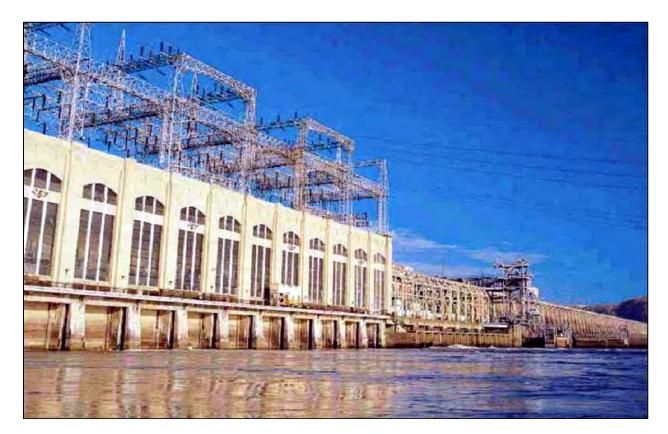
# FINAL STUDY REPORT SEASONAL AND DIURNAL WATER QUALITY IN CONOWINGO POND AND BELOW CONOWINGO DAM RSP 3.1

# **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 (<u>Mathur *et al.*</u> 1988; <u>Normandeau Associates 1998-2000</u>), 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  $\geq 0.99$ , 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: $DO \ge to 6 \text{ mg/L}$ for a 7-day averaging period

June 1 to January 31:  $DO \ge 5.5 \text{ mg/L}$  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

| С    | 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. Exclon 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 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.*, <u>Mathur *et al.* 1988; Normandeau Associates 1998-2000</u>), 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 ( $\pm 0.1 \text{ °C}$  or  $\pm 0.2 \text{ °F}$ ), dissolved oxygen ( $\pm 0.1 \text{ mg/L}$ ), pH ( $\pm 0.2 \text{ units}$ ), and turbidity ( $\pm 1\%$  up to 100 NTU and  $\pm 3\%$  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 ( $\pm 0.1 \text{ mg/L}$ )/temperature ( $\pm 0.5 \text{ °C}$  or  $\pm 0.9 \text{ °F}$ ) 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 <u>Appendix A-1</u>.

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 (<u>Appendix A-2</u>). The samples were collected in a clear 120 ml round plastic bottle with an added preservative (Na<sub>2</sub>S<sub>2</sub>O<sub>3</sub>) (provided by Lancaster Laboratories) and immediately chilled by placing in a cooler with ice as instructed by Lancaster Laboratories personnel (<u>Appendix A-2</u>). 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 <u>Appendix A-3</u>. <u>Appendix B-1</u> provides a listing of individual "boil" hourly measurements of DO and water temperature, along with meteorological data on sampled dates. <u>Appendix B-2</u> provides river flow and water temperature joint probability occurrences for each month (April-October). <u>Appendix C</u> 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.

<u>Figure 4-2</u> 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 <u>Figures 4-3</u> through <u>4-9</u>. 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.

<u>Table 4-1</u> 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 (<u>RMC 1985</u>; <u>Mathur *et al.* 1988</u>; <u>Normandeau Associates</u> <u>1998-2000</u>). 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 <u>Appendix B-2</u>.

# 4.2 Water Quality Conditions in Conowingo Pond in 20104.2.1 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 <u>Appendix C</u>. 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; <u>Welch 1952</u>) was absent at this station on all sampled dates in 2010. A review of temperature profiles for the other sampling stations (<u>Appendix C</u>) 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 <u>Appendix C</u>. 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 difference observed.

Looking at DO conditions along the other transects shows a similar pattern to Transect 4. In addition, 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 (<u>Normandeau Associates 1998-2000</u>).

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 <u>Figure 4-22</u>. 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 <u>Table 4-2</u>. 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.<sup>1</sup> 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 <u>Figure 4-23</u>. This comparison demonstrates a very high degree of similarity between the temperature at Station 643 and that measured along Transects 6, 7 and 8.

<sup>&</sup>lt;sup>1</sup> 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 (<u>Table 4-3</u>). 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 <u>Figure 4-25</u>. 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.

<u>Table 4-4</u> 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, <u>Table 4-4</u> 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 <u>Table 4-4</u>.

<u>Table 4-4</u> 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 <u>Figure 4-27</u>.

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.

<u>Table 4-5</u> 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, <u>Table 4-5</u> 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 <u>Table 4-5</u>.

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 <u>Table 4-5</u> (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. <u>Table 4-6</u> 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  $\pm 1.0$  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  $\pm$  0.5 °C (or within  $\pm$  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 ( $\leq 3$  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 <u>Figure 4-35</u>. <u>Table 4-7</u> shows the results of these regression analyses. In all cases, high R<sup>2</sup> 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. <u>Figure 4-36</u> 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. <u>Table 4-8</u> 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).

<u>Table 4-9</u> 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,  $DO \ge 6 \text{ mg/L}$  for a 7-day averaging period; and
- June 1-January 31,  $DO \ge 5.5 \text{ mg/L}$  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 <u>4-31</u>, 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 (<u>Table 4-2</u>).

#### 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 conditions 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 <u>Welch (1952)</u>, (*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, particularly 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  $\pm 0.5$  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 significant 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.

|                                       | Location                      | Waypoint Locations    |                          |  |                          |  |                          |
|---------------------------------------|-------------------------------|-----------------------|--------------------------|--|--------------------------|--|--------------------------|
| Transect Name<br>and Point<br>Numbers | Number<br>(Mid-Point<br>Bold) | Average<br>Depth (ft) | West Shoreline           | Point between<br>mid-point and<br>west shoreline | Mid-Point*               | Point between<br>mid-point and<br>east shoreline | East Shoreline           |
| Fishing Creek                         | 101                           | 15.3                  | 39.780718N<br>76.28041W  |  |                          |  |                          |
| 101,102,103                           | 102                           | 12.3                  |                          |  | 39.785497N<br>76.273943W |  |                          |
|                                       | 103                           | 7.7                   |                          |  |                          |  | 39.790550N<br>76.269030W |
| Burkin's Run                          | 201                           | 13.8                  | 39.743799N<br>76.252617W |  |                          |  |                          |
| 201,202,203,204,205                   | 202                           | 7.8                   |                          | 39.746456N<br>76.248051W                         |                          |  |                          |
|                                       | 203                           | 14.4                  |                          |  | 39.749014N<br>76.24324W  |  |                          |
|                                       | 204                           | 15.5                  |                          |  |                          | 39.751576N<br>76.238676W                         |                          |
|                                       | 205                           | 4.1                   |                          |  |                          |  | 39.755660N<br>76.235800W |
| Williams Tunnel                       | 301                           | 23.3                  | 39.733799N<br>76.242465W |  |                          |  |                          |
| 301,302,303,304                       | 302                           | 10.6                  |                          | 39.734734N<br>76.237444W                         |                          |  |                          |
|                                       | 303                           | 13.6                  |                          |  | 39.735864N<br>76.232788W |  |                          |
|                                       | 304                           | 27.9                  |                          |  |                          |  | 39.736712N<br>76.228448W |
| State Line                            | 401                           | 6.8                   | 39.719573N<br>76.240804W |  |                          |  |                          |
| 401,402,403,404                       | 402                           | 20.8                  |                          |  | 39.719514N<br>76.236362W |  |                          |
|                                       | 403                           | 14.7                  |                          |  |                          | 39.719585N<br>76.230928W                         |                          |
|                                       | 404                           | 40.4                  |                          |  |                          |  | 39.719336N<br>76.22649W  |
| Lower Pond                            | 501                           | 42.8                  | 39.661438N<br>76.185619W |  |                          |  |                          |
| 501,502,503                           | 502 (611)                     | 50.3                  |                          |  | 39.665462N<br>76.182695W |  |                          |
|                                       | 503                           | 43.0                  |                          |  |                          |  | 39.668883N<br>76.179542W |
| Shure's Landing                       | 601                           | 1 to 10<br>(3.1)      | 39.652224N<br>76.166301W |  |                          |  |                          |
| 601,602,603                           | 602                           | 1 to 10<br>(3.3)      |                          |  | 39.653911N<br>76.164522W |  |                          |
|                                       | 603                           | 1 to 6<br>(2.3)       |                          |  |                          |  | 39.655598N<br>76.162743W |
| Lee's Ferry                           | 701                           | 1 to 10<br>(3.5)      | 39.636949N<br>76.158944W |  |                          |  |                          |
| 701,702,703                           | 702                           | 1 to 10<br>(5.3)      |                          |  | 39.638928N<br>76.156808W |  |                          |
|                                       | 703                           | 1 to 10<br>(3.3)      |                          |  |                          |  | 39.640907N<br>76.154672W |
| The Pool                              | 801                           | 2 to 10<br>(5.3)      | 39.620898N<br>76.149753W |  |                          |  |                          |
| 801.802.803                           | 802                           | 1 to 10<br>(4.7)      | /0.17//JJ W              |  | 39.622122N<br>76.148105W |  |                          |
|                                       | 803                           | 1 to 10<br>(6.0)      |                          |  |                          |  | 39.623346N<br>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.

|           | Holtwood        |           | Long Term Averages ( | 1952-2009) |       | Wind S | peed**  |            |
|-----------|-----------------|-----------|----------------------|------------|-------|--------|---------|------------|
| Date      |                 | Water     | River                | Water      | Range | Gust   | Average | Prevailing |
| s ample d | 2010 Flow (cfs) | Temp (°F) | Flow (cfs)           | Temp (°F)  | MPH   | MPH    | MPH     | 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

|        |             |          |          | Analytical results per 100 ml |             |             |        |     |            |            |         |  |  |  |  |  |
|--------|-------------|----------|----------|-------------------------------|-------------|-------------|--------|-----|------------|------------|---------|--|--|--|--|--|
| Sample | Collected   | Sample A | Analyzed | Penns                         | sylvania st | tation loca | ations | Ma  | ryland sta | tion locat | ions    |  |  |  |  |  |
| 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     |  |  |  |  |  |

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

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 OPERATINGTURBINE DISCHARGE BOIL IN JULY AND AUGUST, 2010.

| Date of Boil Measurements |       |       |       |       |        |        |        |        |        |        |       |       |        |        | Total Number of |        |        |        |        |        |              |
|---------------------------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|-------|-------|--------|--------|-----------------|--------|--------|--------|--------|--------|--------------|
| 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 | Measurements |
| 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.

|  | 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  |       |       |       |       | 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<br>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<br>Conowingo<br>discharge<br>(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<br/>FERC SELECTED DATES IN JULY-AUGUST 2010. FOR COMPARISION, AVERAGE DO VALUES AT STATION 643<br/>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.<br>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<br>Conowingo<br>discharge<br>(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

|            |                      | 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 |
|------------|----------------------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|-------|-------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
|            | 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    |
| Kaplan off |                      | 10    | 10    | 10    | 10    |        | -      | 7      | 0      |        | 10     | 10    | 10    | 10     |        | 12     | 12     | _      | 11     | -      |        | 204     |
|            | N                    | 12    | 13    | 12    | 13    | 6      | 7      | /      | 8      | 11     | 13     | 10    | 13    | 13     | 11     | 13     | 13     | 1      | 11     | 1      | 4      | 204     |
|            |                      | 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    |
|            | Mean Boil DO         |       |       |       | 26    | 10     |        |        | 1.6    |        |        | 10    |       | 10     | 10     |        | 25     | 10     |        | 0      |        | 2.42    |
|            | 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    |
|            |                      |       |       |       |       |        |        |        |        |        |        |       |       |        |        |        |        |        |        |        |        |         |
|            | 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    |
| Kaplan on  |                      |       |       |       |       |        |        |        |        |        |        |       |       |        |        |        |        |        |        |        |        |         |
|            | N                    |       |       | 1     |       | 7      | 7      | 6      | 4      | 2      |        | 3     |       |        | 2      |        |        | 6      | 2      | 4      | 8      | 51      |
|            |                      |       |       | 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    |
|            | Mean Boil DO         |       |       | _     |       |        |        |        |        | 10     |        |       |       |        |        |        |        |        |        |        |        | • • • • |
|            | 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    |

# 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<br/>JULY-AUGUST 2010.

\* 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 WATERTEMPERATURES AT STATIONS 501-503 IN CONOWINGO POND AND STATION 643DOWNSTREAM 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            |
|                            | 11 - 23           |
| Transect 5 (pooled) versus | 11 20             |
| Transect 5 (pooled) versus | 11 20             |
| Transect 5 (pooled) versus | Station 643       |

### 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 <sub>y.x</sub> = <b>0.840</b> |
|  | 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                          |

|      |        |                           |           | Unit 1                |           | Unit 2                |           | Unit 3                |           | Unit 4                |           | Unit 5                |
|------|--------|---------------------------|-----------|-----------------------|-----------|-----------------------|-----------|-----------------------|-----------|-----------------------|-----------|-----------------------|
|      |        |                           | 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                    |

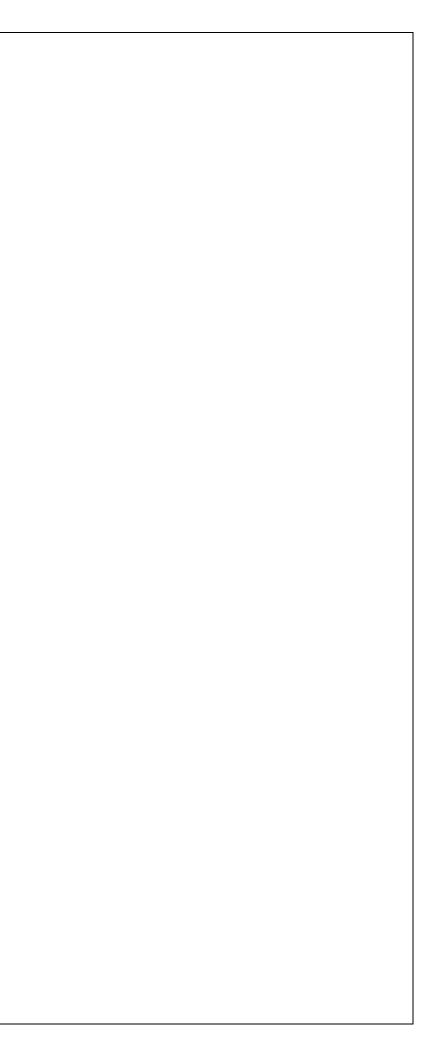
### TABLE 4-9: NUMBER OF HOURS EACH FRANCIS (UNITS 1-7) KAPLAN (UNITS 8-11) TURBINE OPERATED AT CONOWINGO HYDROELECTRIC STATION, JULY-AUGUST 2005-2010.

### TABLE 4.9: CONTINUED.

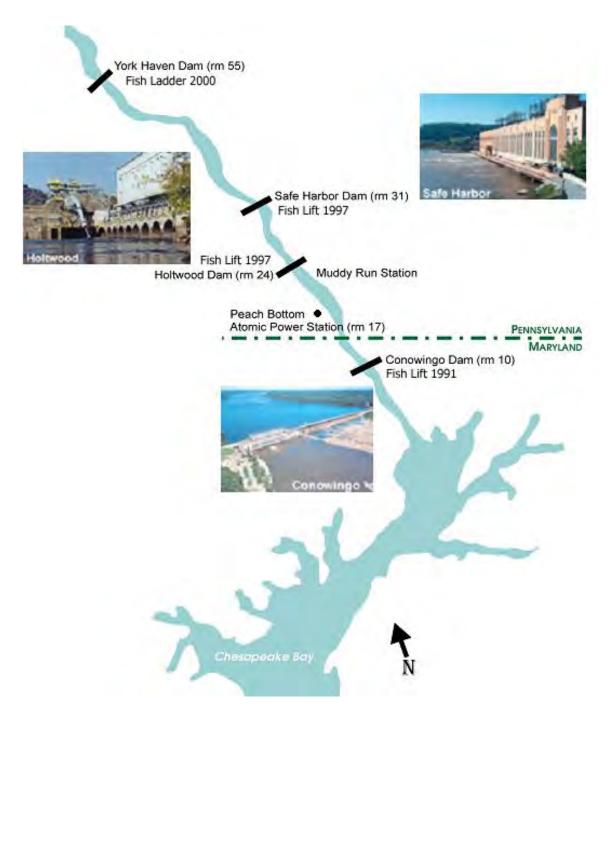
|      |        |                           |           | Unit 6                |           | Unit 7                |           | Unit 8                |           | Unit 9                |           | Unit 10               |
|------|--------|---------------------------|-----------|-----------------------|-----------|-----------------------|-----------|-----------------------|-----------|-----------------------|-----------|-----------------------|
|      |        |                           | 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.

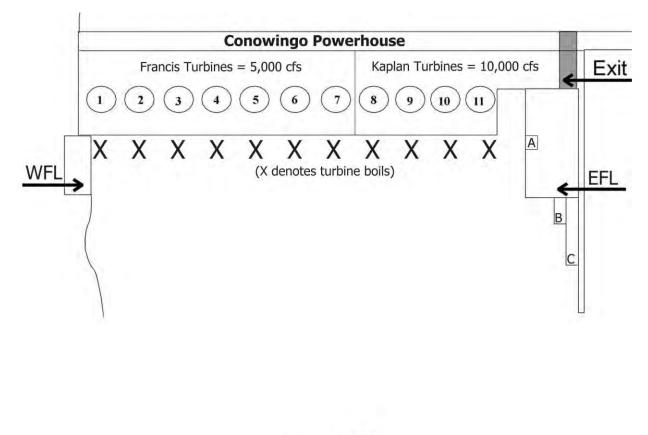
|      |        |                           |           | Unit 11               | Average       |
|------|--------|---------------------------|-----------|-----------------------|---------------|
|      |        |                           | Hours Ran | % of available hours* | Holtwood Flow |
| 2005 | 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                     |               |
|      |        | Day (0800-1959)           | 123       | 33                    |               |
| ·    | August | Night (2000-2359)         | 29        | 23                    |               |
|      |        | Early Morning (2400-0759) | 9         | 4                     | 27,577        |
| 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                     |               |

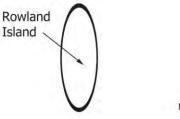


# FIGURE 1-1: LOCATIONS OF POWER STATIONS IN THE LOWER SUSQUEHANNA RIVER 2010.\



### 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.

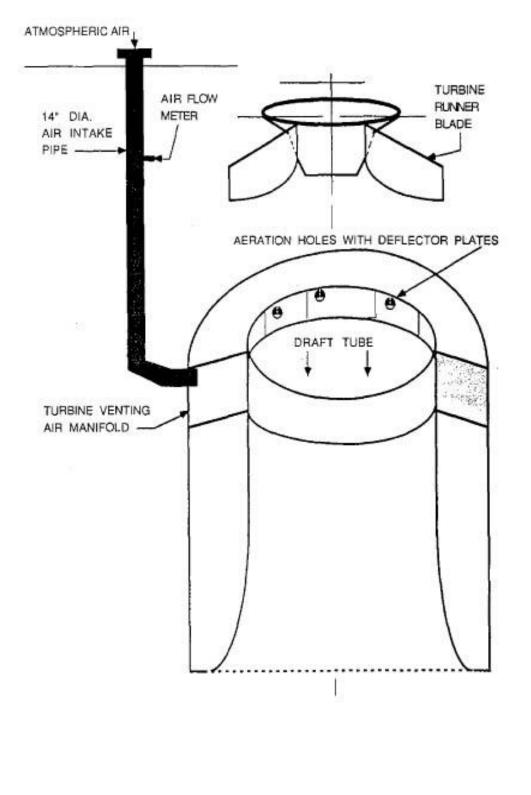


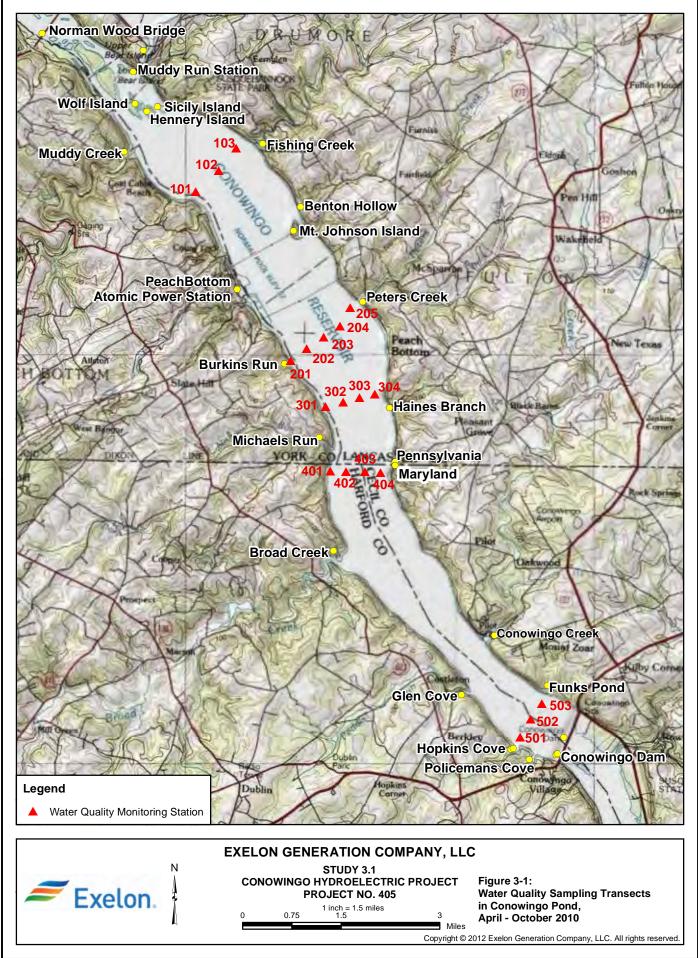


Map not to scale

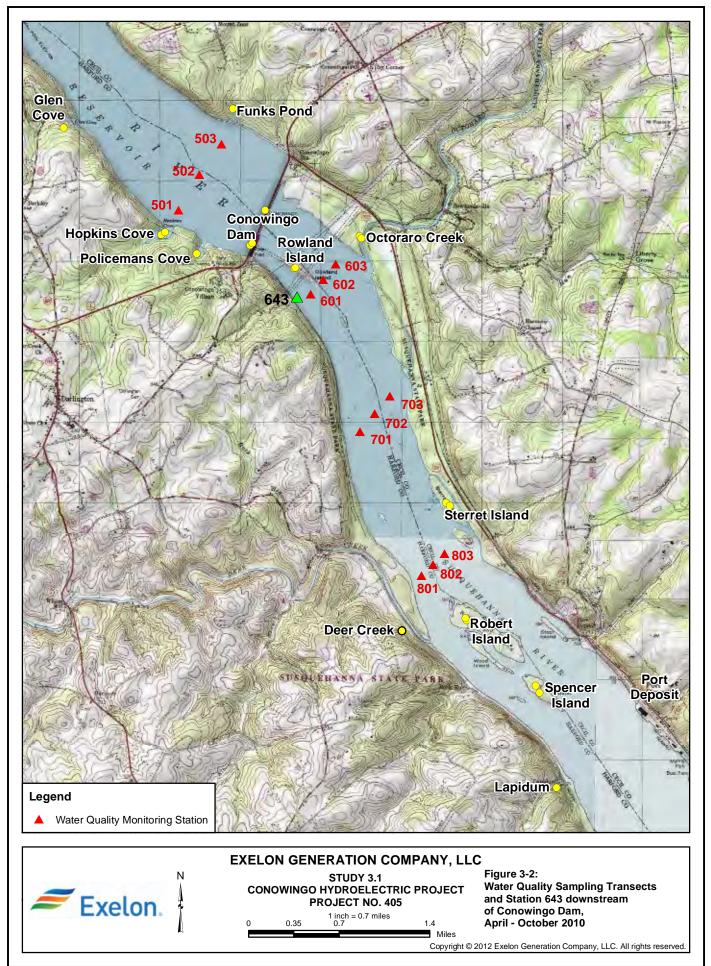
• Station 643 Approx. 0.6 mi downstream of Conowingo

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

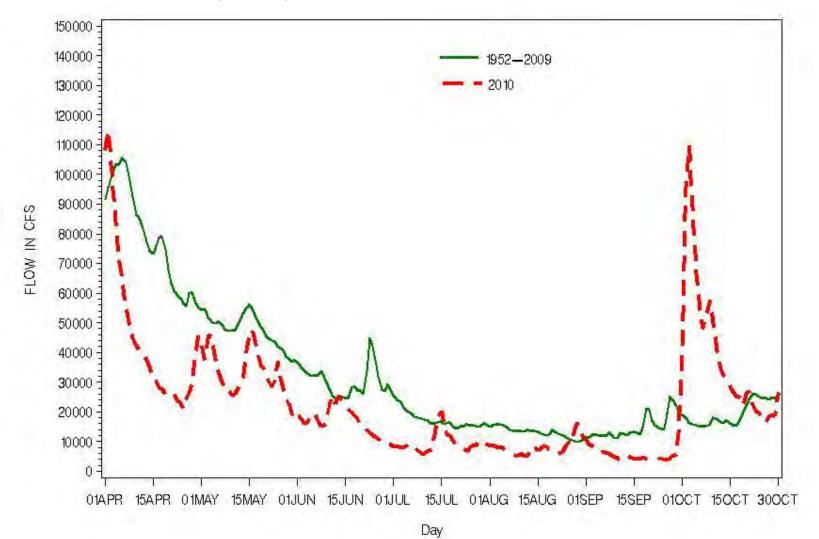




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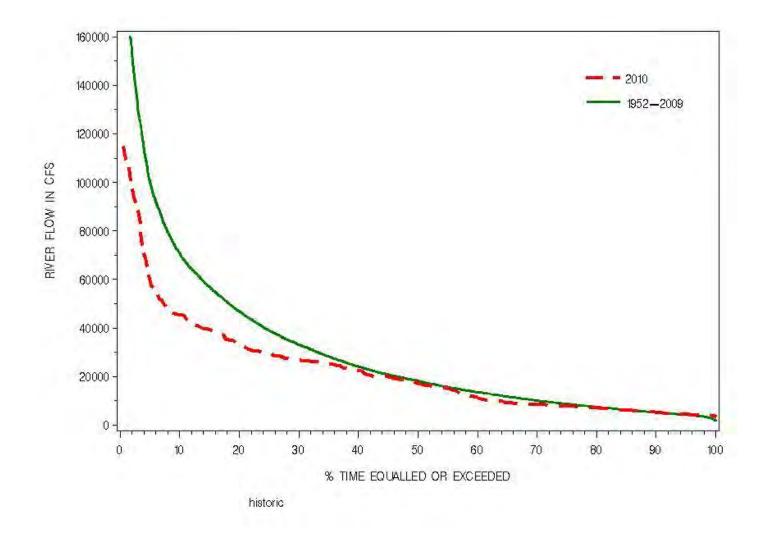


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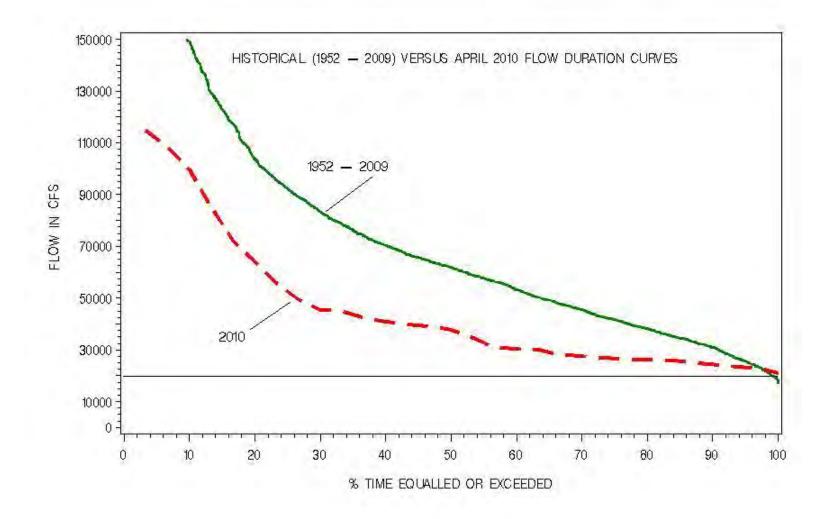




## FIGURE 4-2: PROVIDES AN AVERAGE DAILY FLOW DURATION CURVE FOR THE PERIOD APRIL-OCTOBER, 2010, IN COMPARISON TO THE LONG-TERM (1952-2009) AVERAGE DAILY FLOW DURATION CURVE FOR THE SAME MONTHS.



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



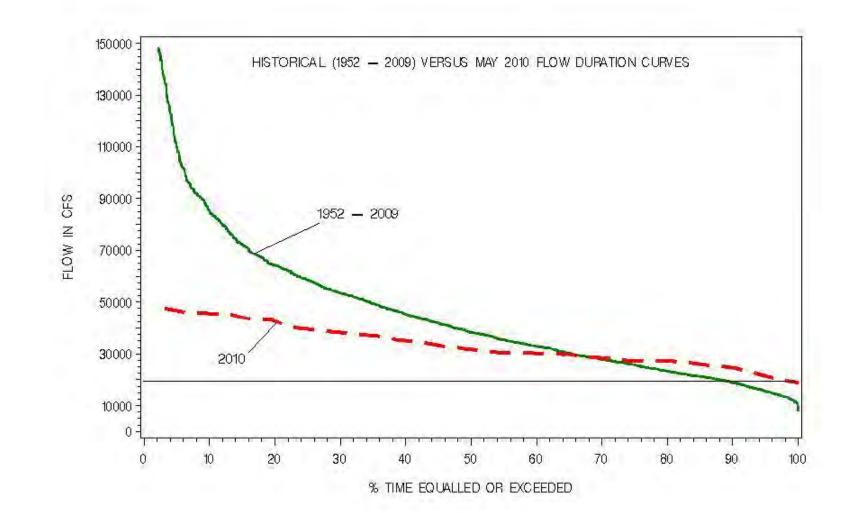
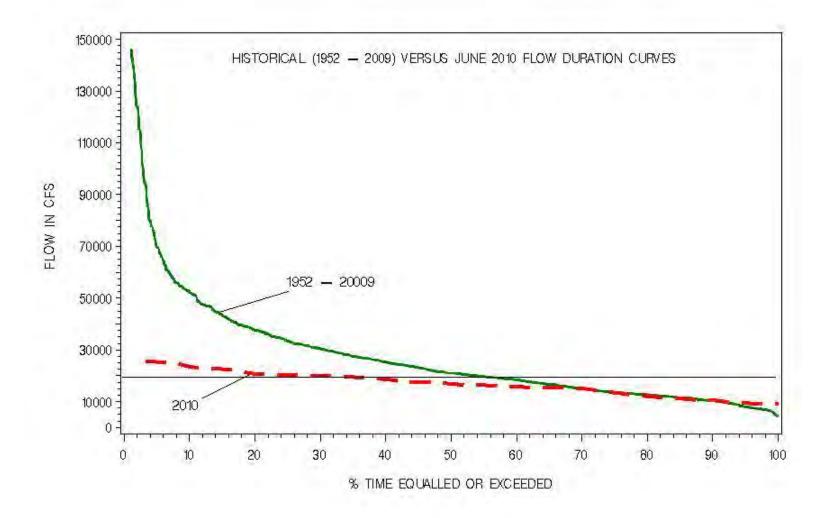
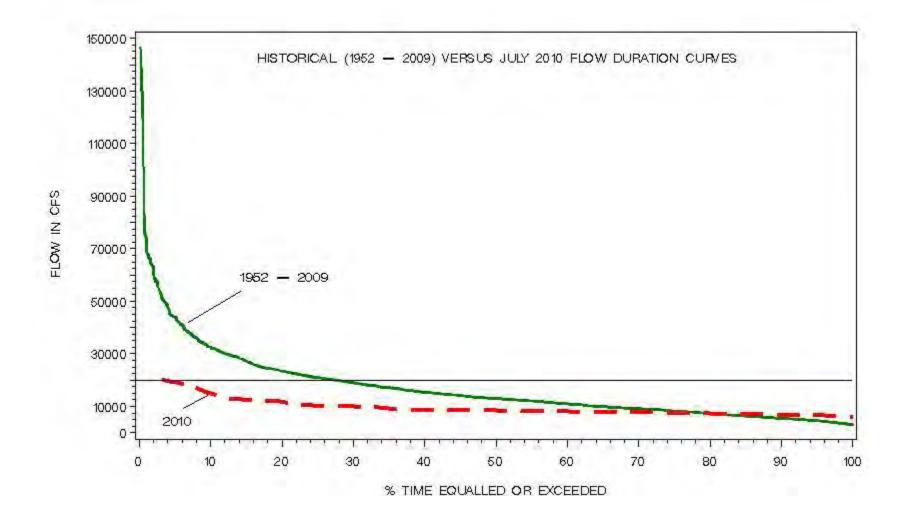


FIGURE 4-4: COMPARISON OF HISTORICAL (1952-2009) DAILY AVERAGE RIVER AND 2010 FLOW DURATION CURVES FOR MAY.

