitor**	
Temp	______ °C	Temp	______ °C **
DO	______ mg/l	DO	______ mg/l **
pH	______ su	pH	______ su **

7 Air Temperature ______ **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements

*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Conowingo Pond **Investigator:** JCD MDM

DATE 0 7 0 7 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1 & 6

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 706 am (prevailing, 24 hr) *

CAL Temp	23.4 °C	CAL DO	8.56 (mg/l)
Meter Temp	23.6 °C	Meter DO	7.9 (mg/l) OK ✓
Meter adj. to	23.4 °C	Meter adj to	8.56 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ______ (prevailing, 24 hr) *

	DO / pH Meter	MS5 Monitor
Temp	°C	°C **
DO	mg/l	mg/l **
pH	su	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ______ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite) Time of Download: ______ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION:

BP 749.58

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 27.5°C (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8 1 5 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 ______ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm ✓ @ 718µS/cm ✓ @ 1413µS/cm ______

Turbidity Calibration*** @ 0 NTU ✓ @ 10 NTU ______ @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ______ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ______ (prevailing, 24 hr) *

	DO / pH Meter	MS5 Monitor
Temp	°C	°C **
DO	mg/l	mg/l **
pH	su	su **

7 Air Temperature 29.8 °C ?

Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LR - Below Conowingo Dam **Investigator :** SWA/KJT

DATE 0 7 0 7 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 1105 (prevailing, 24 hr) *

meter # 10983

CAL Temp	29.0 °C	**CAL DO**	7.67 (mg/l)
Meter Temp	29.5 °C	Meter DO	7.5 (mg/l) OK
Meter adj. to	29.0 °C	Meter adj to	7.67 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ____ **(Lab or Onsite)** **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (____)

5 MONITOR CALIBRATION: BP 749.58

cal. 0800 hr **DO Calibration*** ** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 24.7 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.26 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 ____ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration* ** @ 74μS/cm ✓ @ 718μS/cm ✓ @ 1413μS/cm ____

Turbidity Calibration* ** @ 0 NTU ✓ @ 10 NTU ____ @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

7 Air Temperature 37.5 **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements

*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator :** JCA / Chad

DATE 0 7 1 3 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1/2

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0754 (prevailing, 24 hr) *

meter #15436

CAL Temp 25.5 °C | CAL DO 8.15 (mg/l)
Meter Temp 25.8 °C OK | Meter DO 8.3 (mg/l) OK
Meter adj. to 25.5 °C | Meter adj to 8.15 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

	DO / pH Meter		MS5 Monitor	
Temp		°C		°C **
DO		mg/l		mg/l **
pH		su		su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite) Time of Download: ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION:

BP 746.3

DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 78.2 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.00 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 ______ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74μS/cm ✓ @ 718μS/cm ✓ @ 1413μS/cm ______

Turbidity Calibration*** @ 0 NTU ✓ @ 10 NTU ______ @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

	DO / pH Meter		MS5 Monitor	
Temp		°C		°C **
DO		mg/l		mg/l **
pH		su		su **

7 Air Temperature ______ °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: L.S.R. **Investigator:** SWA, KJT

DATE 0 7 1 3 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 4 +3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0920	CAL Temp 21.0 °C	CAL DO 8.9 (mg/l)
(prevailing, 24 hr) *	Meter Temp 21.2 °C OK	Meter DO 9.4 (mg/l) OK
meter #10983	Meter adj. to 21.0 °C	Meter adj to 8.9 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite) Time of Download: ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: @0820 hr BP 746.3

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other L.D.O. SAT

Cal Temp 78.1 (~~°C~~ F) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 7.98 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 7.0 @ 4.01 N/A @ 10.00 10.0 (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 84µS/cm N/A @ 718µS/cm 718 @ 1413µS/cm N/A

Turbidity Calibration*** @ 0 NTU .03 @ 10 NTU N/A @ 20 NTU 20.0

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

7 Air Temperature ______ °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator :** SWA / CAB

DATE 0 7 2 0 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0744 (prevailing, 24 hr) * **CAL Temp** 27.5 °C **CAL DO** 7.9 (mg/l)

meter # 10984 Meter Temp 27.2 °C ok Meter DO 8.1 (mg/l) OK

Meter adj. to 27.5 °C Meter adj to 7.9 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: 0750 hr BP 747.03

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 79.0°F **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 7.94 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓OK @ 4.01 ______ @ 10.00 ✓OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 0 µS/cm ✓OK @ 718µS/cm ✓OK @ 1413µS/cm ______

Turbidity Calibration*** @ 0 NTU ✓OK @ 10 NTU ______ @ 20 NTU ✓OK

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

7 Air Temperature ______ **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements.

*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONOWINGO - L.S.R. **Investigator:** JCA, KJT

DATE 07 20 10 (mmddyy) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated ~~(aerated)~~ water.

Time 0825 (prevailing, 24 hr) *

CAL Temp 27.0 °C **CAL DO** 7.9 **(mg/l)**
Meter Temp 27.0 °C Meter DO 8.1 (mg/l)
Meter adj. to N/A °C Meter adj to 7.9 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ____ @ 4.01 su ____ or @ 10.00 su ____

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *
Data Download Location: ____ **(Lab or Onsite)** **Time of Download:** ____ (24 hr) *
Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (________)

5 MONITOR CALIBRATION: BP 747.03

DO Calibration* Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 79.0°F 27.0 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 7.94 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 7.00 @ 4.01 ____ @ 10.00 10.00 (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm — @ 718µS/cm — @ 1413µS/cm —

Turbidity Calibration*** @ 0 NTU .03 @ 10 NTU ____ @ 20 NTU 20.0

Time that the monitor was redeployed in the Tailrace N/A (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

7 Air Temperature ____ **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ________

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator :** SWA/MDM

DATE 0 7 2 7 1 0 (m m d d y y)

PURPOSE 2

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

Weather Code 2

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0745 (prevailing, 24 hr) *

meter #10984

CAL Temp 25.0 °C — Meter Temp 25.5 °C OK — Meter adj. to 25.0 °C

CAL DO 8.24 (mg/l) — Meter DO 8.1 (mg/l) OK — Meter adj to 8.24 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite) Time of Download: ____ (24 hr) *

Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP 751.98

@ 0800 hr **DO Calibration***** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 77.7 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.09 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 OK ✓ @ 4.01 ____ @ 10.00 ✓ OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 0 µS/cm ✓ OK @ 718µS/cm ✓ OK @ 1413µS/cm ____

Turbidity Calibration*** @ 0 NTU ✓ OK @ 10 NTU ____ @ 20 NTU ✓ OK

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

7 Air Temperature 26.9 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements.

*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LR 7/27/10 **Investigator :** JCO / COB

DATE 0 7 2 7 1 0 (m m d d y y) **PURPOSE** 3 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast
4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time ______ (prevailing, 24 hr) *

CAL Temp 24.1 °C **CAL DO** 8.4 (mg/l)

Meter Temp 24.1 °C Meter DO 8.4 (mg/l)

Meter adj. to — °C Meter adj to — (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter: Temp ☐☐☐ °C; DO ☐☐☐ mg/l; pH ☐☐☐☐ su

MS5 Monitor: Temp ______ °C **; DO ______ mg/l **; pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION:

BP= 757.98

DO Calibration* Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 100% SAT

Cal Temp 76.0 (°F) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 7.8 0 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration * ** @ 7.00 ✓ @ 4.01 ______ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration* ** @ [illegible]µS/cm ______ @ 718µS/cm ✓ @ 1413µS/cm ✓

Turbidity Calibration* ** @ 0 NTU ✓ @ 10 NTU ______ @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter: Temp ☐☐☐ °C; DO ☐☐☐ mg/l; pH ☐☐☐☐ su

MS5 Monitor: Temp ______ °C **; DO ______ mg/l **; pH ______ su **

7 Air Temperature 85 ~~°C~~ F **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements.

*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator :** SC/AT/ACS

DATE 0 8 0 2 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0800 (prevailing, 24 hr) * **CAL Temp** 25.5 °C **CAL DO** 8.15 (mg/l)

meter # 10984 Meter Temp 25.8 °C Meter DO 8.25 (mg/l) OK

Meter adj. to 25.5 °C OK Meter adj to 8.15 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP 752.1

@ 0830 **DO Calibration***** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 78.5°F **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.02 **(mg/l)** >> DO value from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 ______ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 2µS/cm ✓ @ 718µS/cm ✓ @ 1413µS/cm ______

Turbidity Calibration*** @ 0 NTU ✓ @ 10 NTU ______ @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

7 Air Temperature 26.0 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LR 8/2/10 **Investigator :** JCA / EK

DATE 0 8 0 2 1 0 (m m d d y y) **PURPOSE** 1 2 **Weather Code** 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast
4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0850 (prevailing, 24 hr) *		**CAL Temp**	26 °C	**CAL DO**	8.06 (mg/l)
meter # 15436		Meter Temp	26 °C	Meter DO	5.4 (mg/l)
		Meter adj. to	— °C	Meter adj to	8.06 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: @0800 BP 752.1

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 78.5F **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 ______ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74μS/cm ✓ @ 718μS/cm ______ @ 1413μS/cm ______

Turbidity Calibration*** @ 0 NTU ✓ @ 10 NTU ______ @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

7 Air Temperature ______ **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements.

*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Cono Pond **Investigator :** SWA/MDM

DATE 0 8 1 0 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0740 (prevailing, 24 hr) * **CAL Temp** 25.8 °C **CAL DO** 8.1 (mg/l)

meter #10584 Meter Temp 25.2 °C OK Meter DO 7.5 (mg/l) OK

Meter adj. to 25.8 °C Meter adj to 8.1 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP 746.9

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 28.8 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 7.91 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ______ @ 4.01 ______ @ 10.00 ______ (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm ✓OK @ 718µS/cm ✓OK @ 1413µS/cm ______

Turbidity Calibration*** @ 0 NTU ✓OK @ 10 NTU ______ @ 20 NTU ✓OK

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

7 Air Temperature ______ **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: L.S.R. Below Cono Dam **Investigator:** KJT, JCA

DATE 0 8 1 0 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES or NO** (circle one) — NO

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time	0821	**CAL Temp**	25.5 °C	**CAL DO**	8.1 (mg/l)
(prevailing, 24 hr) *		Meter Temp	25.8 °C	Meter DO	8.6 (mg/l)
		Meter adj. to	25.5 °C	Meter adj to	8.1 (mg/l)

N/A

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

N/A

Time	DO / pH Meter		MS5 Monitor	
☐☐☐☐ (prevailing, 24 hr) *	Temp	°C	Temp	°C **
	DO	mg/l	DO	mg/l **
	pH	su	pH	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

N/A

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP=746.9

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 25.5 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8 0 0 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 7.00 @ 4.01 N/A @ 10.00 10.0 (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm N/A @ 718µS/cm 718 @ 1413µS/cm N/A

Turbidity Calibration*** @ 0 NTU 0.00 @ 10 NTU 10.0 @ 20 NTU N/A

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

N/A

Time	DO / pH Meter		MS5 Monitor	
☐☐☐☐ (prevailing, 24 hr) *	Temp	°C	Temp	°C **
	DO	mg/l	DO	mg/l **
	pH	su	pH	su **

7 Air Temperature ______ **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

N/A

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator :** SWA / ACS

DATE 0 8 1 6 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ____ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0735 (prevailing, 24 hr) * **CAL Temp** 25.5 °C **CAL DO** 8.15 (mg/l)

Meter Temp 25.0 °C Meter DO 8.20 (mg/l)

Meter # 15436 Meter adj. to 25.5 °C Meter adj to 8.15 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter Temp ____ °C; DO ____ mg/l; pH ____ su

MS5 Monitor Temp ____ °C **; DO ____ mg/l **; pH ____ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite) **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP 747.4

DO Calibration* Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 78.9°F (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.02 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration * ** @ 7.00 ✓OK @ 4.01 ____ @ 10.00 ✓OK (Record OK for buffer(s) used)

Conductivity Calibration* ** @ ~~74~~ 0 µS/cm ✓OK @ 718µS/cm ✓OK @ 1413µS/cm ____

Turbidity Calibration* ** @ 0 NTU ✓OK @ 10 NTU ✓OK @ 20 NTU ____

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ____ (prevailing, 24 hr) *

DO / pH Meter Temp ____ °C; DO ____ mg/l; pH ____ su

MS5 Monitor Temp ____ °C **; DO ____ mg/l **; pH ____ su **

7 Air Temperature ____ °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements.

*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: L.S.R. BELOW CONO **Investigator:** KJT, MDM

DATE 0 8 1 6 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time	1029	**CAL Temp**	24.0 °C	**CAL DO**	8.4 (mg/l)
(prevailing, 24 hr) *		Meter Temp	24.2 °C	Meter DO	8.6 (mg/l)
		Meter adj. to	24.0 °C	Meter adj to	8.4 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

N/A

Time	DO / pH Meter		MS5 Monitor	
☐☐☐☐ (prevailing, 24 hr) *	Temp	°C	Temp	°C **
	DO	mg/l	DO	mg/l **
	pH	su	pH	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

N/A

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION:

BP=747.4

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 25.6 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 7 9 6 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 6.97→7.00 @ 4.01 N/A @ 10.00 10.03→10 (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 0 µS/cm N/A @ 718µS/cm 708→718 @ 1413µS/cm N/A

Turbidity Calibration*** @ 0 NTU 0.0 @ 10 NTU 8.2→10.0 @ 20 NTU N/A

Time that the monitor was redeployed in the Tailrace N A (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

N/A

Time	DO / pH Meter		MS5 Monitor	
☐☐☐☐ (prevailing, 24 hr) *	Temp	°C	Temp	°C **
	DO	mg/l	DO	mg/l **
	pH	su	pH	su **

7 Air Temperature 28.4 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: OUTSIDE

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator :** SWA/ACS

DATE 0 8 2 4 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0630 (prevailing, 24 hr) * — CAL Temp 26.5 °C — CAL DO 8.0 (mg/l)

Meter Temp 26.5 °C — Meter DO 7.9 (mg/l) OK

meter # 15436 — Meter adj. to OK °C — Meter adj to 8.0 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter		MS5 Monitor	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite) Time of Download: ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP 748.6

DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 79.9 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 7.91 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓OK @ 4.01 ______ @ 10.00 ✓OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 0 µS/cm ✓OK @ 718µS/cm ✓OK @ 1413µS/cm ______

Turbidity Calibration*** @ 0 NTU ✓OK @ 10 NTU ______ @ 20 NTU ✓OK

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time ☐☐☐☐ (prevailing, 24 hr) *

DO / pH Meter		MS5 Monitor	
Temp	°C	Temp	°C **
DO	mg/l	DO	mg/l **
pH	su	pH	su **

7 Air Temperature ______ °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Lower River **Investigator :** KJT/GAB

DATE 0 8 2 4 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

✓

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

✓

Time	0820 (prevailing, 24 hr) *	CAL Temp	26.8 °C	CAL DO	7.95 (mg/l)
		Meter Temp	26.8 °C	Meter DO	7.9 (mg/l)
		Meter adj. to	N/A °C	Meter adj to	N/A (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

✓

Time	DO / pH Meter		MS5 Monitor	
☐☐☐☐ (prevailing, 24 hr) *	Temp	°C	Temp	°C **
	DO	mg/l	DO	mg/l **
	pH	su	pH	su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

✓

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP=748.6

✓

DO Calibration*** 26.4 **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp ~~99.9~~ (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 7.96 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ok @ 4.01 ______ @ 10.00 OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ 74µS/cm ______ @ 718µS/cm OK @ 1413µS/cm ______ OAS OK

Turbidity Calibration*** @ 0 NTU OK (.03) @ 10 NTU ______ @ 20 NTU OK

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

✓

Time	DO / pH Meter		MS5 Monitor	
☐☐☐☐ (prevailing, 24 hr) *	Temp	°C	Temp	°C **
	DO	mg/l	DO	mg/l **
	pH	su	pH	su **

7 Air Temperature ______ **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator:** SWA/MDM

DATE 0 8 3 1 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0750 (prevailing, 24 hr) * **CAL Temp** 25.5 °C **CAL DO** 8.1 (mg/l)

meter #15436 Meter Temp 26.0 °C OK Meter DO 8.0 (mg/l) OK

Meter adj. to 25.5 °C Meter adj to 8.1 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ___ °C	Temp ___ °C **
	DO ___ mg/l	DO ___ mg/l **
	pH ___ su	pH ___ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite) **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP 754.23

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 19.2 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 7.97 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 ____ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 0 µS/cm ✓ @ 718µS/cm ✓ @ 1413µS/cm ____

Turbidity Calibration*** @ 0 NTU ✓ @ 10 NTU ____ @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ___ °C	Temp ___ °C **
	DO ___ mg/l	DO ___ mg/l **
	pH ___ su	pH ___ su **

7 Air Temperature ____ °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LOWER RIVER **Investigator :** ACS / KJT

DATE 0 8 3 1 1 1 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0830 (prevailing, 24 hr) * meter # 10984

CAL Temp 26.0 °C **CAL DO** 8.0 **(mg/l)**
Meter Temp 25.9 °C Meter DO 8.1 (mg/l)
Meter adj. to 26.0 °C Meter adj to 8.0 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *
Data Download Location: ______ **(Lab or Onsite)** **Time of Download:** ☐☐☐☐ (24 hr) *
Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: BP 754.23

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 78.6 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8 0 4 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓OK. @ 4.01 N/A @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~74~~ 0 µS/cm ✓OK @ 718µS/cm ✓OK @ 1413µS/cm N/A

Turbidity Calibration*** @ 0 NTU ✓OK @ 10 NTU N/A @ 20 NTU ✓OK

Time that the monitor was redeployed in the Tailrace NA ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

7 Air Temperature ______ **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Cono Bnd **Investigator:** ACS, MDM

DATE 0 9 0 7 1 0
m m d d y y

PURPOSE 1
1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

Weather Code 1
1=Clear 2=P. Cloudy 3=Overcast
4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0800 (prevailing, 24 hr) * **CAL Temp** 25.0 °C **CAL DO** 8.24 **(mg/l)**
Meter Temp 24.0 °C Meter DO 8.0 (mg/l)
Meter # 15436 Meter adj. to 8.24 °C Meter adj to 8.24 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)
Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION: **Barometric pressure =** 753.25

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT
4 = Other ______

Cal Temp 26.9 **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 7 5 4 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 ______ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm ✓ @ 718 µS/cm ✓ @ 1413 µS/cm ______

Turbidity Calibration*** @ <1 NTU ✓ @ 10 NTU ______ @ 20 NTU ✓

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

6 Air Temperature 27.2 **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: L.S.R. H_2O QUAL **Investigator:** KJT, CAB

DATE 0 9 0 7 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

? No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0820 (prevailing, 24 hr) * **CAL Temp** 25.0 °C **CAL DO** 8.2 (mg/l)

Meter Temp 25.0 °C Meter DO 8.0 (mg/l)

Meter # 57 Meter adj. to N/A °C Meter adj to 8.2 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION:

Barometric pressure = 753.25

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp 76.6 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.01 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 O.K. @ 4.01 N/A @ 10.00 O.K. (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm O.K. @ 718 µS/cm O.K. @ 1413 µS/cm N/A

Turbidity Calibration*** @ <1 NTU O.K. @ 10 NTU N/A @ 20 NTU O.K.