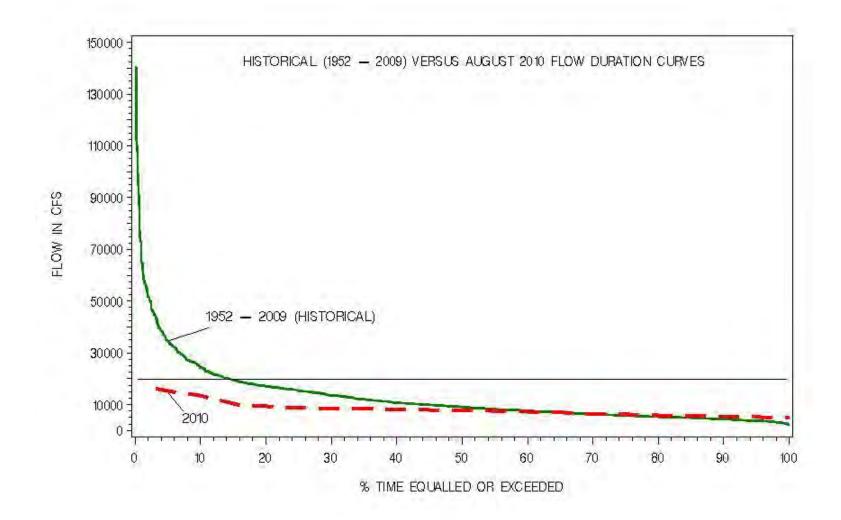
### FIGURE 4-5: COMPARISON OF HISTORICAL (1952-2009) DAILY AVERAGE RIVER AND 2010 FLOW DURATION CURVES FOR JUNE.



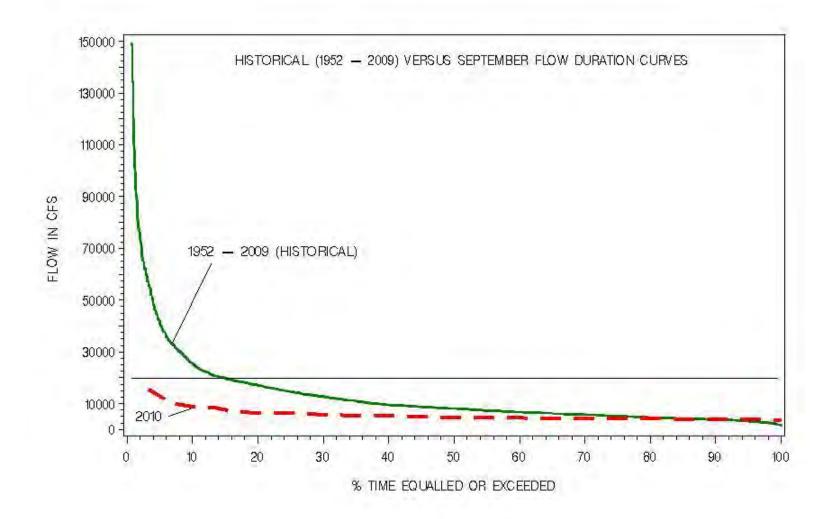
# FIGURE 4-6: COMPARISON OF HISTORICAL (1952-2009) DAILY AVERAGE RIVER AND 2010 FLOW DURATION CURVES FOR JULY.

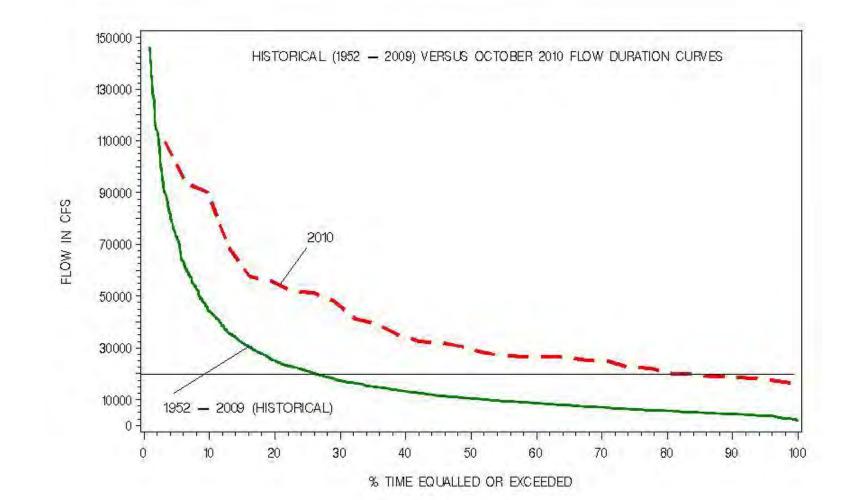












#### FIGURE 4-9: COMPARISON OF HISTORICAL (1952-2009) DAILY AVERAGE RIVER AND 2010 FLOW DURATION CURVES FOR OCTOBER.

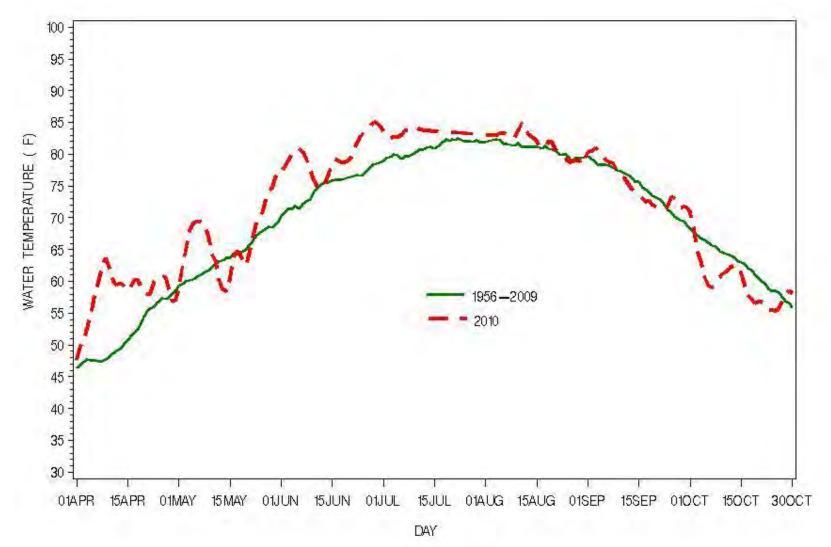
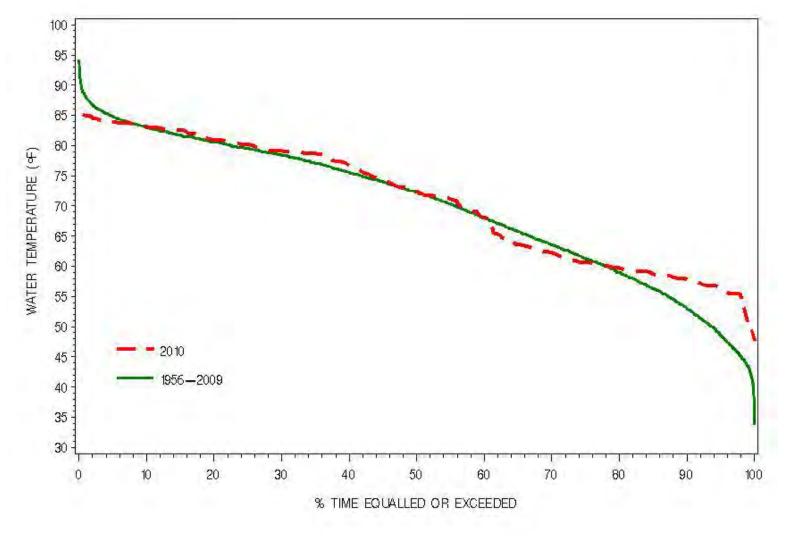
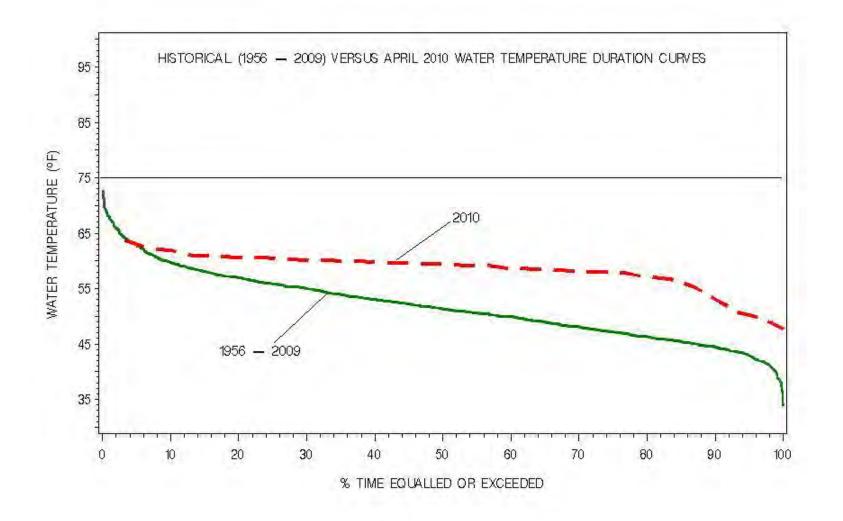


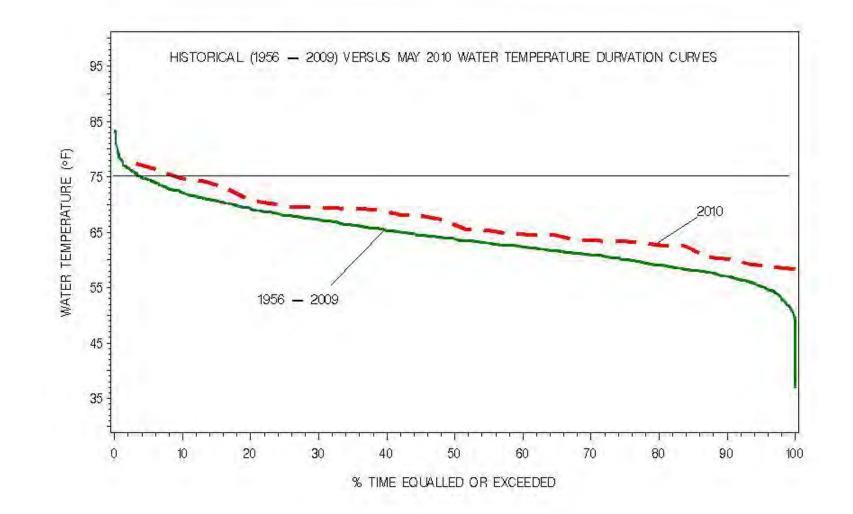
FIGURE 4-10: AVERAGE DAILY WATER TEMPERATURE AT HOLTWOOD IN 2010 AS COMPARED TO THE AVERGE DAILY WATER TEMPERATURE AT HOLTWOOD FOR THE PERIOD 1956-2009.

# 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.

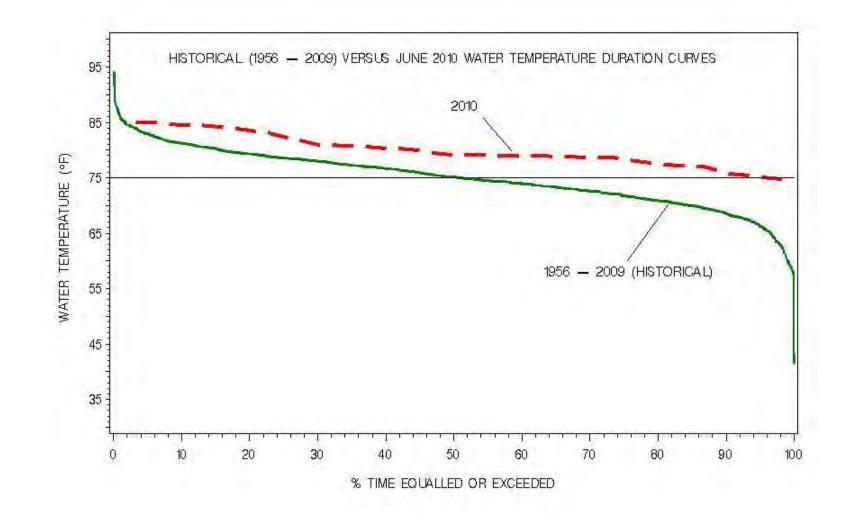
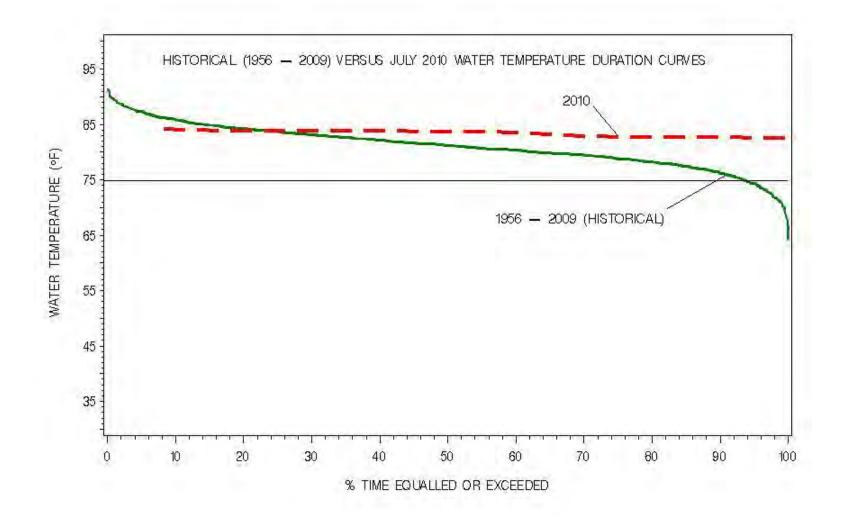
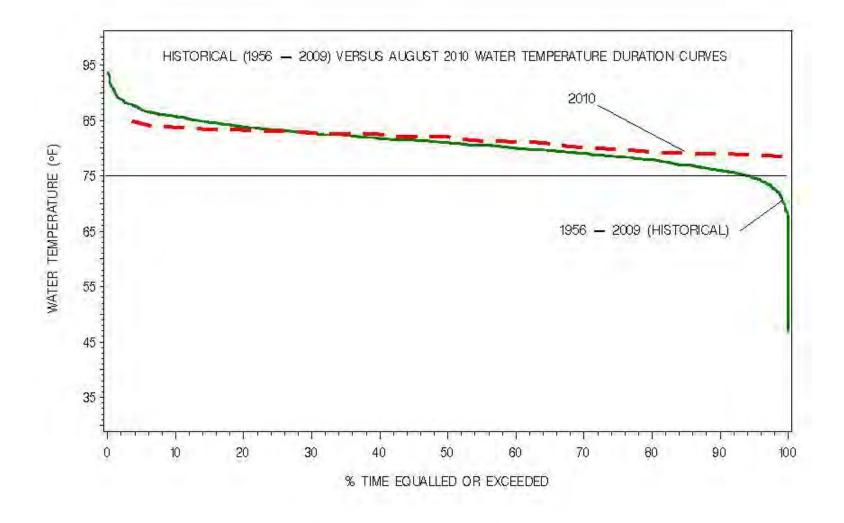


FIGURE 4-14: COMPARISON OF HISTORICAL (1956-2009) AND 2010 DAILY AVERAGE INCOMING WATER TEMPERATURE DURATION CURVES, JUNE.

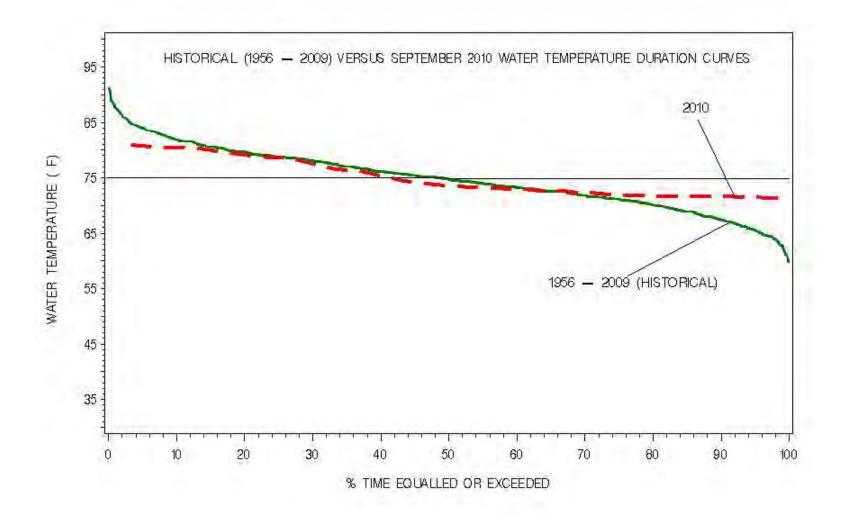




### FIGURE 4-16: COMPARISON OF HISTORICAL (1956-2009) AND 2010 DAILY AVERAGE INCOMING WATER TEMPERATURE DURATION CURVES, AUGUST.







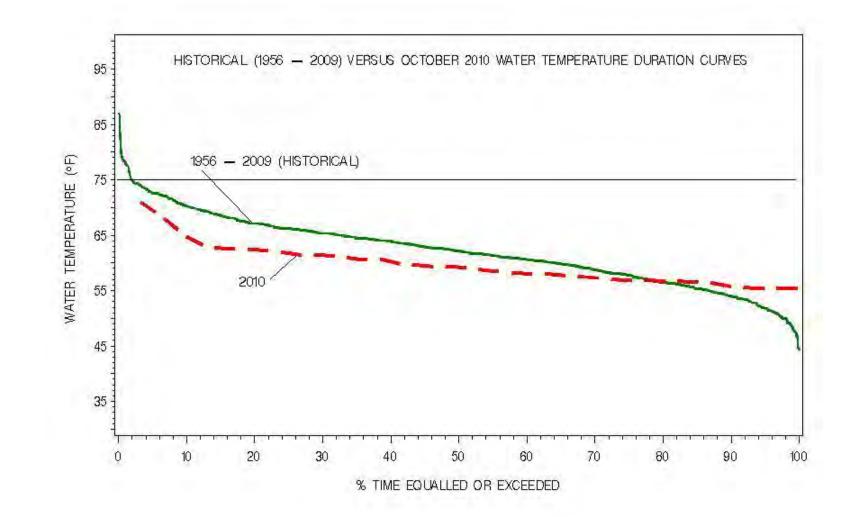
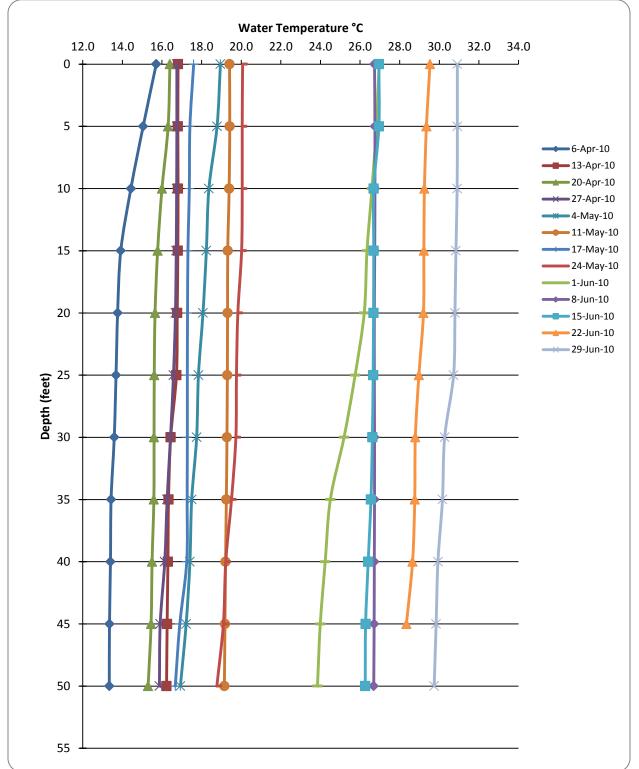
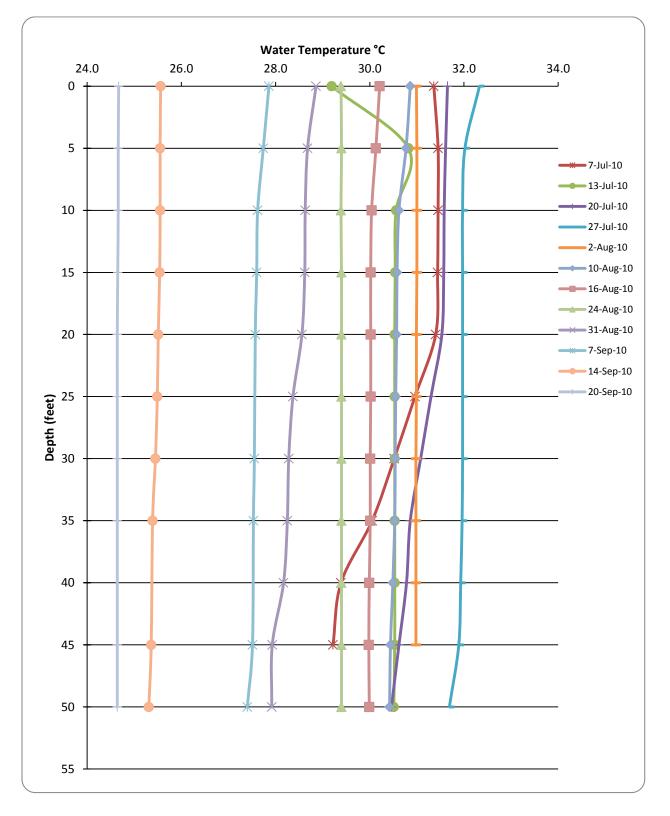


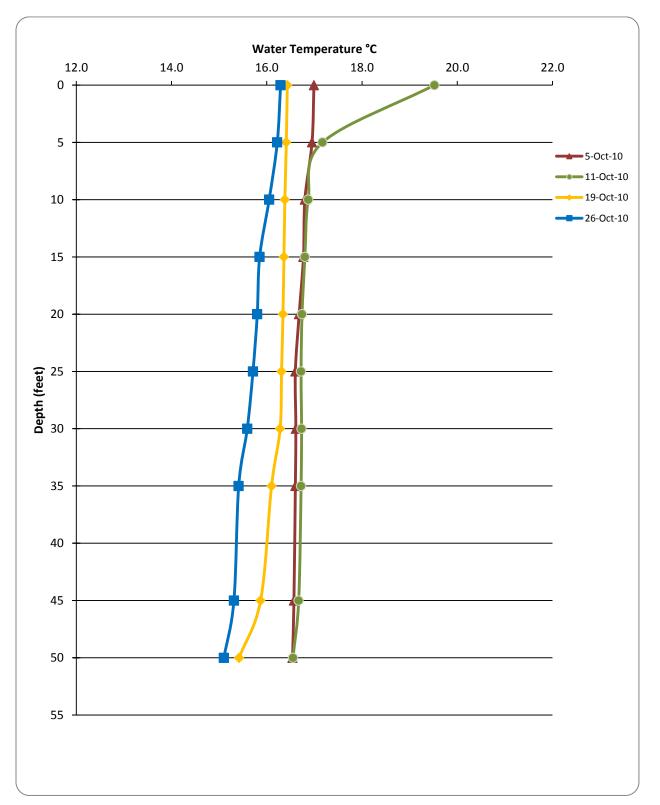
FIGURE 4-18: COMPARISON OF HISTORICAL (1956-2009) AND 2010 DAILY AVERAGE INCOMING WATER TEMPERATURE DURATION CURVES, OCTOBER.

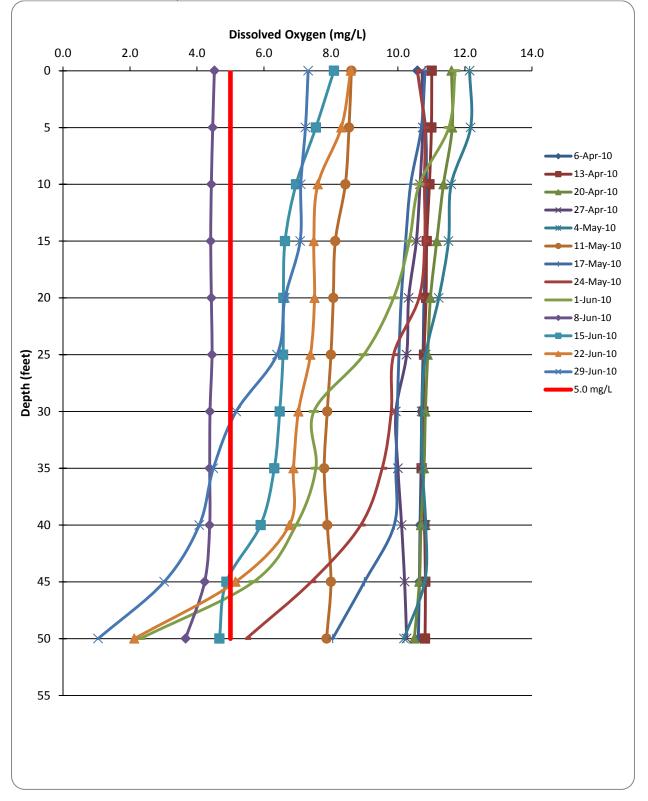


# FIGURE 4-19: EXAMPLE OF VERTICAL WATER TEMPERATURE PROFILES AT STATION 502 (MID POINT) IN CONOWINGO POND, APRIL-OCTOBER 2010.

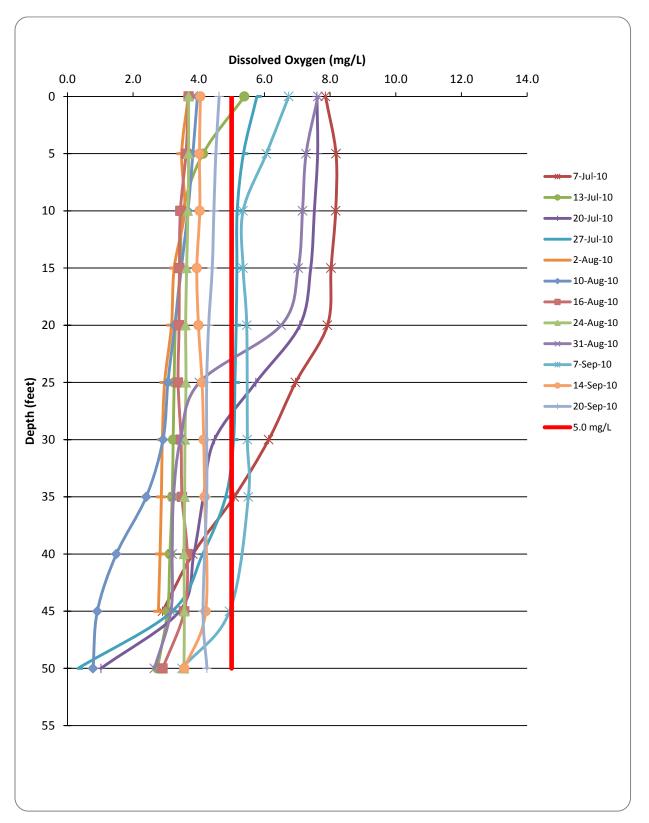
### FIGURE 4-19: CONTINUED.