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

N/A

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

N/A

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

6 Air Temperature ______ °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Conowingo Pond **Investigator :** CAB, ACS

DATE 0 9 1 4 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 2

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0810 (prevailing, 24 hr) * **CAL Temp** 24.2 °C **CAL DO** 8.4 (mg/l)

Meter Temp 24.5 °C Meter DO 8.2 (mg/l)

Meter # 1 Meter adj. to 24.2 °C Meter adj to 8.4 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION: **Barometric pressure =** 746.425

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp 77 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8 1 8 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ok @ 4.01 OK @ 10.00 ______ (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm OK @ 718 µS/cm OK @ 1413 µS/cm ______

Turbidity Calibration*** @ <1 NTU OK @ 10 NTU ______ @ 20 NTU OK

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

6 Air Temperature 25.0 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

MUDDY RUN STATION
DS5X LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: MRPSP STA004-Cylinder or STA005-TR Deck **Investigator :** KJT, MDM

DATE 0 9 1 4 1 0
m m d d y y

PURPOSE 1
1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)
4 = Download only (complete sections 1,2,3,4,& 7)

Weather Code 1
1=Clear 2=P. Cloudy 3=Overcast
4=Lt.Rain 5= H. Rain 6=Fog/Haze

✓ **1 PROJECT FLOW / RELEASE CONDITIONS:** **Reservoir Elevation** ——

No. of MR Units Operating 0 (0 to 8)
Flow from Holtwood Evident: YES or NO (circle one)

✓ **2 YSI DO METER CALIBRATION:** Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0820 (prevailing, 24 hr) *
CAL Temp 24.2 °C CAL DO 8.35 (mg/l)
Meter Temp 24.5 °C Meter DO 8.5 (mg/l)
Meter # 57
Meter adj. to 24.2 °C Meter adj to 8.4 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)
Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

N/A

Time	DO / pH Meter	DS5X Monitor	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **	Temp ______ °C
	DO ☐☐☐ mg/l	DO ______ mg/l **	DO ______ mg/l
	pH ☐☐☐☐ su	pH ______ su **	pH ______ su
		Cond ______ µS/cm**	Cond ______ µS/cm

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

N/A

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *
Data Download Location: ______ (Lab or Onsite) Time of Download: ☐☐☐☐ (24 hr) *
Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: Barometric pressure = 746.4

DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT; 4 = Other ______

Cal Temp 24.4 (°C) >> °C from hand thermometer, YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.01 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 OK @ 4.01 N/A @ 10.00 OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm OK @ 718 µS/cm OK @ 1413 µS/cm N/A

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) * TURBIDITY ✓ O.K.

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

N/A

Time	DO / pH Meter	DS5X Monitor	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **	Temp ______ °C
	DO ☐☐☐ mg/l	DO ______ mg/l **	DO ______ mg/l
	pH ☐☐☐☐ su	pH ______ su **	pH ______ su
		Cond ______ µS/cm**	Cond ______ µS/cm

7 Air Temperature 20.3 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong
Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator :** SWA/

DATE 0 9 2 0 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0740 (prevailing, 24 hr) * CAL Temp 25.0 °C CAL DO 8.24 (mg/l)

Meter Temp 25.0 °C Meter DO 8.3 (mg/l) OK

Meter # ______ Meter adj. to OK °C Meter adj to 8.24 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION:

Barometric pressure = 749.88

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp 76.0°F **(°C)** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8 2 2 **(mg/l)** >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓OK @ 4.01 ______ @ 10.00 ✓OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm ✓OK @ 718 µS/cm ✓OK @ 1413 µS/cm N/A

Turbidity Calibration*** @ <1 NTU ✓OK @ 10 NTU N/A @ 20 NTU ✓OK

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

6 Air Temperature 20.0 °C

Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: L River WQ **Investigator:** KJT / JCA

DATE 0 9 2 0 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0820 (prevailing, 24 hr) *

CAL Temp	24.9 °C	**CAL DO**	8.4 (mg/l)
Meter Temp	24.6 °C	Meter DO	8.6 (mg/l)
Meter adj. to	24.9 °C	Meter adj to	8.4 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

N/A **Time** ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
Redline adjusted up	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ____ (prevailing, 24 hr) *

Data Download Location: ____ (Lab or Onsite) **Time of Download:** ____ (24 hr) *

Applicable Maintenance Performed: ____ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (____)

5 MONITOR CALIBRATION: BP 749.88

DO Calibration* Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SAT

Cal Temp 76.2/24.5 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.2 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 N/A @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ ~~24~~ 0 µS/cm N/A @ 718µS/cm ✓ @ 1413µS/cm N/A

Turbidity Calibration*** @ 0 NTU ✓ @ 10 NTU N/A @ 20 NTU ✓

Time that the monitor was redeployed in the Tailrace ____ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

7 Air Temperature 20.0 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator:** SWA/ACS

DATE 0 9 2 8 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 3 4+5

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0750 (prevailing, 24 hr) * **CAL Temp** 24.5 °C **CAL DO** 8.3 (mg/l)

Meter Temp 24.5 °C Meter DO 8.4 (mg/l) OK

Meter # 10983 Meter adj. to OK °C Meter adj to 8.3 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION: **Barometric pressure =** 739.9

DO Calibration* Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp 26.0 OK (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.10 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓OK @ 4.01 ______ @ 10.00 ✓OK (Record OK for buffer(s) used)

Conductivity Calibration* ** @ 0 µS/cm ✓OK @ 718 µS/cm ✓OK @ 1413 µS/cm ______

Turbidity Calibration* ** @ <1 NTU ✓OK @ 10 NTU ______ @ 20 NTU ✓OK

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter		MS5 Monitor	
____ (prevailing, 24 hr) *	Temp	___ °C	Temp	___ °C **
	DO	___ mg/l	DO	___ mg/l **
	pH	___ su	pH	___ su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter		MS5 Monitor	
____ (prevailing, 24 hr) *	Temp	___ °C	Temp	___ °C **
	DO	___ mg/l	DO	___ mg/l **
	pH	___ su	pH	___ su **

6 Air Temperature 22.8 **°C** **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Lower River **Investigator :** JCA, CAB

DATE 0 9 2 8 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0845 (prevailing, 24 hr) * **CAL Temp** 24.0 °C **CAL DO** 8.40 (mg/l)

Meter Temp 24.0 °C Meter DO 8.50 (mg/l)

Meter # 1 Meter adj. to — °C Meter adj to 8.40 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION: **Barometric pressure =** 739.9

DO Calibration* ** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp 24.9 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8.18 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 X @ 4.01 ____ @ 10.00 X (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm X @ 718 µS/cm X @ 1413 µS/cm ____

Turbidity Calibration*** @ <1 NTU X @ 10 NTU ____ @ 20 NTU X

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter		MS5 Monitor	
☐☐☐☐ (prevailing, 24 hr) *	Temp	°C	Temp ____	°C **
	DO	mg/l	DO ____	mg/l **
	pH	su	pH ____	su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter		MS5 Monitor	
☐☐☐☐ (prevailing, 24 hr) *	Temp	°C	Temp ____	°C **
	DO	mg/l	DO ____	mg/l **
	pH	su	pH ____	su **

6 Air Temperature ____ °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes:

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Cono Pond **Investigator :** SWA/ACS

DATE 1 0 0 5 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 3/4

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time (prevailing, 24 hr) *	0750	CAL Temp	20.0 °C	CAL DO	9.07 (mg/l)
		Meter Temp	20.0 °C	Meter DO	9.0 (mg/l) OK
Meter #	10983	Meter adj. to	OK °C	Meter adj to	9.07 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION:

Barometric pressure = 749.95

DO Calibration* Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp 20.0 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 9.1 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration * ** @ 7.00 √ok @ 4.01 ______ @ 10.00 √ok (Record OK for buffer(s) used)

Conductivity Calibration* ** @ 0 µS/cm √ok @ 718 µS/cm √ok @ 1413 µS/cm ______

Turbidity Calibration* ** @ <1 NTU √ok @ 10 NTU ______ @ 20 NTU √ok

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter		MS5 Monitor	
____ (prevailing, 24 hr) *	Temp	°C	Temp	°C **
	DO	mg/l	DO	mg/l **
	pH	su	pH	su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter		MS5 Monitor	
____ (prevailing, 24 hr) *	Temp	°C	Temp	°C **
	DO	mg/l	DO	mg/l **
	pH	su	pH	su **

6 Air Temperature 17.0 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: LR 10/5/10 **Investigator :** JCo / EK

DATE 1 0 0 5 1 0 (mmddyy) **PURPOSE** 2 **Weather Code** 3/4

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time	8:30	**CAL Temp**	20° °C	**CAL DO**	9.07 (mg/l)
(prevailing, 24 hr) *		Meter Temp	20° °C	Meter DO	9.0 (mg/l)
Meter #	#1	Meter adj. to	— °C	Meter adj to	9.07 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION: **Barometric pressure =** 749.55

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp ______ (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 X @ 4.01 ______ @ 10.00 X (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm X @ 718 µS/cm X @ 1413 µS/cm ______

Turbidity Calibration*** @ <1 NTU X @ 10 NTU ______ @ 20 NTU X

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

6 Air Temperature ______ °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: Light Rain, misty

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONO POND **Investigator :** SWA/RDK

DATE 1 0 1 1 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 1

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0730 (prevailing, 24 hr) * **CAL Temp** 23.0 °C **CAL DO** 8.56 (mg/l)
Meter Temp 23.2 °C OK Meter DO 8.3 (mg/l) OK
Meter # 10983 Meter adj. to 23.0 °C Meter adj to 8.56 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION: #2 **Barometric pressure =** 744.2

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp 72.2°F (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8 5 0 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓OK @ 4.01 ______ @ 10.00 ✓OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm ✓OK @ 718 µS/cm ✓OK @ 1413 µS/cm ______

Turbidity Calibration*** @ <1 NTU ✓OK @ 10 NTU ______ @ 20 NTU ✓OK

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

6 Air Temperature ______ °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

MUDDY RUN STATION
~~DS5X~~ MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: MRPSP STA004-Cylinder or STA005-TR Deck **Investigator :** JCa / EK

DATE 1 0 1 1 1 0 (m m d d y y)

PURPOSE 2
1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)
4 = Download only (complete sections 1,2,3,4,& 7)

Weather Code 1
1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS: **Reservoir Elevation** ______

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time ______ (prevailing, 24 hr) *	CAL Temp 23 °C	CAL DO 8.56 (mg/l)
	Meter Temp 23 °C	Meter DO 8.56 (mg/l)
Meter # ______	Meter adj. to — °C	Meter adj to — (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	DS5X Monitor	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **	Temp ______ °C
	DO ☐☐☐ mg/l	DO ______ mg/l **	DO ______ mg/l
	pH ☐☐☐☐ su	pH ______ su **	pH ______ su
		Cond ______ µS/cm**	Cond ______ µS/cm

4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:

Time retrieved (taken out of service) ☐☐☐☐ (prevailing, 24 hr) *

Data Download Location: ______ (Lab or Onsite) Time of Download: ☐☐☐☐ (24 hr) *

Applicable Maintenance Performed: ______ 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced; 4 = Batteries replaced; 5 = Other (______)

5 MONITOR CALIBRATION: Barometric pressure = 744.2

DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp 23 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO ☐☐☐ (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 ______ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm ✓ @ 718 µS/cm ✓ @ 1413 µS/cm ______

Turbidity <1 - OK
20.6 - OK

Time that the monitor was redeployed in the Tailrace ☐☐☐☐ (prevailing, 24 hr) *

6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	DS5X Monitor	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **	Temp ______ °C
	DO ☐☐☐ mg/l	DO ______ mg/l **	DO ______ mg/l
	pH ☐☐☐☐ su	pH ______ su **	pH ______ su
		Cond ______ µS/cm**	Cond ______ µS/cm

7 Air Temperature ______ °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr

** Record values later from downloaded data at the corresponding time of portable meter measurements.

*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: CONOWINGO POND **Investigator :** SWA/LNT

DATE 1 0 1 9 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 4

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ___ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0745 (prevailing, 24 hr) * **CAL Temp** 20.5 °C **CAL DO** 9.0 (mg/l)

Meter Temp 20.5 °C Meter DO 8.5 (mg/l)

Meter # 10983 Meter adj. to OK °C Meter adj to 9.0 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION: **Barometric pressure =** 746.95

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp 18.6 ______ (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8 9 0 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓OK @ 4.01 ______ @ 10.00 ✓OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm ✓OK @ 718 µS/cm ✓OK @ 1413 µS/cm ______

Turbidity Calibration*** @ <1 NTU ✓OK @ 10 NTU ______ @ 20 NTU ✓OK

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
____ (prevailing, 24 hr) *	Temp ____ °C	Temp ____ °C **
	DO ____ mg/l	DO ____ mg/l **
	pH ____ su	pH ____ su **

6 Air Temperature ______ °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Lower River **Investigator :** EK, ACS

DATE 1 0 1 9 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** ☐

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: **YES** or **NO** (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0831 (prevailing, 24 hr) * **CAL Temp** 20.5 °C **CAL DO** 8.9 (mg/l)

Meter Temp 20.5 °C Meter DO 8.6 (mg/l)

Meter # 57 Meter adj. to ____ °C Meter adj to 8.9 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION: 0825 hr **Barometric pressure =** 746.95

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp 68.1 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8 9 2 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 √OK @ 4.01 ______ @ 10.00 √OK (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm √OK @ 718 µS/cm √OK @ 1413 µS/cm ______

Turbidity Calibration*** @ <1 NTU √OK @ 10 NTU ______ @ 20 NTU √OK

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

6 Air Temperature ______ °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: Conowingo Pond **Investigator :** ACS AMH

DATE 1 0 2 6 1 0 (m m d d y y) **PURPOSE** 3 **Weather Code** 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0815 (prevailing, 24 hr) * CAL Temp 22.0 °C CAL DO 8.72 (mg/l)
Meter Temp 22.0 °C Meter DO 8.50 (mg/l)
Meter # 57 Meter adj. to 22.0 °C Meter adj to 8.72 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION: Barometric pressure = 745.375

DO Calibration* Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp ______ (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 1 0 0 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 ✓ @ 4.01 ______ @ 10.00 ✓ (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm ✓ @ 718 µS/cm ✓ @ 1413 µS/cm ______

Turbidity Calibration*** @ <1 NTU ✓ @ 10 NTU ______ @ 20 NTU ✓

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

Time	DO / pH Meter	MS5 Monitor
0 9 1 5 (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

Time	DO / pH Meter	MS5 Monitor
☐☐☐☐ (prevailing, 24 hr) *	Temp ☐☐☐ °C	Temp ______ °C **
	DO ☐☐☐ mg/l	DO ______ mg/l **
	pH ☐☐☐☐ su	pH ______ su **

6 Air Temperature 17.4 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: ______

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

ENCLOSURE 1

CONOWINGO & MUDDY RUN STATIONS
MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET

LOCATION: L.S.R. BELOW CONOWINGO **Investigator :** KJT, MDM

DATE 1 0 2 6 1 0 (m m d d y y) **PURPOSE** 2 **Weather Code** 3

1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)
2 = Performance check (complete Sections 1, 2, 3 & 7)
3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)

1=Clear 2=P. Cloudy 3=Overcast 4=Lt.Rain 5= H. Rain 6=Fog/Haze

1 PROJECT FLOW / RELEASE CONDITIONS:

No. of MR Units Operating ☐ (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)

2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.

Time 0835 (prevailing, 24 hr) * **CAL Temp** 22.0 °C **CAL DO** 8.7 (mg/l)

Meter Temp 21.8 °C Meter DO 10.4 (mg/l)

Meter # 10984 Meter adj. to 22.0 °C Meter adj to 8.7 (mg/l)

pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)

Time ______ Meter reading @ 7.00 su ______ @ 4.01 su ______ or @ 10.00 su ______

3 MONITOR CALIBRATION: **Barometric pressure =** 745.3

DO Calibration*** **Method Used:** 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other ______

Cal Temp 22.8 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2

Cal DO 8 4 0 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2

pH Calibration *** @ 7.00 O.K.! @ 4.01 N/A @ 10.00 O.K.! (Record OK for buffer(s) used)

Conductivity Calibration*** @ 0 µS/cm O.K.! @ 718 µS/cm O.K.✓ @ 1413 µS/cm N/A

Turbidity Calibration*** @ <1 NTU O.K.! @ 10 NTU N/A @ 20 NTU O.K.✓

4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):

N/A

Time	DO / pH Meter		MS5 Monitor	
☐☐☐☐ (prevailing, 24 hr) *	Temp	°C	Temp ______	°C **
	DO	mg/l	DO ______	mg/l **
	pH	su	pH ______	su **

5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):

N/A

Time	DO / pH Meter		MS5 Monitor	
☐☐☐☐ (prevailing, 24 hr) *	Temp	°C	Temp ______	°C **
	DO	mg/l	DO ______	mg/l **
	pH	su	pH ______	su **

6 Air Temperature 17.2 °C **Wind Conditions** (Circle one): Calm Light Moderate Gusty Strong

Other Sampling Notes: LITTLE UNSURE OF D.O. ON YSI. MAY NEED TO CHANGE MEMBRANE.

* Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
** Record values later from downloaded data at the corresponding time of portable meter measurements.
*** May be done in Lab or Field just prior to deployment, experience to dictate location.

APPENDIX B-1: LISTING OF HOURLY OPERATING TURBINE BOIL MEASUREMENTS.

Appendix B

Boil Measurements

Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	7/2/10	NW	3	2	2	6	4	1	8.5	25.5	29.5
21342031	9	7/2/10	NW	3	2	5	6	9	1	8.6	25.5	29.5
21342031	9	7/2/10	NW	3	2	2	6	57	1	8.6	25.5	29.5
21342031	9	7/2/10	NW	3	2	5	7	2	1	8.7	25.5	29.5
21342031	9	7/2/10	NW	3	2	2	7	59	1	9.0	25.5	30.0
21342031	9	7/2/10	NW	3	2	5	8	3	1	8.7	25.5	29.5
21342031	9	7/2/10	NW	3	2	2	9	2	1	8.1	25.5	29.0
21342031	9	7/2/10	NW	3	2	5	9	6	1	8.2	25.5	29.5
21342031	9	7/2/10	NW	3	2	2	10	3	1	8.6	25.5	29.5
21342031	9	7/2/10	NW	3	2	5	10	8	1	8.4	25.5	29.5
21342031	9	7/2/10	NW	3	2	2	10	55	1	8.1	25.5	29.5
21342031	9	7/2/10	NW	3	2	5	10	58	1	8.4	25.5	29.5
21342031	9	7/2/10	NW	3	2	2	11	58	1	8.5	25.5	29.5
21342031	9	7/2/10	NW	3	2	5	12	2	1	8.4	25.5	29.5
21342031	9	7/2/10	NW	3	2	2	12	56	1	9.0	25.5	29.5
21342031	9	7/2/10	NW	3	2	5	13	1	1	8.4	25.5	29.0
21342031	9	7/2/10	NW	3	2	2	14	0	1	8.4	25.5	29.5
21342031	9	7/2/10	NW	3	2	5	14	4	1	8.2	25.5	29.5
21342031	9	7/2/10	NW	3	2	2	14	57	1	8.3	25.5	29.0
21342031	9	7/2/10	NW	3	2	5	15	0	1	8.2	25.5	29.0
21342031	9	7/2/10	NW	3	2	2	15	57	1	8.2	25.5	28.5
21342031	9	7/2/10	NW	3	2	5	16	2	1	8.0	25.5	28.3
21342031	9	7/2/10	NW	3	2	2	16	57	1	8.2	25.5	29.0
21342031	9	7/2/10	NW	3	2	5	17	3	1	8.4	25.5	29.0
21342031	9	7/2/10	NW	3	2	2	17	47	1	8.4	25.5	29.0
21342031	9	7/2/10	NW	3	2	5	17	53	1	8.2	25.5	29.0
21342031	9	7/3/10	NE	1	1	2	6	2	1	8.7	13.8	28.9
21342031	9	7/3/10	NE	1	1	5	6	5	1	8.3	13.8	28.9
21342031	9	7/3/10	NE	1	1	2	7	0	1	8.6	13.8	28.9
21342031	9	7/3/10	NE	1	1	5	7	3	1	8.7	13.8	29.0
21342031	9	7/3/10	NE	1	1	2	8	1	1	8.3	13.8	29.0
21342031	9	7/3/10	NE	1	1	5	8	5	1	8.1	13.8	29.0
21342031	9	7/3/10	NE	1	1	2	9	4	1	8.8	13.8	29.0
21342031	9	7/3/10	NE	1	1	5	9	7	1	8.2	13.8	29.0
21342031	9	7/3/10	NE	1	1	2	10	0	1	8.2	13.8	29.2
21342031	9	7/3/10	NE	1	1	5	10	4	1	8.3	13.8	29.4
21342031	9	7/3/10	NE	1	1	2	11	0	1	8.2	13.8	29.2
21342031	9	7/3/10	NE	1	1	5	11	4	1	8.3	13.8	29.2

21342031	9	7/3/10	NE	1	1	2	12	1	1	7.9	13.8	29.1

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	7/3/10	NE	1	1	5	12	6	1	8.4	13.8	29.2
21342031	9	7/3/10	NE	1	1	2	13	3	1	8.1	31.0	29.0
21342031	9	7/3/10	NE	1	1	5	13	8	1	8.3	31.0	29.2
21342031	9	7/3/10	NE	1	1	2	14	0	1	8.3	31.0	29.1
21342031	9	7/3/10	NE	1	1	5	14	3	1	8.1	31.0	29.1
21342031	9	7/3/10	NE	1	1	2	15	0	1	8.1	31.0	29.0
21342031	9	7/3/10	NE	1	1	5	15	3	1	8.0	31.0	29.0
21342031	9	7/3/10	NE	1	1	2	16	0	1	8.3	31.0	29.1
21342031	9	7/3/10	NE	1	1	5	16	4	1	8.1	31.0	29.0
21342031	9	7/3/10	NE	1	1	2	17	0	1	8.2	31.0	29.1
21342031	9	7/3/10	NE	1	1	5	17	4	1	7.8	31.0	29.1
21342031	9	7/3/10	NE	1	1	2	18	0	1	7.9	31.0	29.0
21342031	9	7/3/10	NE	1	1	5	18	3	1	7.9	31.0	29.0
21342031	9	7/4/10	N	1	1	2	6	2	1	8.0	17.8	28.5
21342031	9	7/4/10	N	1	1	5	6	8	1	8.2	17.8	28.9
21342031	9	7/4/10	N	1	1	2	7	0	1	7.5	17.8	29.0
21342031	9	7/4/10	N	1	1	5	7	5	1	7.5	17.8	29.0
21342031	9	7/4/10	N	1	1	2	7	57	1	8.2	17.8	29.0
21342031	9	7/4/10	N	1	1	5	8	3	1	8.2	17.8	29.0
21342031	9	7/4/10	N	1	1	2	8	57	1	7.8	17.8	28.8
21342031	9	7/4/10	N	1	1	5	9	2	1	7.6	17.8	28.8
21342031	9	7/4/10	N	1	1	2	10	0	1	8.2	17.8	28.8
21342031	9	7/4/10	N	1	1	5	10	5	1	8.0	17.8	29.0
21342031	9	7/4/10	N	1	1	2	11	3	1	8.2	17.8	29.0
21342031	9	7/4/10	N	1	1	5	11	7	1	8.0	17.8	29.2
21342031	9	7/4/10	N	1	1	2	12	1	1	8.0	17.8	29.0
21342031	9	7/4/10	N	1	1	5	12	6	1	7.8	17.8	29.0
21342031	9	7/4/10	N	1	1	2	13	2	1	8.2	17.8	29.2
21342031	9	7/4/10	N	1	1	5	13	7	1	8.0	17.8	29.2
21342031	9	7/4/10	N	1	1	2	14	0	1	8.4	17.8	29.2
21342031	9	7/4/10	N	1	1	5	14	6	1	7.8	17.8	29.2
21342031	9	7/4/10	N	1	1	2	15	4	1	8.2	17.8	29.0
21342031	9	7/4/10	N	1	1	5	15	7	1	8.0	17.8	29.0
21342031	9	7/4/10	N	1	1	2	16	3	1	8.2	17.8	29.0
21342031	9	7/4/10	N	1	1	5	16	9	1	7.8	17.8	29.0
21342031	9	7/4/10	N	1	1	2	17	0	1	7.5	17.8	29.0
21342031	9	7/4/10	N	1	1	3	17	3	1	7.0	17.8	29.0

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	7/4/10	N	1	1	4	17	7	1	7.0	17.8	29.2
21342031	9	7/4/10	N	1	1	5	17	11	1	7.5	17.8	29.2
21342031	9	7/4/10	N	1	1	8	17	16	1	6.0	17.8	29.0
21342031	9	7/4/10	N	1	1	2	18	2	1	7.5	17.8	29.2
21342031	9	7/4/10	N	1	1	5	18	10	1	7.5	17.8	29.0
21342031	9	7/5/10	N	1	1	2	6	2	1	8.3	20.0	29.2
21342031	9	7/5/10	N	1	1	5	6	5	1	8.0	20.0	29.1
21342031	9	7/5/10	N	1	1	2	7	2	1	8.2	20.0	29.1
21342031	9	7/5/10	N	1	1	5	7	7	1	7.8	20.0	29.2
21342031	9	7/5/10	N	1	1	2	8	0	1	8.0	20.0	29.2
21342031	9	7/5/10	N	1	1	5	8	3	1	8.1	20.0	29.2
21342031	9	7/5/10	N	1	1	2	9	1	1	8.3	20.0	29.2
21342031	9	7/5/10	N	1	1	5	9	4	1	8.0	20.0	29.2
21342031	9	7/5/10	N	1	1	2	10	0	1	8.3	20.0	29.2
21342031	9	7/5/10	N	1	1	5	10	4	1	7.8	20.0	29.3
21342031	9	7/5/10	N	1	1	2	11	0	1	8.1	20.0	29.3
21342031	9	7/5/10	N	1	1	5	11	3	1	7.8	20.0	29.3
21342031	9	7/5/10	N	1	1	2	12	1	1	8.4	20.0	29.4
21342031	9	7/5/10	N	1	1	5	12	5	1	8.0	20.0	29.5
21342031	9	7/5/10	N	1	2	2	13	4	1	8.0	36.8	29.3
21342031	9	7/5/10	N	1	2	5	13	7	1	7.5	36.8	29.5
21342031	9	7/5/10	N	1	2	2	14	2	1	7.9	36.8	29.3
21342031	9	7/5/10	N	1	2	5	14	5	1	7.6	36.8	29.5
21342031	9	7/5/10	N	1	2	2	15	0	1	7.8	36.8	29.3
21342031	9	7/5/10	N	1	2	5	15	4	1	7.5	36.8	29.5
21342031	9	7/5/10	N	1	2	2	16	1	1	8.1	36.8	29.2
21342031	9	7/5/10	N	1	2	5	16	5	1	7.9	36.8	29.4
21342031	9	7/5/10	N	1	2	2	17	0	1	7.5	36.8	29.6
21342031	9	7/5/10	N	1	2	5	17	4	1	7.3	36.8	29.8
21342031	9	7/5/10	N	1	2	2	18	0	1	8.3	36.8	29.5
21342031	9	7/5/10	N	1	2	5	18	3	1	7.9	36.8	29.5
21342031	9	7/14/10		1	3	2	6	0	1	8.5	22.0	30.5
21342031	9	7/14/10		1	3	7	6	5	1	7.5	22.0	30.5
21342031	9	7/14/10		1	3	7	7	0	1	7.6	22.0	30.0
21342031	9	7/14/10		1	3	2	7	6	1	8.1	22.0	30.0
21342031	9	7/14/10		1	3	7	8	0	1	7.5	22.0	30.0
21342031	9	7/14/10		1	3	2	8	6	1	8.1	22.0	30.2
21342031	9	7/14/10		1	3	7	9	0	1	7.4	22.0	30.0

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	7/14/10		1	3	2	9	5	1	8.2	22.0	30.2
21342031	9	7/14/10		1	3	7	10	0	1	7.4	22.0	30.0
21342031	9	7/14/10		1	3	2	10	5	1	8.1	22.0	30.2
21342031	9	7/14/10		1	4	7	11	0	1	7.3	22.5	30.0
21342031	9	7/14/10		1	4	2	11	5	1	8.1	22.5	30.2
21342031	9	7/14/10		1	4	8	12	0	1	6.1	22.5	29.0
21342031	9	7/14/10		1	4	7	12	5	1	6.6	22.5	29.5
21342031	9	7/14/10		1	4	6	12	10	1	4.9	22.5	30.0
21342031	9	7/14/10		1	4	4	12	14	1	4.9	22.5	30.0
21342031	9	7/14/10		1	4	3	12	16	1	6.7	22.5	30.0
21342031	9	7/14/10		1	4	2	12	20	1	7.5	22.5	30.0
21342031	9	7/14/10		1	4	1	12	25	1	7.2	22.5	30.0
21342031	9	7/14/10		1	4	8	13	0	1	6.3	22.5	30.0
21342031	9	7/14/10		1	4	7	13	2	1	6.8	22.5	30.0
21342031	9	7/14/10		1	4	6	13	3	1	6.7	22.5	30.0
21342031	9	7/14/10		1	4	4	13	6	1	7.0	22.5	30.2
21342031	9	7/14/10		1	4	3	13	9	1	7.1	22.5	30.2
21342031	9	7/14/10		1	4	2	13	11	1	7.5	22.5	30.2
21342031	9	7/14/10		1	4	1	13	13	1	7.4	22.5	30.2
21342031	9	7/14/10		1	3	8	14	0	1	6.0	22.5	30.0
21342031	9	7/14/10		1	3	7	14	2	1	6.9	22.5	30.0
21342031	9	7/14/10		1	3	6	14	5	1	7.3	22.5	30.0
21342031	9	7/14/10		1	3	4	14	7	1	7.4	22.5	30.0
21342031	9	7/14/10		1	3	3	14	9	1	7.4	22.5	30.0
21342031	9	7/14/10		1	3	2	14	12	1	7.6	22.5	30.0
21342031	9	7/14/10		1	3	1	14	16	1	7.3	22.5	30.2
21342031	9	7/14/10		1	3	11	15	0	1	5.1	22.5	30.0
21342031	9	7/14/10		1	3	8	15	5	1	6.4	22.5	30.0
21342031	9	7/14/10		1	3	7	15	9	1	7.4	22.5	30.0
21342031	9	7/14/10		1	3	6	15	13	1	7.3	22.5	30.0
21342031	9	7/14/10		1	3	4	15	17	1	7.1	22.5	30.0
21342031	9	7/14/10		1	3	3	15	19	1	7.5	22.5	30.0
21342031	9	7/14/10		1	3	2	15	22	1	7.7	22.5	30.2
21342031	9	7/14/10		1	3	1	15	25	1	7.2	22.5	30.2
21342031	9	7/14/10		1	3	11	16	0	1	5.5	22.5	30.0
21342031	9	7/14/10		1	3	8	16	5	1	6.0	22.5	30.2
21342031	9	7/14/10		1	3	7	16	9	1	7.0	22.5	30.2
21342031	9	7/14/10		1	4	6	16	11	1	6.8	25.0	30.2

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	7/14/10		1	4	4	16	14	1	7.2	25.0	30.2
21342031	9	7/14/10		1	4	3	16	16	1	7.3	25.0	30.2
21342031	9	7/14/10		1	4	2	16	18	1	7.5	25.0	30.5
21342031	9	7/14/10		1	4	1	16	20	1	7.0	25.0	30.5
21342031	9	7/14/10		1	4	11	17	0	1	5.6	25.0	30.0
21342031	9	7/14/10		1	4	9	17	5	1	6.1	25.0	30.2
21342031	9	7/14/10		1	4	8	17	8	1	6.3	25.0	30.2
21342031	9	7/14/10		1	4	7	17	12	1	7.0	25.0	30.2
21342031	9	7/14/10		1	4	6	17	14	1	7.4	25.0	30.5
21342031	9	7/14/10		1	4	4	17	17	1	7.1	25.0	30.5
21342031	9	7/14/10		1	4	3	17	19	1	7.2	25.0	30.5
21342031	9	7/14/10		1	4	2	17	21	1	7.5	25.0	30.5
21342031	9	7/14/10		1	4	1	17	25	1	6.9	25.0	30.5
21342031	9	7/14/10		1	4	9	18	0	1	5.9	25.0	30.2
21342031	9	7/14/10		1	4	8	18	4	1	6.4	25.0	30.2
21342031	9	7/14/10		1	4	7	18	7	1	7.1	25.0	30.2
21342031	9	7/14/10		1	4	6	18	9	1	6.8	25.0	30.2
21342031	9	7/14/10		1	2	4	18	11	1	7.3	26.0	30.2
21342031	9	7/14/10		1	2	3	18	14	1	7.4	26.0	30.5
21342031	9	7/14/10		1	2	2	18	16	1	7.6	26.0	30.5
21342031	9	7/14/10		1	2	1	18	18	1	7.1	26.0	30.5
21342031	9	7/15/10	N	1	2	7	6	0	1	7.9	21.2	30.0
21342031	9	7/15/10	N	1	2	2	6	6	1	8.4	21.2	30.0
21342031	9	7/15/10	N	1	2	7	7	0	1	8.0	21.2	30.0
21342031	9	7/15/10	N	1	2	2	7	5	1	8.5	21.2	30.0
21342031	9	7/15/10	N	1	2	7	8	0	1	7.8	21.2	30.2
21342031	9	7/15/10	N	1	2	2	8	5	1	8.2	21.2	30.2
21342031	9	7/15/10	N	1	2	7	9	0	1	6.8	21.2	30.0
21342031	9	7/15/10	N	1	2	3	9	3	1	7.1	21.2	30.0
21342031	9	7/15/10	N	1	2	2	9	6	1	7.2	21.2	30.0
21342031	9	7/15/10	N	1	2	1	9	8	1	7.0	21.2	30.0
21342031	9	7/15/10	N	1	2	7	10	0	1	6.7	21.2	30.2
21342031	9	7/15/10	N	1	2	3	10	4	1	7.0	21.2	30.2
21342031	9	7/15/10	N	1	2	2	10	7	1	7.6	21.2	30.2
21342031	9	7/15/10	N	1	2	1	10	10	1	7.0	21.2	30.2
21342031	9	7/15/10	N	1	2	7	11	0	1	6.9	30.0	30.0
21342031	9	7/15/10	N	1	2	3	11	5	1	7.0	30.0	30.0
21342031	9	7/15/10	N	1	2	2	11	8	1	7.5	30.0	30.0

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	7/15/10	N	1	2	1	11	10	1	7.1	30.0	30.0
21342031	9	7/15/10	N	1	2	7	12	0	1	6.9	30.0	29.5
21342031	9	7/15/10	N	1	2	3	12	4	1	7.0	30.0	29.5
21342031	9	7/15/10	N	1	2	2	12	6	1	7.6	30.0	29.8
21342031	9	7/15/10	N	1	2	1	12	8	1	7.1	30.0	30.0
21342031	9	7/15/10	N	1	2	11	13	0	1	5.2	30.0	30.0
21342031	9	7/15/10	N	1	2	9	13	3	1	5.5	30.0	30.0
21342031	9	7/15/10	N	1	2	8	13	6	1	6.5	30.0	30.0
21342031	9	7/15/10	N	1	2	7	13	9	1	6.9	30.0	30.0
21342031	9	7/15/10	N	1	2	3	13	12	1	7.2	30.0	30.2
21342031	9	7/15/10	N	1	2	2	13	15	1	7.4	30.0	30.5
21342031	9	7/15/10	N	1	2	1	13	18	1	7.2	30.0	30.2
21342031	9	7/15/10	N	1	2	11	14	0	1	4.7	30.0	30.0
21342031	9	7/15/10	N	1	2	9	14	4	1	5.0	30.0	30.0
21342031	9	7/15/10	N	1	2	8	14	8	1	5.6	34.0	30.0
21342031	9	7/15/10	N	1	2	7	14	11	1	6.7	34.0	30.2
21342031	9	7/15/10	N	1	2	3	14	14	1	7.0	34.0	30.5
21342031	9	7/15/10	N	1	2	2	14	17	1	7.4	34.0	30.5
21342031	9	7/15/10	N	1	2	1	14	19	1	7.3	34.0	30.5
21342031	9	7/15/10	N	1	2	11	15	1	1	4.4	34.0	30.0
21342031	9	7/15/10	N	1	2	9	15	5	1	4.7	34.0	30.0
21342031	9	7/15/10	N	1	2	8	15	8	1	5.5	34.0	30.0
21342031	9	7/15/10	N	1	2	7	15	11	1	6.5	34.0	30.0
21342031	9	7/15/10	N	1	2	3	15	15	1	7.1	34.0	30.0
21342031	9	7/15/10	N	1	2	2	15	17	1	7.5	34.0	30.0
21342031	9	7/15/10	N	1	2	1	15	19	1	7.4	34.0	30.0
21342031	9	7/15/10	N	1	2	11	16	0	1	4.6	34.0	30.0
21342031	9	7/15/10	N	1	2	9	16	5	1	5.0	34.0	30.0
21342031	9	7/15/10	N	1	2	8	16	8	1	6.0	34.0	30.0
21342031	9	7/15/10	N	1	2	7	16	11	1	6.8	34.0	30.0
21342031	9	7/15/10	N	1	2	3	16	14	1	7.4	34.0	30.0
21342031	9	7/15/10	N	1	2	2	16	16	1	7.8	34.0	30.2
21342031	9	7/15/10	N	1	2	1	16	19	1	7.4	34.0	30.2
21342031	9	7/15/10	N	1	2	11	17	0	1	4.8	34.0	30.0
21342031	9	7/15/10	N	1	2	9	17	3	1	5.0	34.0	29.5
21342031	9	7/15/10	N	1	2	8	17	5	1	6.0	34.0	30.0
21342031	9	7/15/10	N	1	2	7	17	7	1	6.7	34.0	30.0
21342031	9	7/15/10	N	1	2	3	17	11	1	7.5	34.0	30.0

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Continued.

Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	7/15/10	N	1	2	2	17	13	1	7.8	34.0	30.0
21342031	9	7/15/10	N	1	2	1	17	16	1	7.5	34.0	30.0
21342031	9	7/15/10	N	1	2	11	18	0	1	5.2	34.0	30.0
21342031	9	7/15/10	N	1	2	9	18	4	1	5.2	34.0	29.8
21342031	9	7/15/10	N	1	2	8	18	7	1	5.9	34.0	30.0
21342031	9	7/15/10	N	1	2	7	18	9	1	6.7	34.0	30.0
21342031	9	7/15/10	N	1	2	3	18	12	1	7.3	34.0	30.0
21342031	9	7/15/10	N	1	2	2	18	14	1	7.7	34.0	30.0
21342031	9	7/15/10	N	1	2	1	18	15	1	7.5	34.0	30.0
21342031	9	7/16/10	N	1	1	2	6	1	1	8.5	31.0	29.8
21342031	9	7/16/10	N	1	1	7	6	9	1	8.0	31.0	29.8
21342031	9	7/16/10	N	1	1	2	7	2	1	8.5	31.0	30.0
21342031	9	7/16/10	N	1	1	7	7	10	1	8.0	31.0	30.0
21342031	9	7/16/10	N	1	1	2	8	9	1	8.0	31.0	30.0
21342031	9	7/16/10	N	1	1	7	8	16	1	7.8	31.0	30.0
21342031	9	7/16/10	N	1	1	2	9	1	1	8.2	31.0	30.0
21342031	9	7/16/10	N	1	1	7	9	6	1	7.5	31.0	30.0
21342031	9	7/16/10	N	1	1	2	10	5	1	8.0	31.0	30.0
21342031	9	7/16/10	N	1	1	7	10	9	1	7.4	31.0	30.0
21342031	9	7/16/10	N	1	1	2	11	3	1	8.2	34.5	30.0
21342031	9	7/16/10	N	1	1	7	11	7	1	7.2	34.5	30.0
21342031	9	7/16/10	N	1	1	2	12	6	1	7.6	34.5	30.0
21342031	9	7/16/10	N	1	1	3	12	9	1	7.0	34.5	30.2
21342031	9	7/16/10	N	1	1	6	12	14	1	6.5	34.5	30.2
21342031	9	7/16/10	N	1	1	7	12	19	1	6.7	34.5	30.5
21342031	9	7/16/10	N	1	1	8	12	22	1	6.5	34.5	30.5
21342031	9	7/16/10	N	1	1	1	13	11	1	7.2	34.5	30.0
21342031	9	7/16/10	N	1	1	2	13	7	1	7.6	34.5	30.0
21342031	9	7/16/10	N	1	1	3	13	13	1	7.4	34.5	30.0
21342031	9	7/16/10	N	1	1	4	13	15	1	7.1	30.5	30.0
21342031	9	7/16/10	N	1	1	6	13	18	1	6.8	30.5	30.0
21342031	9	7/16/10	N	1	1	7	13	21	1	6.7	30.5	30.0
21342031	9	7/16/10	N	1	1	8	13	23	1	6.1	30.5	30.0
21342031	9	7/16/10	N	1	1	9	13	27	1	5.7	30.5	30.0
21342031	9	7/16/10	N	1	1	1	14	1	1	7.2	30.5	30.0
21342031	9	7/16/10	N	1	1	2	14	6	1	7.8	30.5	30.0
21342031	9	7/16/10	N	1	1	3	14	11	1	7.3	30.5	30.0
21342031	9	7/16/10	N	1	1	4	14	14	1	7.2	30.5	30.2