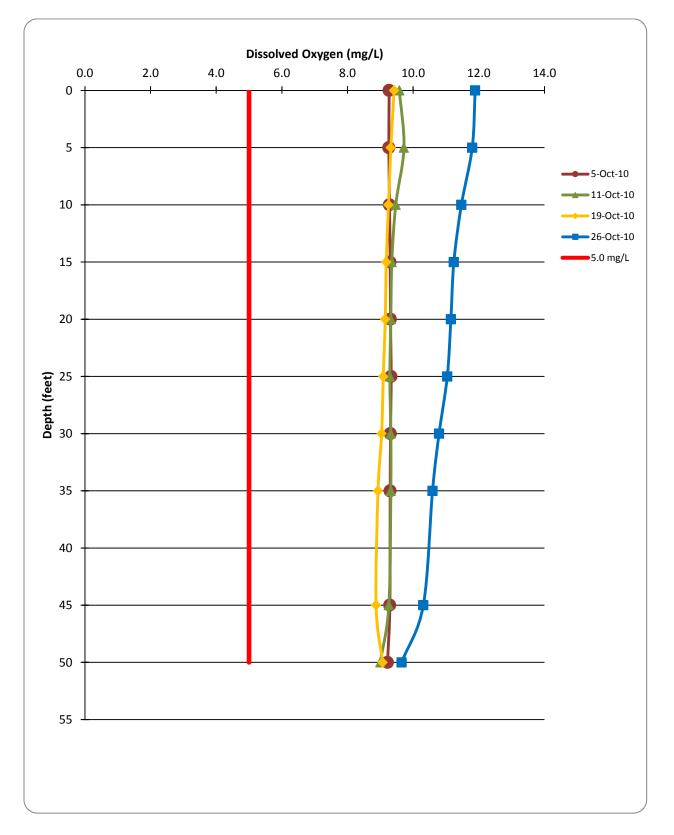


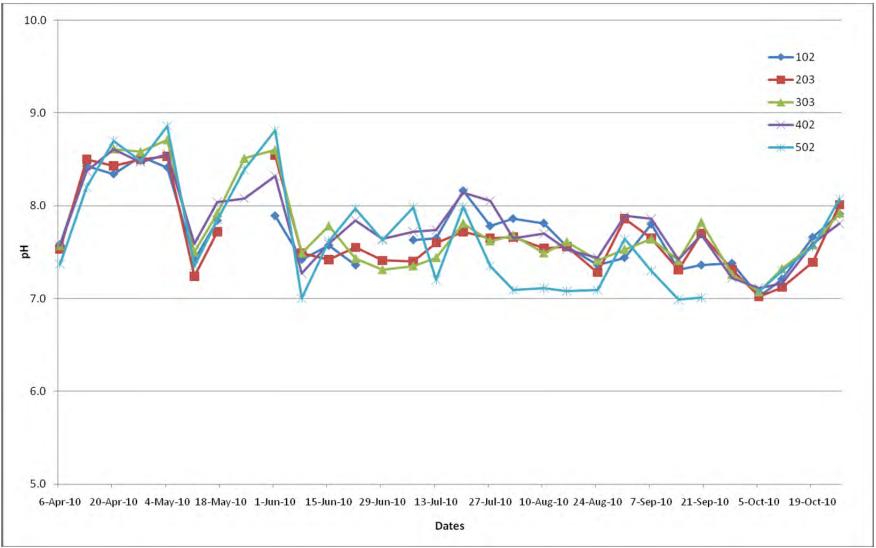




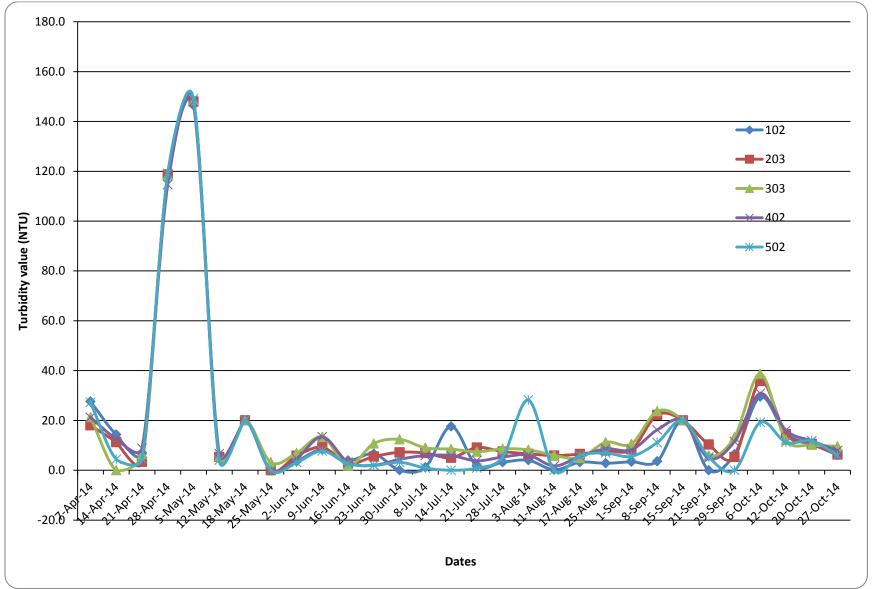
# FIGURE 4-20: EXAMPLE OF DO VERTICAL DISTRIBUTION AT STATION 502 (MID POINT) IN CONOWINGO POND, APRIL-OCTOBER 2010.



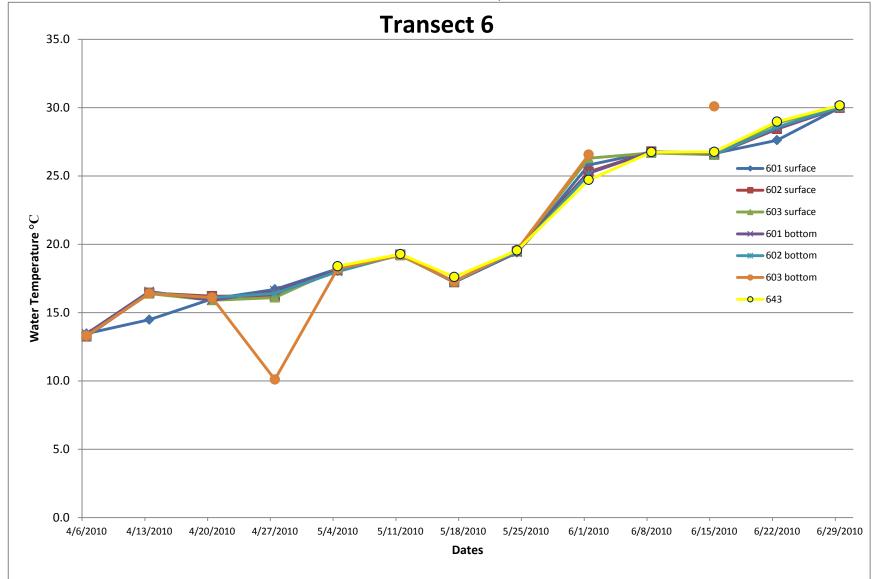




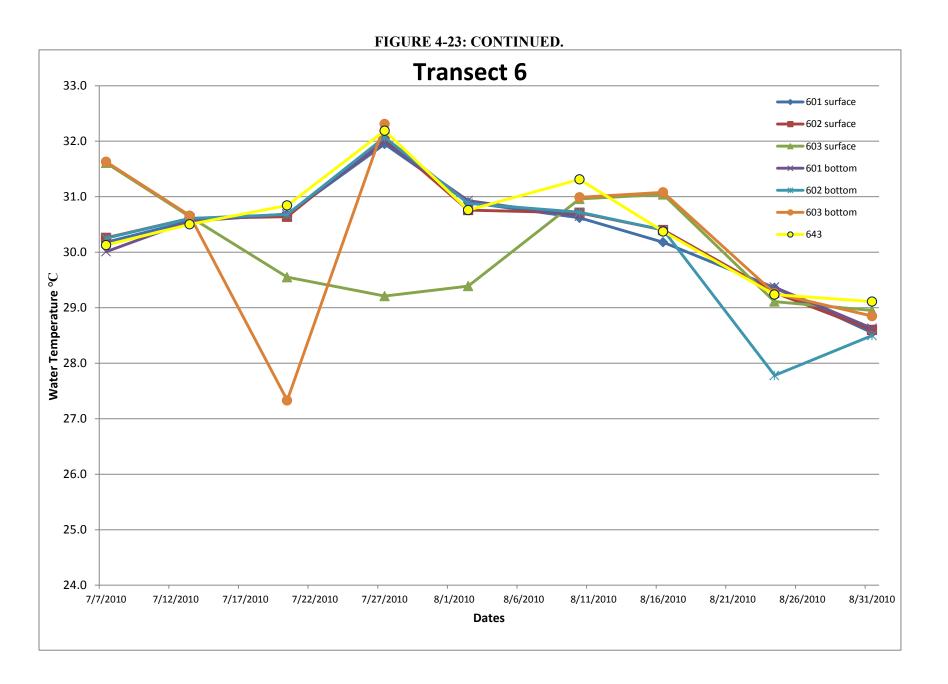
#### FIGURE 4-21: SEASONAL VARIATIONS IN SURFACE PH AT MID POINTS OF TRANSECTS IN CONOWINGO POND, APRIL-OCTOBER 2010.

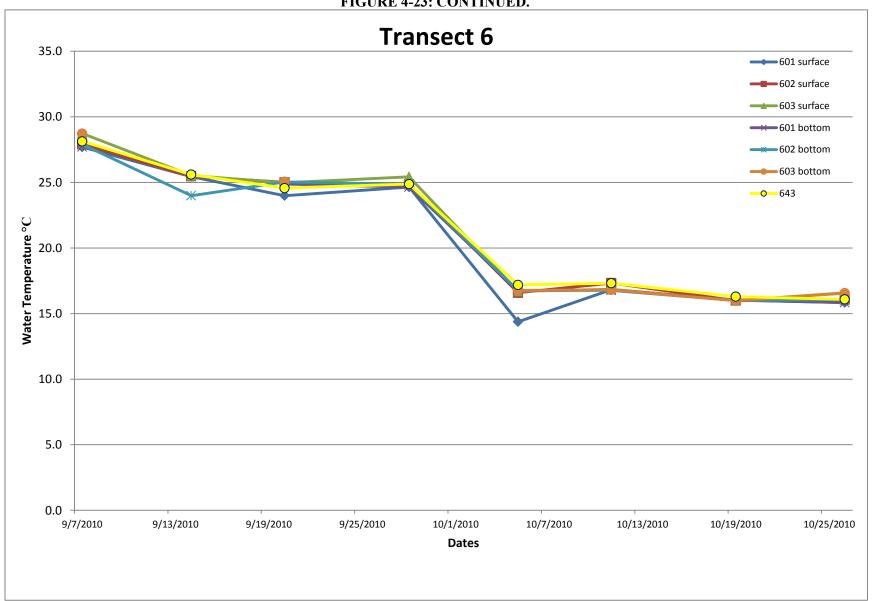


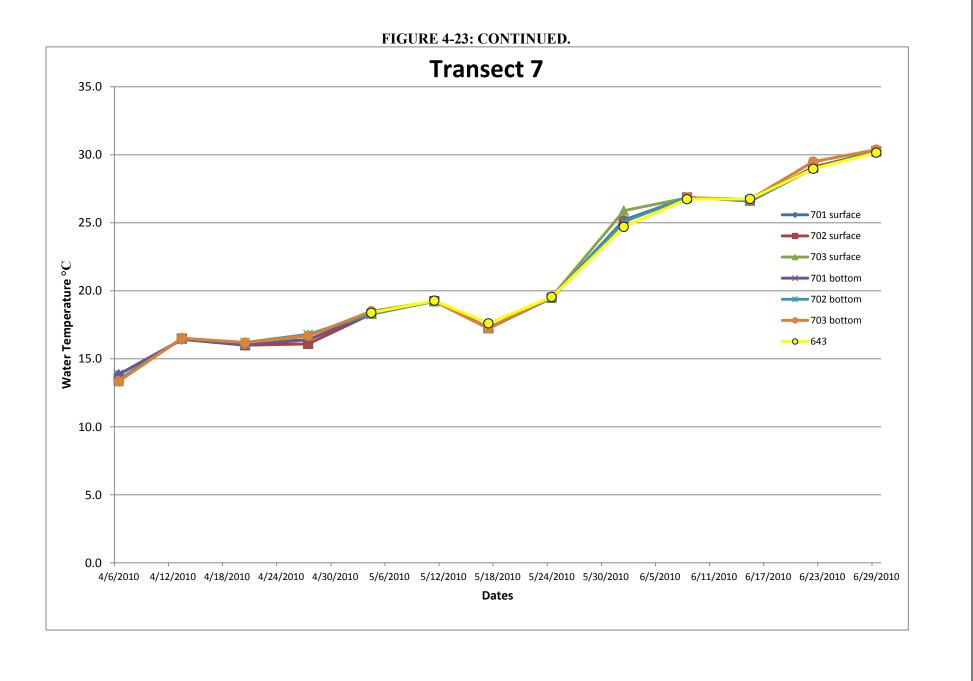
#### FIGURE 4-22: SEASONAL VARIATIONS IN SURFACE TURBIDITY AT MID POINTS OF TRANSECTS IN CONOWINGO POND, APRIL-OCTOBER 2010.

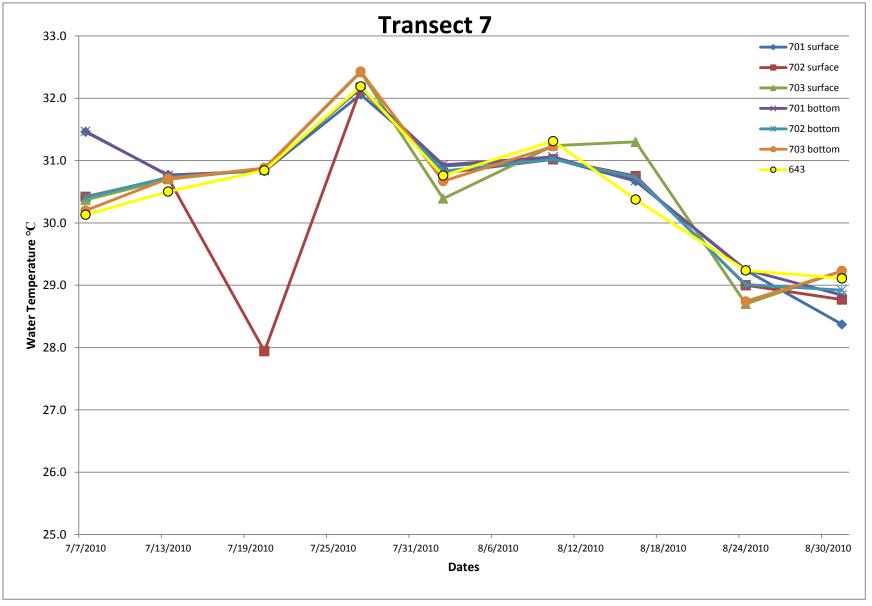


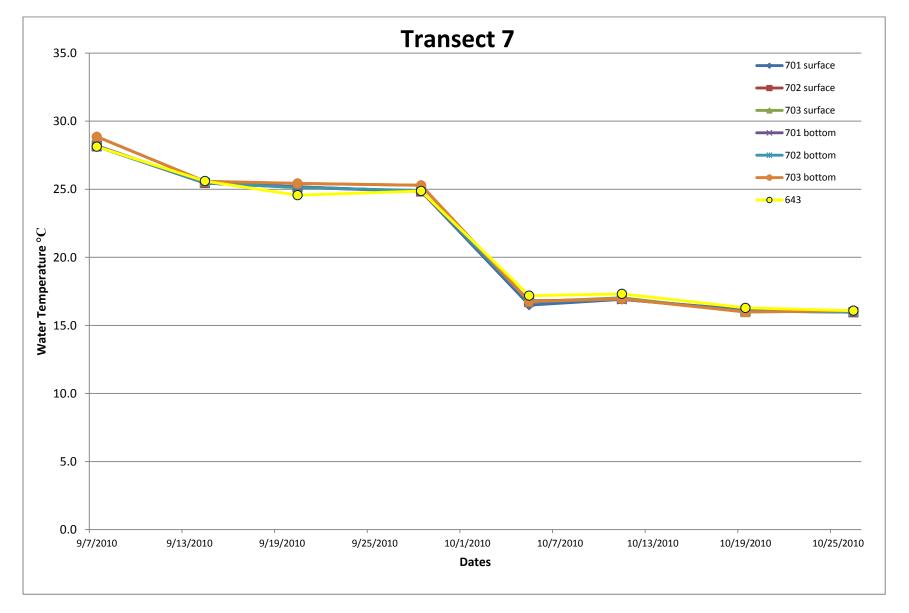
## FIGURE 4-23: SEASONAL VARIATIONS IN SURFACE AND BOTTOM WATER TEMPERATURE (°C) AT TRANSECTS 6, 7, AND 8 DOWNSTREAM OF CONOWINGO DAM, APRIL-OCTOBER 2010.



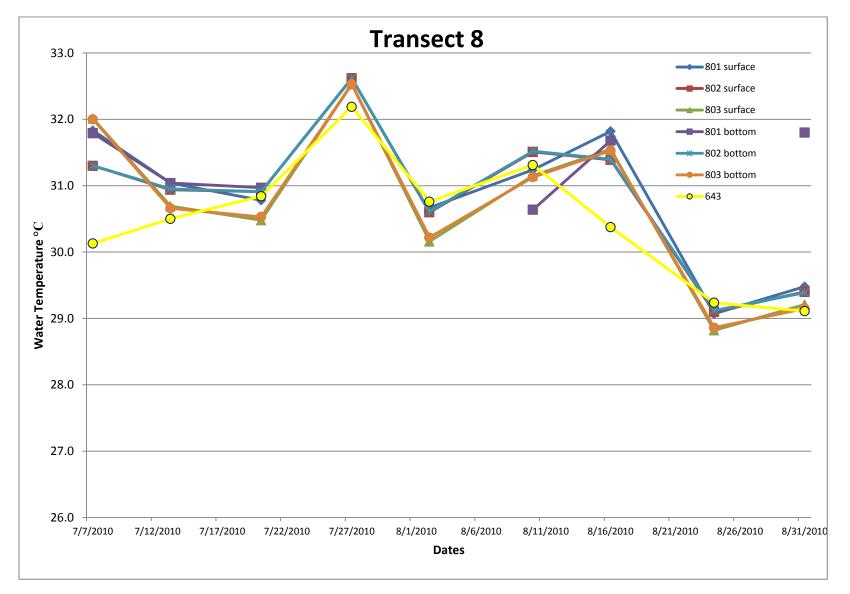










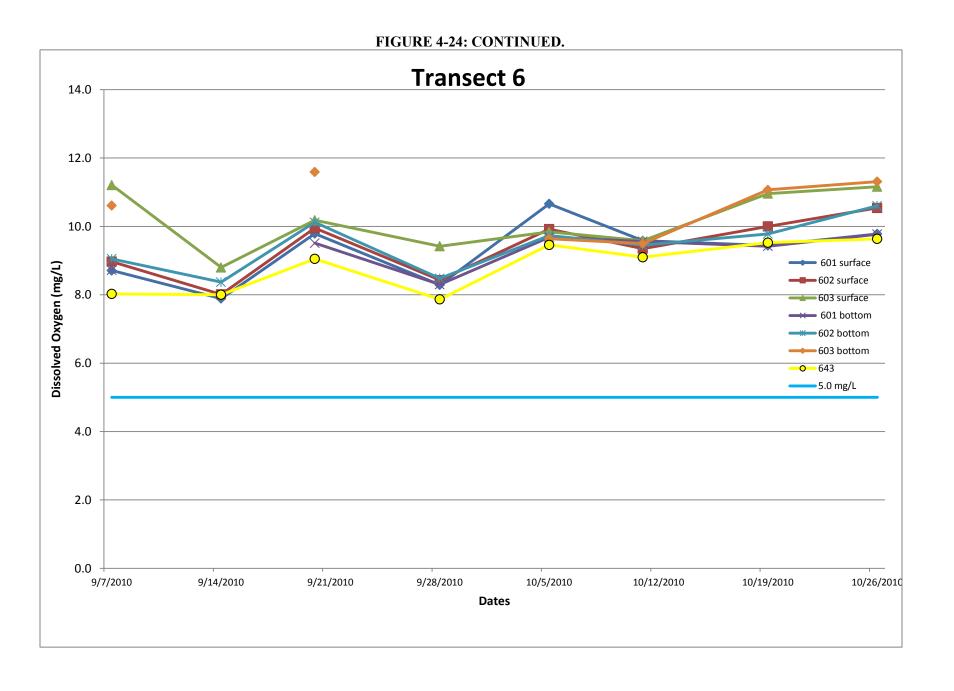


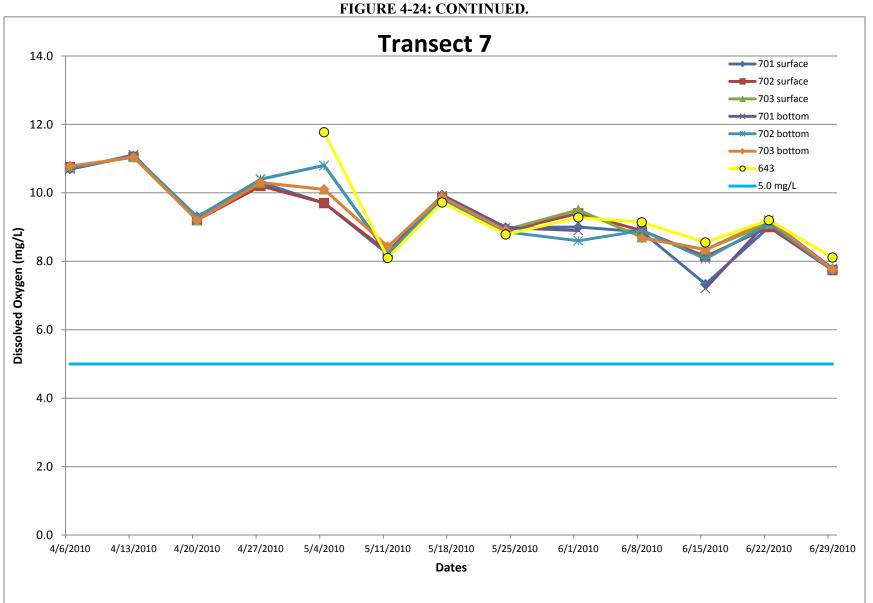




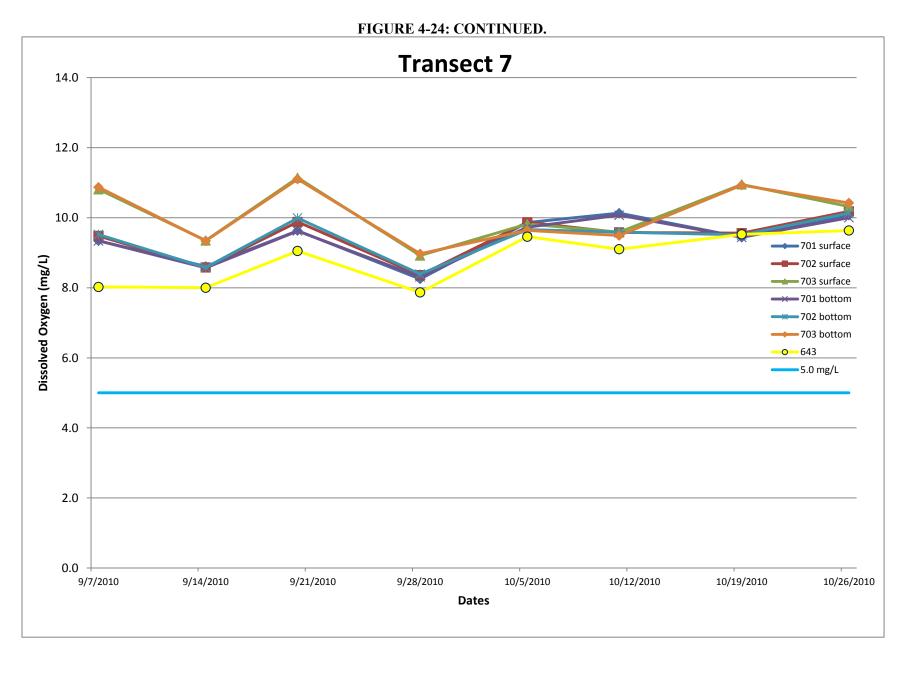
#### FIGURE 4-24: SURFACE AND BOTTOM DO AT TRANSECTS 6, 7, AND 8 DOWNSTREAM OF CONOWINGO DAM, APRIL-OCTOBER 2010.

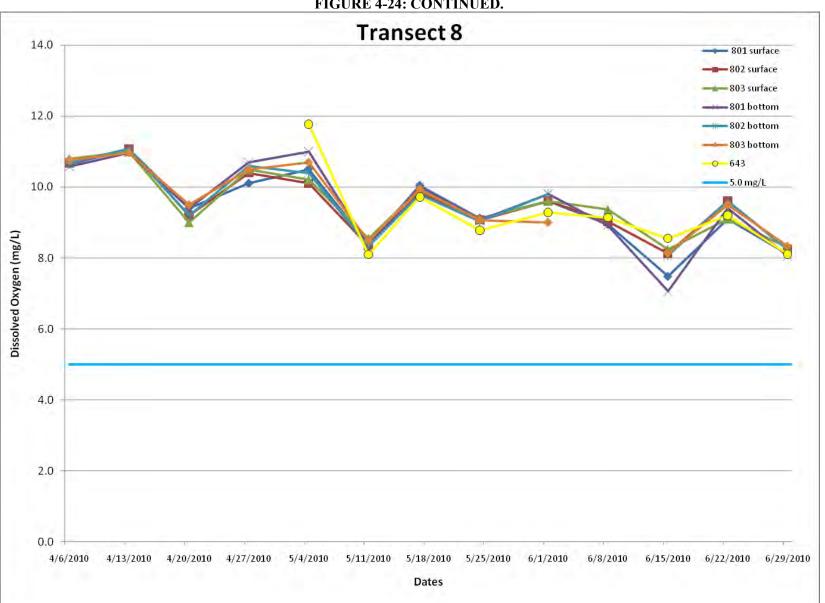


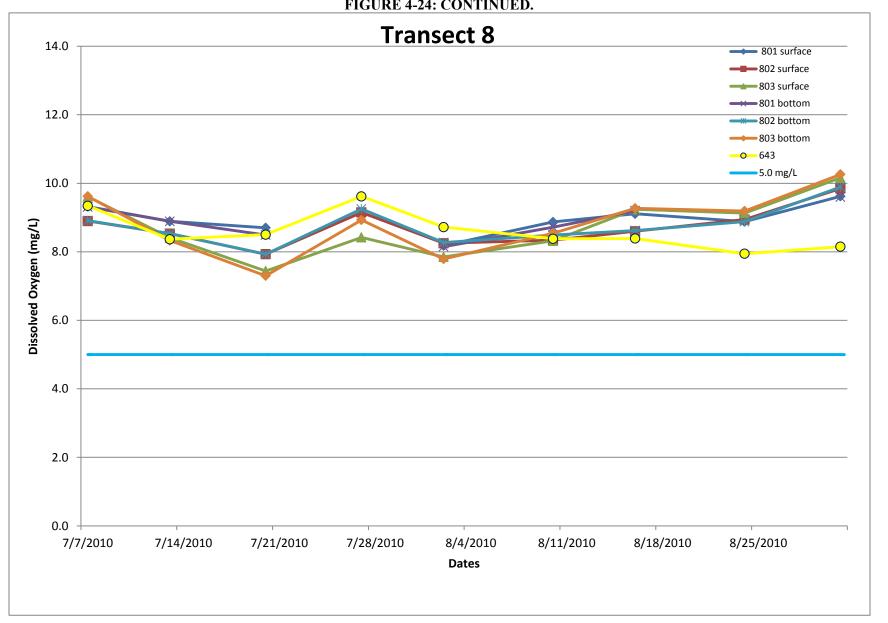


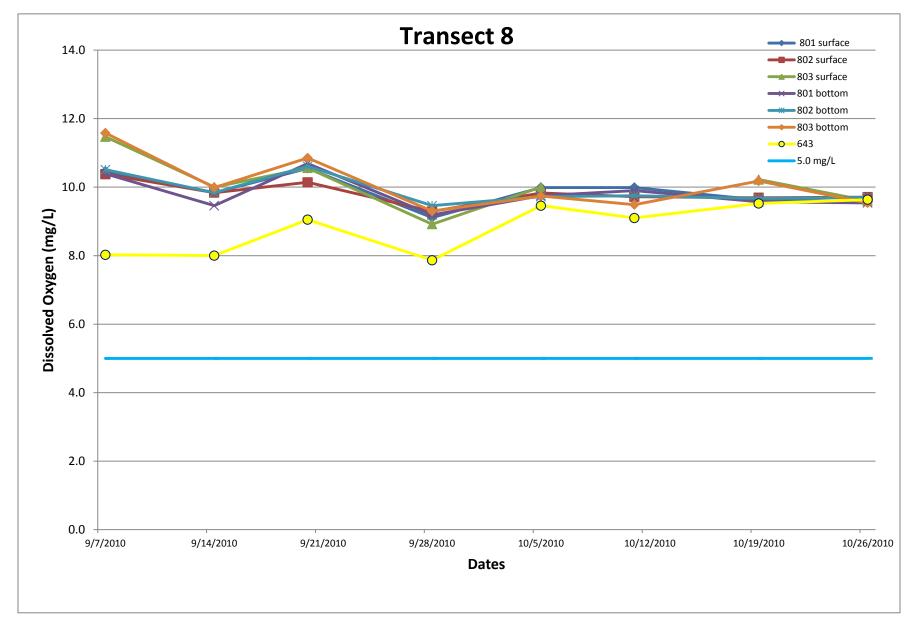




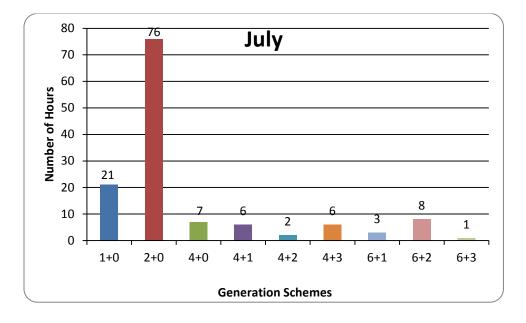


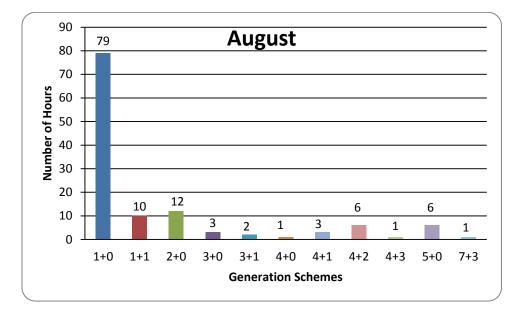






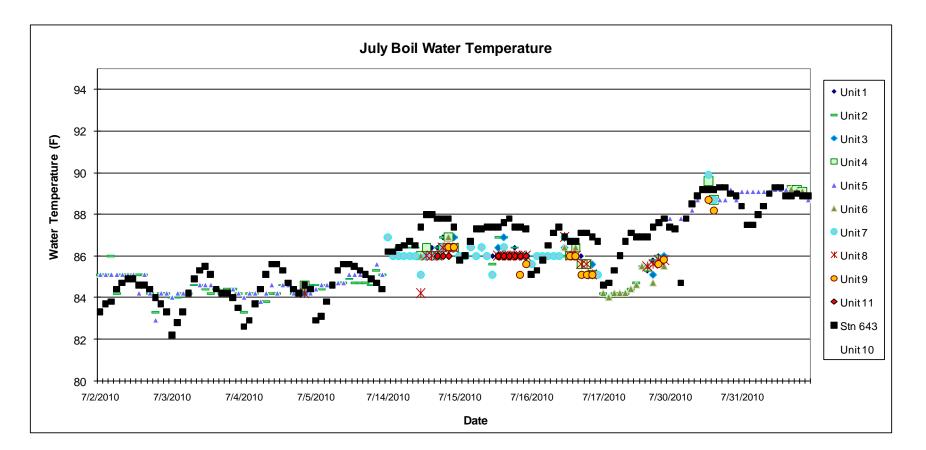
## FIGURE 4-25: NUMBER OF HOURLY TURBINE BOIL SAMPLES COLLECTED DURING PERIODS OF VARIOUS COMBINATIONS OF SMALL AND LARGE TURBINES OPERATING AT CONOWINGO IN JULY-AUGUST 2010.