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	7/16/10	N	1	1	6	14	19	1	6.8	30.5	30.2
21342031	9	7/16/10	N	1	1	7	14	22	1	6.8	31.0	30.0
21342031	9	7/16/10	N	1	1	8	14	26	1	6.2	31.0	30.0
21342031	9	7/16/10	N	1	1	9	14	30	1	5.9	31.0	30.0
21342031	9	7/16/10	N	1	1	1	15	6	1	7.0	31.0	30.0
21342031	9	7/16/10	N	1	1	2	15	9	1	7.2	31.0	29.8
21342031	9	7/16/10	N	1	1	3	15	12	1	7.0	31.0	29.8
21342031	9	7/16/10	N	1	1	4	15	15	1	7.0	31.0	29.8
21342031	9	7/16/10	N	1	1	6	15	18	1	6.5	31.0	29.5
21342031	9	7/16/10	N	1	1	7	15	20	1	6.8	31.0	29.5
21342031	9	7/16/10	N	1	1	8	15	23	1	6.1	31.0	29.8
21342031	9	7/16/10	N	1	1	9	15	26	1	5.9	32.5	29.5
21342031	9	7/16/10	N	1	1	1	16	1	1	7.2	32.5	29.8
21342031	9	7/16/10	N	1	1	2	16	4	1	7.8	32.5	29.8
21342031	9	7/16/10	N	1	1	3	16	8	1	7.4	32.5	29.8
21342031	9	7/16/10	N	1	1	4	16	11	1	7.2	32.5	29.8
21342031	9	7/16/10	N	1	1	6	16	16	1	6.6	32.5	29.5
21342031	9	7/16/10	N	1	1	7	16	20	1	6.8	32.5	29.5
21342031	9	7/16/10	N	1	1	8	16	23	1	6.2	32.5	29.8
21342031	9	7/16/10	N	1	1	9	16	26	1	5.9	32.5	29.5
21342031	9	7/16/10	N	1	1	1	17	9	1	7.6	32.5	29.5
21342031	9	7/16/10	N	1	1	2	17	14	1	8.1	32.5	29.5
21342031	9	7/16/10	N	1	1	3	17	19	1	7.9	32.5	29.8
21342031	9	7/16/10	N	1	1	4	17	22	1	7.5	32.5	29.5
21342031	9	7/16/10	N	1	1	6	17	26	1	6.9	32.5	29.5
21342031	9	7/16/10	N	1	1	7	17	30	1	6.8	32.5	29.5
21342031	9	7/16/10	N	1	1	8	17	33	1	6.2	32.5	29.5
21342031	9	7/16/10	N	1	1	9	17	37	1	5.8	32.5	29.5
21342031	9	7/16/10	N	1	1	2	18	6	1	7.8	32.5	29.5
21342031	9	7/16/10	N	1	1	7	18	11	1	6.8	32.5	29.5
21342031	9	7/17/10	N	1	1	2	6	4	1	7.6	23.0	29.0
21342031	9	7/17/10	N	1	1	6	6	8	1	5.8	23.0	29.0
21342031	9	7/17/10	N	1	1	2	7	1	1	8.0	23.0	28.9
21342031	9	7/17/10	N	1	1	6	7	5	1	5.9	23.0	28.9
21342031	9	7/17/10	N	1	1	2	8	0	1	8.2	23.0	29.0
21342031	9	7/17/10	N	1	1	6	8	4	1	5.7	23.0	29.0
21342031	9	7/17/10	N	1	1	2	9	0	1	8.0	23.0	29.0
21342031	9	7/17/10	N	1	1	6	9	3	1	6.2	23.0	29.0

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	7/17/10	N	1	1	2	10	0	1	8.2	23.0	29.0
21342031	9	7/17/10	N	1	1	6	10	4	1	6.4	23.0	29.0
21342031	9	7/17/10	N	1	1	2	11	1	1	8.4	23.0	29.1
21342031	9	7/17/10	N	1	1	6	11	5	1	6.0	23.0	29.1
21342031	9	7/17/10	N	1	1	2	12	0	1	8.2	23.0	29.3
21342031	9	7/17/10	N	1	1	6	12	5	1	5.8	23.0	29.2
21342031	9	7/17/10	NE	2	2	2	13	3	1	7.6	23.0	29.7
21342031	9	7/17/10	NE	2	2	6	13	7	1	5.5	23.0	29.7
21342031	9	7/17/10	NE	2	2	1	14	2	1	7.1	23.0	29.6
21342031	9	7/17/10	NE	2	2	2	14	6	1	7.1	23.0	29.6
21342031	9	7/17/10	NE	2	2	3	14	10	1	6.7	23.0	29.7
21342031	9	7/17/10	NE	2	2	6	14	15	1	4.6	23.0	29.7
21342031	9	7/17/10	NE	2	2	8	14	20	1	6.0	23.0	29.7
21342031	9	7/17/10	NE	2	2	1	15	0	1	7.2	23.0	29.9
21342031	9	7/17/10	NE	2	2	2	15	4	1	7.6	23.0	29.9
21342031	9	7/17/10	NE	2	2	3	15	8	1	6.7	23.0	29.5
21342031	9	7/17/10	NE	2	2	6	15	13	1	4.8	23.0	29.3
21342031	9	7/17/10	NE	2	2	8	15	18	1	6.0	23.0	29.8
21342031	9	7/17/10	NE	2	2	1	16	1	1	7.6	23.0	30.0
21342031	9	7/17/10	NE	2	2	2	16	4	1	7.8	23.0	30.0
21342031	9	7/17/10	NE	2	2	3	16	8	1	6.8	23.0	29.9
21342031	9	7/17/10	NE	2	2	6	16	13	1	5.0	23.0	29.9
21342031	9	7/17/10	NE	2	2	8	16	18	1	5.8	23.0	29.9
21342031	9	7/17/10	NE	2	2	9	16	21	1	6.1	23.0	29.8
21342031	9	7/17/10	NE	2	2	1	17	0	1	7.4	23.0	30.0
21342031	9	7/17/10	NE	2	2	2	17	3	1	7.8	23.0	30.0
21342031	9	7/17/10	NE	2	2	3	17	7	1	7.1	23.0	30.0
21342031	9	7/17/10	NE	2	2	6	17	11	1	4.9	23.0	29.7
21342031	9	7/17/10	NE	2	2	8	17	16	1	6.0	23.0	29.9
21342031	9	7/17/10	NE	2	2	9	17	19	1	6.4	23.0	29.9
21342031	9	7/30/10	N	1	1	5	6	0	1	7.2	18.8	31.0
21342031	9	7/30/10	N	1	1	5	7	0	1	7.2	18.8	30.8
21342031	9	7/30/10	N	1	1	5	8	0	1	7.2	18.8	31.0
21342031	9	7/30/10	N	1	1	5	9	0	1	7.0	18.8	31.0
21342031	9	7/30/10	N	1	1	5	10	0	1	7.2	18.8	31.2
21342031	9	7/30/10	N	1	1	5	11	4	1	7.5	18.8	31.5
21342031	9	7/30/10	N	1	1	5	12	1	1	7.2	18.8	31.8
21342031	9	7/30/10	N	1	1	5	13	1	1	7.2	18.8	31.5

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	7/30/10	N	1	1	9	13	6	1	5.7	18.8	31.5
21342031	9	7/30/10	N	1	1	7	13	10	1	6.6	18.8	32.0
21342031	9	7/30/10	N	2	1	4	13	15	1	6.9	27.5	32.0
21342031	9	7/30/10	N	2	1	3	13	19	1	6.7	27.5	32.0
21342031	9	7/30/10	N	2	1	3	14	1	1	6.9	27.5	31.5
21342031	9	7/30/10	N	2	1	4	14	5	1	6.9	27.5	31.5
21342031	9	7/30/10	N	2	1	5	14	12	1	7.4	27.5	31.5
21342031	9	7/30/10	N	2	1	7	14	16	1	6.8	27.5	31.5
21342031	9	7/30/10	N	2	1	9	14	19	1	6.1	27.5	31.2
21342031	9	7/30/10	N	2	1	5	15	4	1	7.3	27.5	31.5
21342031	9	7/30/10	N	2	1	5	16	1	1	7.3	27.5	31.5
21342031	9	7/30/10	N	2	1	5	17	6	1	7.5	27.5	31.8
21342031	9	7/30/10	N	2	1	5	18	4	1	7.5	27.5	31.5
21342031	9	7/31/10		1	2	5	6	0	1	6.7		31.7
21342031	9	7/31/10		1	2	5	7	0	1	7.0		31.7
21342031	9	7/31/10		1	2	5	8	0	1	7.1		31.7
21342031	9	7/31/10		1	2	5	9	0	1	7.2		31.7
21342031	9	7/31/10		1	2	5	10	0	1	7.2		31.7
21342031	9	7/31/10		1	2	5	11	1	1	7.4		31.7
21342031	9	7/31/10		1	2	5	12	1	1	7.3		31.8
21342031	9	7/31/10		1	2	5	13	2	1	7.5		31.8
21342031	9	7/31/10		1	2	5	14	0	1	7.4		31.8
21342031	9	7/31/10	NE	2	2	3	15	2	1	7.2		31.7
21342031	9	7/31/10	NE	2	2	4	15	6	1	6.8		31.8
21342031	9	7/31/10	NE	2	2	5	15	9	1	7.3		31.8
21342031	9	7/31/10	NE	2	2	6	15	13	1	6.7		31.8
21342031	9	7/31/10	NE	2	2	3	16	0	1	6.8		31.7
21342031	9	7/31/10	NE	2	2	4	16	3	1	6.8		31.8
21342031	9	7/31/10	NE	2	2	5	16	7	1	7.3		31.7
21342031	9	7/31/10	NE	2	2	6	16	10	1	6.7		31.7
21342031	9	7/31/10	NE	2	2	3	17	0	1	6.8		31.7
21342031	9	7/31/10	NE	2	2	4	17	3	1	6.7		31.7
21342031	9	7/31/10	NE	2	2	5	17	7	1	7.2		31.6
21342031	9	7/31/10	NE	2	2	6	17	10	1	6.7		31.7
21342031	9	7/31/10	NE	2	2	5	18	7	1	7.1		31.5
21342031	9	8/1/10	NE	1	3	5	6	1	1	6.8	21.0	31.0
21342031	9	8/1/10	NE	1	3	5	7	0	1	7.1	21.0	31.1
21342031	9	8/1/10	NE	1	3	5	8	0	1	7.2	21.0	31.1

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	8/1/10	NE	1	3	5	9	1	1	7.2	21.0	31.1
21342031	9	8/1/10	NE	1	3	5	10	0	1	7.3	21.0	31.1
21342031	9	8/1/10	NE	1	3	5	11	0	1	7.5	21.0	31.3
21342031	9	8/1/10	NE	1	3	5	12	2	1	7.3	21.0	31.1
21342031	9	8/1/10	NE	1	3	5	13	5	1	7.3	21.0	31.2
21342031	9	8/1/10	NE	1	3	5	14	0	1	7.3	21.0	31.2
21342031	9	8/1/10	NE	1	3	1	15	2	1	6.8	21.0	
21342031	9	8/1/10	NE	1	3	2	15	6	1	7.4	21.0	
21342031	9	8/1/10	E	2	2	5	15	10	1	7.1	28.5	31.2
21342031	9	8/1/10	E	2	2	1	16	4	1	6.6	28.5	31.1
21342031	9	8/1/10	E	2	2	2	16	7	1	7.4	28.5	31.1
21342031	9	8/1/10	E	2	2	3	16	11	1	6.4	28.5	31.2
21342031	9	8/1/10	E	2	2	5	16	15	1	7.0	28.5	31.1
21342031	9	8/1/10	E	2	2	8	16	22	1	6.0	28.5	31.1
21342031	9	8/1/10	E	2	2	1	17	0	1	6.7	28.5	31.1
21342031	9	8/1/10	E	2	2	2	17	3	1	7.1	28.5	31.2
21342031	9	8/1/10	E	2	2	3	17	6	1	6.4	28.5	31.2
21342031	9	8/1/10	E	2	2	5	17	10	1	6.6	28.5	31.2
21342031	9	8/1/10	E	2	2	8	17	15	1	5.0	28.5	31.6
21342031	9	8/1/10	E	2	2	1	18	0	1	6.5	28.5	31.2
21342031	9	8/1/10	E	2	2	2	18	4	1	7.0	28.5	31.2
21342031	9	8/1/10	E	2	2	3	18	7	1	6.2	28.5	31.2
21342031	9	8/1/10	E	2	2	5	18	11	1	6.7	28.5	31.2
21342031	9	8/1/10	E	2	2	8	18	16	1	5.2	28.5	31.2
21342031	9	8/2/10	N	1	1	2	6	5	1	8.2	23.5	31.0
21342031	9	8/2/10	N	1	1	5	6	11	1	7.7	23.5	30.8
21342031	9	8/2/10	N	1	1	2	7	1	1	8.2	23.5	30.8
21342031	9	8/2/10	N	1	1	5	7	6	1	7.9	23.5	31.0
21342031	9	8/2/10	N	1	1	2	8	4	1	8.3	23.5	30.8
21342031	9	8/2/10	N	1	1	5	8	10	1	8.0	23.5	31.0
21342031	9	8/2/10	N	1	1	2	9	0	1	8.2	23.5	31.0
21342031	9	8/2/10	N	1	1	5	9	3	1	7.9	23.5	31.0
21342031	9	8/2/10	N	1	1	2	9	53	1	8.5	23.5	31.0
21342031	9	8/2/10	N	1	1	5	10	0	1	8.0	23.5	31.0
21342031	9	8/2/10	N	1	1	2	11	4	1	8.4	24.0	30.8
21342031	9	8/2/10	N	1	1	5	11	10	1	7.8	24.0	30.8
21342031	9	8/2/10	N	1	1	2	12	1	1	8.0	24.0	31.0
21342031	9	8/2/10	N	1	1	5	12	8	1	7.8	24.0	31.0

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Continued.

Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	8/2/10	N	1	1	2	13	0	1	8.3	24.0	31.2
21342031	9	8/2/10	N	1	1	5	13	4	1	7.9	24.0	31.0
21342031	9	8/2/10	N	1	1	2	14	2	1	8.3	24.0	30.8
21342031	9	8/2/10	N	1	1	5	14	7	1	7.9	24.0	30.8
21342031	9	8/2/10	N	1	1	2	15	4	1	8.1	24.0	31.0
21342031	9	8/2/10	N	1	1	5	15	9	1	7.8	24.0	31.0
21342031	9	8/2/10	N	1	1	2	16	18	1	7.6	24.0	31.0
21342031	9	8/2/10	N	1	1	5	16	21	1	7.4	24.0	31.0
21342031	9	8/2/10	N	1	1	5	17	10	1	7.3	24.0	31.0
21342031	9	8/2/10	N	1	1	5	18	0	1	7.5	24.0	31.2
21342031	9	8/13/10	E	1	4	2	6	0	1	7.4	22.0	29.5
21342031	9	8/13/10	E	1	4	2	7	0	1	7.6	22.0	30.0
21342031	9	8/13/10	E	1	4	2	8	0	1	7.5	22.0	30.2
21342031	9	8/13/10	E	1	4	2	9	0	1	7.5	22.0	30.2
21342031	9	8/13/10	E	1	4	2	10	0	1	7.7	22.0	30.2
21342031	9	8/13/10	E	1	4	2	11	0	1	7.6	22.0	30.2
21342031	9	8/13/10	E	1	4	2	12	0	1	7.4	22.0	30.2
21342031	9	8/13/10	E	1	4	2	13	0	1	7.6	22.0	29.5
21342031	9	8/13/10	E	1	4	2	14	2	1	7.6	22.0	29.5
21342031	9	8/13/10	E	1	4	2	15	2	1	7.6	22.0	29.5
21342031	9	8/13/10	E	1	3	2	16	0	1	7.5	22.5	29.5
21342031	9	8/13/10	E	1	3	2	17	0	1	7.3	22.5	30.0
21342031	9	8/13/10	E	1	3	2	18	0	1	7.3	22.5	29.8
21342031	9	8/14/10	E	1	2	2	6	5	1	6.9	18.9	31.0
21342031	9	8/14/10	E	1	2	2	7	1	1	7.1	18.9	31.1
21342031	9	8/14/10	E	1	2	2	8	3	1	7.2	18.9	31.1
21342031	9	8/14/10	E	1	2	2	9	0	1	7.2	18.9	31.1
21342031	9	8/14/10	E	1	2	2	10	0	1	7.3	18.9	31.2
21342031	9	8/14/10	E	1	2	2	11	0	1	7.2	18.9	31.1
21342031	9	8/14/10	E	1	2	2	12	2	1	7.2	18.9	31.0
21342031	9	8/14/10	E	1	2	2	13	0	1	7.3	18.9	31.1
21342031	9	8/14/10	E	1	2	2	14	2	1	7.2	18.9	31.2
21342031	9	8/14/10	E	1	2	2	15	1	1	7.2	18.9	31.1
21342031	9	8/14/10	E	1	2	1	16	5	1	6.8	25.0	31.2
21342031	9	8/14/10	E	1	2	2	16	7	1	7.2	25.0	31.2
21342031	9	8/14/10	E	1	2	3	16	8	1	6.2	25.0	31.2
21342031	9	8/14/10	E	1	2	4	16	12	1	5.9	25.0	31.2
21342031	9	8/14/10	E	1	2	8	16	17	1	4.8	25.0	31.2

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	8/14/10	E	1	2	9	16	19	1	5.0	25.0	31.1
21342031	9	8/14/10	E	1	2	11	16	22	1	3.9	25.0	31.2
21342031	9	8/14/10	E	1	2	1	17	2	1	6.0	25.0	31.1
21342031	9	8/14/10	E	1	2	2	17	5	1	6.8	25.0	31.2
21342031	9	8/14/10	E	1	2	3	17	8	1	7.9	25.0	31.2
21342031	9	8/14/10	E	2	2	1	18	3	1	6.0	25.0	31.0
21342031	9	8/14/10	E	2	2	2	18	6	1	6.7	25.0	31.0
21342031	9	8/14/10	E	2	2	3	18	9	1	6.5	25.0	31.1
21342031	9	8/14/10	E	2	2	4	18	12	1	6.4	25.0	31.1
21342031	9	8/14/10	E	2	2	5	18	16	1	6.6	25.0	30.9
21342031	9	8/14/10	E	2	2	6	18	19	1	5.7	25.0	31.1
21342031	9	8/14/10	E	2	2	7	18	22	1	6.6	25.0	31.1
21342031	9	8/14/10	E	2	2	8	18	26	1	5.3	25.0	31.1
21342031	9	8/14/10	E	2	2	9	18	29	1	5.6	25.0	31.1
21342031	9	8/14/10	E	2	2	11	18	32	1	4.6	25.0	31.1
21342031	9	8/15/10	S	1	3	2	6	5	1	7.3	22.0	30.9
21342031	9	8/15/10	S	1	3	2	7	1	1	7.6	22.0	30.8
21342031	9	8/15/10	S	1	3	2	8	2	1	7.9	22.0	30.8
21342031	9	8/15/10	S	1	3	2	9	0	1	7.4	22.0	30.8
21342031	9	8/15/10	S	1	3	2	10	0	1	7.5	22.0	30.8
21342031	9	8/15/10	S	1	3	2	11	3	1	7.3	22.0	30.8
21342031	9	8/15/10	S	1	3	2	12	1	1	7.6	22.0	30.6
21342031	9	8/15/10	S	1	3	2	13	2	1	7.5	22.0	30.7
21342031	9	8/15/10	S	1	3	2	14	2	1	7.5	22.0	30.7
21342031	9	8/15/10	S	1	3	5	14	5	1	7.9	22.0	30.7
21342031	9	8/15/10	S	1	3	2	15	1	1	7.4	22.0	30.6
21342031	9	8/15/10	S	2	4	2	16	1	1	7.5	23.0	30.8
21342031	9	8/15/10	S	2	4	2	17	2	1	7.4	23.0	30.3
21342031	9	8/15/10	S	2	4	2	18	1	1	7.3	23.0	30.3
21342031	9	8/16/10	SE	1	2	2	6	0	1	7.3	22.0	30.0
21342031	9	8/16/10	SE	1	2	2	7	0	1	7.4	22.0	29.9
21342031	9	8/16/10	SE	1	2	2	8	0	1	7.2	22.0	29.9
21342031	9	8/16/10	SE	1	2	2	9	0	1	7.5	22.0	29.9
21342031	9	8/16/10	SE	1	2	2	10	0	1	7.3	22.0	29.9
21342031	9	8/16/10	SE	1	2	2	11	0	1	7.4	22.0	29.8
21342031	9	8/16/10	SE	1	2	2	12	0	1	7.3	22.0	29.8
21342031	9	8/16/10	SE	1	2	2	13	0	1	7.5	22.0	29.8
21342031	9	8/16/10	SE	1	2	4	13	5	1	6.4	22.0	29.8