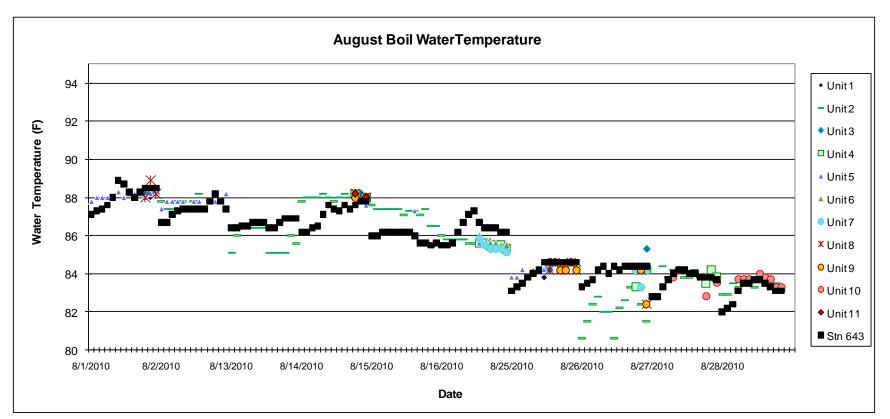


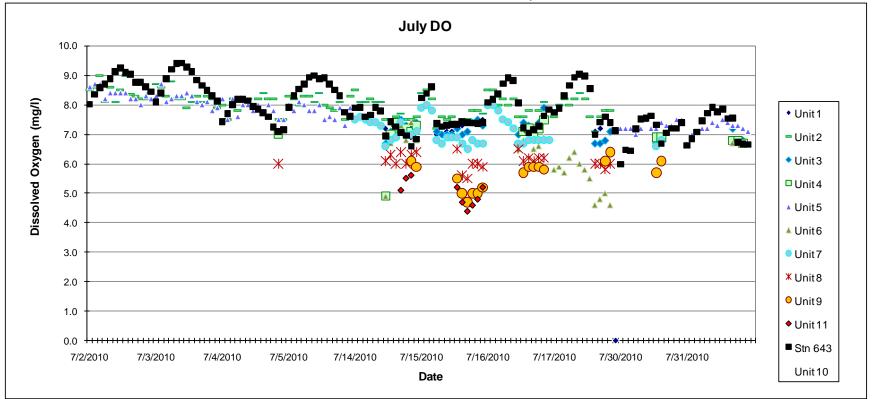


Note: On the x axis lables, the first number indicates the number of small units operating and the second number indicates the number of large units operating. For example the bar labeled 1+0 indicates the number of hours of turbine discharge boil sampling was conducted during the sampling season when 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.

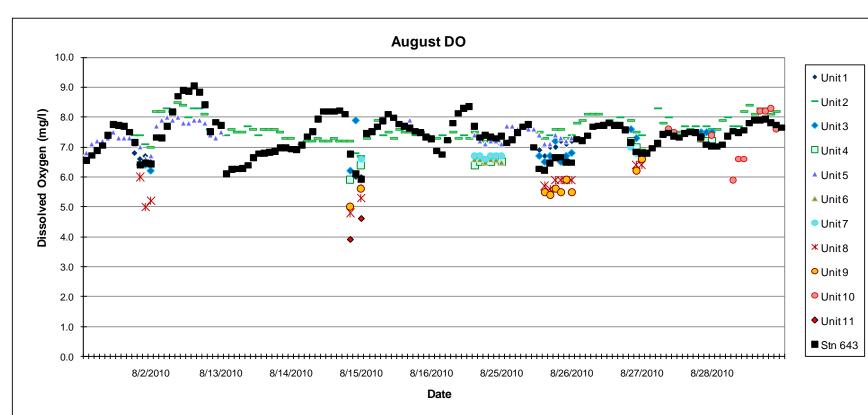
## FIGURE 4-26: PLOT OF HOURLY TEMPERATURE MEASUREMENTS (°F) OF OPERATING TURBINE DISCHARGE BOILS ON THE FERC SELECTED DATES AT CONOWINGO DAM, JULY-AUGUST 2010.







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



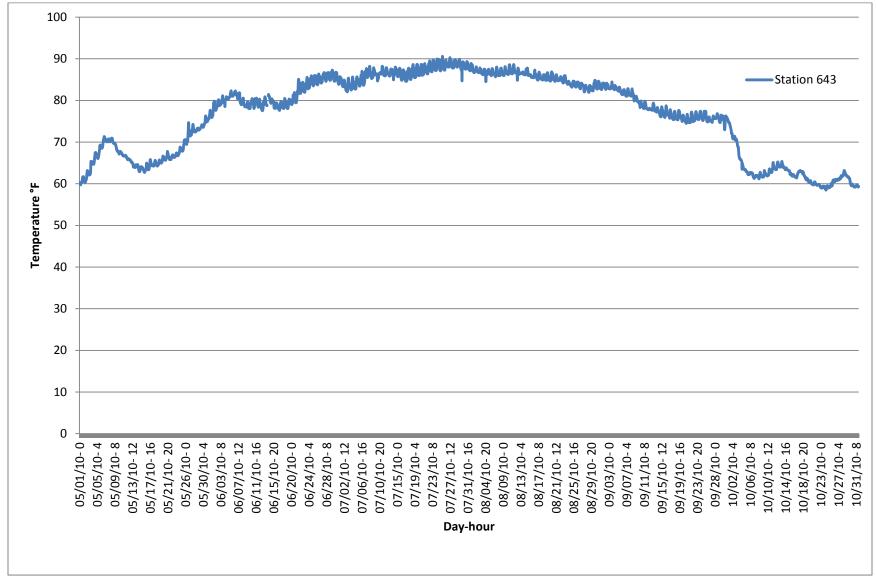
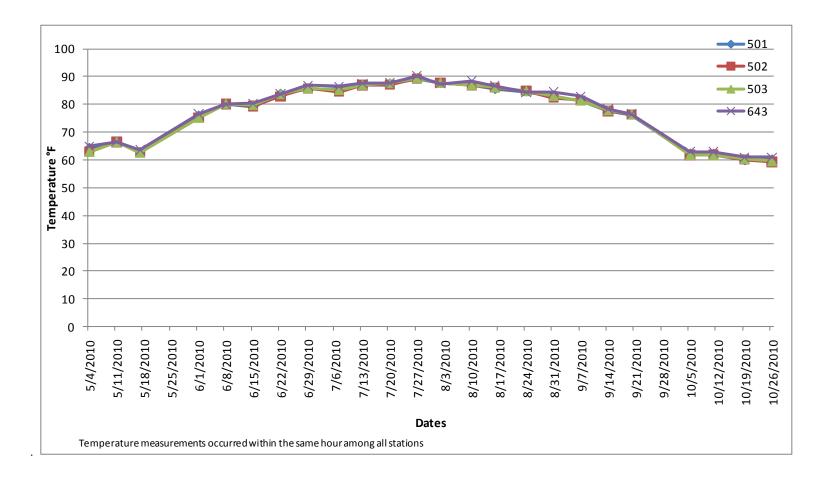
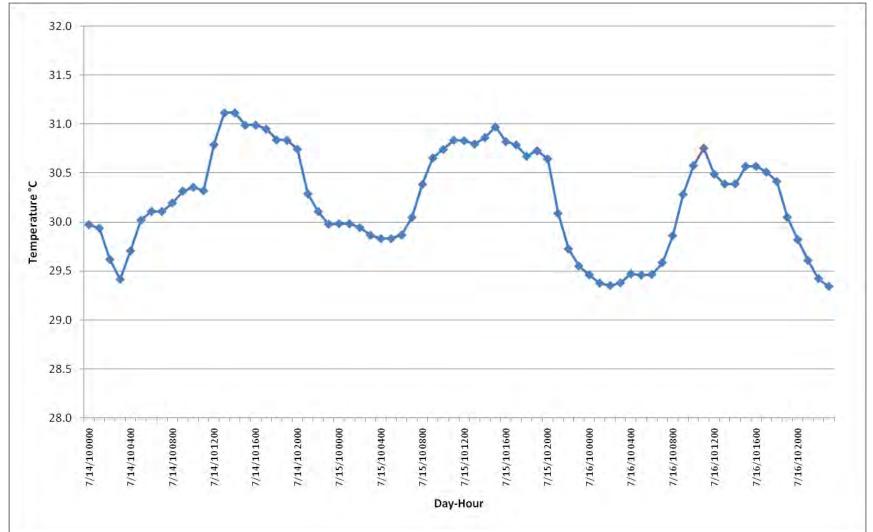


FIGURE 4-28: HOURLY TEMPERATURE MEASUREMENTS AT STATION 643 DOWNSTREAM OF CONOWINGO DAM, MAY-OCTOBER 2010.



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

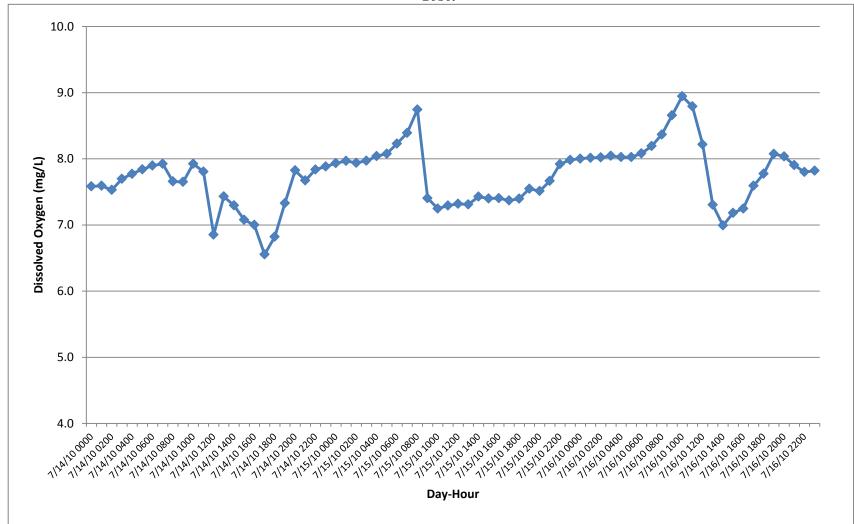


#### FIGURE 4-30: EXAMPLES OF DIURNAL VARIATIONS IN HOURLY WATER TEMPERATURE AT STATION 643 DOWNSTREAM OF CONOWINGO DAM ON JULY 14-16 AND AUGUST 14-16.

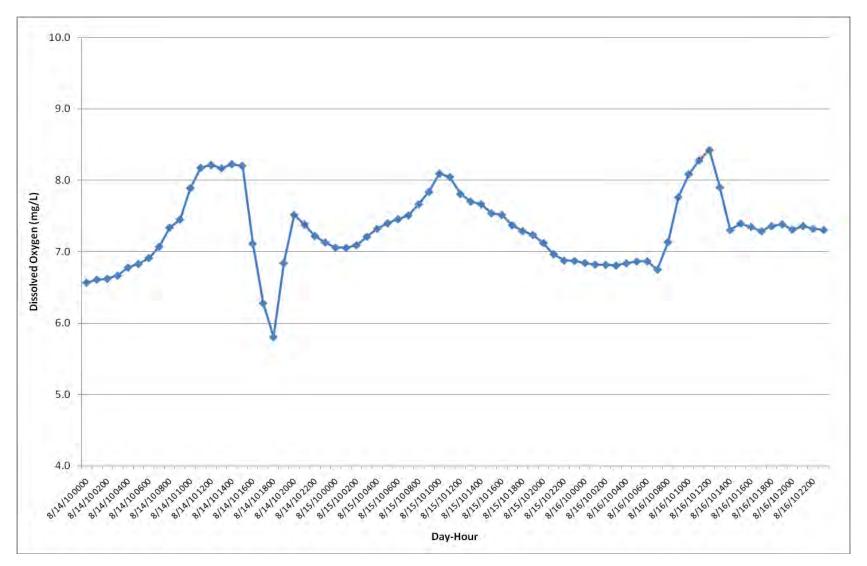
32.0 31.5 31.0 30.5 Temperature °C 30.0 29.5 29.0 28.5 28.0 ++++++  $\frac{2}{812^{A10}} \frac{1}{812^{A10}} \frac{1}{812^{A1$ 

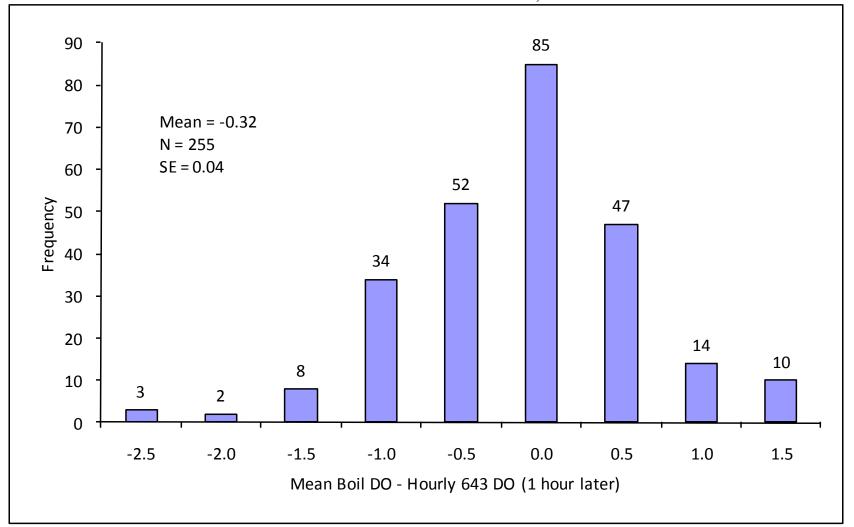
14.0 - dissolved oxygen - average of sensor 1 and sensor 2 -5.0 mg/L 12.0 10.0 Dissolved Oxygen (mg/L) 8.0 6.0 4.0 2.0 0.0 011511211221102 5105101020 07/28/01/0-18 05/01/10-0 10/07/10-0 10/29/10-2 08/20/20/20/24 121512121221222 09/10/10-12 6/14/10-22 210.20128/10.40.14 08/06/10-09106110 ~19/19/10·1 date-hour

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

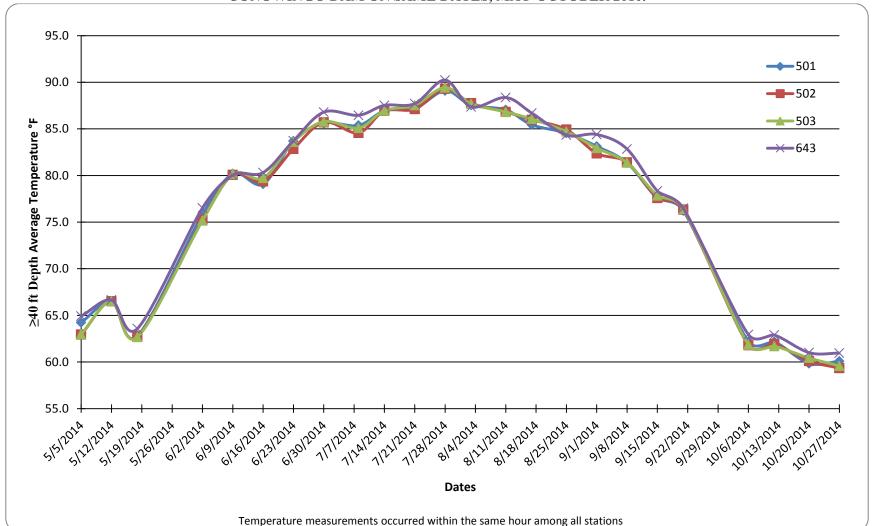


## FIGURE 4-32: EXAMPLES OF DIURNAL VARIATIONS IN DO AT STATION 643 ON SELECTED DATES IN JULY AND AUGUST 2010.





#### FIGURE 4-33: 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.

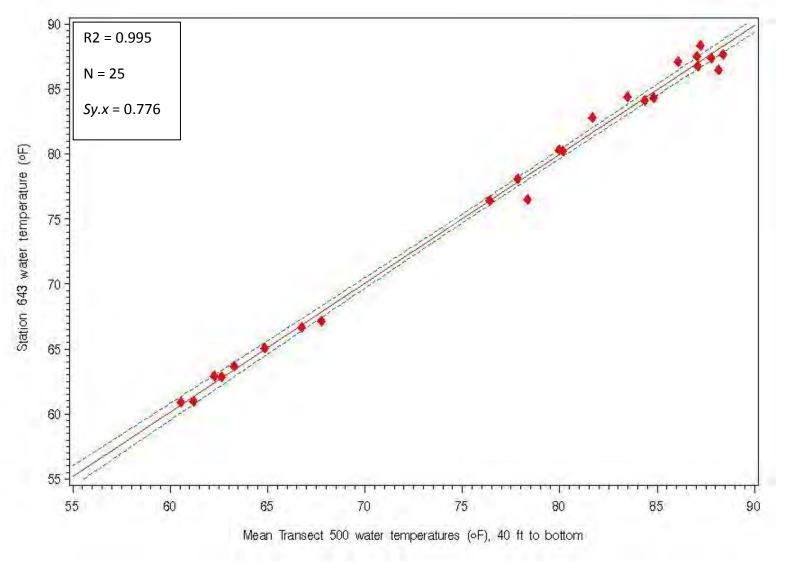


FIGURE 4-35: CONTINUED.

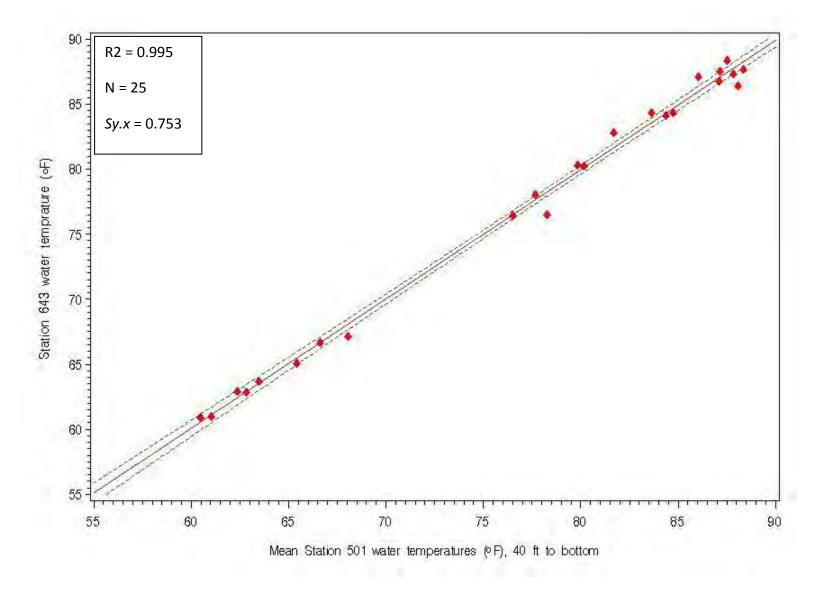


FIGURE 4-35: CONTINUED.

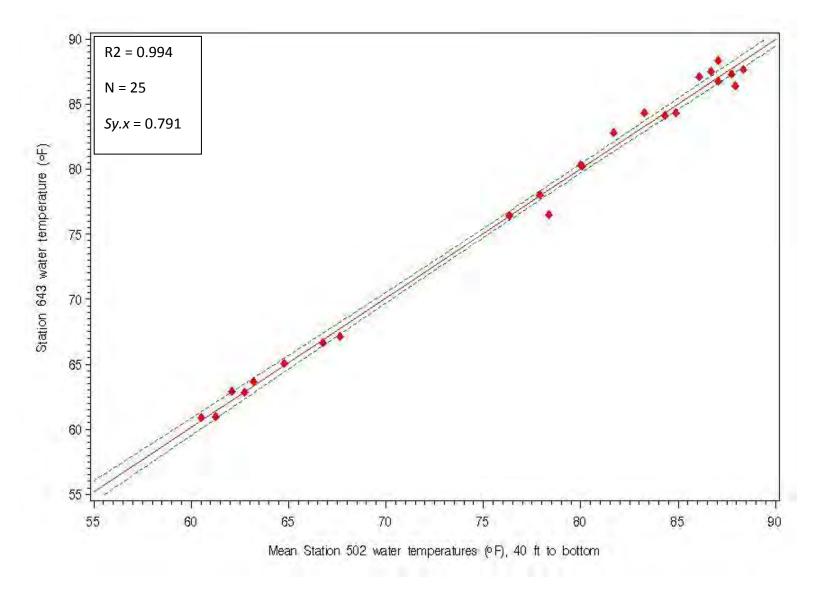
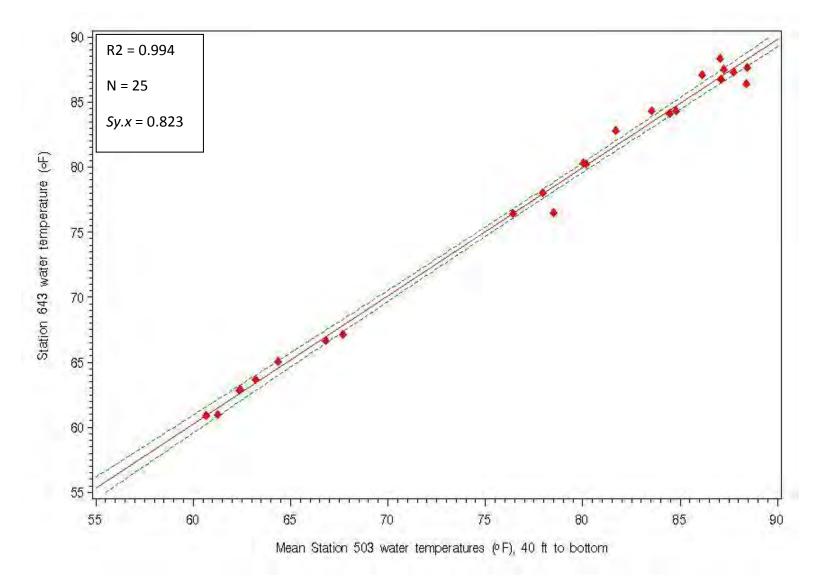
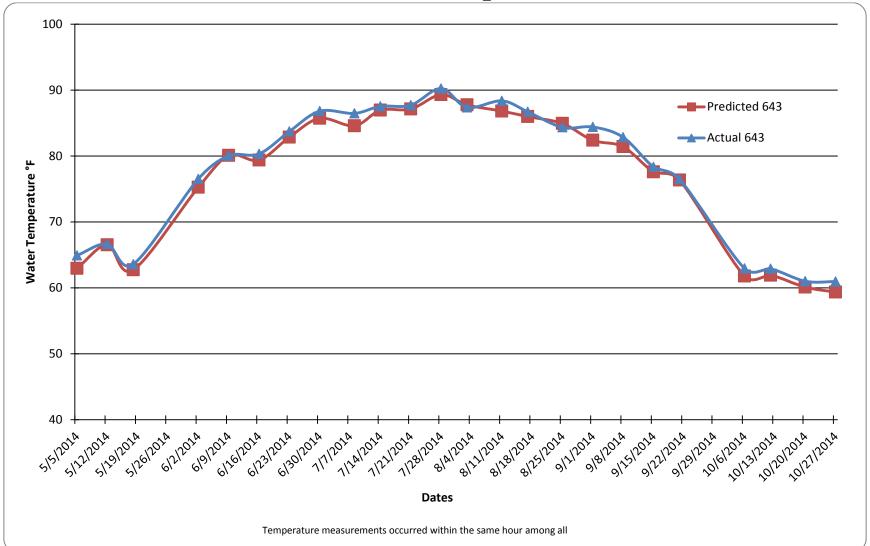


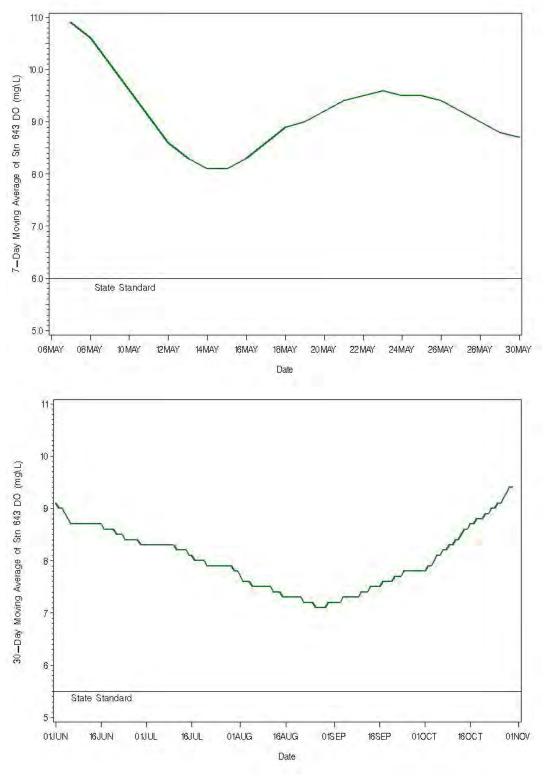
FIGURE 4-35: CONTINUED.





# 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           | $\pm$ 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         | $\pm 0.2$ 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           | $\pm$ 0.10 °C                           | 0.01 °C               |
| Hydrolab MS5 / LDO                     | 0 to 30 mg/L          | $\pm 0.1$ mg/L                          | 0.01 mg/L             |
| Hydrolab MS5 / pH                      | 0 to 14 units         | $\pm 0.2$ 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<br>± 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          | $\pm$ 0.1 mg/L                          | 0.1 mg/L              |
| YSI Model 57 / Temperature             | -5 to 45 °C           | $\pm 0.50$ °C                           | 0.25 °C               |

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| Calibration Date: $2/2/16$ Cali                            | bration Time: 0550        | Calibration Date: 7/2/10 Cali                      | bration Time: 6848                   |
|--|---------------------------|--|--------------------------------------|
| Meter Type: <u>×</u> YSI (meter $\# PH9 -r12$ )            | Hach MS5                  |  | Hach MS5                             |
| Calibration Water Temperature8,5°C                         | DO Solubility 9.35 ppm    | Calibration Water Temperature $19.5$ °C            | DO Solubility <u>9.10</u> ppm        |
| Meter Water Temperature/8,5°C                              | Meter DO <u>1, 16</u> ppm | Meter Water Temperature2る.つ_oC                     | Meter DO <u>9.3</u> ppm              |
| Meter Water Temp. adjusted to <u>18,5</u> °C               |                           | Meter Water Temp. adjusted to <u>19.5</u> °C       | Meter DO adjusted to <u>9.18 ppm</u> |
| Calibration Date: 7/2/10 Calibration                       | pration Time:0645         | Calibration Date: 7/2/10 Cali                      | protion Times A945                   |
| Mater Truck X 1101 ( 1101 M)                               | Hach MS5                  | Meter Type: $X$ YSI (meter #_ $PH$ 91-1 $\eta_2$ ) | Hach MS5                             |
| Calibration Water Temperature <u>185</u> °C                | DO Solubility 9.35 ppm    | Calibration Water Temperature S_°C                 | DO Solubility                        |
| Meter Water Temperature 18.5 °C                            | Meter DO <u>935</u> ppm   | Meter Water Temperature2).5°C                      | Meter DO 6. 6 ppm                    |
| Meter Water Temp. adjusted to°C                            | Meter DO adjusted toppm   | Meter Water Temp. adjusted to°C                    | Meter DO adjusted toppm              |
| Calibration Date: 7/2//0 Calib                             | ration Time: 0742         | Calibration Date: 7/2/10 Calib                     |                                      |
| Meter Type: <u>×</u> YSI (meter # <u><i>PH 91-m</i>2</u> ) |                           | Meter Type: X YSI (meter # <u>PH 9/-/ha</u> )      | Hach MS5                             |
| Calibration Water Temperature <u>18,5</u> °C               | DO Solubility 9.35 ppm    | Calibration Water Temperature°C                    | DO Solubility <u>8.8</u> _ppm        |
| Meter Water Temperature <u>185</u> °C                      | Meter DO <u>9.35</u> ppm  | Meter Water Temperature01.55°C                     | Meter DO <u><u><u></u></u>ppm</u>    |
| Meter Water Temp. adjusted to°C                            | Meter DO adjusted toppm   | Meter Water Temp. adjusted to°C                    | Meter DO adjusted toppm              |

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| Calibration Date: 7/2 10 Cali          | bration Time: 1155                  | Calibration Date: 7/2/10 Cal  | ibration Time: 1448   |
|--|-------------------------------------|---|---|
| Meter Type: X YSI (meter # 9 H91-Mo)   | Hach MS5                            | Meter Type: X YSI (meter # PH91-M2)   | Hach MS5  |
| Calibration Water Temperature23.5_°C   | DO Solubility <u>8.5</u> ppm        | Calibration Water Temperature 23.0 °C   | DO Solubility ppm   |
| Meter Water Temperature <u>23,5</u> °C | Meter DO ppm                        | Meter Water Temperature°C   | Meter DOppm   |
| Meter Water Temp. adjusted to°C        |                                     | Meter Water Temp. adjusted to°C   | Meter DO adjusted toppm   |
| Calibration Date: 7210 Calib           | pration Time: 1253                  | Calibration Date: 7/2/10 Cali   | bration Times 1509  |
| Matter T N Hard H MILLAL AND           |                                     | Meter Type: $\underline{\times}$ YSI (meter # $\underline{PH} 9/\underline{-172}$ ) |   |
|  |                                     |   | Hach MS5  |
| Calibration Water Temperature°C        | DO Solubility <u>8,5</u> _ppm       | Calibration Water Temperature $23.0$ °C   | DO Solubility <u>8, 5</u> ppm   |
| Meter Water Temperature 23.5 °C        | Meter DO <u>8.4</u> ppm             | Meter Water TemperatureO°C  | Meter DOppm   |
| Meter Water Temp. adjusted to°C        | Meter DO adjusted to <u>8.5</u> ppm | Meter Water Temp. adjusted to°C   | Meter DO adjusted toppm   |
| Calibration Date: 7/2/10 Calib         | ration Time: 1349                   | Calibration Date: 7/2/10 Cali   | huntion Times 1155  |
| Meter Type: X YSI (meter # 191-17)     |                                     | Meter Type: YSI (meter #_ PH91-Md)  |   |
|  |                                     |   | Hach MS5  |
| Calibration Water Temperature 23.6 °C  | DO Solubility 8.5 ppm               | Calibration Water Temperature°C   | DO Solubility <u>8.5</u> ppm  |
| Meter Water Temperature 23.0 °C        | Meter DO <u>8.5</u> ppm             | Meter Water Temperature3.0°C  | Meter DO & Sppm   |
| Meter Water Temp. adjusted to°C        | Meter DO adjusted toppm             | Meter Water Temp. adjusted to°C   | Meter DO adjusted toppm   |
|  |                                     |   | The second se |

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| 1-5- |   |    | - |

| Calibration Date: 07-03-10 Cali                    | bration Time: 5:55                | Calibration Date: 07-03-10 Cal                            | ibration Time: (150)         |
|--|-----------------------------------|---|------------------------------|
| Meter Type: YSI (meter #                           | Hach MS5                          | Meter Type: YSI (meter # PH 91 - M2)                      | Hach MS5                     |
| Calibration Water Temperature <u>17.9</u> °C       | DO Solubility 9,5 20 ppm          | Calibration Water Temperature 17.0 °C                     |                              |
| Meter Water Temperature 17.9 °C                    | Meter DO 9, L ppm                 | Meter Water Temperature                                   | Meter DO 9.0 ppm             |
| Meter Water Temp. adjusted to°C                    |                                   | Meter Water Temp. adjusted to°C                           | Meter DO adjusted to 9.7 ppm |
| Calibration Date: 07-03-10 Calib                   | pration Time: 7:47                | Calibration Date: 07-03-10 Cali                           | bration Time: X:45           |
| Meter Type: YSI (meter # <u>PH91-M2</u> )          |                                   | Meter Type: X YSI (meter $\#PH91-M2$ )                    | Hach MS5                     |
| Calibration Water Temperature <u>8.7</u> °C        |                                   | Calibration Water Temperature <u>20,0</u> °C              |                              |
| Meter Water Temperature <u>18.7</u> °C             |                                   | Meter Water Temperature <u>20,0</u> °C                    | Meter DO 9.1. ppm            |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to $9.3$ ppm    | Meter Water Temp. adjusted to°C                           | Meter DO adjusted toppm      |
| Calibration Date: 07-03-10 Calib                   | ration Time: 9:49                 | Calibration Date: <u>67-03-10</u> Cali                    | handline Time 10:50          |
| Meter Type: <u>X</u> YSI (meter # <u>PH91-M3</u> ) |                                   | Meter Type: $\underline{X}$ YSI (meter # <u>PH91-M2</u> ) | Hach MS5                     |
| Calibration Water Temperature 20.8 °C              | DO Solubility <u>8,9</u> ppm      | Calibration Water TemperatureC                            | DO Solubilityppm             |
| Meter Water Temperature <u>20.8</u> °C             | Meter DO <u>69</u> _ppm           | Meter Water Temperature <u>22.5</u> °C                    | Meter DO <u><u> </u></u>     |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to <u>M</u> ppm | Meter Water Temp. adjusted to°C                           | Meter DO adjusted to 8.6 ppm |

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| Calibration Date: 07-03-10 Cali              | ibration Time: 11:50                   | Calibration Date: 07-03-10 Cal  | 12:21                              |
|--|--|---|------------------------------------|
| Meter Type: X YSI (meter # PH 91 - M2)       | Hach MS5                               | Meter Type: X YSI (meter # PH41-M2)                                     |                                    |
|  |  | Vieter Type: _/YSI (meter #   | Hach MS5                           |
| Calibration Water Temperature <u>24.0</u> °C | DO Solubility <u>8,4</u> ppm           | Calibration Water Temperature <u>25,0</u> °C                            | DO Solubility <u>8.24</u> ppm      |
| Meter Water Temperature <u>24.0</u> °C       | Meter DOppm                            | Meter Water TemperatureC  | Meter DO <u>8.4</u> ppm            |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to $\underline{}$    | Meter Water Temp. adjusted to°C   | Meter DO adjusted to 8.2. ppm      |
| Calibration Date: 07-03-10 Cali              | bration Time: 13:50                    | Calibration Data: $\sqrt{2}$ , $\sqrt{2}$ , $\sqrt{2}$                  |                                    |
| Motor True V HOLD U DIIGA MO                 | Hach MS5                               | Calibration Date: 07-03-10 Cali<br>Meter Type: X YSI (meter # PH 91-M2) | Hach MS5                           |
| Calibration Water Temperature°C              | DO Solubility 8,4 ppm                  | Calibration Water Temperature <u>24.0</u> °C                            | DO Solubilityppm                   |
| Meter Water Temperature <u>24.0</u> ℃        | Meter DO <u>8.4</u> ppm                | Meter Water Temperature <u>240</u> °C                                   | Meter DOppm                        |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to /// ppm           | Meter Water Temp. adjusted to°C   | Meter DO adjusted to <u>MA</u> ppm |
| Calibration Date: 07-03-10 Calib             | pration Time: 15:50                    | Calibration Date: <u>(17-03-10</u> Calil                                |                                    |
| Meter Type: X YSI (meter # <u>PH91-M2</u> )  |  | Meter Type: X YSI (meter $\#PH91-M^2$ )                                 |                                    |
| Calibration Water Temperature°C              | DO Solubility 8.4 ppm                  | Calibration Water TemperatureQ°C  | DO Solubility <u>8.4</u> ppm       |
| Meter Water TemperatureC                     | Meter DO <u>8.3</u> ppm                | Meter Water Temperature <u>24.0</u> °C                                  | Meter DO 8.5 ppm                   |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to 8.4 ppm           | Meter Water Temp. adjusted to°C   | Meter DO adjusted to <u>84</u> ppm |
| Calibration Date: 07-03-10 Cali              | brutten Time: 17:52                    |   |                                    |
| Meter Type: X YSI (meter \$ PH91-M           | B) Hach MS5                            |   |                                    |
| Calibration Wester Temp, 24.0°C              | DOSdubility 8.4 ppm                    |   |                                    |
|  | DOSalubility 8.4 ppm<br>Mato DO 8.5 pm |   |                                    |
| Meter Wuter Tonp Adjusted ToE                | Meter DO adjusted to 8.40pm            |   |                                    |

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| Dissolved Oxygen and V | Water | Temperature | Meter | Calibration | Sheet |
|------------------------|-------|-------------|-------|-------------|-------|
|------------------------|-------|-------------|-------|-------------|-------|

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| Calibration Date: 07-01-10 Calibration              | bration Time: <u>5:47</u>                   | Calibration Date: 07-04-10 Cali              | bration Time: 06 (3                   |
|---|---|--|---------------------------------------|
| Meter Type: YSI (meter # PH91 - M2_)                | Hach MS5                                    | Meter Type: YSI (meter # 🏞 🍕 - M2)           | Hach MS5                              |
| Calibration Water Temperature <u>8</u> . <u></u> °C | DO Solubility 9.3 ppm                       | Calibration Water Temperature <u>855</u> °C  | DO Solubility <b>9.3</b> ppm          |
| Meter Water Temperature <u>13, 8</u> °C             | Meter DO <u>9</u> ppm                       | Meter Water Temperature <u>18,4</u> °C       | Meter DO <u>9.5</u> ppm               |
| Meter Water Temp. adjusted to <u>18.5</u> °C        | Meter DO adjusted to <u><u>3</u> ppm</u>    | Meter Water Temp. adjusted to <u>18.5</u> °C | Meter DO adjusted to 9.3 ppm          |
| Calibration Date: 07-04-10 Calib                    | pration Time: 0750                          | Calibration Date: 07-04-10 Cali              | bration Times & Build                 |
|   | Hach MS5                                    | Meter Type: YSI (meter $\#_{PA91} - M2_)$    | Hach MS5                              |
| Calibration Water Temperature 18,5 °C               | DO Solubility <u>9.3</u> ppm                | Calibration Water Temperature <u>19.8</u> °C | DO Solubility 9, 2 ppm                |
| Meter Water Temperature <u>18.5</u> °C              | Meter DO <u>8.6</u> ppm                     | Meter Water Temperature <u>20.0</u> °C       | Meter DO 9.5 ppm                      |
| Meter Water Temp. adjusted to <u>NR</u> °C          | Meter DO adjusted to 9.3 ppm                | Meter Water Temp. adjusted to <u>\9.8</u> •C | Meter DO adjusted to 9.2 ppm          |
| Calibration Date: 07-04-10 Calib                    | ration Time: 0952                           | Calibration Date: 07-04-10 Calil             | aration Time: 14 Ca                   |
| Meter Type: YSI (meter #2019 10 20)                 |   | Meter Type: YSI (meter # <u>Ph91 - M2_</u> ) | Dration Time: <u>1658</u><br>Hach MS5 |
| Calibration Water Temperature 21.5 °C               | DO Solubility 8.8 ppm                       | Calibration Water Temperature 23.0 °C        | DO Solubility <u>8.5</u> ppm          |
| Meter Water Temperature <u>21.5</u> °C              | Meter DO <u><u></u><u></u>ppm</u>           | Meter Water Temperature <u>23.0</u> °C       | Meter DO <u>8.5</u> ppm               |
| Meter Water Temp. adjusted to <u>N</u> A °C         | Meter DO adjusted to <u>&amp; &amp;</u> ppm | Meter Water Temp. adjusted to ^ C            | Meter DO adjusted to <u>NAppm</u>     |

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| Calibration Date: 07-04-10 Cali              | bration Time: 1150  | Calibration Date: 07-04-10 Calibration Time: 1255   |
|--|---|---|
| Meter Type: YSI (meter #                     | Hach MS5  | Meter Type: YSI (meter #???? Hach MS5   |
| Calibration Water Temperature 24.0°C         | DO Solubility 8.4 ppm   | Calibration Water Temperature 24.8 °C DO Solubility 8.3 ppm   |
| Meter Water Temperature <u>24.0</u> °C       | Meter DO <u>8,4</u> ppm   | Meter Water Temperature 24.8 °C Meter DO 8.2 ppm  |
| Meter Water Temp. adjusted to O °C           | Meter DO adjusted to NAppm  | Meter Water Temp. adjusted to <u>NA</u> °C Meter DO adjusted to <u>Sppm</u>   |
| Calibration Date: 01-04-10 Calil             | pration Time: 1355  |   |
| Meter Type: YSI (meter # Ph9 + M 2)          |   | Calibration Date:       07-04-10       Calibration Time:       1450         Meter Type:       VSI (meter #PMA1-M2)       Hach MS5             |
| Calibration Water Temperature 24.5 °C        |   | Calibration Water Temperature <u>25.0</u> °C DO Solubility <u>8.2</u> ppm   |
| Meter Water Temperature 24.8 °C              | Meter DO <u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u> | Meter Water Temperature <u>25.0</u> °C Meter DO <u>8.2</u> ppm  |
| Meter Water Temp. adjusted to <u>24.5</u> °C | Meter DO adjusted to MA ppm   | Meter Water Temp. adjusted to <u>NIA</u> °C Meter DO adjusted to <u>NA</u> ppm  |
| Calibration Date: 07-64-16 Calib             | ration Time: 1545   | Calibration Date: Al-Al-La Calibration Time V. Ca   |
|  |   | Calibration Date:         67-64-10         Calibration Time:         1650           Meter Type:        YSI (meter #2H91-M2_)         Hach MS5 |
| Calibration Water Temperature <u>24.5</u> °C | DO Solubility <u> </u>  | Calibration Water Temperature <u>24.5</u> °C DO Solubility <u>8.3</u> ppm   |
| Meter Water Temperature <u>29.8</u> °C       | Meter DO <u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u> | Meter Water Temperature <u>Z4.5</u> °C Meter DO <u>8,2</u> ppm  |
| Meter Water Temp. adjusted to $24.5$ °C      | Meter DO adjusted to <u>)</u> A ppm   | Meter Water Temp. adjusted to <u>NA</u> °C Meter DO adjusted to <u>8.3</u> ppm  |
|  |   |   |

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| Calibration Date: 07-6470 Cali               | pration Time: 1750               | Calibration Date:             | Calit | pration Time:          |
|--|----------------------------------|-------------------------------|-------|------------------------|
| Meter Type: YSI (meter # <u>Prt91- m2_</u> ) | Hach MS5                         | Meter Type: YSI (meter #      |       | Hach MS5               |
| Calibration Water Temperature 24.0 °C        | DO Solubility <u><u></u>ppm</u>  | Calibration Water Temperature |       | DO Solubility pp       |
| Meter Water Temperature <u>24.6</u> °C       | Meter DO <u>8</u> , <u>5</u> ppm | Meter Water Temperature       | _°C   | Meter DOppm            |
| Meter Water Temp. adjusted to N/A °C         | Meter DO adjusted to 8,4 ppm     | Meter Water Temp. adjusted to | °C    | Meter DO adjusted top  |
| Calibration Date: Calib                      | ration Time:                     | Calibration Date:             | Calib | ration Time:           |
| Meter Type: YSI (meter #)                    |                                  | Meter Type: YSI (meter #      | )     | Hach MS5               |
| Calibration Water Temperature°C              | DO Solubilityppm                 | Calibration Water Temperature | °C    | DO Solubilitypp        |
| Meter Water Temperature°C                    | Meter DOppm                      | Meter Water Temperature       | _°C   | Meter DOppm            |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted toppm          | Meter Water Temp. adjusted to | _°C   | Meter DO adjusted topp |
| Calibration Date: Calib                      | ration Time:                     | Calibration Date:             | Calib | ration Time:           |
| Meter Type: YSI (meter #)                    |                                  | Meter Type: YSI (meter #      | )     | Hach MS5               |
| Calibration Water Temperature°C              | DO Solubilityppm                 | Calibration Water Temperature | _°C   | DO Solubilityppr       |
| Meter Water Temperature°C                    | Meter DOppm                      | Meter Water Temperature       | _°C   | Meter DOppm            |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted toppm          | Meter Water Temp. adjusted to | _°C   | Meter DO adjusted topp |

CALIBRATION'S FOR OCOA 07-04-10 KJT

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| Heter Type:       YSI (meter # 10983)       Hach MSS         Calibration Water Temperature       22.0 °C       DO Solubility       8.7 ppm       Calibration Water Temperature       24.0 °C       DO Solubility       9.4 ppm         Acter Water Temperature       22.0 °C       DO Solubility       8.7 ppm       Meter Water Temperature       24.0 °C       Meter DO       8.4 ppm         Acter Water Temperature       22.0 °C       Meter DO       8.9 ppm       Meter Water Temperature       24.0 °C       Meter DO       8.4 ppm         Acter Water Temperature       24.0 °C       Meter DO adjusted to R.7 ppm       Meter Water Temperature       24.0 °C       Meter DO adjusted to NIA ppm         Acter Type:       YSI (meter # 10983)       Hach MS5       Meter Type:       YSI (meter # 10983)       Hach MS5         alibration Date:       0.7 0.01-10       Calibration Time:       1.3 49       Calibration Date:       0.7 0.01-10       Calibration Time:       2.5 0         Atter Type:       YSI (meter # 10983)       Hach MS5       Meter Type:       YSI (meter # 10983)       Hach MS5         alibration Water Temperature       24.5 °C       DO Solubility       8.3 ppm       Calibration Water Temperature       24.5 °C       Meter Meter Do adjusted to NIA ppm         teter Water Temp. adjusted to       24.5 °C <th>Calibration Date: 07-04-10 C</th> <th>Calibration Time: 0955</th> <th>Calibration Date: 67-69-10 Cali</th> <th>bration Time: 115C</th>  | Calibration Date: 07-04-10 C  | Calibration Time: 0955   | Calibration Date: 67-69-10 Cali   | bration Time: 115C                                     |
|---|---|--|---|--|
| Acter Water Temperature $27.0  ^{\circ}$ C Meter DO $8.9  ^{\circ}$ ppm Meter Water Temperature $24.0  ^{\circ}$ C Meter DO $8.4  ^{\circ}$ ppm Meter Water Temperature $24.0  ^{\circ}$ C Meter DO adjusted to $8.7  ^{\circ}$ ppm Meter Water Temp. adjusted to $14  ^{\circ}$ C Meter DO adjusted to $8.7  ^{\circ}$ ppm Meter Water Temp. adjusted to $14  ^{\circ}$ C Meter DO adjusted to $14  ^{\circ}$ C DO Solubility $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C DO Solubility $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $8.3  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C DO Solubility $8.4  ^{\circ}$ ppm Meter Water Temperature $24.5  ^{\circ}$ C Meter DO $2.5  ^{\circ}$ ppm Meter Water Temperature $24.5$ | Meter Type: YSI (meter #_16983)   | Hach MS5   |   |  |
| deter Water Temp. adjusted to $A \circ C$ Meter DO adjusted to $A \circ C$ DO Solubility $R \circ C$ Meter DO adjusted to $A \circ C$ Meter Mater Temperature $C C$ DO Solubility $A \circ$  | Calibration Water Temperature <u>22.0</u> °C  | DO Solubility <u>8,7</u> ppm   | Calibration Water Temperature 24.0 °C   | DO Solubility 8.4 ppm                                  |
| Calibration Date:       1-04-10       Calibration Time:       1349         Calibration Date:       1-04-10       Calibration Time:       1349         Calibration Date:       1-04-10       Calibration Time:       1500         Calibration Water Temperature       24.5 °C       DO Solubility       8.3 ppm         Calibration Water Temperature       24.5 °C       DO Solubility       8.3 ppm         Calibration Water Temperature       24.5 °C       DO Solubility       8.3 ppm         Calibration Water Temperature       24.5 °C       DO Solubility       8.3 ppm         Calibration Date:       01-04-10       Calibration Time:       14.5 °C         Meter Water Temperature       24.5 °C       Meter Do adjusted to N Appm       Meter Water Temperature       24.5 °C       Meter Do adjusted to N Appm         Ider Water Temp.       adjusted to       24.5 °C       Meter Do adjusted to       N A ppm         Alibration Date:       01-04-10       Calibration Time:       17.5 S       Calibration Date:       Calibration Time:       17.5 S         Calibration Water Temperature       24.0 °C       DO Solubility       8.4 ppm       Calibration Water Temperature       °C       DO Solubility       ppm         eter Water Temperature       24.0 °C       Meter DO adjusted to  | Meter Water Temperature 22.0 °C   | Meter DO <u>8</u> ,9 ppm   | Meter Water Temperature <u>24.6</u> °C  | Meter DO 8.4 ppm                                       |
| Atter Type:      YSI (meter #109 & 3  | Meter Water Temp. adjusted to <u>N</u> A°C  | Meter DO adjusted to <u><b>R</b>7</u> ppm  | Meter Water Temp. adjusted to <u>PIA</u> C  | Meter DO adjusted to NA ppm                            |
| Atter Type:      YSI (meter #109 & 3  | Calibration Date: <u>47-64-16</u> Cr  | alibration Time: 1349  | Calibration Date: (7- ()-10 Calib   | protion Time: 1850                                     |
| alibration Water Temperature       24.5 °C       DO Solubility       8.3 ppm       Calibration Water Temperature       24.5 °C       DO Solubility       8.3 ppm         Intere Water Temperature       24.5 °C       Meter DO       8.3 ppm       Meter Water Temperature       24.5 °C       Meter DO       8.3 ppm         Intere Water Temperature       24.5 °C       Meter DO       8.3 ppm       Meter Water Temperature       24.5 °C       Meter DO       8.3 ppm         Intere Water Temp. adjusted to       24.5 °C       Meter DO       8.3 ppm       Meter Water Temperature       24.5 °C       Meter DO       8.3 ppm         Intere Water Temp. adjusted to       24.5 °C       Meter DO adjusted to       NAppm       Meter Water Temperature       24.5 °C       Meter DO adjusted to       NAppm         Intere Water Temp. adjusted to       24.5 °C       Meter DO adjusted to       NAppm       Meter Water Temperature       Calibration Time:       Meter Meter Water Temperature       Meter Mass       Meter Mass         Intraction Water Temperature       24.0 °C       DO Solubility       8.4 ppm       Meter Water Temperature       °C       DO Solubility       ppm         eter Water Temperature       24.0 °C       Meter DO       8.5 ppm       Meter Water Temperature       °C       Meter DO       ppm  | Meter Type: YSI (meter # <u>109 83</u> )  |  | Meter Type: $\sqrt{YSI (meter # 10183)}$  | Hach MS5   |
| teter Water Temp. adjusted to 24.5 °C       Meter DO adjusted to NAppm       Meter Water Temp. adjusted to NAppm       Meter DO adjusted to NAppm         alibration Date:       07-64-10       Calibration Time:       1755       Calibration Date:       Calibration Time:       Calibration Time:         leter Type:       ✓ YSI (meter #164.83)       Hach MS5       Calibration Date:       Calibration Time:       Calibration Time:         alibration Water Temperature       24.0 °C       DO Solubility       8.4 ppm       Calibration Water Temperature       °C       DO Solubility       ppm         eter Water Temperature       24.0 °C       Meter DO       8.5 ppm       Meter Water Temperature       °C       DO Solubility       ppm         eter Water Temperature       24.0 °C       Meter DO       8.5 ppm       Meter Water Temperature       °C       DO Solubility       ppm         eter Water Temperature       24.0 °C       Meter DO adjusted to 8.4 ppm       Meter Water Temperature       °C       Meter DO       ppm         eter Water Temp. adjusted to       1/A °C       Meter DO adjusted to 8.4 ppm       Meter Water Temp. adjusted to       °C       Meter DO adjusted to       ppm         -       7HA °C       Meter DO adjusted to 8.4 ppm       Calibration Calibration Calibration Calibration Calibration Calibration Calibration Calibration Calibratica  | Calibration Water Temperature 24.5 °C   | DO Solubility <u>8.3</u> ppm   |   |  |
| alibration Date:       07-64-10       Calibration Time:       1755       Calibration Date:       Calibration Time:       Calibration Time:         Leter Type:       /_YSI (meter # 104 83_)  | Meter Water Temperature <u>24, 2</u> °C   | Meter DO <b>7.3</b> ppm  | Meter Water Temperature <u>24.5</u> °C  | Meter DO 8.3 ppm                                       |
| Ideer Type:      YSI (meter #_104 83_)      Hach MS5       Meter Type:      YSI (meter #)      Hach MS5         alibration Water Temperature       24.0 °C       DO Solubility       8.4 ppm       Calibration Water Temperature°C       DO Solubilityppm         Ideer Water Temperature       24.0 °C       Meter DO       8.5 ppm       Meter Water Temperature°C       DO Solubilityppm         Ideer Water Temperature       24.0 °C       Meter DO       8.5 ppm       Meter Water Temperature°C       Meter DOppm         Ideer Water Temperature       24.0 °C       Meter DO       8.5 ppm       Meter Water Temperature°C       Meter DOppm         Ideer Water Temp. adjusted to               Ideer Water Temp. adjusted to   <   | Meter Water Temp. adjusted to 24.5 °C   | Meter DO adjusted to NA ppm  | Meter Water Temp. adjusted to) A_°C   | Meter DO adjusted to NA ppm                            |
| Hach MS5       Hach MS5       Meter Type:YSI (meter #)Hach MS5         Alibration Water Temperature 24.0 °C       DO Solubility 8.4 ppm       Calibration Water Temperature °C       DO Solubilityppm         Leter Water Temperature 24.0 °C       Meter DOS ppm       Meter Water Temperature °C       DO Solubility ppm         Leter Water Temperature24.0 °C       Meter DOS ppm       Meter Water Temperature °C       Meter DOppm         Leter Water Temperature24.0 °C       Meter DOS ppm       Meter Water Temperature °C       Meter DOppm         Leter Water Temperature24.0 °C       Meter DOS ppm       Meter Water Temperature °C       Meter DOppm         Leter Water Temp. adjusted to  | Calibration Date: 07-64-10 Ca   | alibration Time: 1755  | Calibration Date: Calib   | ration Time:   |
| alibration Water Temperature 24.0 °C DO Solubility 8.4 ppm Calibration Water Temperature °C DO Solubility ppm<br>leter Water Temperature 24.0 °C Meter DO 8.5 ppm Meter Water Temperature °C Meter DO ppm<br>eter Water Temp. adjusted to Meter DO adjusted to 8.4 ppm Meter Water Temp. adjusted to °C Meter DO adjusted to ppm<br>- THIS METER SEEMS TO TO TO THOR PRATICA RATION RATION COLL   | Aeter Type: YSI (meter # <u>104</u> <b>83</b> )   | Hach MS5   |   |  |
| eter Water Temp. adjusted to <u><u>J</u><u>A</u> °C Meter DO adjusted to <u><u>8</u>, <u>4</u> ppm Meter Water Temp. adjusted to <u>°</u>C Meter DO adjusted to <u>ppm</u><br/>- THIS METER SEEMS TO HOLD CALIBRATION RATTER WELL <u>U</u></u></u>  | Calibration Water Temperature <u>24.0</u> °C  |  |   |  |
| -THIS METER SEEMS TO HOLD CALIBRATION RATTER WELL !!  | Aeter Water Temperature <u>24.0</u> °C  | Meter DO <b>8.5</b> ppm  | Meter Water Temperature°C   | Meter DOppm  |
|   | Aeter Water Temp. adjusted to/A °C  | Meter DO adjusted to 8.9 ppm   | Meter Water Temp. adjusted to°C   | Meter DO adjusted toppm                                |
| WORKS WELL & MATCHES SOND'S WHEN WE USE FOR HZO GUIL, ON C.P.   | Calibration Water Temperature $24.0 \circ c$<br>Meter Water Temperature $24.0 \circ c$<br>Meter Water Temp. adjusted to $\lambda/A \circ c$<br>- THIS METER | DO Solubility <u>8.4</u> ppm<br>Meter DO <u>8.5</u> ppm<br>Meter DO adjusted to <u>8.4</u> ppm | Calibration Water Temperature°C<br>Meter Water Temperature°C<br>Meter Water Temp. adjusted to°C | DO Solubilityp<br>Meter DOppm<br>Meter DO adjusted top |

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| Calibration Date: 07-05-10 Cali              | bration Time: <u>5:54</u> | Calibration Date:                             | Calibration Time:                   |
|--|---------------------------|---|-------------------------------------|
| Meter Type: X YSI (meter # PH91-M2)          | Hach MS5                  | Meter Type: YSI (meter #                      |                                     |
| Calibration Water Temperature <u>18.5</u> °C | DO Solubility 9.26 ppm    | Calibration Water Temperature°C               | DO Solubilityppm                    |
| Meter Water Temperature <u>18.5</u> °C       | Meter DO 10.0 ppm         | Meter Water Temperature                       | Meter DOppm                         |
| Meter Water Temp. adjusted to°C              |                           | Meter Water Temp. adjusted to°C               | Meter DO adjusted toppm             |
| Calibration Date: Calibration                | bration Time:             | Calibration Date: C                           | alibration Time                     |
| Meter Type: X YSI (meter #)                  |                           | Meter Type: YSI (meter #)                     | Hach MS5                            |
| Calibration Water Temperature°C              | DO Solubilityppm          | Calibration Water Temperature°C               | DO Solubilityppm                    |
| Meter Water Temperature°C                    | Meter DOppm               | Meter ater Temperature°C                      | Meter DOppm                         |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted toppm   | Meter Water Temp. adjusted to°C               | Meter DO adjusted toppm             |
| Calibration Date: Calib                      | pration Time: 9.50        | Calibration Date: 07-05-10 Ca                 | libration Times 10:50               |
| Meter Type: YSI (meter #)                    |                           | Meter Type: $X$ YSI (meter # <u>PH91-M1</u> ) | Hach MS5                            |
| Calibration Water Temperature 22 °C          | DO Solubility 2 ppm       | Calibration Water Temperature <u>24.0</u> °C  | DO Solubility <u>8.4</u> ppm        |
| Meter Water Temperature <b>\$2</b> °C        | Meter DO <u>\$</u> 7_ppm  | Meter Water Temperature <u>24.0</u> °C        | Meter DO <u>83</u> ppm              |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to pm   | Meter Water Temp. adjusted to°C               | Meter DO adjusted to <u>8.4</u> ppm |

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| Calibration Date.               | 0.1   |                                  |                                    |              |                           |
|---------------------------------|-------|----------------------------------|------------------------------------|--------------|---------------------------|
|                                 |       | bration Time:                    | Calibration Date:                  | Calil        | bration Time:             |
| Meter Type YSI (meter #         |       | Hach MS5                         | Meter Type: YSI (meter #           | <u>-M2</u> ) | Hach MS5                  |
| Calibration Water Temperature   | _°C   | DO Solubility                    | Calibration Water Temperature      | _°C          | DO Solubilityppm          |
| Meter Water Temperature         | °C    | Meter DOppm                      | Meter Water Temperature            | _°C          | Meter DOppm               |
| Meter Water Temp. adjusted to   | _°C   | Meter DO adjusted toppm          | Meter Water Temp. adjusted to      | _°C          | Meter DO adjusted to Appm |
| Calibration Date:               | Cali  | bration Time:                    | Calibration Date: 1                | Calib        | pration Time:             |
| Meter Type: YSI (meter #        |       | Hach MS5                         | Meter Type: YSI (meter #           | 1. 10. 100   |                           |
| Calibration Water Temperature   | _°C   | DO Solubilityppm                 | Calibration Water Temperature      | <u>0</u> °C  | DO Solubilityppm          |
| Meter Water Temperature         | _°C   | Meter DOppm                      | Meter Water Temperature            | _°C          | Meter DOppm               |
| Meter Water Temp. adjusted to   | _°C   | . Meter DO adjusted to ppm       | Meter Water Temp. adjusted to      | _°C          | Meter DO adjusted toppm   |
| Calibration Date:               | Calil | pration Time:                    | Calibration Date: 27-05-10         | 0.11         | 11111                     |
| Meter Type YSI (meter #         |       | A DAY OF A DAY OF A DAY OF A DAY | Meter Type: X YSI (meter #PH91     |              |                           |
| Calibration Water Temperature   | _°C   | DO Solubilityppm                 | Calibration Water Temperature 28.0 | _°C          | DO Solubility 7.8 ppm     |
| Meter Water Temperature         | _°C   | Meter DOppm                      | Meter Water Temperature            | _°C          | Meter DO 7.8 ppm          |
| Meter Water Temp. adjusted to   | _°C   | Meter DO adjusted toppm          | Meter Water Temp. adjusted to      | _°C          | Meter DO adjusted to A    |
| calibration Date: 07-05-10      | Cabbr | iter me                          |                                    |              |                           |
| Meter Type: X VSI Meter >       | * PHG | -M2) Hach MS5                    |                                    |              |                           |
| Calibration Water Temp _ 27.6°C | DA    | Solubility 7.95 ppm              |                                    |              |                           |
| Landramon water lemp            |       |                                  |                                    |              |                           |
| Meter Vitor Temp _27.0°C        | Me    | iter DO 78 ppm                   |                                    |              |                           |
| Meter Wuter Temp adjusted to    | 0     | C Metor DO adjusted to 200       | (ppm)                              |              |                           |

|      | 1 |    |    |
|------|---|----|----|
| Page |   | of | 10 |
| 1-5- |   | 01 | -> |

|  | ration Time: 0553                   | Calibration Date: 7-14-10 Ca                                     | libration Time: 0850                          |
|--|-------------------------------------|--|---|
| Meter Type: YSI (meter #)                    | Hach MS5                            | Meter Type: YSI (meter #_10983 )                                 |   |
| Calibration Water Temperature <u>21.0</u> °C | DO Solubilityppm                    | Calibration Water Temperature <u>20,5</u> °C                     | DO Solubility <u>9.0</u> ppm                  |
| Meter Water Temperature <u>20.8</u> °C       | Meter DO <u>8</u> , ppm             | Meter Water Temperature <u>70,5</u> °C                           | Meter DO <u>9</u> ppm                         |
| Meter Water Temp. adjusted to <u>21.0</u> °C |                                     | Meter Water Temp. adjusted to°C                                  | Meter DO adjusted to <u>OK</u> ppm            |
| Calibration Date: 07-14-10 Calib             | ration Time: 0653                   | Calibration Date: 7-14-10 Cal                                    | libration Time: 0950                          |
|  |                                     | Meter Type: YSI (meter # <u>10283</u> )                          | Hach MS5                                      |
| Calibration Water Temperature 20,5 °C        | DO Solubility 9. 0 ppm              | Calibration Water Temperature 20.5 °C                            | DO Solubility <u>2.5</u> ppm                  |
| Meter Water Temperature <u>21.0</u> °C       | Meter DO <u>8.9</u> ppm             | Meter Water Temperature  | Meter DO <u>9.0</u> ppm                       |
| Meter Water Temp. adjusted to $20.5$ °C      | Meter DO adjusted to <u>9.0</u> ppm | Meter Water Temp. adjusted to^C                                  | Meter DO adjusted to <u>614</u> ppm           |
| Calibration Date: 07-14-10 Calibr            | ration Time: 0750                   | Calibration Date: 7-14-11) Cal                                   | ibration Time: 1050                           |
| Meter Type: YSI (meter # <u>10억웅 3</u> )     |                                     | Meter Type: $\underline{\checkmark}$ YSI (meter # <u>10983</u> ) |   |
| Calibration Water Temperature <u>20.5</u> °C | DO Solubility <u>90</u> ppm         | Calibration Water Temperature 20.5 °C                            | DO Solubility <u>9.0</u> ppm                  |
| Meter Water Temperature <u>20.5</u> °C       | Meter DO <u>9.0</u> ppm             | Meter Water Temperature°C  | Meter DO <u>89</u> ppm                        |
| Meter Water Temp. adjusted toK°C             | Meter DO adjusted to <u>OK</u> ppm  | Meter Water Temp. adjusted to°C                                  | Meter DO adjusted to $\frac{9.0}{\text{ppm}}$ |