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	8/16/10	SE	1	2	5	13	8	1	7.4	22.0	29.8
21342031	9	8/16/10	SE	1	2	6	13	11	1	6.6	22.0	30.0
21342031	9	8/16/10	SE	1	2	7	13	14	1	6.7	22.0	29.9
21342031	9	8/16/10	SE	1	2	2	14	0	1	7.3	22.0	29.8
21342031	9	8/16/10	SE	1	2	4	14	4	1	6.5	22.0	29.8
21342031	9	8/16/10	SE	1	2	5	14	7	1	7.2	22.0	29.8
21342031	9	8/16/10	SE	1	2	6	14	10	1	6.6	22.0	29.8
21342031	9	8/16/10	SE	1	2	7	14	13	1	6.7	22.0	29.7
21342031	9	8/16/10	SE	1	2	2	15	0	1	7.2	22.0	29.8
21342031	9	8/16/10	SE	1	2	4	15	3	1	6.5	22.0	29.7
21342031	9	8/16/10	SE	1	2	5	15	6	1	7.1	22.0	29.9
21342031	9	8/16/10	SE	1	2	6	15	9	1	6.5	31.5	29.8
21342031	9	8/16/10	SE	1	2	7	15	12	1	6.6	31.5	29.6
21342031	9	8/16/10	SE	1	2	2	16	0	1	7.2	31.5	29.8
21342031	9	8/16/10	SE	1	2	4	16	3	1	6.5	31.5	29.7
21342031	9	8/16/10	SE	1	2	5	16	6	1	7.2	31.5	29.7
21342031	9	8/16/10	SE	1	2	6	16	9	1	6.6	31.5	29.8
21342031	9	8/16/10	SE	1	2	7	16	12	1	6.7	31.5	29.6
21342031	9	8/16/10	SE	1	2	2	17	0	1	7.2	31.5	29.7
21342031	9	8/16/10	SE	1	2	4	17	3	1	6.6	31.5	29.7
21342031	9	8/16/10	SE	1	2	5	17	6	1	7.2	31.5	29.7
21342031	9	8/16/10	SE	1	2	6	17	9	1	6.6	31.5	29.7
21342031	9	8/16/10	SE	1	2	7	17	12	1	6.7	31.5	29.6
21342031	9	8/16/10	SE	1	2	2	18	0	1	7.1	31.5	29.6
21342031	9	8/16/10	SE	1	2	4	18	3	1	6.5	31.5	29.6
21342031	9	8/16/10	SE	1	2	5	18	6	1	7.1	31.5	29.7
21342031	9	8/16/10	SE	1	2	6	18	8	1	6.5	31.5	29.7
21342031	9	8/16/10	SE	1	2	7	18	10	1	6.7	31.5	29.5
21342031	9	8/25/10	N	1	3	5	6	20	1	7.7	19.8	28.8
21342031	9	8/25/10	N	1	3	5	7	21	1	7.7	19.8	28.8
21342031	9	8/25/10	N	1	3	5	8	1	1	7.6	19.8	29.0
21342031	9	8/25/10	N	1	3	5	9	1	1	7.7	19.8	28.8
21342031	9	8/25/10	N	1	3	5	10	1	1	7.6	19.8	29.0
21342031	9	8/25/10	N	1	3	5	11	1	1	7.6	19.8	29.0
21342031	9	8/25/10	N	1	3	1	12	3	1	6.9	19.8	28.8
21342031	9	8/25/10	N	1	3	2	12	6	1	7.5	19.8	29.0
21342031	9	8/25/10	N	1	3	3	12	10	1	6.7	19.8	29.0
21342031	9	8/25/10	N	1	3	5	12	17	1	7.4	19.8	29.0

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	8/25/10	N	1	2	1	13	3	1	6.7		29.0
21342031	9	8/25/10	N	1	2	2	13	7	1	7.3		29.2
21342031	9	8/25/10	N	1	2	3	13	10	1	6.5		29.0
21342031	9	8/25/10	N	1	2	5	13	14	1	7.1		29.2
21342031	9	8/25/10	N	1	2	8	13	19	1	5.7		29.0
21342031	9	8/25/10	N	1	2	9	13	22	1	5.5		29.2
21342031	9	8/25/10	N	1	2	1	14	1	1	7.0		29.2
21342031	9	8/25/10	N	1	2	2	14	6	1	7.4		29.2
21342031	9	8/25/10	N	1	2	3	14	10	1	6.7		29.2
21342031	9	8/25/10	N	1	2	5	14	14	1	7.1		29.2
21342031	9	8/25/10	N	1	2	8	14	20	1	5.6		29.2
21342031	9	8/25/10	N	1	2	9	14	25	1	5.4		29.2
21342031	9	8/25/10	N	1	2	1	15	4	1	7.0		29.0
21342031	9	8/25/10	N	1	2	2	15	7	1	7.6		29.0
21342031	9	8/25/10	N	1	2	3	15	11	1	7.2		29.0
21342031	9	8/25/10	N	1	2	5	15	13	1	7.4		29.0
21342031	9	8/25/10	N	1	2	8	15	18	1	5.9		29.0
21342031	9	8/25/10	N	1	2	9	15	21	1	5.6		29.0
21342031	9	8/25/10	N	1	2	1	16	2	1	7.2		29.0
21342031	9	8/25/10	N	1	2	2	16	7	1	7.6		29.0
21342031	9	8/25/10	N	1	2	3	16	10	1	6.5	23.0	29.0
21342031	9	8/25/10	N	1	2	5	16	15	1	7.3	23.0	29.0
21342031	9	8/25/10	N	1	2	8	16	20	1	5.9	23.0	29.0
21342031	9	8/25/10	N	1	2	9	16	24	1	5.5	23.0	29.0
21342031	9	8/25/10	N	1	2	1	17	1	1	7.1	23.0	29.2
21342031	9	8/25/10	N	1	2	2	17	5	1	7.3	23.0	29.2
21342031	9	8/25/10	N	1	2	3	17	8	1	6.7	23.0	29.2
21342031	9	8/25/10	N	1	2	5	17	10	1	7.2	23.0	29.2
21342031	9	8/25/10	N	1	2	8	17	14	1	5.9	23.0	29.2
21342031	9	8/25/10	N	1	2	9	17	19	1	5.9	23.0	29.2
21342031	9	8/25/10	N	1	2	1	18	1	1	7.2		29.0
21342031	9	8/25/10	N	1	2	2	18	5	1	7.4		29.0
21342031	9	8/25/10	N	1	2	3	18	11	1	6.8		29.0
21342031	9	8/25/10	N	1	2	5	18	17	1	7.3		29.0
21342031	9	8/25/10	N	1	2	8	18	25	1	5.9		29.0
21342031	9	8/25/10	N	1	2	9	18	28	1	5.5		29.0
21342031	9	8/26/10	NW	2	2	2	6	0	1	7.8	26.0	27.0
21342031	9	8/26/10	NW	2	2	2	7	0	1	7.9	26.0	27.5

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Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	8/26/10	NW	2	2	2	8	0	1	8.1	26.0	28.0
21342031	9	8/26/10	NW	2	2	2	9	0	1	8.1	26.0	28.2
21342031	9	8/26/10	NW	2	2	2	10	0	1	8.1	26.0	27.8
21342031	9	8/26/10	NW	2	2	2	11	1	1	7.8	26.0	27.8
21342031	9	8/26/10	NW	2	2	2	12	1	1	7.9	26.0	27.0
21342031	9	8/26/10	NW	2	2	2	13	1	1	7.8	26.0	27.9
21342031	9	8/26/10	NW	2	2	2	14	0	1	8.0	26.0	28.1
21342031	9	8/26/10	NW	2	2	2	15	1	1	7.6	26.0	28.5
21342031	9	8/26/10	NW	2	2	2	16	0	1	7.9	26.0	28.5
21342031	9	8/26/10	NW	2	2	3	16	5	1	7.6	26.0	28.5
21342031	9	8/26/10	NW	2	2	4	16	9	1	7.2	26.0	28.5
21342031	9	8/26/10	NW	2	2	7	16	12	1	7.0	26.0	29.0
21342031	9	8/26/10	NW	2	2	2	17	2	1	7.5	26.0	28.0
21342031	9	8/26/10	NW	2	2	3	17	5	1	7.3	26.0	28.5
21342031	9	8/26/10	NW	2	2	4	17	7	1	7.0	26.0	29.0
21342031	9	8/26/10	NW	2	2	7	17	13	1	6.8	26.0	28.5
21342031	9	8/26/10	NW	2	2	8	17	18	1	6.4	26.0	29.0
21342031	9	8/26/10	NW	2	2	9	17	21	1	6.2	26.0	29.0
21342031	9	8/26/10	NW	2	2	2	18	2	1	7.4	26.0	27.5
21342031	9	8/26/10	NW	2	2	3	18	5	1	6.8	26.0	28.5
21342031	9	8/26/10	NW	2	2	4	18	7	1	6.8	26.0	29.0
21342031	9	8/26/10	NW	2	2	7	18	12	1	6.8	26.0	29.0
21342031	9	8/26/10	NW	2	2	8	18	15	1	6.4	26.0	28.0
21342031	9	8/26/10	NW	2	2	9	18	19	1	6.6	26.0	28.0
21342031	9	8/27/10	NW	1	1	2	8	32	1	8.3		29.1
21342031	9	8/27/10	NW	1	1	2	9	6	1	7.8		28.8
21342031	9	8/27/10	NW	1	1	2	10	0	1	8.0		29.0
21342031	9	8/27/10	NW	1	1	10	10	6	1	7.6		28.8
21342031	9	8/27/10	NW	1	1	2	11	3	1	7.5		29.0
21342031	9	8/27/10	NW	1	1	10	11	12	1	7.5		29.0
21342031	9	8/27/10	NW	1	1	2	12	3	1	7.5		28.8
21342031	9	8/27/10	NW	1	1	2	13	1	1	7.7		28.8
21342031	9	8/27/10	NW	1	1	2	14	0	1	7.6		29.0
21342031	9	8/27/10	NW	1	1	2	15	1	1	7.7		28.8
21342031	9	8/27/10	NW	1	1	2	16	4	1	7.5		28.8
21342031	9	8/27/10	NW	1	1	3	16	8	1	7.5		28.8
21342031	9	8/27/10	NW	1	1	4	16	12	1	7.3		28.6
21342031	9	8/27/10	NW	1	1	10	16	18	1	7.3		28.2

Appendix B

Continued.

Client	Program	Date	Wind Direction	Wind Speed	Weather	Unit	Hour	Minute	Depth	DO	Air Temperature °C	Water Temperature °C
21342031	9	8/27/10	NW	1	1	2	17	2	1	7.7		28.8
21342031	9	8/27/10	NW	1	1	3	17	5	1	7.5		28.8
21342031	9	8/27/10	NW	1	1	4	17	10	1	7.2		29.0
21342031	9	8/27/10	NW	1	1	2	18	0	1	7.6		28.8
21342031	9	8/27/10	NW	1	1	3	18	3	1	7.5		28.8
21342031	9	8/27/10	NW	1	1	4	18	7	1	7.2		28.8
21342031	9	8/27/10	NW	1	1	10	18	12	1	7.4		28.6
21342031	9	8/28/10	S	1	2	2	6	5	1	7.6	15.0	28.3
21342031	9	8/28/10	S	1	2	2	7	3	1	7.9	15.0	28.3
21342031	9	8/28/10	S	1	2	2	8	2	1	8.0	15.0	28.6
21342031	9	8/28/10	S	1	2	2	9	1	1	7.7	15.0	28.5
21342031	9	8/28/10	S	1	2	10	9	6	1	5.9	15.0	28.7
21342031	9	8/28/10	S	1	2	2	10	1	1	7.7	15.0	28.6
21342031	9	8/28/10	S	1	2	10	10	5	1	6.6	15.0	28.7
21342031	9	8/28/10	S	1	2	2	11	0	1	8.2	15.0	28.6
21342031	9	8/28/10	S	1	2	10	11	6	1	6.6	15.0	28.7
21342031	9	8/28/10	S	1	2	2	12	0	1	8.4	15.0	28.5
21342031	9	8/28/10	S	1	2	2	13	0	1	8.1	15.0	28.8
21342031	9	8/28/10	S	1	2	10	13	5	1	7.9	15.0	28.9
21342031	9	8/28/10	S	1	1	2	14	1	1	8.3	28.5	28.7
21342031	9	8/28/10	S	1	1	10	14	6	1	8.2	28.5	28.8
21342031	9	8/28/10	S	1	1	2	15	1	1	8.3	28.5	28.5
21342031	9	8/28/10	S	1	1	10	15	7	1	8.2	28.5	28.7
21342031	9	8/28/10	S	1	1	2	16	3	1	8.1	28.5	28.6
21342031	9	8/28/10	S	1	1	10	16	9	1	8.3	28.5	28.5
21342031	9	8/28/10	S	1	1	2	17	0	1	8.2	28.5	28.4
21342031	9	8/28/10	S	1	1	10	17	5	1	7.6	28.5	28.5

Joint occurrence of daily Holtwood river flows and temperatures April, 1956 - 2009 (historic) and 2010.

	1956-2009 (Historic)																			
	32-35		36-40		41-45		46-50		51-55		56-60		61-65		66-70		71-75		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15,000-19,999							2	0.12	4	0.25	5	0.31	3	0.19	1	0.06			15	0.93
20,000-24,999							2	0.12	15	0.93	26	1.6	13	0.8	4	0.25	1	0.06	61	3.76
25,000-29,999							5	0.31	22	1.36	29	1.79	13	0.8	10	0.62	1	0.06	80	4.94
30,000-34,999					3	0.19	13	0.8	35	2.16	25	1.54	14	0.86	6	0.37	1	0.06	97	5.98
35,000-39,999			1	0.06	6	0.37	14	0.86	28	1.73	35	2.16	20	1.23	5	0.31			109	6.72
40,000-44,999					8	0.49	21	1.3	32	1.97	37	2.28	11	0.68	1	0.06			110	6.79
45,000-49,999			1	0.06	8	0.49	22	1.36	41	2.53	26	1.6	8	0.49	1	0.06			107	6.6
50,000 PLUS	2	0.12	19	1.17	202	12.5	393	24.2	289	17.8	116	7.16	15	0.93	6	0.37			1042	64.3
TOTAL	**2**	**0.12**	**21**	**1.3**	**227**	**14**	**472**	**29.1**	**466**	**28.8**	**299**	**18.5**	**97**	**5.98**	**34**	**2.1**	**3**	**0.19**	**1621**	**100**

	2010																			
	32-35		36-40		41-45		46-50		51-55		56-60		61-65		66-70		71-75		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
20,000-24,999											1	3.33	3	10					4	13.3
25,000-29,999											6	20	1	3.33					7	23.3
30,000-34,999											4	13.3							4	13.3
35,000-39,999											3	10							3	10
40,000-44,999											1	3.33	1	3.33					2	6.67
45,000-49,999											1	3.33	2	6.67					3	10
50,000 PLUS							2	6.67	3	10	2	6.67							7	23.3
TOTAL							**2**	**6.67**	**3**	**10**	**18**	**60**	**7**	**23.3**					**30**	**100**

Joint occurrence of daily Holtwood river flows and temperatures May, 1956 - 2009 (historic) and 2010.

	1956-2009 (Historic)																			
	36-40		**46-50**		**51-55**		**56-60**		**61-65**		**66-70**		**71-75**		**76-80**		**>80**		**TOTAL**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
7,500-9,999							1	0.06											1	0.06
10,000-14,999									3	0.18	24	1.44	14	0.84	14	0.84	2	0.12	57	3.43
15,000-19,999									16	0.96	54	3.25	36	2.16	28	1.68	2	0.12	136	8.17
20,000-24,999					1	0.06	11	0.66	59	3.55	69	4.15	51	3.06	4	0.24			195	11.72
25,000-29,999					8	0.48	27	1.62	57	3.43	62	3.73	30	1.8	2	0.12			186	11.18
30,000-34,999	1	0.06			4	0.24	29	1.74	63	3.79	50	3	23	1.38					170	10.22
35,000-39,999					4	0.24	20	1.2	61	3.67	37	2.22	15	0.9	1	0.06			138	8.29
40,000-44,999					7	0.42	24	1.44	66	3.97	20	1.2	9	0.54					126	7.57
45,000-49,999					1	0.06	31	1.86	40	2.4	18	1.08	10	0.6					100	6.01
50,000 PLUS			5	0.3	64	3.85	220	13.22	189	11.36	59	3.55	16	0.96	2	0.12			555	33.35
TOTAL	**1**	**0.06**	**5**	**0.3**	**89**	**5.35**	**363**	**21.81**	**554**	**33.29**	**393**	**23.62**	**204**	**12.26**	**51**	**3.06**	**4**	**0.24**	**1664**	**100**

	2010																			
	36-40		**46-50**		**51-55**		**56-60**		**61-65**		**66-70**		**71-75**		**76-80**		**>80**		**TOTAL**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
15,000-19,999															1	3.23			1	3.23
20,000-24,999													2	6.45	1	3.23			3	9.68
25,000-29,999							1	3.23	3	9.68	3	9.68	1	3.23					8	25.81
30,000-34,999							1	3.23	2	6.45	3	9.68	1	3.23					7	22.58
35,000-39,999							1	3.23	2	6.45	2	6.45							5	16.13
40,000-44,999							1	3.23	2	6.45									3	9.68
45,000-49,999							1	3.23	2	6.45	1	3.23							4	12.9
TOTAL							**5**	**16.13**	**11**	**35.48**	**9**	**29.03**	**4**	**12.9**	**2**	**6.45**			**31**	**100**

Joint occurrence of daily Holtwood river flows and temperatures June, 1956 - 2009 (historic) and 2010.

	1956 - 2009 (Historic)															
	41-45		**56-60**		**61-65**		**66-70**		**71-75**		**76-80**		**>80**		**TOTAL**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
2,500-4,999									1	0.06	4	0.25	1	0.06	6	0.37
5,000-7,499									6	0.37	38	2.37	17	1.06	61	3.81
7,500-9,999							1	0.06	7	0.44	31	1.94	41	2.56	80	5
10,000-14,999							19	1.19	76	4.75	149	9.31	92	5.75	336	20.99
15,000-19,999					1	0.06	18	1.12	102	6.37	115	7.18	26	1.62	262	16.36
20,000-24,999			1	0.06	1	0.06	27	1.69	95	5.93	68	4.25	21	1.31	213	13.3
25,000-29,999			1	0.06	4	0.25	28	1.75	71	4.43	40	2.5	9	0.56	153	9.56
30,000-34,999					3	0.19	25	1.56	54	3.37	31	1.94	9	0.56	122	7.62
35,000-39,999					1	0.06	24	1.5	42	2.62	23	1.44	1	0.06	91	5.68
40,000-44,999	1	0.06			1	0.06	16	1	23	1.44	15	0.94	1	0.06	57	3.56
45,000-49,999					2	0.12	16	1	18	1.12	6	0.37			42	2.62
50,000 PLUS	1	0.06	15	0.94	33	2.06	46	2.87	68	4.25	14	0.87	1	0.06	178	11.12
TOTAL	**2**	**0.12**	**17**	**1.06**	**46**	**2.87**	**220**	**13.74**	**563**	**35.17**	**534**	**33.35**	**219**	**13.68**	**1601**	**100**

	2010															
	41-45		**56-60**		**61-65**		**66-70**		**71-75**		**76-80**		**>80**		**TOTAL**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
7,500-9,999													3	10	3	10
10,000-14,999													6	20	6	20
15,000-19,999											10	33.33	2	6.67	12	40
20,000-24,999									1	3.33	6	20			7	23.33
25,000-29,999									2	6.67					2	6.67
TOTAL									**3**	**10**	**16**	**53.33**	**11**	**36.67**	**30**	**100**

Joint occurrence of daily Holtwood river flows and temperatures July, 1956 - 2009 (historic) and 2010.