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|  | pration Time: <u>115D</u>           | Calibration Date: 7-14-11 Cali               | bration Time: 1450                  |
|--|-------------------------------------|--|-------------------------------------|
| Meter Type: YSI (meter # <u>10983</u> )      | Hach MS5                            | Meter Type: YSI (meter #/098-3)              | Hach MS5                            |
| Calibration Water Temperature°C              | DO Solubility <u>9.D</u> ppm        | Calibration Water Temperature°C              | DO Solubility <u>9</u> pm           |
| Meter Water Temperature <u>26.5</u> °C       | Meter DO <u>9</u> ppm               | Meter Water TemperatureO°C                   | Meter DOppm                         |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to <u>9.0</u> ppm | Meter Water Temp. adjusted to°C              | Meter DO adjusted toppm             |
|  | ration Time: 1250                   | Calibration Date: 7-14-11) Cali              | bration Time: 1550                  |
| Meter Type: YSI (meter #_ <u>10783</u> )     | Hach MS5                            | Meter Type: VSI (meter #_/0783_)             |                                     |
| Calibration Water Temperature <u>20.0</u> °C | <i>A</i> ,                          | Calibration Water Temperature <u>20.0</u> °C | DO Solubilityppm                    |
| Meter Water Temperature <u>20.0</u> °C       | Meter DO <u>9</u> /ppm              | Meter Water Temperature°C                    | Meter DO <u>9.2</u> ppm             |
| Meter Water Temp, adjusted to °C             | Meter DO adjusted to 0/ ppm         | Meter Water Temp. adjusted to°C              | Meter DO adjusted to <u>9.1</u> ppm |
| Calibration Date: <u>7-14-10</u> Calib       | ration Time: 1350                   | Calibration Date: _7-14-10 Calil             | pration Time: <u>1650</u>           |
| Meter Type: YSI (meter # <u>/0983</u> )      |                                     | Meter Type: YSI (meter #_10983_)             | Hach MS5                            |
| Calibration Water Temperature 200 °C         | DO Solubilityppm                    | Calibration Water Temperature <u>20.0</u> °C | DO Solubility <u><u></u>ppm</u>     |
| Meter Water Temperature°C                    | Meter DO <u>9</u> ppm               | Meter Water Temperature <u>20.0</u> °C       | Meter DOppm                         |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to <u>M</u> ppm   | Meter Water Temp. adjusted toOK°C            | Meter DO adjusted toppm             |

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| Calibration Date: <u>714-10</u> Calibration Date: <u>714-10</u> Calibration | pration Time: <u>1750</u>         | Calibration Date:             | Calib | pration Time:           |
|---|-----------------------------------|-------------------------------|-------|-------------------------|
| Meter Type: YSI (meter #)   | Hach MS5                          | Meter Type: YSI (meter #      |       |                         |
| Calibration Water Temperature <u>20.0</u> °C                                | DO Solubility <u>9</u> ppm        | Calibration Water Temperature |       | DO Solubility ppm       |
| Meter Water Temperature <u>20.0</u> °C                                      | Meter DOppm                       | Meter Water Temperature       | °C    | Meter DOppm             |
| Meter Water Temp. adjusted toOK°C   | Meter DO adjusted to <u>0</u> ppm | Meter Water Temp. adjusted to | °C    | Meter DO adjusted toppm |
| Calibration Date: Calib   | ration Time:                      | Calibration Date:             | Calib | ration Time:            |
| Meter Type: YSI (meter #)   | Hach MS5                          | Meter Type: YSI (meter #      |       |                         |
| Calibration Water Temperature°C   | DO Solubilityppm                  | Calibration Water Temperature | °C    | DO Solubility ppm       |
| Meter Water Temperature°C   | Meter DOppm                       | Meter Water Temperature       | _°C   | Meter DOppm             |
| Meter Water Temp. adjusted to°C   | Meter DO adjusted toppm           | Meter Water Temp. adjusted to | °C    | Meter DO adjusted toppm |
| Calibration Date: Calib   | ration Time:                      | Calibration Date:             | Calib | ration Time:            |
| Meter Type: YSI (meter #)   |                                   | Meter Type: YSI (meter #      |       |                         |
| Calibration Water Temperature°C   | DO Solubilityppm                  | Calibration Water Temperature | °C    | DO Solubilityppm        |
| Meter Water Temperature°C   | Meter DOppm                       | Meter Water Temperature       | _°C   | Meter DOppm             |
| Meter Water Temp. adjusted to°C   | Meter DO adjusted toppm           | Meter Water Temp. adjusted to | °C    | Meter DO adjusted toppm |

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|  | ration Time: 0554                   | Calibration Date: 7-14-10 Cal        | ibration Time: 115D                 |
|--|-------------------------------------|--------------------------------------|-------------------------------------|
| Meter Type: YSI (meter # 9 ()2               | Hach MS5                            | Meter Type: YSI (meter #PH91-M&)     | Hach MS5                            |
| Calibration Water Temperature <u>21.0</u> °C | DO Solubilityppm                    | Calibration Water Temperature 2000 C | DO Solubility <u>9,1</u> ppm        |
| Meter Water Temperature 20.8 °C              | Meter DOppm                         | Meter Water Temperature°C            | Meter DO <u>9.0</u> ppm             |
| Meter Water Temp. adjusted to <u>2</u> o     |                                     | Meter Water Temp. adjusted to°C      | Meter DO adjusted to <u>9.1</u> ppm |
| Calibration Date: 7-14-10 Calib              | ration Time: _0750                  | Calibration Date: Cali               | bration Time: 1357)                 |
| Meter Type:YSI (meter # <u>PH91-M3</u> )     |                                     | Meter Type: YSI (meter #)            |                                     |
| Calibration Water Temperature <u>20.5</u> °C | DO Solubility <u> </u>              | Calibration Water Temperature°C      | DO Solubility <u>9</u> / ppm        |
| Meter Water Temperature <u>20.5</u> °C       | Meter DOppm                         | Meter Water Temperature°C            | Meter DOppm                         |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted toppm             | Meter Water Temp. adjusted to°C      | Meter DO adjusted to <u>OC</u> ppm  |
| Calibration Date: 7-14-10 Calibr             | ration Time: 0950                   | Calibration Date: Cali               | hention Times 1553                  |
|  |                                     | Meter Type: YSI (meter #)            | Hach MS5                            |
| Calibration Water Temperature <u>20.5</u> °C | DO Solubility <u>9.</u> b ppm       | Calibration Water Temperature°C      | DO Solubilityppm                    |
| Meter Water Temperature <u>20.5</u> °C       | Meter DO <u>9</u> ppm               | Meter Water Temperature°C            | Meter DO <u>9.1</u> ppm             |
| Meter Water Temp. adjusted to <u>6</u> C °C  | Meter DO adjusted to <u>0</u> k ppm | Meter Water Temp. adjusted to°C      | Meter DO adjusted to <u>OK</u> ppm  |

| Dissolved Oxygen a | nd Water | Temperature | Meter | <b>Calibration Sheet</b> |
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|  | bration Time: 0550           | Calibration Date: 7-15-10 Cali               | bration Time: 0850                |
|--|------------------------------|--|-----------------------------------|
| Meter Type: YSI (meter # <u>10983</u> )                    | Hach MS5                     |  | Hach MS5                          |
| Calibration Water Temperature $2^{\circ}.^{\circ}_{\circ}$ | DO Solubility 9 / ppm        | Calibration Water Temperature <u>21.</u> °C  | DO Solubility <u>8,7</u> ppm      |
| Meter Water Temperature <u>20.0</u> °C                     | Meter DO <u>9,3</u> ppm      | Meter Water Temperature <u>21.p</u> °C       | Meter DO <u><u> </u></u>          |
| Meter Water Temp. adjusted to°C                            |                              | Meter Water Temp. adjusted to°C              | Meter DO adjusted to <u>A</u> ppm |
| Calibration Date: 7-15-10 Calibration                      | pration Time:                | Calibration Date: 7-15-10 Calil              | pration Time: 0950                |
| Meter Type: YSI (meter #_10983)                            |                              | Meter Type: YSI (meter # / <u>8</u> 983)     | Hach MS5                          |
| Calibration Water Temperature°C                            |                              | Calibration Water Temperature 22.0 °C        | DO Solubility <u>8.7</u> ppm      |
| Meter Water Temperature <u>20</u> °C                       | Meter DO <u>9.0</u> ppm      | Meter Water Temperature°C                    | Meter DOppm                       |
| Meter Water Temp. adjusted to°C                            | Meter DO adjusted toppm      | Meter Water Temp. adjusted to°C              | Meter DO adjusted to 2.7 ppm      |
| Calibration Date: <u>7-15-10</u> Calib                     | ration Time: 0750            | Calibration Date: 7-15-10 Calib              | pration Time: 1050                |
| Meter Type: YSI (meter #_/0783)                            | Hach MS5                     | Meter Type: YSI (meter #_/ 0983)             | Hach MS5                          |
| Calibration Water Temperature <u>20,5</u> °C               | DO Solubility ppm            | Calibration Water Temperature <u>25.0</u> °C | DO Solubility <u>856</u> ppm      |
| Meter Water Temperature°C                                  | Meter DOppm                  | Meter Water Temperature 23.5°C               | Meter DO 8,5 ppm                  |
| Meter Water Temp. adjusted to <u>S</u> C                   | Meter DO adjusted to 4.0 ppm | Meter Water Temp. adjusted to <u>23.0</u> °C | Meter DO adjusted to 8.56 ppm     |

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|   | bration Time: 1150                     | Calibration Date: 7-15-10 Cali   | bration Time: 1450                             |
|---|--|--|--|
| Meter Type: YSI (meter #_ <u>16783_</u> )           | Hach MS5                               | Meter Type: YSI (meter #/~? 83)  |  |
| Calibration Water Temperature <u>24.0</u> °C        | DO Solubility 8.9 ppm                  | Calibration Water Temperature <u>25.0</u> °C   | DO Solubility <u> </u>                         |
| Meter Water Temperature <u>24.0</u> ℃               | Meter DO <u>8.4</u> ppm                | Meter Water Temperature <u>25.2</u> °C   | Meter DO <u>8</u> ppm                          |
| Meter Water Temp. adjusted to°C                     | Meter DO adjusted to OK_ppm            | Meter Water Temp. adjusted to $\frac{25}{25} \circ \frac{25}{25} $ | Meter DO adjusted to <u>8.24</u> ppm           |
| Calibration Date: 7-15-10 Cali                      | pration Time: 1250                     | Calibration Date: 7-15-10 Cali   |  |
| Meter Type: YSI (meter $\# \frac{100783}{100783}$ ) |  | Meter Type:YSI (meter #983)  | Hach MS5                                       |
| Calibration Water Temperature <u>24,5</u> °C        | DO Solubility <u>8.3</u> ppm           | Calibration Water Temperature <u>25.0</u> °C   | DO Solubility <u>8.24</u> ppm                  |
| Meter Water Temperature <u>24. o</u> °C             |  | Meter Water Temperature <u>23.0</u> °C   | Meter DOppm                                    |
| Meter Water Temp. adjusted to $29.5 \text{ °C}$     | Meter DO adjusted to $\frac{2}{3}$ ppm | Meter Water Temp. adjusted to <u></u> °C   | Meter DO adjusted to $\frac{8.24}{\text{ppm}}$ |
| Calibration Date: <u>7-15-10</u> Calib              | pration Time: 1350                     | Calibration Date: 7-15-16 Calib  | 16 CD  |
| Meter Type:YSI (meter #983)                         |  | Meter Type: YSI (meter # Call  | Hach MS5                                       |
| Calibration Water Temperature <u>25.0</u> °C        | DO Solubility <u>8.24</u> ppm          | Calibration Water Temperature <u>25.0</u> °C   | DO Solubility 8.24 ppm                         |
| Meter Water Temperature <u>25.0</u> °C              | Meter DO <u>S</u> 24 ppm               | Meter Water Temperature25.0°C  | Meter DO S. Jppm                               |
| Meter Water Temp. adjusted to°C                     | Meter DO adjusted to OC ppm            | Meter Water Temp. adjusted to°C  | Meter DO adjusted to 8.24 ppm                  |

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| Calibration Date: 7-15-10 Calil        | pration Time: 1750               | Calibration Date:               |       |                         |
|--|----------------------------------|---------------------------------|-------|-------------------------|
| Meter Type: YSI (meter #_/11983)       |                                  | Calibration Date:               | Calib | pration Time:           |
|  | Hach MS5                         | Meter Type: YSI (meter #        | )     | Hach MS5                |
| Calibration Water Temperature 24.0 °C  | DO Solubility <u>8.4</u> ppm     | Calibration Water Temperature   | °C    | DO Solubilityppm        |
| Meter Water Temperature <u>24.0</u> °C | Meter DO <u>8</u> , <u>y</u> ppm | Meter Water Temperature         | °C    | Meter DO ppm            |
| Meter Water Temp. adjusted toO/C°C     | Meter DO adjusted toppr          | n Meter Water Temp. adjusted to | °C    | Meter DO adjusted toppm |
| Calibration Date: Calib                | ration Time:                     | Calibration Date:               | Calib | notion Times            |
| Meter Type: YSI (meter #)              | Hach MS5                         | Calibration Date:               | Calib |                         |
|  |                                  | Meter Type: YSI (meter #        | )     | Hach MS5                |
| Calibration Water Temperature°C        | DO Solubility ppm                | Calibration Water Temperature   | °C    | DO Solubilityppm        |
| Meter Water Temperature°C              | Meter DOppm                      | Meter Water Temperature         | °C    | Meter DOppm             |
| Meter Water Temp. adjusted to°C        | Meter DO adjusted toppn          | Meter Water Temp. adjusted to   | °C    | Meter DO adjusted toppm |
| Calibration Date: Calib                | ration Time:                     | Calibration Date:               | Calib |                         |
| Meter Type: YSI (meter #)              | Hach MS5                         | Calibration Date:               |       |                         |
|  |                                  | Meter Type: YSI (meter #        | )     | Hach MS5                |
| Calibration Water Temperature°C        | DO Solubility ppm                | Calibration Water Temperature   | °C    | DO Solubilityppm        |
| Meter Water Temperature°C              | Meter DOppm                      | Meter Water Temperature         | °C    | Meter DOppm             |
| Meter Water Temp. adjusted to°C        | Meter DO adjusted toppm          | Meter Water Temp. adjusted to   | °C    | Meter DO adjusted toppm |

| Dissolved Oxygen and Water | · Temperature Meter | <b>Calibration Sheet</b> |
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| Calibration Date: 7-15-10 Ca                    | libration Time: 0550                     | Calibration Date: 7-15-10 Ca                 | libration Time: /150                      |
|---|--|--|---|
| Meter Type: $V$ YSI (meter # $\underline{M2}$ ) | Hach MS5                                 | Meter Type: YSI (meter #//////2)             | Hach MS5                                  |
| Calibration Water Temperature 20.0 °C           | DO Solubility <u><u></u>ppm</u>          | Calibration Water Temperature <u>24.0</u> °C | DO Solubility S. 4 ppm                    |
| Meter Water Temperature <u>19.5</u> °C          |  | Meter Water Temperature A.Y.U_°C             | Meter DO <u>8</u> , 4 ppm                 |
| Meter Water Temp. adjusted to °C                | Meter DO adjusted to <u>1</u> ppm        | Meter Water Temp. adjusted to°C              | Meter DO adjusted to <u><i>bk</i></u> ppm |
|   | ibration Time: 0750                      | Calibration Date: 7-15-10 Cal                | ibration Time: 1350                       |
| Meter Type: YSI (meter # <u>PA91~M2</u> )       | Hach MS5                                 | Meter Type: YSI (meter # <u>PH91-112</u> )   | Hach MS5                                  |
| Calibration Water Temperature <u>20.5</u> °C    | DO Solubility <u></u> ppm                | Calibration Water Temperature $25.0$ °C      | DO Solubility 8.24 ppm                    |
| Meter Water Temperature <u>20.5</u> °C          | Meter DO <u>9.1</u> ppm                  | Meter Water Temperature25.b°C                | Meter DOppm                               |
| Meter Water Temp. adjusted to <u>OK</u> °C      | Meter DO adjusted to 20 ppm              | Meter Water Temp. adjusted to^C              | Meter DO adjusted to $\frac{824}{ppm}$    |
|   | bration Time: <u>0950</u>                | Calibration Date: 7-15-10 Cal                | ibration Time: 1550                       |
| Meter Type: YSI (meter #                        | Hach MS5                                 | Meter Type: YSI (meter #                     | Hach MS5                                  |
| Calibration Water Temperature°C                 | DO Solubility <u>8.7</u> ppm             | Calibration Water Temperature <u>25.0</u> °C | DO Solubility 8.24 ppm                    |
| Meter Water Temperature22_0°C                   | Meter DO <u>8, 7</u> ppm                 | Meter Water Temperature°C                    | Meter DO <u>8.3</u> ppm                   |
| Meter Water Temp. adjusted to $0 \sim 0$        | Meter DO adjusted to $\frac{D^2}{2}$ ppm | Meter Water Temp. adjusted to°C              | Meter DO adjusted to 8.24 ppm             |

| REDA WHITE COOLER   |  |  |                                       |
|---|--|--|---------------------------------------|
| Dissolved Oxygen and Water Temperature Met  | er Calibration Sheet   | METER Page.  | of                                    |
| Calibration Date: <u>07-16-10</u> Cali<br>Meter Type: <u>YSI (meter # PH91 - M2</u> ) | bration Time: <u>65555</u><br>Hach MS5   | Calibration Date: $07 - 16 - 10$ Cali<br>Meter Type: $$ YSI (meter # <u>Ph91 - M2</u> )      | bration Time: <u>0755</u><br>Hach MS5 |
| Calibration Water Temperature <u>18.5</u> °C  | DO Solubility 9.3 ppm  | Calibration Water Temperature <u>1915</u> °C   | DO Solubilityppm                      |
| Meter Water Temperature <u>18.5</u> °C  | Meter DO 9.5 ppm   | Meter Water Temperature <u>19.5</u> °C   | Meter DO <b>8</b> ppm                 |
| Meter Water Temp. adjusted toA °C   | Meter DO adjusted to <u>9.3</u> ppm  | Meter Water Temp. adjusted to/A_°C   | Meter DO adjusted to <u>9. / ppm</u>  |
| Calibration Date: 07-16-10 Calil<br>Meter Type:YSI (meter #PH91-M2)                   | pration Time: <u>09.55</u><br>Hach MS5   | Calibration Date: <u>07-16-10</u> Calibration Date: <u>V</u> YSI (meter # <u>Pt191-172</u> ) | Dration Time: <u>1154</u><br>Hach MS5 |
| Calibration Water Temperature 22.0 °C   | DO Solubility <u>8.7</u> ppm   | Calibration Water Temperature 24.5 °C  | DO Solubility 8.3 ppm                 |
| Meter Water Temperature <u>22.6</u> °C  | Meter DO <b><u><u></u></u></b> <u></u> | Meter Water Temperature 24.5 °C  | Meter DO <u>8.3</u> ppm               |
| Meter Water Temp. adjusted to C   | Meter DO adjusted to <u>\$.7</u> ppm   | Meter Water Temp. adjusted to <u>NA</u> °C   | Meter DO adjusted to <u>NIA</u> ppm   |
| Calibration Date: 07-16-10 Calib<br>Meter Type: VSI (meter #PrA1- M2)                 | Pration Time: 1352<br>Hach MS5   | Calibration Date: 07-16-10 Calib<br>Meter Type: / YSI (meter # Phq1-m Z)                     | ration Time: <u>/SS</u> )<br>Hach MS5 |
| Calibration Water Temperature <u>25.5</u> <sub>C</sub>                                | DO Solubility 8.1 ppm  | Calibration Water Temperature 25, 5 °C   | DO Solubility <b>7</b> ppm            |
| Meter Water Temperature <b>26.5</b> °C  |  | Meter Water Temperature <u>Z6.0</u> °C   | Meter DO 8.1 ppm                      |
| Meter Water Temp. adjusted to °C  | Meter DO adjusted to <u></u> ppm   | Meter Water Temp. adjusted to $25.5$ °C  | Meter DO adjusted to NA ppm           |
|   |  |  |                                       |

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|---|---|--|
| Dissolved Oxygen and Water Temperature Mete   | er Calibration Sheet $\left( USE \right)$ | D FOR DATA) Page of 2  |
| Calibration Date: 07-16-10 Cali               | bration Time: 0551                        | Calibration Date: 07.16-10 Calibration Time: 0647                                  |
| Meter Type: YSI (meter # <u>/0983</u> )       | Hach MS5                                  | Meter Type: YSI (meter # 10983 Hach MS5  |
| Calibration Water Temperature <u>18,5</u> °C  | DO Solubility <u>9.3</u> ppm              | Calibration Water Temperature <u>19.0</u> °C DO Solubility <u>9.2</u> ppm          |
| Meter Water Temperature <u>18, 2</u> °C       | Meter DO <u>9.3</u> ppm                   | Meter Water Temperature <u>19.0</u> °C Meter DO <u>9.5</u> ppm                     |
| Meter Water Temp. adjusted to <u>18, 5</u> °C | Meter DO adjusted to N/A ppm              | Meter Water Temp. adjusted to $\lambda$ A $\circ$ C Meter DO adjusted to $9.2$ ppm |
| Calibration Date: 07-16-10 Calib              | pration Time: 0748                        | Calibration Date: 07-16-10 Calibration Time: 0855                                  |
| Meter Type: YSI (meter #/0983)                | Hach MS5                                  | Meter Type: YSI (meter #83 Hach MS5  |
| Calibration Water Temperature <u>19,5</u> °C  | DO Solubility 9,1 ppm                     | Calibration Water Temperature <u>26,5</u> °C DO Solubility <u>9,0</u> ppm          |
| Meter Water Temperature °C                    | Meter DO 9.5 ppm                          | Meter Water Temperature <u>20.5</u> °C Meter DO <u>9.0</u> ppm                     |
| Meter Water Temp. adjusted to <u>JA</u> °C    | Meter DO adjusted to <u>9.</u> ppm        | Meter Water Temp. adjusted to <u>NIA</u> °C Meter DO adjusted to <u>NIA</u> ppm    |
| Calibration Date: 07-16-10 Calib              | ration Time: 0955                         | Calibration Date: 07-16-10 Calibration Time: 1055                                  |
| Meter Type: YSI (meter #983)                  | Hach MS5                                  | Meter Type: YSI (meter # <u>/0983</u> ) Hach MS5                                   |
| Calibration Water Temperature <u>ZZ.0</u> °C  | DO Solubility <u> </u>                    | Calibration Water Temperature 23.5 °C DO Solubility 8.5 ppm                        |
| Meter Water Temperature <u>72.0</u> °C        | Meter DO <u>87</u> ppm                    | Meter Water Temperature <u>23.5</u> °C Meter DO <u>8.5</u> ppm                     |
| Meter Water Temp. adjusted to <u>NA</u> C     | Meter DO adjusted to <u>PIA</u> ppm       | Meter Water Temp. adjusted to <u>NIR</u> °C Meter DO adjusted to <u>NIR</u> pm     |
| JUST NOTICED                                  | ON INSIDE THE                             | METER IS LABELED # 10983   |
| IN Z PLACES, ON                               | J OUTSIDE OF A                            | Box METER 15 # 10984 IN Z PLACES,  |
| I USED THE #                                  | ON METER, NO                              | TBIX.  |
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| Dissolved Oxygen and Water Temperature Meter Calibration Sheet       (USEO FOR DATA)       Page 2 of 2         Calibration Date:       07-16-10       Calibration Time: 1154       Calibration Date: 07-16-13       Calibration Time: 1248         Meter Type:       YSI (meter # 10983)       Hach MS5       Calibration Water Temperature 24.5 °C       DO Solubility 8.3 ppm       Calibration Water Temperature 25.0 °C       DO Solubility 8.2   | npm           |
|---|---------------|
| Meter Type:       YSI (meter # 10983)       Hach MS5       Calibration Date:       Orellowing Date:       Orelowing Date:       O   | npm           |
| Meter Type: V YSI (meter # 10183) Hach MS5 Meter Type: VSI (meter # 10983) Hach MS5   | npm           |
| Calibration Water Temperature 24.5 °C DO Solubility 8.3 ppm Calibration Water Temperature 25.0 cc Do Solubility 8.3   | nnm           |
| Canoration water remperature $25.0$ °C DO Solubility $5.5$ ppm Calibration Water Temperature $25.0$ °C DO Solubility $?.2$  |               |
| Meter Water Temperature 24.5 °C Meter DO 8.3 ppm Meter Water Temperature 25.2 °C Meter DO 8.2 ppm   | m             |
| Meter Water Temp. adjusted to <u>NIA</u> °C Meter DO adjusted to <u>NIA</u> ppm Meter Water Temp. adjusted to <u>ZSO</u> °C Meter DO adjusted to <u>NIA</u>   | <b>⁴_</b> ppm |
| Calibration Date: 07-16-10 Calibration Time: 1352 Calibration Date: 07-16-10 Calibration Time: 1458   |               |
| Meter Type: VSI (meter # 10983) Hach MS5 Meter Type: VSI (meter # 10983) Hach MS5   |               |
| Calibration Water Temperature 25.5 C DO Solubility 8.1 ppm Calibration Water Temperature 25.5 C DO Solubility 8.1 p   | _ppm          |
| Meter Water Temperature 25.5 °C Meter DO 8.0 ppm Meter Water Temperature 26.6 °C Meter DO 8.1 ppm   | n             |
| Meter Water Temp. adjusted to <u>N</u> Meter DO adjusted to <u>8.1</u> ppm Meter Water Temp. adjusted to <u>25.5</u> °C Meter DO adjusted to <u>N</u> Meter DO adjusted to <u>8.1</u> ppm Meter Water Temp. adjusted to <u>25.5</u> °C  | <b>≜</b> ppm  |
| Calibration Date: 07-16-18 Calibration Time: 1551 Calibration Date: 07-16-18 Calibration Time: 1657   |               |
| Meter Type:      YSI (meter # 10983)      Hach MS5       Calibration Date: 07-16-10       Calibration Time: 1657         Meter Type:      YSI (meter # 10983)      Hach MS5       Meter Type:YSI (meter # 10983)      Hach MS5  |               |
| Calibration Water Temperature 25.5 °C DO Solubility 8.1 ppm Calibration Water Temperature 26.0 °C DO Solubility 8.0 pp  | _ppm          |
| Meter Water Temperature 25.5 °C Meter DO 8.0 ppm Meter Water Temperature 26.0 °C Meter DO 8.0 ppm   | n             |
| Meter Water Temp. adjusted to $NA$ C Meter DO adjusted to $R$ ppm Meter Water Temp. adjusted to $AA$ C Meter DO adjusted to $AA$ Ppm Meter Water Temp. adjusted to $AA$ C Meter DO adjusted to $AA$ Ppm Meter Water Temp. adjusted to $AA$ C Meter DO adjusted to $AA$ Ppm Meter Water Temp. adjusted to $AA$ C Meter DO adjusted to $AA$ Ppm Meter Water Temp. adjusted to $AA$ C Meter DO adjusted to $AA$ Ppm Meter Water Temp. adjusted to $AA$ C Meter DO adjusted to $AA$ Ppm Meter Water Temp. adjusted to $AA$ PPm Meter Vater Vater AA PPm Meter Vater AA PPM AA PP | ppm           |

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| Calibration Date: 07 17 10 Cal             | ibration Time: 06.55          | Calibration Date: 07/17/0                 | Calibration Time: 0750                     |
|--|-------------------------------|---|--|
| Meter Type: YSI (meter #)                  | Hach MS5                      | Meter Type: X YSI (meter # 0983           | ) Hach MS5                                 |
| Calibration Water Temperature9.0 °C        | DO Solubility ppm             | Calibration Water Temperature             |  |
| Meter Water Temperature°C                  | Meter DOppm                   | Meter Water Temperature°C                 | Meter DOppm                                |
| Meter Water Temp. adjusted to°C            | Meter DO adjusted toppm       | Meter Water Temp. adjusted to°C           | Meter DO adjusted toppm                    |
| Calibration Date: 07/17/10 Cali            | bration Time: 0850            | Calibration Date: 07/17/10                | 0.51                                       |
| Meter Type: YSI (meter #0983)              | Hach MS5                      | Meter Type: YSI (meter #                  | Calibration Time: <b>5</b><br>_) Hach MS5  |
| Calibration Water Temperature <u>2</u> °°C | DO Solubility <u> </u>        | Calibration Water Temperature <u>3</u> °C | DO Solubility <u>8.56</u> ppm              |
| Meter Water Temperature°C                  | Meter DO ppm                  | Meter Water Temperature°C                 | Meter DO <u>55</u> ppm                     |
| Meter Water Temp. adjusted to°C            | Meter DO adjusted to MA_ppm   | Meter Water Temp. adjusted to°C           | Meter DO adjusted toppm                    |
| Calibration Date: 07/17/10 Calib           | pration Time: 1950            | Calibration Date: 07                      | U.F.S.                                     |
| Meter Type: YSI (meter #)                  |                               | Meter Type: YSI (meter #3                 | Calibration Time: <u>150</u><br>) Hach MS5 |
| Calibration Water Temperature <u>25</u> °C | DO Solubilityppm              | Calibration Water Temperature°C           | DO Solubility 7.95 ppm                     |
| Meter Water TemperatureOC                  | Meter DOppm                   | Meter Water Temperature                   | Meter DO 8.1 ppm                           |
| Meter Water Temp. adjusted to°C            | Meter DO adjusted to 7.25 ppm | Meter Water Temp. adjusted to°C           | Meter DO adjusted to 80 ppm                |

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| Calibration Date: 07/17/10 Cal   | ibration Time: 13:52                  | Calibration Date: <u>1110</u> Ca         |                                    |
|--|---------------------------------------|--|------------------------------------|
| Meter Type: YSI (meter #63)  | Hach MS5                              | Mater Turner VOL                         | libration Time:                    |
|  |                                       | Meter Type: YSI (meter # <u>0983</u> )   | Hach MS5                           |
| Calibration Water Temperature <u>28</u> °C   | DO Solubility 7.81 ppm                | Calibration Water Temperature            | DO Solubility 7.8 ppm              |
| Meter Water Temperature <u>26</u> °C   |                                       |  |                                    |
| Meter Water Temp. adjusted to°C  | Meter DO adjusted to <u>7.8</u> ppm   | Meter Water Temp. adjusted to°C          | Meter DO adjusted to <u>NA</u> ppm |
| Calibration Date: 07/17/10 Cal   | ibration Time: 1555                   | Calibration Date: 07/17/10 Ca            |                                    |
| Meter Type: X YSI (meter # 0983)   |                                       | Meter Type: X YSI (meter # <u>0983</u> ) |                                    |
| Calibration Water Temperature <u>28</u> °C   | DO Solubility 7.8( ppm                | Calibration Water Temperature°C          | DO Solubility 7,81 ppm             |
| Meter Water Temperature <u>28</u> °C   | · · · · · · · · · · · · · · · · · · · | Meter Water Temperature $28$ °C          | Meter DO <u>7,9</u> ppm            |
| Meter Water Temp. adjusted to°C  | Meter DO adjusted to <u>216</u> ppm   | Meter Water Temp. adjusted to°C          | Meter DO adjusted to 7.8 k         |
| Calibration Date: 07/17/18 Cali  | bration Time: 17:47                   | Calibration Date: 07/17/10 Ca            | libration Time.                    |
| Meter Type: X YSI (meter # 10683)  |                                       | Meter Type: YSI (meter #)                | Hach MS5                           |
| Calibration Water Temperature <u> </u>   | DO Solubility 7.81 ppm                | Calibration Water Temperature°C          | DO Solubilityppm                   |
| Meter Water Temperature <u>26</u> °C   | Meter DO 7.8 ppm                      | Meter Water Temperature°C                | Meter DOppm                        |
| Meter Water Temp. adjusted to°C  | Meter DO adjusted to MA ppm           | Meter Water Temp. adjusted to°C          | Meter DO adjusted toppm            |
| Culibration Date: 17 Calib   | reiten Time:                          |  |                                    |
| Meter Type: X VSI (meter * 10453)  | Huch MS5                              |  |                                    |
| Collibration Water TemperatureC  | DO Solubility ppm                     |  |                                    |
| Meter Water Temperature C  | Meter DU pon                          |  |                                    |
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| L Contraction of the second seco |                                       |  |                                    |

Q.C. METER- RAW COATER

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| Calibration Date: 07-30=10 Calibration Time: 0650 Calibration Date: 07-30-10 Calibration Time: 0848 |   |  |                                     |  |
|---|---|--|-------------------------------------|--|
| Meter Type: YSI (meter # <u>PH91-MZ</u> )   | Hach MS5                                |  | Hach MS5                            |  |
| Calibration Water Temperature 21.5 °C   | DO Solubility <u>8</u> ppm              | Calibration Water Temperature 21.0 °C              | DO Solubility <u> </u>              |  |
| Meter Water Temperature 21.8 °C   | Meter DO <u>&amp; 6</u> ppm             | Meter Water Temperature O°C                        | Meter DO <u>89</u> ppm              |  |
| Meter Water Temp. adjusted to 21.5°C  | Meter DO adjusted to 28 ppm             | Meter Water Temp. adjusted to <u>\\</u> <b>\</b> C | Meter DO adjusted to DPppm          |  |
| Calibration Date: 07-30-10 Calibration Time: 1054 Calibration Date: 07-30-10 Calibration Time: 1247 |   |  | pration Time: 1247                  |  |
| Meter Type: YSI (meter # <u>P H91- M Z</u> )  | Hach MS5                                |  | Hach MS5                            |  |
| Calibration Water Temperature 23.0 °C   | DO Solubility 8.5 ppm                   | Calibration Water Temperature 23.5 °C              | DO Solubility <u>8.5</u> ppm        |  |
| Meter Water Temperature°C   | Meter DO 8. 6 ppm                       | Meter Water Temperature <u>23.5</u> °C             | Meter DO <u>8</u> , ppm             |  |
| Meter Water Temp. adjusted to <u>PIA</u> °C   | Meter DO adjusted to X. S ppm           | Meter Water Temp. adjusted to °C                   | Meter DO adjusted to <u>8.5</u> ppm |  |
| Calibration Date: 07-30-10 Calib  | ration Time: /550                       | Calibration Date: 67-30-10 Calib                   | pration Time: SO                    |  |
| Meter Type: YSI (meter # <u>MAI • MZ</u> )  | -                                       | Meter Type: / YSI (meter #PH91+ MZ)                | Hach MS5                            |  |
| Calibration Water Temperature 23.0°C  | DO Solubility <u>85</u> ppm             | Calibration Water Temperature 21.5 °C              | DO Solubility 8.8 ppm               |  |
| Meter Water Temperature°C   | Meter DO ppm                            | Meter Water Temperature <u>21.5</u> °C             | Meter DO <u>8.6</u> ppm             |  |
| Meter Water Temp. adjusted to NA °C   | Meter DO adjusted to <u><u>K</u>ppm</u> | Meter Water Temp. adjusted to <u>NA</u> °C         | Meter DO adjusted to <u> 8</u> ppm  |  |

| Dissolved Oxygen and Water Temperature Mete   | WOODE W<br>r Calibration Sheet        | BOX<br>Page  | of Z                                   |
|---|---------------------------------------|--|--|
| Calibration Date: <u>107.38-10</u> Calib<br>Meter Type: YSI (meter # <u>18983</u> ) | pration Time: <u>0552</u><br>Hach MS5 |  | Dration Time: <u>06.56</u><br>Hach MS5 |
| Calibration Water Temperature 22. 6 °C  | DO Solubility <u>8.</u> 7 ppm         | Calibration Water Temperature 21.5°C   | DO Solubility 🥂 🖇ppm                   |
| Meter Water Temperature 21.5 °C   | Meter DO <u><u>R</u> <u>2</u> ppm</u> | Meter Water Temperature <u>7\5</u> °C  | Meter DO <u><b>R</b></u> ppm           |
| Meter Water Temp. adjusted to <u>72.0</u> C   | Meter DO adjusted to <u>8.7</u> ppm   | Meter Water Temp. adjusted to <u>\\</u> A_°C   | Meter DO adjusted to <u>R. 8</u> ppm   |
| Calibration Date: <u>07-30-10</u> Calib<br>Meter Type: YSI (meter # <u>10983</u> )  | ration Time: <u>0751</u><br>Hach MS5  | Calibration Date: <u>07-30-10</u> Calibration Date: <u>V</u> YSI (meter #_/ <u>19983</u> ) | pration Time:<br>Hach MS5              |
| Calibration Water Temperature 20.5 °C   | DO Solubility <u>9.0</u> ppm          | Calibration Water Temperature <u>21.0</u> °C   | DO Solubility 79 ppm                   |
| Meter Water Temperature <u>20,5</u> °C  | Meter DO 900 ppm                      | Meter Water Temperature <u>20 8</u> °C   | Meter DO <u>89</u> ppm                 |
| Meter Water Temp. adjusted toA_°C   | Meter DO adjusted to <u>NA</u> ppm    | Meter Water Temp. adjusted to <u>21.0</u> °C   | Meter DO adjusted to <u> </u>          |
| Calibration Date: 07-30-10 Calibration Time: 0944                                   |                                       | Calibration Date: 07-30-10 Calibration Time: 1954  |  |
| Meter Type: YSI (meter # <u>10983</u> )   | Hach MS5                              | Meter Type: YSI (meter #_ <u>109 &amp; 3</u> )   | Hach MS5                               |
| Calibration Water Temperature <u>21.8</u> °C  | DO Solubility <u>88</u> ppm           | Calibration Water Temperature <u>23</u> 0°C  | DO Solubility 8.5 _ppm                 |
| Meter Water Temperature <u>21.8</u> °C  | Meter DO                              | Meter Water Temperature <u>23.0</u> °C   | Meter DO <u>8.5</u> ppm                |
| Meter Water Temp. adjusted to °C  | Meter DO adjusted to <u>NA</u> ppm    | Meter Water Temp. adjusted to <u>NIA</u> °C  | Meter DO adjusted to <u>A</u> ppm      |

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| Calibration Date: 07-30-10 Calibration Time: 1/50 |                              | Calibration Date: 07-30-10 Calibration Time: 1247 |                                     |  |
|---|------------------------------|---|-------------------------------------|--|
| Meter Type: YSI (meter #)                         | Hach MS5                     | Meter Type: YSI (meter # <u>10983</u> )           | Hach MS5                            |  |
| Calibration Water Temperature <u>23.8</u> °C      | DO Solubilityppm             | Calibration Water Temperature 23.5 °C             | DO Solubility <u> </u>              |  |
| Meter Water Temperature <u>23.8</u> °C            | Meter DO <u>8.5</u> ppm      | Meter Water Temperature <u>23.5</u> °C            | Meter DO <u>8</u> ppm               |  |
| Meter Water Temp. adjusted to <u>NA</u> °C        | Meter DO adjusted to 8.4 ppm | Meter Water Temp. adjusted to°C                   | Meter DO adjusted to <u>  (</u> ppm |  |
| Calibration Date: 07-30-10 Calib                  | ration Time: 1352            | Calibration Date: 07-30-10 Calib                  | pration Time:                       |  |
| Meter Type: _/ YSI (meter #_ <u>10983</u> )       | Hach MS5                     | Meter Type: 🖌 YSI (meter # <u>/0983</u> )         | Hach MS5                            |  |
| Calibration Water Temperature 23.5 °C             |                              | Calibration Water Temperature <u>23.0</u> °C      | DO Solubility ppm                   |  |
| Meter Water TemperatureS°C                        | Meter DOppm                  | Meter Water Temperature <u>23.0</u> °C            | Meter DOppm                         |  |
| Meter Water Temp. adjusted to°C                   | Meter DO adjusted toppm      | Meter Water Temp. adjusted to <u>NIA</u> °C       | Meter DO adjusted toppm             |  |
| Calibration Date: 07-30 10 Calibration Time: 67   |                              | Calibration Date: <u> </u>                        | pration Time: 1750                  |  |
| Meter Type: YSI (meter #)                         |                              | Meter Type: YSI (meter # <b>10983</b> _)          |                                     |  |
| Calibration Water Temperature°C                   | DO Solubility <b>7</b> ppm   | Calibration Water Temperature <u>21.5</u> °C      | DO Solubility <u>8.8</u> ppm        |  |
| Meter Water TemperatureO°C                        | Meter DO <u>8</u> ppm        | Meter Water Temperature 21.5 °C                   | Meter DOppm                         |  |
| Meter Water Temp. adjusted to°C                   | Meter DO adjusted toppm      | Meter Water Temp. adjusted toA_°C                 | Meter DO adjusted toppm             |  |

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| Calibration Date: 7/31/10     |        | ration Time              | Calibration Date: Cal                              | libration Time: 7:48                |
|-------------------------------|--------|--------------------------|--|-------------------------------------|
| Meter Type: X YSI (meter #    |        | Hach MS5                 | Calibration Date: Cal<br>Meter Type: YSI (meter #) | Hach MS5                            |
| Calibration Water Temperature | _°C    | DO Solubility ppm        | Calibration Water Temperature°C                    | DO Solubility ppm                   |
| Meter Water Temperature       | _°C    | Meter DOppm              | Meter Water Temperature°C                          | Meter DOppm                         |
| Meter Water Temp. adjusted to | °C     | Meter DO adjusted to ppm | Meter Water Temp. adjusted to°C                    | Meter DO adjusted toppm             |
| Calibration Date:             | Calib  | ration Time:             | Calibration Date: <u>1/31/10</u> Cal               | ibration Time: 9:52                 |
| Meter Type: YSI (meter #      | )      |                          | Meter Type: X YSI (meter #PH91-M2)                 |                                     |
| Calibration Water Temperature | °C     | DO Solubilityppm         | Calibration Water Temperature°C                    | DO Solubility 8,72 (8,7)            |
| Meter Water Temperature       | °C     | Meter DOppm              | Meter Water Temperature2,°C                        | Meter DO <u>8.8</u> ppm             |
| Meter Water Temp. adjusted to | _°C    | Meter DO adjusted to ppm | Meter Water Temp. adjusted to°C                    | Meter DO adjusted to <u>8.7</u> ppm |
| Calibration Date:             | Calibr | ration Time: <u>50</u>   | Calibration Date: 73110 Cal                        | ibration Time: 11:51                |
| Meter Type: X YSI (meter # H  | )      | Hach MS5                 | Meter Type: X YSI (meter #PH91-M2)                 |                                     |
| Calibration Water Temperature | _°C    | DO Solubilityppm         | Calibration Water Temperature <u>24.0</u> °C       | DO Solubility 8.40 ppm              |
| Meter Water Temperature       | °C     | Meter DOppm              | Meter Water Temperature <u>24.0</u> °C             | Meter DOppm                         |
| Meter Water Temp. adjusted to | _°C    | Meter DO adjusted toppm  | Meter Water Temp. adjusted to°C                    | Meter DO adjusted to MA ppm         |

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| Calibration Date: 7131/10 Calib                    |  | Calibration Date: 7131/10 Cali               | bration Time: 13:53  |
|--|--|--|--|
| Meter Type: YSI (meter # <u>PH91-M2</u> )          | Hach MS5                               | Meter Type: X YSI (meter # PH91-M3)          | Hach MS5   |
| Calibration Water Temperature <u>240</u> °C        | DO Solubility 8.40 ppm                 | Calibration Water Temperature <u>24.0</u> °C | DO Solubility <u>8.40</u> ppm  |
| Meter Water Temperature°C                          | Meter DO <u>7.3</u> ppm                | Meter Water Temperature <u>24.0</u> ℃        | Meter DO <u>8.4</u> ppm  |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to $\frac{8.4}{ppm}$ | Meter Water Temp. adjusted to°C              | Meter DO adjusted to MA_ppm  |
| Calibration Date: 7/31/10 Calib                    |  | Calibration Date: 7/31/10 Cali               | bration Time: 16 54  |
| Meter Type: YSI (meter #)                          | Hach MS5                               | Meter Type: X YSI (meter # <u>PH91-12</u> )  | and the second s |
| Calibration Water Temperature <u>24.0</u> °C       | DO Solubility <u>8,40</u> ppm          | Calibration Water Temperature <u>24.0</u> °C | DO Solubility <u>&amp; 40</u> ppm  |
| Meter Water Temperature                            | Meter DO 8.4 ppm                       | Meter Water Temperature <u>24.0</u> °C       | Meter DO <u>8.5</u> ppm  |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to NAppm             | Meter Water Temp. adjusted to°C              | Meter DO adjusted to $8.4$ ppm   |
| Calibration Date: 1/31/10 Calib                    | ration Time: 17:32                     | Calibration Date: Calil                      | pration Time:  |
| Meter Type: $\times$ YSI (meter # <u>PH91-M2</u> ) | Hach MS5                               | Meter Type: YSI (meter #)                    |  |
| Calibration Water Temperature 24.0 °C              | DO Solubility 8,40 ppm                 | Calibration Water Temperature°C              | DO Solubility ppm  |
| Meter Water Temperature <u>24.0</u> °C             | Meter DOppm                            | Meter Water Temperature°C                    | Meter DOppm  |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted toppm                | Meter Water Temp. adjusted to°C              | Meter DO adjusted toppm  |

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| Calibration Date: 8/1/10 Cali                | bration Time: 653                        | Calibration Date: 8/1/10 Cal   | 7.52                               |
|--|--|--|------------------------------------|
| Meter Type: X YSI (meter #PH91-N2)           | Hach MS5                                 | Meter Type: X YSI (meter #PH91-h2)                                       |                                    |
| Calibration Water TemperatureC               |  | Calibration Water Temperature <u>20,0</u> °C<br>I don't know how it wort | DO Solubility $9.07(9.1)$ ppm      |
| Meter Water Temperature°C                    | Meter DO <u>8.4</u> ppm                  | dum but it did<br>Meter Water Temperature 2000_°C                        | Meter DO <u>8.95</u> ppm           |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to 8.9 ppm             | Meter Water Temp. adjusted to°C  | Meter DO adjusted to <u>91</u> ppm |
| Calibration Date: 8/1/10 Calib               | pration Time: 8:52                       | Calibration Date: 8/1/10 Cali  | bration Time: 9'52                 |
| Meter Type: X YSI (meter $#PH91-M2$ )        | Hach MS5                                 | Meter Type: X YSI (meter $\#PH91-M2$ )                                   | Hach MS5                           |
| Calibration Water Temperature <u>20.0</u> °C | DO Solubility <u>CI-07</u> (4.1)<br>ppm  | Calibration Water Temperature 20.0 °C                                    | DO Solubility <u>9.07</u> ppm      |
| Meter Water Temperature <u>20.0</u> °C       |  | Meter Water Temperature <u>20.0</u> °C                                   | Meter DOppm                        |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to 9.1 ok              | Meter Water Temp. adjusted to°C  | Meter DO adjusted toppm            |
| Calibration Date: 8110 Calib                 | pration Time: 10:54                      | Calibration Date: Cali   | bration Time: 11                   |
| Meter Type: X YSI (meter $\#PH91-M2$ )       |  | Meter Type: <u>X</u> YSI (meter $\#PH91-M2$ )                            | Hach MS5                           |
| Calibration Water Temperature°C              | DO Solubilityppm                         | Calibration Water Temperature°C  | DO Solubilityppm                   |
| Meter Water Temperature0°C                   | Meter DO <u>8.9</u> ppm                  | Meter Water Temperature°C  | Meter DOppm                        |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to $\frac{9.1}{2}$ ppm | Meter Water Temp. adjusted to°C  | Meter DO adjusted toppm            |

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| Calibration Date: 8/1/10 Calib               | pration Time: 12:57                               | Calibration Date: 8/1/10 Cal                 | ibration Time: 13:52          |
|--|---|--|-------------------------------|
| Meter Type: X YSI (meter #PH91-M2)           | Hach MS5  | Meter Type: X YSI (meter #PH91-M2)           | Hach MS5                      |
| Calibration Water Temperature 22.0 °C        |   | Calibra ion Water Temperature <u>23.0</u> °C | DO Solubility 8.56 (8-53)     |
| Meter Water Temperature <u>22.0</u> °C       | Meter DO <u>8.7</u> ppm                           | Meter Water Temperature <u>3.0</u> °C        | Meter DO <u>8.5</u> ppm       |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to <u>NA</u> ppm                | Meter Water Temp. adjusted to°C              | Meter DO adjusted to 8.55 ppm |
| Calibration Date: 8/1/10 Calib               | ration Time: <u>14:52</u>                         | Calibration Date: 81110 Cal                  | ibration Time: 16:52          |
| Meter Type: X YSI (meter #PH91-M2)           | Hach MS5  | Meter Type: X YSI (meter # <u>1491-M2</u> )  | Hach MS5                      |
| Calibration Water Temperature <u>23.0</u> °C |   |  |                               |
| Meter Water Temperature <u>23.0</u> °C       | Meter DO <u>8.55</u> ppm                          | Meter Water Temperature <u>230</u> °C        | Meter DOppm                   |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to <u>MA</u> ppm                | Meter Water Temp. adjusted to°C              | Meter DO adjusted to Mappm    |
| Calibration Date: 81/16 Calib                | ration Time: <u>17:50</u>                         | Calibration Date: Cal                        | ibration Time:                |
| Meter Type: X YSI (meter # PH91 M2)          | Hach MS5  | Meter Type: YSI (meter #)                    | Hach MS5                      |
| Calibration Water Temperature°C              | DO Solubility <u>4</u> ppm                        | Calibration Water Temperature°C              | DO Solubilityppm              |
| Meter Water Temperature O°C                  | Meter DO <u>Bi6</u> ppm<br>put i bihum<br>& 538.6 | Meter Water Temperature°C                    | Meter DOppm                   |
| Meter Water Temp. adjusted to°C              |   | Meter Water Temp. adjusted to°C              | Meter DO adjusted toppm       |

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| Calibration Date: 08-02-10 Cali               | bration Time: 0552                  | Calibration Date: 08-02-10 Ca  | libration Time: 0748                |
|---|-------------------------------------|--|-------------------------------------|
| Meter Type: YSI (meter #pp91-m2)              | Hach MS5                            | Meter Type: YSI (meter # PH91 - M3                                       |                                     |
| Calibration Water Temperature 72.0 °C         | DO Solubility <u>8.7</u> ppm        | Calibration Water Temperature <u>218</u> °C                              | DO Solubility <u> </u>              |
| Meter Water Temperature <u>72.0</u> °C        | Meter DO <u>8.7</u> ppm             | Meter Water Temperature <u>218</u> °C                                    | Meter DO <u><u></u>ppm</u>          |
| Meter Water Temp. adjusted to <u>NA</u> °C    | Meter DO adjusted to $\lambda$ ppm  | Meter Water Temp. adjusted toA_°C  | Meter DO adjusted to Sppm           |
| Calibration Date: 08 - 02-00 Cali             | bration Time: 09-12                 | Calibration Date: 08-02-10 Ca  | libration Time: <u>1151</u>         |
|   |                                     | Meter Type: $\checkmark$ YSI (meter $\#$ $\mathbb{P}$ $\mathbb{N}^{2}$ ) | Hach MS5                            |
| Calibration Water Temperature <u>22.6</u> °C  | DO Solubility 8.7 ppm               | Calibration Water Temperature 22-0°C                                     | DO Solubility <u>8.7</u> ppm        |
| Meter Water Temperature <u>22.0</u> °C        | Meter DOppm                         | Meter Water Temperature Z2.0 °C  | Meter DO <u><b>8</b></u> ppm        |
| Meter Water Temp. adjusted to°C               | Meter DO adjusted to <u>777</u> ppm | Meter Water Temp. adjusted to C  | Meter DO adjusted to <u>8-7</u> ppm |
| Calibration Date: 08-02-10 Calil              | pration Time: 1355                  | Calibration Date: 08-02-10 Ca  | ibration Time: 14 4 8               |
|   |                                     | Meter Type: $\checkmark$ YSI (meter # $PH$ )                             | Hach MS5                            |
| Calibration Water Temperature <sup>2</sup> °C | DO Solubility 8.7 ppm               | Calibration Water Temperature <u>22.0</u> °C                             | DO Solubility <u>8.7</u> ppm        |
| Meter Water Temperature°C                     | Meter DO <u>8.7</u> ppm             | Meter Water Temperature°C  | Meter DO <u>89</u> ppm              |
| Meter Water Temp. adjusted to °C              | Meter DO adjusted to UN ppm         | Meter Water Temp. adjusted toALA_°C                                      | Meter DO adjusted to <u>§.7</u> ppm |
| J PH91-m2                                     | 1659                                |  |                                     |
| 21.5  | 8.8                                 |  |                                     |
| 21.2<br>21.5                                  | 8.7<br>8.8                          |  |                                     |

| Dissolved Oxygen and Water Temperature Mete                                       | WOODED<br>er Calibration Sheet     | Bax<br>Page  | of                                       |
|---|------------------------------------|--|--|
| Calibration Date: <u>08-02-10</u> Cali<br>Meter Type: <u>VSI (meter # 10983</u> ) |                                    | Calibration Date:         08-02-10         C           Meter Type:         YSI (meter # 10983)         YSI (meter # 10983) | alibration Time: <u>0653</u><br>Hach MS5 |
| Calibration Water Temperature <u>72.0</u> °C                                      | DO Solubility <u></u> <u>8</u> ppm | Calibration Water Temperature <u>22.0</u> °C   | DO Solubility <u>87</u> ppm              |
| Meter Water Temperature <u>22.0</u> °C  | Meter DOppm                        | Meter Water Temperature <u>22.0</u> °C   | Meter DO <u>8.7</u> ppm                  |
| Meter Water Temp. adjusted to <u>DIA</u> C  |                                    | Meter Water Temp. adjusted to <u>\\\\</u> °C   | Meter DO adjusted to <u>Appm</u>         |
| Calibration Date: 08-02-10 Calib  |                                    |  | alibration Time: 0854                    |
| Meter Type: YSI (meter #_ <u>/0983_</u> )   | Hach MS5                           | Meter Type: YSI (meter #_ <u>10983_</u> )  | Hach MS5                                 |
| Calibration Water Temperature°C   | DO Solubility <u> </u>             | Calibration Water Temperature <u>22.0</u> °C   | DO Solubility <u>87</u> ppm              |
| Meter Water Temperature <u>21.9</u> °C  | Meter DO <u>8.8</u> ppm            | Meter Water Temperature <u>722-0</u> °C  | Meter DO ppm                             |
| Meter Water Temp. adjusted to A °C  | Meter DO adjusted to,              | Meter Water Temp. adjusted toNA°C  | Meter DO adjusted to <u>NA</u> ppm       |
|   | ration Time: 0942                  | Calibration Date: 08-2-10 Ca   | alibration Time: 10.58                   |
| Meter Type: YSI (meter # <u>/ 0 위 중 3</u> )                                       | Hach MS5                           | Meter Type: YSI (meter #_ <u>/0983_</u> )  |  |
| Calibration Water Temperature 22.0 °C   | DO Solubilityppm                   | Calibration Water Temperature <u>22-0</u> °C   | DO Solubility <u>8-7</u> ppm             |
| Meter Water Temperature 22.0 °C   | Meter DO <u>8.6</u> ppm            | Meter Water Temperature <u>22.0</u> °C   | Meter DO <u>8.7</u> ppm                  |
| Meter Water Temp. adjusted to <u>A</u> C  | Meter DO adjusted to <u></u> ppm   | Meter Water Temp. adjusted to  | Meter DO adjusted to Mppm                |

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| Calibration Date: 08-02-10 Calibration Time: 1151                              | Calibration Date: 08-02-10 Calibration Time: 1258                               |
|--|---|
| Meter Type: YSI (meter # <u>10983</u> ) Hach MS5                               | Meter Type: YSI (meter # /0983) Hach MS5  |
| Calibration Water Temperature <u>72.0</u> °C DO Solubility <u>8.7</u> ppm      | Calibration Water Temperature $27 - \circ_{\rm C}$ DO Solubility $5 - 7$ ppm    |
| Meter Water Temperature <u>72.0</u> °C Meter DO <u>8.7</u> ppm                 | Meter Water Temperature <u>72.0</u> °C Meter DO <u>8.7</u> ppm                  |
| Meter Water Temp. adjusted to °C Meter DO adjusted to ppm                      | Meter Water Temp. adjusted to <u>NPppm</u> °C Meter DO adjusted to <u>NPppm</u> |
| Calibration Date: 08-02 Calibration Time:                                      | Calibration Date: 08-02-10 Calibration Time: 1448                               |
| Meter Type: YSI (meter #) Hach MS5   | Meter Type:YSI (meter #/0 ?8 3)Hach MS5   |
| Calibration Water Temperature°C DO Solubilityppm                               | Calibration Water Temperature <u>22.0</u> °C DO Solubility <u>8.7</u> ppm       |
| Meter Water Temperature °C Meter DO ppm  | Meter Water Temperature <u>220</u> °C Meter DO <u>8.7</u> ppm                   |
| Meter Water Temp. adjusted to°C Meter DO adjusted toppm                        | Meter Water Temp. adjusted to <u>NIA</u> °C Meter DO adjusted to <u>NIA</u> ppm |
| Calibration Date: 08-02-16 Calibration Time: 1553                              | Calibration Date: 08-02-10 Calibration Time: 1659                               |
|  | Meter Type:YSI (meter #_/ <u>0183</u> ) Hach MS5                                |
| Calibration Water Temperature <u>215</u> °C DO Solubility <u>8.8</u> ppm       | Calibration Water Temperature <u>21.5</u> °C DO Solubility <u>8.8</u> ppm       |
| Meter Water Temperature <u>21.5</u> °C Meter DO <u>8.6</u> ppm                 | Meter Water Temperature 21.5 °C Meter DO 8.8 ppm                                |
| Meter Water Temp. adjusted to <u>NNA</u> °C Meter DO adjusted to <u>88</u> ppm | Meter Water Temp. adjusted to <u>N/A</u> °C Meter DO adjusted to <u>MA</u> ppm  |
| 68-02-10 1755  |   |
|  |   |
| 8.8  |   |
| 8.7  |   |
|  | 1   |
| 8.8  |   |

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| Calibration Date: 8-13-10 Calib                      | pration Time: <u>6:52</u>                 | Calibration Date: 8-13-10 Calib                   | pration Time: 7:54                   |
|--|---|---|--------------------------------------|
| Meter Type: <u>/ST_</u> YSI (meter # <u>/0983_</u> ) | Hach MS5                                  | Meter Type: YSI (meter #)                         | Hach MS5                             |
| Calibration Water Temperature <u>20.8</u> °C         | DO Solubility <u>8,9</u> _ppm             | Calibration Water Temperature <u>20, 8</u> °C     | DO Solubility <u>8,9</u> ppm         |
| Meter Water Temperature <u>20.8</u> °C               | Meter DO <u>8,9</u> ppm                   | Meter Water Temperature <u>20, 8</u> °C           | Meter DO <u>89</u> ppm               |
| Meter Water Temp. adjusted to <u>0K</u> °C           | Meter DO adjusted to <u><i>OK</i></u> ppm | Meter Water Temp. adjusted to <u>0K</u> °C        | Meter DO adjusted to <u>0K</u> ppm   |
| Calibration Date: 8-13-10 Calib                      | ration Time: <u>8:54</u>                  | Calibration Date: 8-13-10 Calib                   | pration Time: 9:54                   |
| Meter Type: YSI (meter #)                            |   | Meter Type: YSI (meter #)                         |                                      |
| Calibration Water Temperature <u>20,8</u> °C         |   | Calibration Water Temperature <u>20.9</u> °C      | DO Solubility <u>8,9</u> ppm         |
| Meter Water Temperature <u>20, 8</u> °C              | Meter DO <u>9,0</u> ppm                   | Meter Water Temperature <u>20, 9</u> °C           | Meter DO <u>88</u> ppm               |
| Meter Water Temp. adjusted to <u><i>OK</i></u> °C    | Meter DO adjusted to <u>2, 7</u> ppm      | Meter Water Temp. adjusted to <u>0K</u> °C        | Meter DO adjusted to <u>8, 9</u> ppm |
| Calibration Date: 8-13-10 Calibr                     | ration Time: <u>10:53</u>                 | Calibration Date: 8-13-10 Calib                   | ration Time: 11:53                   |
| Meter Type: YSI (meter #)                            |   | Meter Type: YSI (meter #)                         |                                      |
| Calibration Water Temperature <u>2/10</u> °C         | 0.0                                       | Calibration Water Temperature <u>21.</u> 2_°C     | DO Solubility <u>8,9</u> ppm         |
| Meter Water Temperature <u>21,</u> °C                | Meter DO <u>87</u> ppm                    | Meter Water Temperature <u>21.2</u> °C            | Meter DO <u>9.0</u> ppm              |
| Meter Water Temp. adjusted to <u><i>OK</i></u> °C    | Meter DO adjusted to <u>OK</u> _ppm       | Meter Water Temp. adjusted to <u><i>OK</i></u> °C | Meter DO adjusted to <u>89</u> ppm   |