	1956 - 2009 (historic)											
	61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
2,500-5,499							2	0.12	120	7.34	122	7.47
5,500-7,499							33	2.02	187	11.44	220	13.46
7,500-9,999					4	0.24	36	2.2	189	11.57	229	14.01
10,000-14,999					9	0.55	126	7.71	234	14.32	369	22.58
15,000-19,999					8	0.49	107	6.55	116	7.1	231	14.14
20,000-24,999					14	0.86	97	5.94	56	3.43	167	10.22
25,000-29,999					12	0.73	45	2.75	26	1.59	83	5.08
30,000-34,999					8	0.49	44	2.69	12	0.73	64	3.92
35,000-39,999					8	0.49	22	1.35	8	0.49	38	2.33
40,000-44,999					11	0.67	20	1.22	2	0.12	33	2.02
45,000-49,999			1	0.06	4	0.24	9	0.55	1	0.06	15	0.92
50,000 PLUS	1	0.06	12	0.73	34	2.08	14	0.86	2	0.12	63	3.86
TOTAL	**1**	**0.06**	**13**	**0.8**	**112**	**6.85**	**555**	**33.97**	**953**	**58.32**	**1634**	**100**
	2010											
	61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
5,500-7,499									6	50	6	50
7,500-9,999									6	50	6	50
TOTAL									**12**	**100**	**12**	**100**

Joint occurrence of daily Holtwood river flows and temperatures August, 1956 - 2009 (historic) and 2010.

	1956 - 2009 (historic)											
	46-50		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
0-2,499									3	0.18	3	0.18
2,500-5,499					1	0.06	36	2.17	224	13.48	261	15.7
5,500-7,499					12	0.72	87	5.23	261	15.7	360	21.66
7,500-9,999			2	0.12	10	0.6	81	4.87	168	10.11	261	15.7
10,000-14,999			2	0.12	21	1.26	126	7.58	160	9.63	309	18.59
15,000-19,999			2	0.12	21	1.26	125	7.52	67	4.03	215	12.94
20,000-24,999	1	0.06			10	0.6	42	2.53	27	1.62	80	4.81
25,000-29,999					8	0.48	37	2.23	8	0.48	53	3.19
30,000-34,999					10	0.6	21	1.26	4	0.24	35	2.11
35,000-39,999					6	0.36	14	0.84	2	0.12	22	1.32
40,000-44,999					5	0.3	5	0.3	1	0.06	11	0.66
45,000-49,999					2	0.12	6	0.36	2	0.12	10	0.6
50,000 PLUS			7	0.42	9	0.54	25	1.5	1	0.06	42	2.53
TOTAL	**1**	**0.06**	**13**	**0.78**	**115**	**6.92**	**605**	**36.4**	**928**	**55.84**	**1662**	**100**

	2010											
	46-50		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
5,000-7,499							3	10.71	11	39.29	14	50
7,500-9,999							3	10.71	7	25	10	35.71
10,000-14,999							3	10.71			3	10.71
15,000-19,999							1	3.57			1	3.57
TOTAL							**10**	**35.71**	**18**	**64.29**	**28**	**100**

Joint occurrence of daily Holtwood river flows and temperatures September, 1956 - 2009 (historic) and 2010.

	1956 - 2009 (Historic)													
	56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0-2,499									6	0.4	19	1.25	25	1.65
2,500-5,499					11	0.73	95	6.26	137	9.03	76	5.01	319	21.03
5,500-7,499			3	0.2	42	2.77	91	6	133	8.77	55	3.63	324	21.36
7,500-9,999			5	0.33	23	1.52	108	7.12	64	4.22	48	3.16	248	16.35
10,000-14,999			2	0.13	31	2.04	102	6.72	56	3.69	21	1.38	212	13.97
15,000-19,999			18	1.19	47	3.1	66	4.35	11	0.73	9	0.59	151	9.95
20,000-24,999			14	0.92	21	1.38	24	1.58	15	0.99	2	0.13	76	5.01
25,000-29,999			7	0.46	15	0.99	6	0.4	5	0.33			33	2.18
30,000-34,999			3	0.2	15	0.99	7	0.46	5	0.33			30	1.98
35,000-39,999			4	0.26	6	0.4	4	0.26					14	0.92
40,000-44,999			2	0.13	3	0.2	5	0.33	1	0.07	1	0.07	12	0.79
45,000-49,999					6	0.4	1	0.07			1	0.07	8	0.53
50,000 PLUS	5	0.33	14	0.92	31	2.04	9	0.59	2	0.13	4	0.26	65	4.28
TOTAL	**5**	**0.33**	**72**	**4.75**	**251**	**16.55**	**518**	**34.15**	**435**	**28.68**	**236**	**15.56**	**1517**	**100**

	2010													
	56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
2,500-5,499							15	50	3	10			18	60
5,500-7,499							3	10	5	16.67			8	26.67
7,500-9,999									1	3.33	1	3.33	2	6.67
10,000-14,999									1	3.33			1	3.33
15,000-19,999							1	3.33					1	3.33
TOTAL							**19**	**63.33**	**10**	**33.33**	**1**	**3.33**	**30**	**100**

Joint occurrence of daily Holtwood river flows and temperatures October, 1956 - 2009 (historic) and 2010.

	1956-2009 (Historic) and 2010																			
	41-45		**46-50**		**51-55**		**56-60**		**61-65**		**66-70**		**71-75**		**76-80**		**>80**		**TOTAL**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
0-2,499											7	0.44	5	0.31					12	0.75
2,500-4,999					5	0.31	27	1.68	43	2.68	70	4.36	48	2.99	9	0.56	4	0.25	206	12.83
5,000-7,499					22	1.37	58	3.61	104	6.48	61	3.8	12	0.75	7	0.44	1	0.06	265	16.5
7,500-9,999					10	0.62	40	2.49	93	5.79	69	4.3	20	1.25	2	0.12			234	14.57
10,000-14,999					28	1.74	75	4.67	122	7.6	48	2.99	15	0.93	1	0.06			289	18
15,000-19,999			4	0.25	16	1	59	3.67	44	2.74	19	1.18	8	0.5	1	0.06			151	9.4
20,000-24,999			1	0.06	21	1.31	38	2.37	33	2.05	12	0.75	3	0.19					108	6.72
25,000-29,999			2	0.12	18	1.12	10	0.62	21	1.31	4	0.25	5	0.31	1	0.06			61	3.8
30,000-34,999					15	0.93	14	0.87	13	0.81	6	0.37	2	0.12					50	3.11
35,000-39,999			1	0.06	9	0.56	8	0.5	7	0.44	6	0.37	2	0.12					33	2.05
40,000-44,999			1	0.06	11	0.68	13	0.81	1	0.06	3	0.19	1	0.06					30	1.87
45,000-49,999			3	0.19	6	0.37	9	0.56	3	0.19	2	0.12							23	1.43
50,000 PLUS	4	0.25	31	1.93	45	2.8	38	2.37	17	1.06	4	0.25	5	0.31					144	8.97
TOTAL	**4**	**0.25**	**43**	**2.68**	**206**	**12.83**	**389**	**24.22**	**501**	**31.2**	**311**	**19.36**	**126**	**7.85**	**21**	**1.31**	**5**	**0.31**	**1606**	**100**

	2010																			
	41-45		**46-50**		**51-55**		**56-60**		**61-65**		**66-70**		**71-75**		**76-80**		**>80**		**TOTAL**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
15,000-19,999					2	6.45	4	12.9											6	19.35
20,000-24,999					1	3.23	3	9.68											4	12.9
25,000-29,999							5	16.13	1	3.23									6	19.35
30,000-34,999							1	3.23	2	6.45									3	9.68
35,000-39,999									1	3.23			1	3.23					2	6.45
40,000-44,999									1	3.23									1	3.23
45,000-49,999							1	3.23											1	3.23
50,000 PLUS							2	6.45	5	16.13	1	3.23							8	25.81
TOTAL					**3**	**9.68**	**16**	**51.61**	**10**	**32.26**	**1**	**3.23**	**1**	**3.23**					**31**	**100**

Joint occurrence of daily Holtwood river flows and temperatures April, 1956 - 2010.

	32-35		36-40		41-45		46-50		51-55		56-60		61-65		66-70		71-75		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15,000-19,999							2	0.12	4	0.24	5	0.3	3	0.18	1	0.06			15	0.91
20,000-24,999							2	0.12	15	0.91	27	1.64	16	0.97	4	0.24	1	0.06	65	3.94
25,000-29,999							5	0.3	22	1.33	35	2.12	14	0.85	10	0.61	1	0.06	87	5.27
30,000-34,999					3	0.18	13	0.79	35	2.12	29	1.76	14	0.85	6	0.36	1	0.06	101	6.12
35,000-39,999			1	0.06	6	0.36	14	0.85	28	1.7	38	2.3	20	1.21	5	0.3			112	6.78
40,000-44,999					8	0.48	21	1.27	32	1.94	38	2.3	12	0.73	1	0.06			112	6.78
45,000-49,999			1	0.06	8	0.48	22	1.33	41	2.48	27	1.64	10	0.61	1	0.06			110	6.66
50,000 PLUS	2	0.12	19	1.15	202	12.24	395	23.92	292	17.69	118	7.15	15	0.91	6	0.36			1049	63.54
TOTAL	2	0.12	21	1.27	227	13.75	474	28.71	469	28.41	317	19.2	104	6.3	34	2.06	3	0.18	1651	100

Joint occurrence of daily Holtwood river flows and temperatures May, 1956 - 2010.

	36-40		46-50		51-55		56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
7,500-9,999							1	0.06											1	0.06
10,000-14,999									3	0.18	24	1.42	14	0.83	14	0.83	2	0.12	57	3.36
15,000-19,999									16	0.94	54	3.19	36	2.12	29	1.71	2	0.12	137	8.08
20,000-24,999					1	0.06	11	0.65	59	3.48	69	4.07	53	3.13	5	0.29			198	11.68
25,000-29,999					8	0.47	28	1.65	60	3.54	65	3.83	31	1.83	2	0.12			194	11.45
30,000-34,999	1	0.06			4	0.24	30	1.77	65	3.83	53	3.13	24	1.42					177	10.44
35,000-39,999					4	0.24	21	1.24	63	3.72	39	2.3	15	0.88	1	0.06			143	8.44
40,000-44,999					7	0.41	25	1.47	68	4.01	20	1.18	9	0.53					129	7.61
45,000-49,999					1	0.06	32	1.89	42	2.48	19	1.12	10	0.59					104	6.14
50,000 PLUS			5	0.29	64	3.78	220	12.98	189	11.15	59	3.48	16	0.94	2	0.12			555	32.74
TOTAL	1	0.06	5	0.29	89	5.25	368	21.71	565	33.33	402	23.72	208	12.27	53	3.13	4	0.24	1695	100

Joint occurrence of daily Holtwood river flows and temperatures June, 1956 - 2010.

	41-45		56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%			N	%
2,500-4,999									1	0.06	4	0.25	1	0.06	6	0.37
5,000-7,499									6	0.37	38	2.33	17	1.04	61	3.74
7,500-9,999							1	0.06	7	0.43	31	1.9	44	2.7	83	5.09
10,000-14,999							19	1.16	76	4.66	149	9.14	98	6.01	342	20.97
15,000-19,999					1	0.06	18	1.1	102	6.25	125	7.66	28	1.72	274	16.8
20,000-24,999			1	0.06	1	0.06	27	1.66	96	5.89	74	4.54	21	1.29	220	13.49
25,000-29,999			1	0.06	4	0.25	28	1.72	73	4.48	40	2.45	9	0.55	155	9.5
30,000-34,999					3	0.18	25	1.53	54	3.31	31	1.9	9	0.55	122	7.48
35,000-39,999					1	0.06	24	1.47	42	2.58	23	1.41	1	0.06	91	5.58
40,000-44,999	1	0.06			1	0.06	16	0.98	23	1.41	15	0.92	1	0.06	57	3.49
45,000-49,999					2	0.12	16	0.98	18	1.1	6	0.37			42	2.58
50,000 PLUS	1	0.06	15	0.92	33	2.02	46	2.82	68	4.17	14	0.86	1	0.06	178	10.91
TOTAL	2	0.12	17	1.04	46	2.82	220	13.49	566	34.7	550	33.72	230	14.1	1631	100

Joint occurrence of daily Holtwood river flows and temperatures July, 1956 - 2010.

	61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%			N	%
2,500-4,999							2	0.12	120	7.29	122	7.41
5,000-7,499							33	2	193	11.73	226	13.73
7,500-9,999					4	0.24	36	2.19	195	11.85	235	14.28
10,000-14,999					9	0.55	126	7.65	234	14.22	369	22.42
15,000-19,999					8	0.49	107	6.5	116	7.05	231	14.03
20,000-24,999					14	0.85	97	5.89	56	3.4	167	10.15
25,000-29,999					12	0.73	45	2.73	26	1.58	83	5.04
30,000-34,999					8	0.49	44	2.67	12	0.73	64	3.89
35,000-39,999					8	0.49	22	1.34	8	0.49	38	2.31
40,000-44,999					11	0.67	20	1.22	2	0.12	33	2
45,000-49,999			1	0.06	4	0.24	9	0.55	1	0.06	15	0.91
50,000 PLUS	1	0.06	12	0.73	34	2.07	14	0.85	2	0.12	63	3.83
TOTAL	1	0.06	13	0.79	112	6.8	555	33.72	965	58.63	1646	100

Joint occurrence of daily Holtwood river flows and temperatures August, 1956 - 2010.

	46-50		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
0-2,499									3	0.18	3	0.18
2,500-4,999					1	0.06	36	2.13	224	13.25	261	15.44
5,000-7,499					12	0.71	90	5.33	272	16.09	374	22.13
7,500-9,999			2	0.12	10	0.59	84	4.97	175	10.36	271	16.04
10,000-14,999			2	0.12	21	1.24	129	7.63	160	9.47	312	18.46
15,000-19,999			2	0.12	21	1.24	126	7.46	67	3.96	216	12.78
20,000-24,999	1	0.06			10	0.59	42	2.49	27	1.6	80	4.73
25,000-29,999					8	0.47	37	2.19	8	0.47	53	3.14
30,000-34,999					10	0.59	21	1.24	4	0.24	35	2.07
35,000-39,999					6	0.36	14	0.83	2	0.12	22	1.3
40,000-44,999					5	0.3	5	0.3	1	0.06	11	0.65
45,000-49,999					2	0.12	6	0.36	2	0.12	10	0.59
50,000 PLUS			7	0.41	9	0.53	25	1.48	1	0.06	42	2.49
TOTAL	1	0.06	13	0.77	115	6.8	615	36.39	946	55.98	1690	100

Joint occurrence of daily Holtwood river flows and temperatures September, 1956 - 2010.

	56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0-2,499									6	0.39	19	1.23	25	1.62
2,500-4,999					11	0.71	110	7.11	140	9.05	76	4.91	337	21.78
5,000-7,499			3	0.19	42	2.71	94	6.08	138	8.92	55	3.56	332	21.46
7,500-9,999			5	0.32	23	1.49	108	6.98	65	4.2	49	3.17	250	16.16
10,000-14,999			2	0.13	31	2	102	6.59	57	3.68	21	1.36	213	13.77
15,000-19,999			18	1.16	47	3.04	67	4.33	11	0.71	9	0.58	152	9.83
20,000-24,999			14	0.9	21	1.36	24	1.55	15	0.97	2	0.13	76	4.91
25,000-29,999			7	0.45	15	0.97	6	0.39	5	0.32			33	2.13
30,000-34,999			3	0.19	15	0.97	7	0.45	5	0.32			30	1.94
35,000-39,999			4	0.26	6	0.39	4	0.26					14	0.9
40,000-44,999			2	0.13	3	0.19	5	0.32	1	0.06	1	0.06	12	0.78
45,000-49,999					6	0.39	1	0.06			1	0.06	8	0.52
50,000 PLUS	5	0.32	14	0.9	31	2	9	0.58	2	0.13	4	0.26	65	4.2
TOTAL	5	0.32	72	4.65	251	16.22	537	34.71	445	28.77	237	15.32	1547	100

Joint occurrence of daily Holtwood river flows and temperatures October, 1956 - 2010.

	41-45		46-50		51-55		56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0-2,499											7	0.43	5	0.31					12	0.73
2,500-4,999					5	0.31	27	1.65	43	2.63	70	4.28	48	2.93	9	0.55	4	0.24	206	12.58
5,000-7,499					22	1.34	58	3.54	104	6.35	61	3.73	12	0.73	7	0.43	1	0.06	265	16.19
7,500-9,999					10	0.61	40	2.44	93	5.68	69	4.22	20	1.22	2	0.12			234	14.29
10,000-14,999					28	1.71	75	4.58	122	7.45	48	2.93	15	0.92	1	0.06			289	17.65
15,000-19,999			4	0.24	18	1.1	63	3.85	44	2.69	19	1.16	8	0.49	1	0.06			157	9.59
20,000-24,999			1	0.06	22	1.34	41	2.5	33	2.02	12	0.73	3	0.18					112	6.84
25,000-29,999			2	0.12	18	1.1	15	0.92	22	1.34	4	0.24	5	0.31	1	0.06			67	4.09
30,000-34,999					15	0.92	15	0.92	15	0.92	6	0.37	2	0.12					53	3.24
35,000-39,999			1	0.06	9	0.55	8	0.49	8	0.49	6	0.37	3	0.18					35	2.14
40,000-44,999			1	0.06	11	0.67	13	0.79	2	0.12	3	0.18	1	0.06					31	1.89
45,000-49,999			3	0.18	6	0.37	10	0.61	3	0.18	2	0.12							24	1.47
50,000 PLUS	4	0.24	31	1.89	45	2.75	40	2.44	22	1.34	5	0.31	5	0.31					152	9.29
TOTAL	4	0.24	43	2.63	209	12.77	405	24.74	511	31.22	312	19.06	127	7.76	21	1.28	5	0.31	1637	100

SAH=monthly_jnt_occur_56-2010_flow_interval_v3/Oct 56-2010-2/8/2011

Joint occurrence of daily Holtwood river flows and temperatures November, 1956 - 2009.

	32-35		36-40		41-45		46-50		51-55		56-60		61-65		66-70		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0-2,499													1	0.06	2	0.13	3	0.19
2,500-4,999			1	0.06			11	0.7	17	1.08	14	0.89	4	0.25	1	0.06	48	3.05
5,000-7,499					6	0.38	25	1.59	57	3.63	31	1.97	11	0.7	4	0.25	134	8.52
7,500-9,999					6	0.38	18	1.15	35	2.23	19	1.21	10	0.64			88	5.6
10,000-14,999			16	1.02	21	1.34	52	3.31	82	5.22	13	0.83	8	0.51			192	12.21
15,000-19,999			14	0.89	24	1.53	46	2.93	47	2.99	9	0.57	4	0.25			144	9.16
20,000-24,999	5	0.32	19	1.21	33	2.1	48	3.05	31	1.97	14	0.89	4	0.25			154	9.8
25,000-29,999			33	2.1	34	2.16	55	3.5	28	1.78	9	0.57	2	0.13			161	10.24
30,000-34,999			25	1.59	32	2.04	39	2.48	33	2.1	2	0.13					131	8.33
35,000-39,999			15	0.95	36	2.29	26	1.65	18	1.15	6	0.38	2	0.13			103	6.55
40,000-44,999			9	0.57	39	2.48	24	1.53	8	0.51	1	0.06					81	5.15
45,000-49,999			3	0.19	20	1.27	17	1.08	6	0.38	1	0.06					47	2.99
50,000 PLUS			32	2.04	112	7.12	89	5.66	39	2.48	13	0.83	1	0.06			286	18.19
TOTAL	5	0.32	167	10.62	363	23.09	450	28.63	401	25.51	132	8.4	47	2.99	7	0.45	1572	100

APPENDIX B-2: RIVER FLOW AND WATER TEMPERATURE JOINT PROBABILITY OCCURRENCES FOR EACH MONTH (APRIL-OCTOBER).

	1956-2009 (Historic)																			
	32-35		36-40		41-45		46-50		51-55		56-60		61-65		66-70		71-75		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15,000-19,999							2	0.12	4	0.25	5	0.31	3	0.19	1	0.06			15	0.93
20,000-24,999							2	0.12	15	0.93	26	1.6	13	0.8	4	0.25	1	0.06	61	3.76
25,000-29,999							5	0.31	22	1.36	29	1.79	13	0.8	10	0.62	1	0.06	80	4.94
30,000-34,999					3	0.19	13	0.8	35	2.16	25	1.54	14	0.86	6	0.37	1	0.06	97	5.98
35,000-39,999			1	0.06	6	0.37	14	0.86	28	1.73	35	2.16	20	1.23	5	0.31			109	6.72
40,000-44,999					8	0.49	21	1.3	32	1.97	37	2.28	11	0.68	1	0.06			110	6.79
45,000-49,999			1	0.06	8	0.49	22	1.36	41	2.53	26	1.6	8	0.49	1	0.06			107	6.6
50,000 PLUS	2	0.12	19	1.17	202	12.46	393	24.24	289	17.83	116	7.16	15	0.93	6	0.37			1042	64.28
TOTAL	**2**	**0.12**	**21**	**1.3**	**227**	**14**	**472**	**29.1**	**466**	**28.8**	**299**	**18.5**	**97**	**5.98**	**34**	**2.1**	**3**	**0.19**	**1621**	**100**
	2010																			
	32-35		36-40		41-45		46-50		51-55		56-60		61-65		66-70		71-75		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
20,000-24,999											1	3.33	3	10					4	13.33
25,000-29,999											6	20	1	3.33					7	23.33
30,000-34,999											4	13.33							4	13.33
35,000-39,999											3	10							3	10
40,000-44,999											1	3.33	1	3.33					2	6.67
45,000-49,999											1	3.33	2	6.67					3	10
50,000 PLUS							2	6.67	3	10	2	6.67							7	23.33
TOTAL							**2**	**6.67**	**3**	**10**	**18**	**60**	**7**	**23.3**					**30**	**100**

APPENDIX B-2: JOINT OCCURRENCE OF DAILY HOLTWOOD RIVER FLOWS AND TEMPERATURES MAY, 1956-2009 (HISTORIC) AND 2010.

	1956-2009 (Historic)																			
	36-40		46-50		51-55		56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
7,500-9,999							1	0.06											1	0.06
10,000-14,999									3	0.18	24	1.44	14	0.84	14	0.84	2	0.12	57	3.43
15,000-19,999									16	0.96	54	3.25	36	2.16	28	1.68	2	0.12	136	8.17
20,000-24,999					1	0.06	11	0.66	59	3.55	69	4.15	51	3.06	4	0.24			195	11.72
25,000-29,999					8	0.48	27	1.62	57	3.43	62	3.73	30	1.8	2	0.12			186	11.18
30,000-34,999	1	0.06			4	0.24	29	1.74	63	3.79	50	3	23	1.38					170	10.22
35,000-39,999					4	0.24	20	1.2	61	3.67	37	2.22	15	0.9	1	0.06			138	8.29
40,000-44,999					7	0.42	24	1.44	66	3.97	20	1.2	9	0.54					126	7.57
45,000-49,999					1	0.06	31	1.86	40	2.4	18	1.08	10	0.6					100	6.01
50,000 PLUS			5	0.3	64	3.85	220	13.22	189	11.36	59	3.55	16	0.96	2	0.12			555	33.35
TOTAL	**1**	**0.06**	**5**	**0.3**	**89**	**5.35**	**363**	**21.8**	**554**	**33.3**	**393**	**23.6**	**204**	**12.3**	**51**	**3.06**	**4**	**0.24**	**1664**	**100**

	2010																			
	36-40		46-50		51-55		56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15,000-19,999															1	3.23			1	3.23
20,000-24,999													2	6.45	1	3.23			3	9.68
25,000-29,999							1	3.23	3	9.68	3	9.68	1	3.23					8	25.81
30,000-34,999							1	3.23	2	6.45	3	9.68	1	3.23					7	22.58
35,000-39,999							1	3.23	2	6.45	2	6.45							5	16.13
40,000-44,999							1	3.23	2	6.45									3	9.68
45,000-49,999							1	3.23	2	6.45	1	3.23							4	12.9
TOTAL							**5**	**16.1**	**11**	**35.5**	**9**	**29**	**4**	**12.9**	**2**	**6.45**			**31**	**100**

APPENDIX B-2: JOINT OCCURRENCE OF DAILY HOLTWOOD RIVER FLOWS AND TEMPERATURES JUNE, 1956-2009 (HISTORIC) AND 2010.

	1956 - 2009 (Historic)															
	41-45		56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
2,500-4,999									1	0.06	4	0.25	1	0.06	6	0.37
5,000-7,499									6	0.37	38	2.37	17	1.06	61	3.81
7,500-9,999							1	0.06	7	0.44	31	1.94	41	2.56	80	5
10,000-14,999							19	1.19	76	4.75	149	9.31	92	5.75	336	20.99
15,000-19,999					1	0.06	18	1.12	102	6.37	115	7.18	26	1.62	262	16.36
20,000-24,999			1	0.06	1	0.06	27	1.69	95	5.93	68	4.25	21	1.31	213	13.3
25,000-29,999			1	0.06	4	0.25	28	1.75	71	4.43	40	2.5	9	0.56	153	9.56
30,000-34,999					3	0.19	25	1.56	54	3.37	31	1.94	9	0.56	122	7.62
35,000-39,999					1	0.06	24	1.5	42	2.62	23	1.44	1	0.06	91	5.68
40,000-44,999	1	0.06			1	0.06	16	1	23	1.44	15	0.94	1	0.06	57	3.56
45,000-49,999					2	0.12	16	1	18	1.12	6	0.37			42	2.62
50,000 PLUS	1	0.06	15	0.94	33	2.06	46	2.87	68	4.25	14	0.87	1	0.06	178	11.12
TOTAL	**2**	**0.12**	**17**	**1.06**	**46**	**2.87**	**220**	**13.7**	**563**	**35.2**	**534**	**33.4**	**219**	**13.7**	**1601**	**100**
	2010															
	41-45		56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
7,500-9,999													3	10	3	10
10,000-14,999													6	20	6	20
15,000-19,999											10	33.33	2	6.67	12	40
20,000-24,999									1	3.33	6	20			7	23.33
25,000-29,999									2	6.67					2	6.67
TOTAL									**3**	**10**	**16**	**53.3**	**11**	**36.7**	**30**	**100**

APPENDIX B-2: JOINT OCCURRENCE OF DAILY HOLTWOOD RIVER FLOWS AND TEMPERATURES JULY, 1956-2009 (HISTORIC) AND 2010.

	1956 - 2009 (Historic)											
	61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
2,500-5,499							2	0.12	120	7.34	122	7.47
5,500-7,499							33	2.02	187	11.44	220	13.46
7,500-9,999					4	0.24	36	2.2	189	11.57	229	14.01
10,000-14,999					9	0.55	126	7.71	234	14.32	369	22.58
15,000-19,999					8	0.49	107	6.55	116	7.1	231	14.14
20,000-24,999					14	0.86	97	5.94	56	3.43	167	10.22
25,000-29,999					12	0.73	45	2.75	26	1.59	83	5.08
30,000-34,999					8	0.49	44	2.69	12	0.73	64	3.92
35,000-39,999					8	0.49	22	1.35	8	0.49	38	2.33
40,000-44,999					11	0.67	20	1.22	2	0.12	33	2.02
45,000-49,999			1	0.06	4	0.24	9	0.55	1	0.06	15	0.92
50,000 PLUS	1	0.06	12	0.73	34	2.08	14	0.86	2	0.12	63	3.86
TOTAL	**1**	**0.06**	**13**	**0.8**	**112**	**6.85**	**555**	**33.97**	**953**	**58.32**	**1634**	**100**

	2010											
	61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
5,500-7,499									6	50	6	50
7,500-9,999									6	50	6	50
TOTAL									**12**	**100**	**12**	**100**

APPENDIX B-2: JOINT OCCURRENCE OF DAILY HOLTWOOD RIVER FLOWS AND TEMPERATURES AUGUST, 1956-2009 (HISTORIC) AND 2010.

	1956 - 2009 (Historic)											
	46-50		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
0-2,499									3	0.18	3	0.18
2,500-5,499					1	0.06	36	2.17	224	13.48	261	15.7
5,500-7,499					12	0.72	87	5.23	261	15.7	360	21.66
7,500-9,999			2	0.12	10	0.6	81	4.87	168	10.11	261	15.7
10,000-14,999			2	0.12	21	1.26	126	7.58	160	9.63	309	18.59
15,000-19,999			2	0.12	21	1.26	125	7.52	67	4.03	215	12.94
20,000-24,999	1	0.06			10	0.6	42	2.53	27	1.62	80	4.81
25,000-29,999					8	0.48	37	2.23	8	0.48	53	3.19
30,000-34,999					10	0.6	21	1.26	4	0.24	35	2.11
35,000-39,999					6	0.36	14	0.84	2	0.12	22	1.32
40,000-44,999					5	0.3	5	0.3	1	0.06	11	0.66
45,000-49,999					2	0.12	6	0.36	2	0.12	10	0.6
50,000 PLUS			7	0.42	9	0.54	25	1.5	1	0.06	42	2.53
TOTAL	**1**	**0.06**	**13**	**0.78**	**115**	**6.92**	**605**	**36.4**	**928**	**55.84**	**1662**	**100**

	2010											
	46-50		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%
5,000-7,499							3	10.71	11	39.29	14	50
7,500-9,999							3	10.71	7	25	10	35.71
10,000-14,999							3	10.71			3	10.71
15,000-19,999							1	3.57			1	3.57
TOTAL							**10**	**35.71**	**18**	**64.29**	**28**	**100**

APPENDIX B-2: JOINT OCCURRENCE OF DAILY HOLTWOOD RIVER FLOWS AND TEMPERATURES SEPTEMBER, 1956-2009 (HISTORIC) AND 2010.

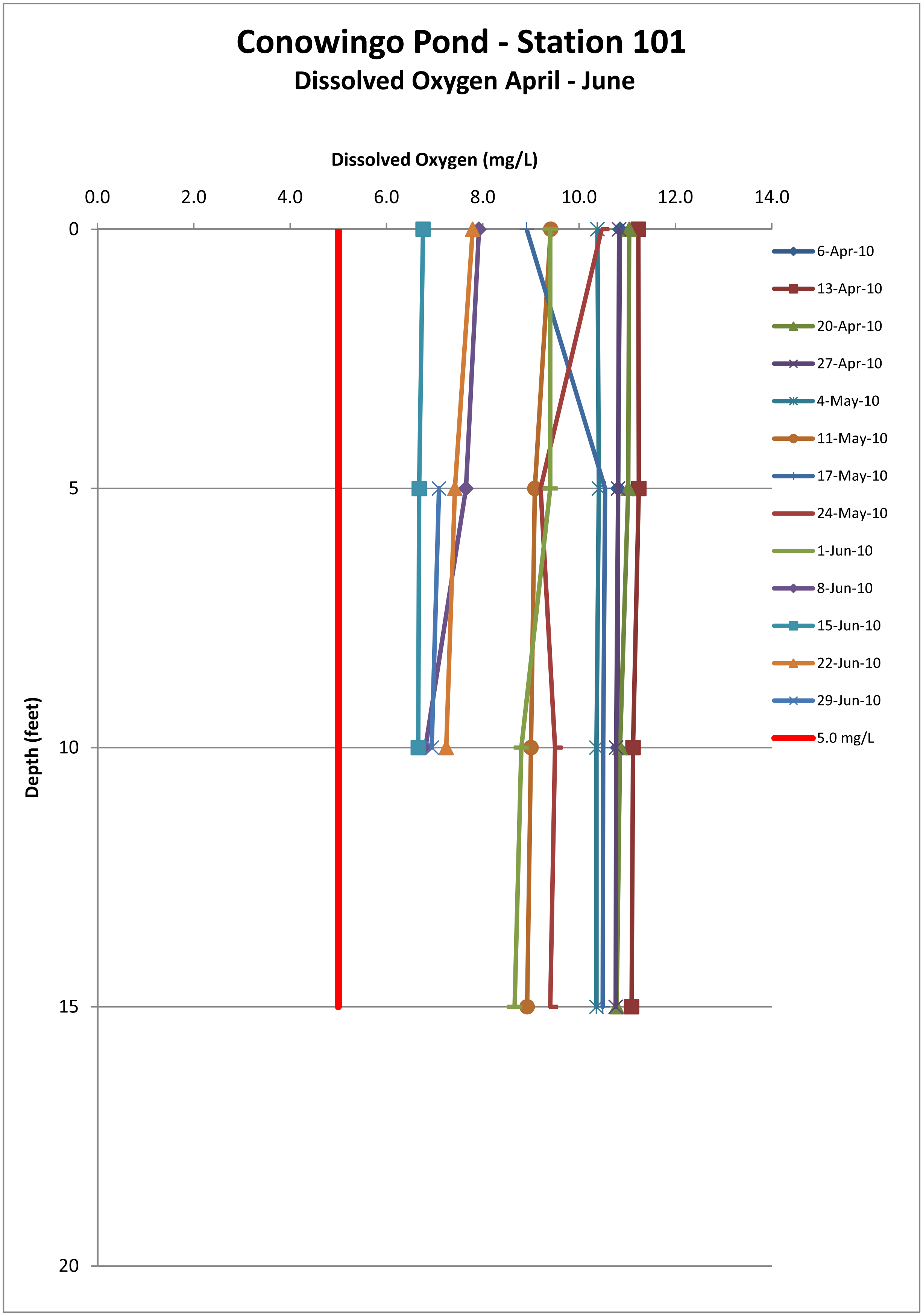
	1956 - 2009 (Historic)													
	56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0-2,499									6	0.4	19	1.25	25	1.65
2,500-5,499					11	0.73	95	6.26	137	9.03	76	5.01	319	21.03
5,500-7,499			3	0.2	42	2.77	91	6	133	8.77	55	3.63	324	21.36
7,500-9,999			5	0.33	23	1.52	108	7.12	64	4.22	48	3.16	248	16.35
10,000-14,999			2	0.13	31	2.04	102	6.72	56	3.69	21	1.38	212	13.97
15,000-19,999			18	1.19	47	3.1	66	4.35	11	0.73	9	0.59	151	9.95
20,000-24,999			14	0.92	21	1.38	24	1.58	15	0.99	2	0.13	76	5.01
25,000-29,999			7	0.46	15	0.99	6	0.4	5	0.33			33	2.18
30,000-34,999			3	0.2	15	0.99	7	0.46	5	0.33			30	1.98
35,000-39,999			4	0.26	6	0.4	4	0.26					14	0.92
40,000-44,999			2	0.13	3	0.2	5	0.33	1	0.07	1	0.07	12	0.79
45,000-49,999					6	0.4	1	0.07			1	0.07	8	0.53
50,000 PLUS	5	0.33	14	0.92	31	2.04	9	0.59	2	0.13	4	0.26	65	4.28
TOTAL	**5**	**0.33**	**72**	**4.75**	**251**	**16.6**	**518**	**34.2**	**435**	**28.7**	**236**	**15.6**	**1517**	**100**

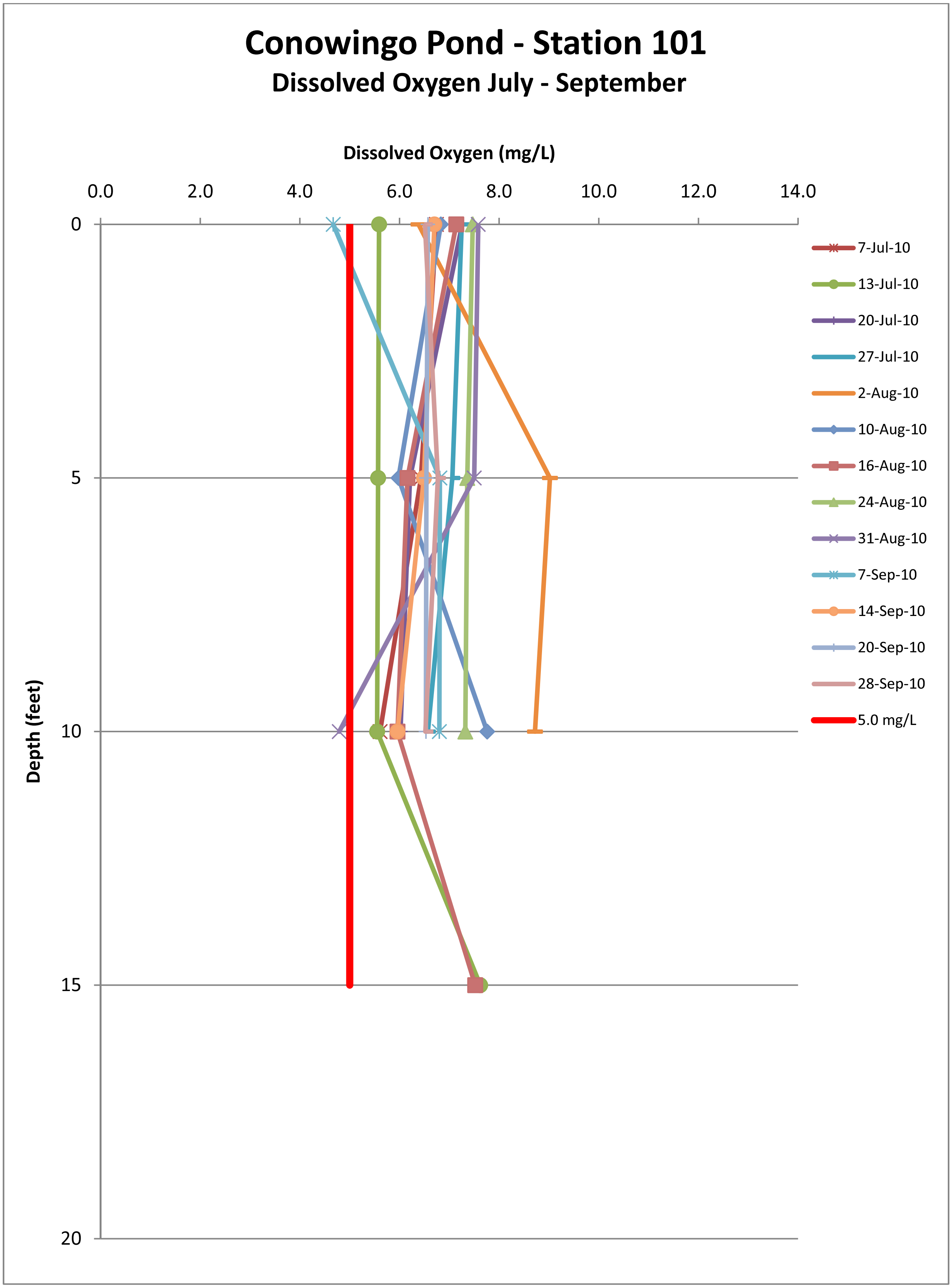
	2010													
	56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
2,500-5,499							15	50	3	10			18	60
5,500-7,499							3	10	5	16.67			8	26.67
7,500-9,999									1	3.33	1	3.33	2	6.67
10,000-14,999									1	3.33			1	3.33
15,000-19,999							1	3.33					1	3.33
TOTAL							**19**	**63.3**	**10**	**33.3**	**1**	**3.33**	**30**	**100**

APPENDIX B-2: JOINT OCCURRENCE OF DAILY HOLTWOOD RIVER FLOWS AND TEMPERATURES OCTOBER, 1956-2009 (HISTORIC) AND 2010.

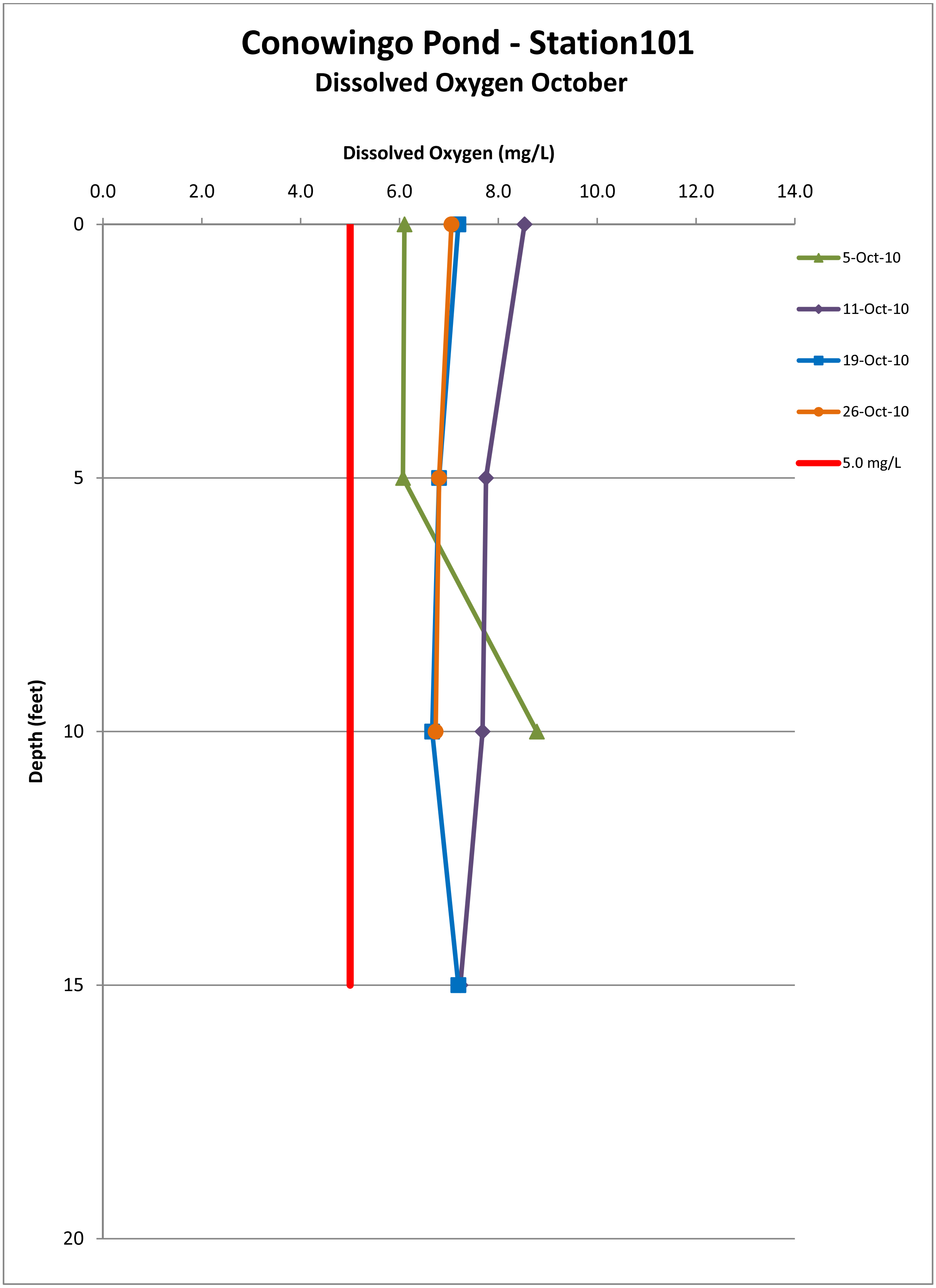
	1956-2009 (Historic) and 2010																			
	41-45		46-50		51-55		56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0-2,499											7	0.44	5	0.31					12	0.75
2,500-4,999					5	0.31	27	1.68	43	2.68	70	4.36	48	2.99	9	0.56	4	0.25	206	12.83
5,000-7,499					22	1.37	58	3.61	104	6.48	61	3.8	12	0.75	7	0.44	1	0.06	265	16.5
7,500-9,999					10	0.62	40	2.49	93	5.79	69	4.3	20	1.25	2	0.12			234	14.57
10,000-14,999					28	1.74	75	4.67	122	7.6	48	2.99	15	0.93	1	0.06			289	18
15,000-19,999			4	0.25	16	1	59	3.67	44	2.74	19	1.18	8	0.5	1	0.06			151	9.4
20,000-24,999			1	0.06	21	1.31	38	2.37	33	2.05	12	0.75	3	0.19					108	6.72
25,000-29,999			2	0.12	18	1.12	10	0.62	21	1.31	4	0.25	5	0.31	1	0.06			61	3.8
30,000-34,999					15	0.93	14	0.87	13	0.81	6	0.37	2	0.12					50	3.11
35,000-39,999			1	0.06	9	0.56	8	0.5	7	0.44	6	0.37	2	0.12					33	2.05
40,000-44,999			1	0.06	11	0.68	13	0.81	1	0.06	3	0.19	1	0.06					30	1.87
45,000-49,999			3	0.19	6	0.37	9	0.56	3	0.19	2	0.12							23	1.43
50,000 PLUS	4	0.25	31	1.93	45	2.8	38	2.37	17	1.06	4	0.25	5	0.31					144	8.97
TOTAL	**4**	**0.25**	**43**	**2.68**	**206**	**12.8**	**389**	**24.2**	**501**	**31.2**	**311**	**19.4**	**126**	**7.85**	**21**	**1.31**	**5**	**0.31**	**1606**	**100**
	2010																			
	41-45		46-50		51-55		56-60		61-65		66-70		71-75		76-80		>80		TOTAL	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
15,000-19,999					2	6.45	4	12.9											6	19.35
20,000-24,999					1	3.23	3	9.68											4	12.9
25,000-29,999							5	16.13	1	3.23									6	19.35
30,000-34,999							1	3.23	2	6.45									3	9.68
35,000-39,999									1	3.23			1	3.23					2	6.45
40,000-44,999									1	3.23									1	3.23
45,000-49,999							1	3.23											1	3.23
50,000 PLUS							2	6.45	5	16.13	1	3.23							8	25.81
TOTAL					**3**	**9.68**	**16**	**51.6**	**10**	**32.3**	**1**	**3.23**	**1**	**3.23**					**31**	**100**

APPENDIX C: CONOWINGO POND DO AND WATER TEMPERATURE PROFILE PLOTS (ALL 8 TRANSECTS)

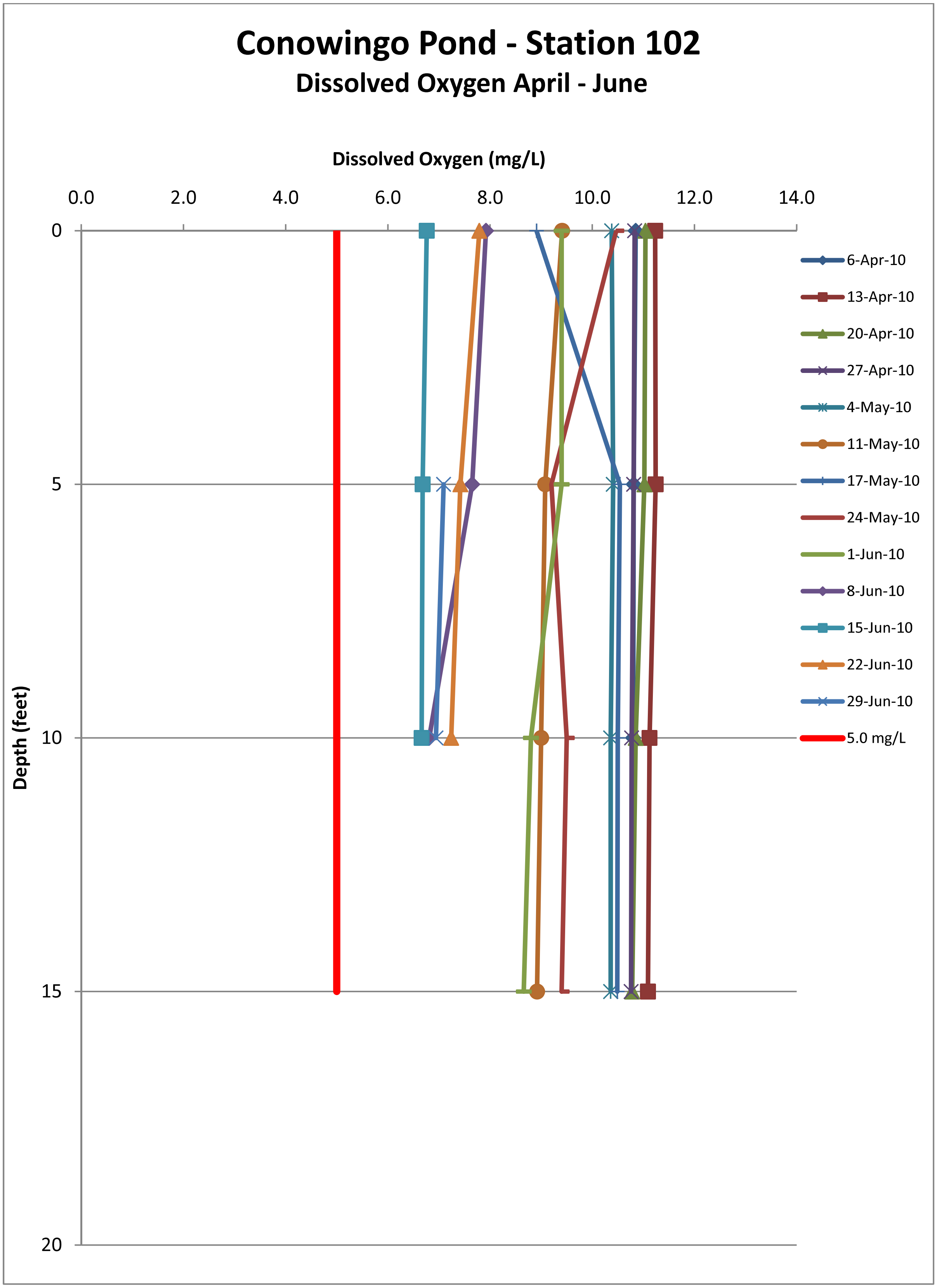

Conowingo Pond - Station 101
Dissolved Oxygen April - June
Dissolved Oxygen (mg/L)
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
Depth (feet)
0
5
10
15
20
6-Apr-10
13-Apr-10
20-Apr-10
27-Apr-10
4-May-10
11-May-10
17-May-10
24-May-10
1-Jun-10
8-Jun-10
15-Jun-10
22-Jun-10
29-Jun-10
5.0 mg/L



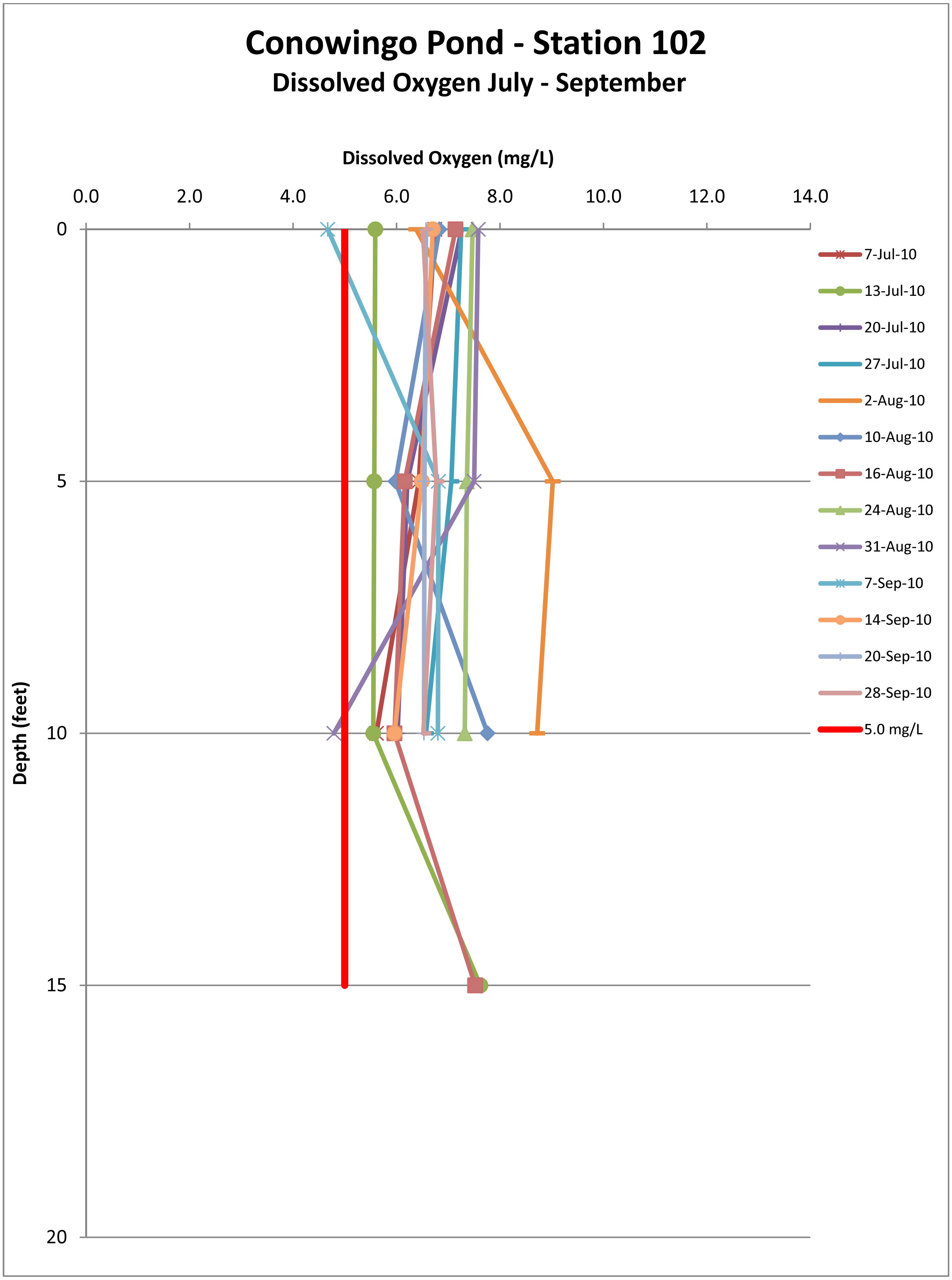
Conowingo Pond - Station 101
Dissolved Oxygen July - September
Dissolved Oxygen (mg/L)
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
Depth (feet)
0
5
10
15
20
7-Jul-10
13-Jul-10
20-Jul-10
27-Jul-10
2-Aug-10
10-Aug-10
16-Aug-10
24-Aug-10
31-Aug-10
7-Sep-10
14-Sep-10
20-Sep-10
28-Sep-10
5.0 mg/L

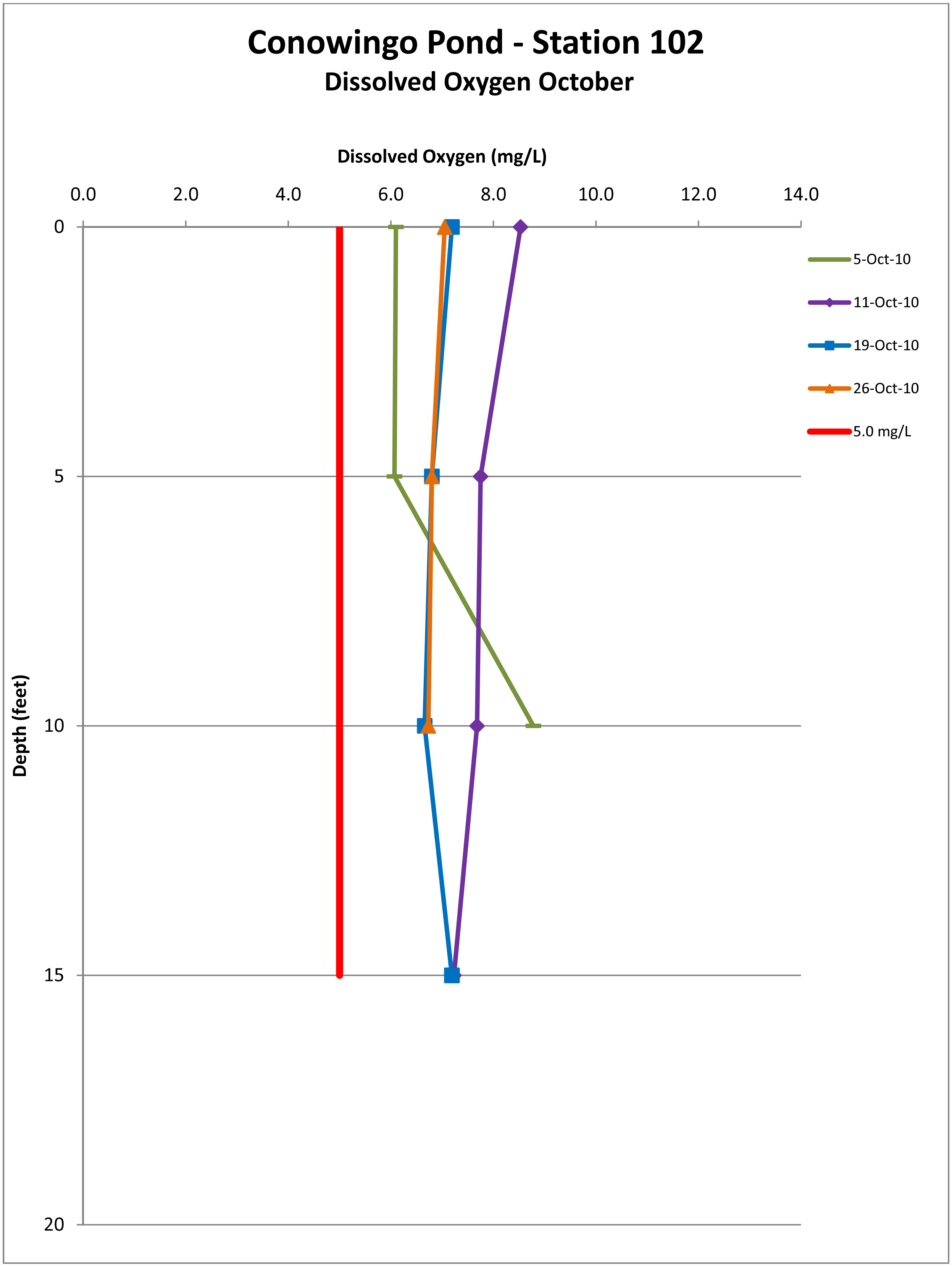


Conowingo Pond - Station101
Dissolved Oxygen October
Dissolved Oxygen (mg/L)
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
Depth (feet)
0
5
10
15
20
5-Oct-10
11-Oct-10
19-Oct-10
26-Oct-10
5.0 mg/L



Conowingo Pond - Station 102
Dissolved Oxygen April - June
Dissolved Oxygen (mg/L)
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
Depth (feet)
0
5
10
15
20
6-Apr-10
13-Apr-10
20-Apr-10
27-Apr-10
4-May-10
11-May-10
17-May-10
24-May-10
1-Jun-10
8-Jun-10
15-Jun-10
22-Jun-10
29-Jun-10
5.0 mg/L


Conowingo Pond - Station 102
Dissolved Oxygen July - September
Dissolved Oxygen (mg/L)
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
Depth (feet)
0
5
10
15
20
7-Jul-10
13-Jul-10
20-Jul-10
27-Jul-10
2-Aug-10
10-Aug-10
16-Aug-10
24-Aug-10
31-Aug-10
7-Sep-10
14-Sep-10
20-Sep-10
28-Sep-10
5.0 mg/L


Conowingo Pond - Station 102
Dissolved Oxygen October
Dissolved Oxygen (mg/L)
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
0
5
10
15
20
Depth (feet)
5-Oct-10
11-Oct-10
19-Oct-10
26-Oct-10
5.0 mg/L