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STC/BUB

| Calibration Date: $\frac{8-/3-/0}{2000}$ Calib     |   | Calibration Date: 8/13/10 Calib                    | pration Time: 13504-5               |
|--|---|--|-------------------------------------|
| Meter Type: <u>YST</u> YSI (meter # <u>10983</u> ) | Hach MS5                                | Meter Type: <u>YSI</u> YSI (meter # <u>10983</u> ) | Hach MS5                            |
| Calibration Water Temperature <u>21.5</u> °C       | DO Solubility <b>9.8</b> ppm            | Calibra ion Water Temperature <u>21, 5</u> °C      | DO Solubility <u> </u>              |
| Meter Water Temperature <u>21.5</u> °C             | Meter DO <u><i>S</i></u> , <u>8</u> ppm | Meter Water Temperature <u>21.5</u> °C             | Meter DO ppm                        |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to <u>O</u> ppm       | Meter Water Temp. adjusted to $\underline{OK}_{C}$ | Meter DO adjusted to <u>OK</u> ppm  |
| Calibration Date: <u>3/13/10</u> Calib             | ration Time: 1453 hrs                   | Calibration Date: <u>8/13/10</u> Calib             | ration Time: 1550/-                 |
| Meter Type: <u>YSI</u> YSI (meter # <u>10983</u> ) |   | Meter Type: YSI (meter $#)$                        | Hach MS5                            |
| Calibration Water Temperature $21.5$ °C            | DO Solubility <u>8.8</u> ppm            | Calibration Water Temperature <u>21.5</u> °C       | DO Solubility <u>8.8</u> ppm        |
| Meter Water Temperature <u>21.5</u> ℃              | Meter DO <u>8.8</u> ppm                 | Meter Water Temperature <u>21.5</u> °C             | Meter DO <u>8, 8</u> _ppm           |
| Meter Water Temp. adjusted to <u>OK</u> °C         | Meter DO adjusted to <u>6 K</u> ppm     | Meter Water Temp. adjusted to°C                    | Meter DO adjusted to <u>0 K</u> ppm |
| Calibration Date: 8/13/10 Calibr                   | ration Time: 1648 hrs                   | Calibration Date: <u>8/13/10</u> Calib             | · · · /7//-                         |
|  |   | 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2            | ration Time: <u>////</u>            |
| Calibration Water Temperature <u>21.5</u> °C       | DO Solubility <b>8</b> ppm              | Calibration Water Temperature <u>21.5</u> °C       | DO Solubility <u>8.8</u> ppm        |
| Meter Water Temperature <u>21.5</u> °C             | Meter DO <u>8, 8</u> ppm                | Meter Water Temperature <i>2 1. 5</i> _∘C          | Meter DO 8.8 _ppm                   |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to <u>OK</u> ppm      | Meter Water Temp. adjusted toOK°C                  | Meter DO adjusted to <u>6</u> k—ppm |

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| Calibration Date: 8/14/1() Cali                    | ibration Time: <u>654</u>               | Calibration Date: 8/14/10 Calib                    | pration Time: 7:57                     |                      |
|--|---|--|--|----------------------|
| Meter Type: <u>×</u> YSI (meter # <u>PH91-M2</u> ) | Hach MS5                                | Meter Type: <u>X</u> YSI (meter # <u>PH91-M</u> 2) |  | I turned             |
| Calibration Water Temperature 22.0 °C              | DO Solubility <u>8.72 (8.7)</u> ppm     | Calibration Water Temperature <u>21.0</u> °C       | DO Solubility <u>7.90</u> ppm          | the AC .             |
|  |   | Meter Water Temperature°C                          | Meter DO <u>8.7</u> ppm                | cause of the         |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to <u>7</u> ppm       | Meter Water Temp. adjusted to°C                    | Meter DO adjusted to 8.9 ppm           | drup. (2)<br>to 21°C |
| Calibration Date: 8/14/10 Cali                     |   | Calibration Date: 8/14/1() Calib                   | pration Time: 9:52                     |                      |
| Meter Type: X YSI (meter #PH91-M2)                 | Hach MS5                                | Meter Type: X YSI (meter #PH91-M2)                 | Hach MS5                               |                      |
| Calibration Water Temperature 21.6 °C              | DO Solubility 8.90 ppm                  | Calibration Water Temperature <u>21.0</u> °C       | DO Solubility <u>8.90</u> ppm          |                      |
| Meter Water Temperature <u>21.0</u> °C             | Meter DO <u>8</u> ,9 ppm                | Meter Water Temperature°C                          | Meter DOppm                            |                      |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to NA ppm             | Meter Water Temp. adjusted to°C                    | Meter DO adjusted toppm                |                      |
| Calibration Date: 8/14/10 Cali                     |   | Calibration Date: 8 4 10 Calib                     | pration Time: 11:52                    |                      |
| Meter Type: <u>X</u> YSI (meter # <u>PH91-M2</u> ) | Hach MS5                                | Meter Type: X YSI (meter #PH91-M2)                 |  |                      |
| Calibration Water Temperature <u>R2.0</u> °C       | DO Solubility 8.72 (8.7) <sub>ppm</sub> | Calibration Water Temperature <u>220</u> °C        | DO Solubility <u>&amp; 72 8.7)</u> ppm |                      |
| Meter Water TemperatureQ2.0°C                      | Meter DOppm                             | Meter Water Temperature <u>22.0</u> °C             | Meter DO <u>8</u> ppm                  |                      |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to 8.7 ppm            | Meter Water Temp. adjusted to°C                    | Meter DO adjusted to <u>8.7</u> ppm    |                      |

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| Calibration Date: 8/ 10 Calib                      |   | Calibration Date: 8/14/10 Cali                     |                                   |
|--|---|--|-----------------------------------|
| Meter Type: <u>X</u> YSI (meter # <u>PH91-M2</u> ) | Hach MS5                                      | Meter Type: <u>X</u> YSI (meter # <u>PH91-M2</u> ) | Hach MS5                          |
| Calibration Water Temperature 22,0 °C              | DO Solubility <u>حرم (جرم)</u> ppm            | Calibration Water Temperature <u>3.0</u> °C        | DO Solubility 8.56 (8.5) ppm      |
| Meter Water Temperature <u>22.0</u> °C             | Meter DO <u>84</u> ppm                        | Meter Water Temperature <u>23.0</u> °C             | Meter DOppm                       |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to $\frac{8.7}{\text{ppm}}$ | Meter Water Temp. adjusted to°C                    | Meter DO adjusted toppm           |
| Calibration Date: 8/14/10 Calib                    |   | Calibration Date: 81410 Cali                       |                                   |
| Meter Type: X YSI (meter # <u>PH91-M2</u> )        | Hach MS5                                      | Meter Type: <u>X</u> YSI (meter # <u>PH91-Ma</u> ) | Hach MS5                          |
| Calibration Water Temperature 23.0 °C              | DO Solubility 856 (85)ppm                     | Calibration Water Temperature $23.0$ °C            | DO Solubility <u>856 (المج</u> pm |
| Meter Water Temperature <u>23.0</u> °C             | Meter DO <u>8.5</u> ppm                       | Meter Water Temperature <u>23.0</u> °C             | Meter DO <u>8.5</u> ppm           |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to <u>NA</u> ppm            | Meter Water Temp. adjusted to°C                    | Meter DO adjusted to 1/1/2_ppm    |
| Calibration Date: 8 14 10 Calib                    | ration Time: 17:50                            | Calibration Date: Cali                             | bration Time:                     |
| Meter Type: X YSI (meter # PH91-M2)                |   | Meter Type: YSI (meter #)                          |                                   |
| Calibration Water Temperature <u>23.0</u> °C       | DO Solubility 856 (85)                        | Calibration Water Temperature°C                    | DO Solubilityppm                  |
| Meter Water Temperature <u>3.0</u> °C              | Meter DO <u>8.5</u> ppm                       | Meter Water Temperature°C                          | Meter DOppm                       |
| Meter Water Temp. adjusted to°C                    | Meter DO adjusted to MA ppm                   | Meter Water Temp. adjusted to°C                    | Meter DO adjusted toppm           |

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| Calibration Date: 8 5 0 Calib  | ration Time:                        | Calibration Date: 8/15/10 Cal  | bration Time: 7:55                  |
|--|-------------------------------------|--|-------------------------------------|
| Meter Type: $\underline{X}$ YSI (meter # $\underline{PH91}$ -M $\underline{A}$ )   | Hach MS5                            | Meter Type: <u>X</u> YSI (meter $\# \underline{PH91} - \underline{M2}$ ) |                                     |
| Calibration Water Temperature 22.0 °C  | DO Solubility <u>72 (8,7)</u> ppm   | Calibration Water Temperature <u><b>RLO</b></u> °C                       | DO Solubility <u>8.90</u> ppm       |
| Meter Water Temperature <u>22.0</u> °C   | Meter DO <u>8</u> ppm               | Meter Water Temperature <u>21.0</u> °C                                   | Meter DOppm                         |
| Meter Water Temp. adjusted to°C  | Meter DO adjusted to 8.7 ppm        | Meter Water Temp. adjusted to°C  | Meter DO adjusted toppm             |
| Calibration Date: <u>4/15/10</u> Calib   | ration Time: <u>8: 53</u>           | Calibration Date: 8/15/10 Cali   | bration Time: 9:50                  |
| Meter Type: $\chi$ YSI (meter # <u>PH91-M2</u> )   | Hach MS5                            | Meter Type: <u>X</u> YSI (meter # <u>PH91-M2</u> )                       | Hach MS5                            |
| Calibration Water Temperature <u>21.0</u> °C   | DO Solubility 8.90 ppm              | Calibration Water Temperature <u>210</u> °C                              | DO Solubility <u>8,90</u> ppm       |
| Meter Water Temperature <u>21.0</u> °C   | Meter DO <u>89</u> ppm              | Meter Water Temperature <u>21.0</u> °C                                   | Meter DO <u>8.9</u> ppm             |
| Meter Water Temp. adjusted to°C  | Meter DO adjusted to <u>N/A</u> ppm | Meter Water Temp. adjusted to°C  | Meter DO adjusted to MA_ppm         |
|  | ration Time: 10.55                  | Calibration Date: 8510 Cali  | bration Time: 11:54                 |
| Meter Type: X YSI (meter # PH91-M2)  | Hach MS5                            | Meter Type: X YSI (meter # <u>PH41-M2</u> )                              |                                     |
| Calibration Water Temperature <u>Q1.0</u> °C   | DO Solubility 8.90 ppm              | Calibration Water Temperature <u>20.0</u> °C                             | DO Solubility <u>9.07 (9.1)</u> ppm |
| Meter Water Temperature <u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u> | Meter DOppm                         | Meter Water Temperature <u>20.0</u> °C                                   | Meter DOppm                         |
| Meter Water Temp. adjusted to°C  | Meter DO adjusted toppm             | Meter Water Temp. adjusted to°C  | Meter DO adjusted toppm             |

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| Calibration Date:                         | Calib         | pration Time:               | Calibration Date |                            | Calib | pration Time:               |
|---|---------------|-----------------------------|------------------|----------------------------|-------|-----------------------------|
| Meter Type: X YSI (meter #                | )             | Hach MS5                    |                  | YSI (meter #               |       |                             |
| Calibration Water Temperature             | °C            | DO Solubilityppm            | Calibration Wate | er Temperature             | °C    | DO Solubilityppm            |
| Meter Water Temperature                   | _°C           | Meter DOppm                 | Meter Water Ter  | mperature                  | _°C   | Meter DOppm                 |
| Meter Water Temp. adjusted to             | °C            | Meter DO adjusted toppm     | Meter Water Ter  | mp. adjusted to            | °C    | Meter DO adjusted toppm     |
| Calibration Date:                         | Calib         | ration Time:                | Calibration Date | ::                         | Calib | pration Time:               |
| Meter Type: YSI (meter #                  | <u>/1)</u> )  | Hach MS5                    | Meter Type: 🦄    | YSI (meter #               | )     | Hach MS5                    |
| Calibration Water Temperature             | _°C           | DO Solubilityppm            | Calibration Wate | er Temperature <u>21.0</u> | _°C   | DO Solubility 8.90 ppm      |
| Meter Water Temperature                   | _°C           | Meter DOppm                 | Meter Water Ter  | nperature <u>21.6</u>      | _°C   | Meter DO <u>89</u> ppm      |
| Meter Water Temp. adjusted to             | °C            | Meter DO adjusted toppm     | Meter Water Ter  | np. adjusted to            | _•C   | Meter DO adjusted to MA ppm |
| Calibration Date: 8/15/10                 | Calib         | ration Time: 17:50          | Calibration Date | :                          | Calib | ration Time:                |
| Meter Type: X YSI (meter #PH91            | - <u>M2</u> ) |                             |                  | YSI (meter #               |       |                             |
| Calibration Water Temperature <u>21.0</u> | _°C           | DO Solubility 8.90 ppm      | Calibration Wate | er Temperature             | _°C   | DO Solubilityppm            |
| Meter Water Temperature                   | _°C           | Meter DO <u>8.9</u> ppm     | Meter Water Ten  | nperature                  | _°C   | Meter DOppm                 |
| Meter Water Temp. adjusted to             | _°C           | Meter DO adjusted to MA ppm | Meter Water Ten  | np. adjusted to            | _°C   | Meter DO adjusted toppm     |

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| Calibration Date: 8-16-10 Calib                       | ration Time: 05.50                          | Calibration Date: <u>8-16-10</u> Cali                | bration Time: 0850                     |
|---|---|--|--|
| Meter Type: 151 YSI (meter # 04-91-MD                 |   | Meter Type: <u>¥SI</u> YSI (meter # <u>PH91 M2</u> ) |  |
| Calibration Water Temperature 27,5 °C                 | DO Solubility 8.65 ppm                      | Calibration Water Temperature <u>22,9</u> °C         | DO Solubility <u>8,6</u> ppm           |
| Meter Water Temperature <u>22.45</u> °C               | Meter DO <u>8.70</u> ppm                    | Meter Water Temperature <u>22.9</u> °C               | Meter DO <b>2,4</b> ppm                |
| Meter Water Temp. adjusted to <u>22.5</u> °C          | Meter DO adjusted to <u>Siles</u> ppm       | Meter Water Temp. adjusted to°C                      | Meter DO adjusted to <u>C</u> ppm      |
| Calibration Date: 8-16-10 Calib                       | ration Time: 0650                           | Calibration Date: 8-16-10 Calil                      | pration Time: 0950                     |
| Meter Type: <u>↓S1</u> YSI (meter # <u>PH 91 M2</u> ) | Hach MS5                                    | Meter Type: <u>\SI</u> YSI (meter # <u>P#91 M2</u> ) |  |
| Calibration Water Temperature 22.5 °C                 |   | Calibration Water Temperature <u>23, 0</u> °C        | DO Solubility <u>8,56</u> ppm          |
| Meter Water Temperature <u>22,5</u> °C                | Meter DO 8.6 ppm                            | Meter Water Temperature <u>23, 2</u> °C              | Meter DO <u>8.56</u> ppm               |
| Meter Water Temp. adjusted to <u>22,5</u> °C          | Meter DO adjusted to 8.65 ppm               | Meter Water Temp. adjusted to 23.0 °C                | Meter DO adjusted to $\frac{OK}{PPM}$  |
| Calibration Date: 8-16-10 Calibr                      | ration Time: 0750                           | Calibration Date: 8-16-10 Calib                      | pration Time: 1050                     |
| Meter Type: <u>YS</u> YSI (meter # <u>PH91 M2</u> )   | Hach MS5                                    | Meter Type: <u>XS</u> YSI (meter # <u>PH-91 M2</u> ) |  |
| Calibration Water Temperature <u>22.5</u> °C          |   | Calibration Water Temperature <u>25.0</u> °C         | DO Solubility 8,24 ppm                 |
| Meter Water Temperature 22.5 °C                       | Meter DO <u>8.70</u> ppm                    | Meter Water Temperature25. /°C                       | Meter DO <u>8:30</u> ppm               |
| Meter Water Temp. adjusted to <u>SK</u> °C            | Meter DO adjusted to <u><b>8.65</b></u> ppm | Meter Water Temp. adjusted to <u>25.0</u> °C         | Meter DO adjusted to <u>8, 24 p</u> pm |

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| Calibration Date: 876-10 Calil                         | pration Time: <u>1150</u>           | Calibration Date: 8-16-10 Cali                      | bration Time: 1450            |
|--|-------------------------------------|---|-------------------------------|
| Meter Type: <u>VSL</u> YSI (meter # <u>PH 91 M2</u> )  | Hach MS5                            | Meter Type: <b>251</b> YSI (meter # <u>PH91M2</u> ) |                               |
| Calibration Water Temperature <u>455</u> °C            | DO Solubility 8,2 ppm               | Calibration Water Temperature <u>26,3</u> °C        | DO Solubility <u>8,05</u> ppm |
| Meter Water Temperature <u>25.5</u> °C                 | Meter DO <u>8,2</u> ppm             | Meter Water Temperature <u>26.3</u> °C              | Meter DO <u>8./0</u> ppm      |
| Meter Water Temp. adjusted to <u>OK</u> °C             | Meter DO adjusted to <u>0</u> K_ppm | Meter Water Temp. adjusted to <u> </u>              | Meter DO adjusted to 8.05 ppm |
| Calibration Date: 8-16-10 Calib                        | pration Time: <u>1250</u>           | Calibration Date: 8-16-10 Calil                     | pration Time: 1550            |
| Meter Type: <u>VSI</u> YSI (meter # <u>91 M2</u> )     | Hach MS5                            | Meter Type: YSI YSI (meter #PH91 M2)                | Hach MS5                      |
| Calibration Water Temperature <u>26.0</u> °C           |                                     | Calibration Water Temperature <u>26.0</u> °C        | DO Solubility ppm             |
| Meter Water Temperature <u>26.6</u> °C                 | Meter DOppm                         | Meter Water Temperature <u>26.0</u> °C              | Meter DO <u><u></u>ppm</u>    |
| Meter Water Temp. adjusted to <u>DK</u> °C             | Meter DO adjusted to <u>© K</u> ppm | Meter Water Temp. adjusted to°C                     | Meter DO adjusted to OK ppm   |
| Calibration Date: <u>8-16-10</u> Calib                 | ration Time: 1350                   | Calibration Date: 8-16-10 Calib                     | pration Time: 1450            |
| Meter Type: <u>YS1</u> YSI (meter # <u>P H 91 M2</u> ) | *                                   | Meter Type: <u>YSI YSI (meter H 91 M 2)</u>         |                               |
| Calibration Water Temperature <u>26.2</u> °C           |                                     | Calibration Water Temperature <u>26.0</u> °C        | DO Solubilityppm              |
| Meter Water Temperature <u>26.2</u> °C                 | Meter DO <u>8, ppm</u>              | Meter Water Temperature26.0 °C                      | Meter DO <u>8,2</u> ppm       |
| Meter Water Temp. adjusted to°C                        | Meter DO adjusted to 8.05 pm        | Meter Water Temp. adjusted to°C                     | Meter DO adjusted to ppm      |

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| Page | <u> </u> | of |  |
|------|----------|----|--|
|------|----------|----|--|

| Calibration Date: 2-16-10          |            | pration Time: 1750      |      | Calibration Date:             | Calit | pration Time:          |      |
|------------------------------------|------------|-------------------------|------|-------------------------------|-------|------------------------|------|
| Meter Type: VSI (meter # PH 9      | <u>1M2</u> | Hach MS5                |      | Meter Type: YSI (meter #      |       |                        |      |
| Calibration Water Temperature 2572 | _°C        | DO Solubility 8.2       |      | Calibration Water Temperature |       | DO Solubility          | ppm  |
| Meter Water Temperature 25:2       | _°C        | Meter DO <u>8,2</u> ppr | n    | Meter Water Temperature       | °C    | Meter DO               | _ppm |
| Meter Water Temp. adjusted to _OK  | _°C        | Meter DO adjusted to OK | _ppm | Meter Water Temp. adjusted to | °C    | Meter DO adjusted to _ | ppm  |
| Calibration Date:                  | Calib      | ration Time:            |      | Calibration Date:             | Calib | ration Time:           |      |
| Meter Type: YSI (meter #           |            |                         |      | Meter Type: YSI (meter #      |       |                        |      |
| Calibration Water Temperature      | _°C        | DO Solubility           |      | Calibration Water Temperature |       | DO Solubility          | ppm  |
| Meter Water Temperature            | °C         | Meter DOppn             | n    | Meter Water Temperature       | °C    | Meter DO               | _ppm |
| Meter Water Temp. adjusted to      | _°C        | Meter DO adjusted to    | _ppm | Meter Water Temp. adjusted to | °C    | Meter DO adjusted to _ | ppm  |
| Calibration Date:                  | Calibi     | ration Time:            |      | Calibration Date:             | Calib | ration Time:           |      |
| Meter Type: YSI (meter #           |            |                         |      | Meter Type: YSI (meter #      |       |                        |      |
| Calibration Water Temperature      | _°C        | DO Solubility           | ppm  | Calibration Water Temperature | °C    | DO Solubility          | ppm  |
| Meter Water Temperature            | °C         | Meter DOppm             | n    | Meter Water Temperature       | °C    | Meter DO               | _ppm |
| Meter Water Temp. adjusted to      | _°C        | Meter DO adjusted to    | _ppm | Meter Water Temp. adjusted to | °C    | Meter DO adjusted to _ | ppm  |

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|---|--------------------------------------|---|---|
| Dissolved Oxygen and Water Temperature Meter  | r Calibration Sheet                  | Page.   | of  |
| Calibration Date: <u>08.25-10</u> Calib<br>Meter Type: <u>V</u> YSI (meter # <u>P+Q1-M2</u> ) | ration Time: <u>0615</u><br>Hach MS5 | Calibration Date: <u>08-25-10</u> Calibration Date: <u>VSI (meter #PM91-w2</u> )            | bration Time: <u>0750</u><br>Hach MS5       |
| Calibration Water Temperature <u>20.0</u> °C  | DO Solubility 9.0 ppm                | Calibration Water Temperature <u>200</u> °C   | DO Solubility <u>9.0</u> ppm                |
| Meter Water Temperature <u>19.8</u> °C  | Meter DO 9,1 ppm                     | Meter Water Temperature <u>19.9</u> °C  | Meter DO <u>8.9</u> ppm                     |
| Meter Water Temp. adjusted to <u>200</u> °C   | Meter DO adjusted to <u>9</u> .0 ppm | Meter Water Temp. adjusted to <u>20</u> °C  | Meter DO adjusted to 9.0 ppm                |
|   |                                      | Calibration Date: <u>08-25-10</u> Calibration Date: <u>V</u> YSI (meter # <u>PH91- m2</u> ) |   |
| Calibration Water Temperature 21.0 °C   | DO Solubility <u>&amp; 9</u> ppm     | Calibration Water Temperature 21.5 °C   | DO Solubility 8.8 ppm                       |
| Meter Water Temperature°C   | Meter DO <u>8</u> ppm                | Meter Water TemperatureC  | Meter DO <u>8.7</u> ppm                     |
| Meter Water Temp. adjusted to <u>P\A</u> °C   | Meter DO adjusted toAppm             | Meter Water Temp. adjusted to A A C   | Meter DO adjusted to <u>&amp; &amp;</u> ppm |
| Calibration Date: 08 - 25 - 10 Calib  | ration Time: 1345                    | Calibration Date: 08-25-10 Calil  | bration Time: 1550                          |
| Meter Type: YSI (meter # Phg 1 - me_)   |                                      | Meter Type: YSI (meter #PH91 - M2)  |   |
| Calibration Water Temperature 21.5 °C   | DO Solubility <u> </u>               | Calibration Water Temperature 20,5 °C   | DO Solubility <u>90</u> ppm                 |
| Meter Water Temperature 21.5 °C   | Meter DO <u>88</u> ppm               | Meter Water Temperature <u>20.5</u> °C  | Meter DOppm                                 |
| Meter Water Temp. adjusted to <u>wha</u> °C   | Meter DO adjusted to <u>N</u> ppm    | Meter Water Temp. adjusted to <u>NIA</u> °C   | Meter DO adjusted to Oppm                   |
| 1750HRS 20  | 9.0                                  |   |   |
| 2.0 0.12  | 89                                   |   |   |
| A U   |                                      |   |   |

| Calibration Date: 08-25-10 Cal<br>Meter Type: VSI (meter #/0983)   | ibration Time: <u>0615</u><br>Hach MS5                                      | Calibration Date: 08-25-10 Calibration Time: 065                     |
|--|---|--|
| Calibration Water Temperature $20.0$ °C  |   | Meter Type: YSI (meter # <u>109<b>83</b></u> ) Hach MS5              |
| Meter Water Temperature9 & °C  |   | Calibration Water Temperature <u>20, 1</u> °C DO Solubility <u>9</u> |
|  | Meter DO <u>9.2</u> ppm   | Meter Water Temperature <u>20</u> °C Meter DO 9,1                    |
| Meter Water Temp. adjusted to <u>20</u> °C   | Meter DO adjusted to $\underline{\mathbf{Q}}$ , $\underline{\mathbf{O}}$ pp | Meter Water Temp. adjusted to <u>20</u> . C Meter DO adjusted to     |
| Calibration Date:         O8-25-15         Cali           Meter Type:         YSI (meter # 10983         ) | bration Time: 0750<br>Hach MS5  | Calibration Date: 08.25-10 Calibration Time: 08.57                   |
|  |   | Meter Type: YSI (meter #_/ <u>2983</u> ) Hach MS5                    |
| Calibration Water Temperature <u>200</u> °C  | DO Solubility <u>9</u> o ppm  | Calibration Water Temperature $26.2$ °C DO Solubility $9$ .          |
| Meter Water Temperature <u>Zo</u> , <u>C</u> °C  | Meter DO <u></u> ppm  | Meter Water Temperature 20.4 °C Meter DO 8.9                         |
| Meter Water Temp. adjusted to <u>NIA</u> °C  | Meter DO adjusted to <u>NA</u> ppn  | Meter Water Temp. adjusted to 20.2 °C Meter DO adjusted to           |
|  | bration Time: 0955  | Calibration Date: 08-25-10 Calibration Time: 1047                    |
| Meter Type: YSI (meter # <u>10983</u> )  | Hach MS5  | Meter Type: YSI (meter #/ <b>69 8 3</b> Hach MS5                     |
| Calibration Water Temperature Z1.0 °C  | DO Solubility 89 ppm  | Calibration Water Temperature 21.6 °C DO Solubility 8.               |
| Meter Water Temperature <u>26.8</u> °C   | Meter DOppm   | Meter Water Temperature <u>21.0</u> °C Meter DO <u>88</u>            |
| Meter Water Temp. adjusted to <u>ZLO</u> °C  | Meter DO adjusted to <u>NIA</u> ppm   | Meter Water Temp. adjusted to <u>~~~~~</u> °C Meter DO adjusted to   |
|  |   |  |

|  | WOODEN                                | Box  |                                     |
|--|---------------------------------------|--|-------------------------------------|
| Dissolved Oxygen and Water Temperature Mete                        | er Calibration Sheet                  | Page   | 2 of 2                              |
| Calibration Date: 08-25-10 Cali<br>Meter Type: YSI (meter # 10983) | bration Time: <u>//SO</u><br>Hach MS5 | Calibration Date: <u>08 · 25 - 10</u> Cali<br>Meter Type: <u>/</u> YSI (meter # <u>10983</u> ) | bration Time: 1249<br>Hach MS5      |
| Calibration Water Temperature <u>Z1.5</u> °C                       | DO Solubility 8.8 ppm                 | Calibration Water Temperature <u>21.5</u> °C   | DO Solubility <u>8</u> ppm          |
| Meter Water Temperature <u>21.5</u> °C                             | Meter DO <u><b>R</b></u> ppm          | Meter Water Temperature°C  | Meter DO <u>8.7</u> ppm             |
| Meter Water Temp. adjusted to <u>PP o</u> C                        | Meter DO adjusted to 🔥 🗛 ppm          | Meter Water Temp. adjusted to 🍋 🖒 °C   | Meter DO adjusted to <u>8.8</u> ppm |
| Calibration Date: 08-25-10 Calib                                   | pration Time: 1345                    | Calibration Date: 08-25-10 Calib   | pration Time: 1449                  |
| Meter Type: YSI (meter #10983_)                                    | -                                     | Meter Type: YSI (meter #_10983_)   |                                     |
| Calibration Water Temperature 21.5 °C                              | DO Solubility 88 ppm                  | Calibration Water Temperature 21.0 °C  | DO Solubility <u>&amp; 9</u> pm     |
| Meter Water Temperature <u>Z1. S</u> °C                            | Meter DO <b>?</b> 7 ppm               | Meter Water Temperature°C  | Meter DO <b>8</b> ppm               |
| Meter Water Temp. adjusted to <u>NIA</u> °C                        | Meter DO adjusted to <b>C</b> ppm     | Meter Water Temp. adjusted to°C  | Meter DO adjusted to <u>S</u> ppm   |
| Calibration Date: 08-25-10 Calib                                   | ration Time: 1556                     | Calibration Date: 08-25-10 Calib   | ration Times 11 114                 |
|  |                                       | Meter Type: YSI (meter # <u>/0 183</u> )   | Hach MS5                            |
| Calibration Water Temperature 20.5 °C                              | DO Solubility <u><b>9</b></u> ppm     | Calibration Water Temperature <u>200</u> °C  | DO Solubility 9.0 ppm               |
| Meter Water Temperature <u>20.5</u> °C                             | Meter DO <u>89</u> ppm                | Meter Water Temperature <u>19.8</u> °C   | Meter DO <u>9.1</u> ppm             |
| Meter Water Temp. adjusted toO_°C                                  | Meter DO adjusted to <b>A D</b> ppm   | Meter Water Temp. adjusted to <u>20.0</u> °C   | Meter DO adjusted toppm             |
| 1750 HES 20.0°C<br>20.2°C<br>20.0°C                                | 9.0                                   |  |                                     |

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| Calibration Date: 8/26/16 Calib   | protion Time: 0555                         | Calibration Date: 8/26/16 Calib              | vention Time: 0848           |
|---|--|--|------------------------------|
| Meter Type: $\underline{Y}$ YSI (meter # $\underline{PH9} - \underline{M2}$ )   |  | Meter Type: X YSI (meter #)                  | 1                            |
| Neter Type F SI (meter $\# \underline{f} + f (\underline{f} + f - f + d)$ )   | Hach MS5                                   | Meter Type: Y SI (meter #)                   |                              |
| Calibration Water Temperature <u>19.9</u> °C  | DO Solubilityppm                           | Calibration Water TemperatureC_°C            | DO Solubility <u>9</u> pm    |
| Meter Water Temperature 20.1 °C   | Meter DO 9.8 ppm                           | Meter Water Temperature&.0°C                 | Meter DO <u>9.1</u> ppm      |
| Meter Water Temp. adjusted to <u>9</u> °C   | Meter DO adjusted to $\underline{9.0}$ ppm | Meter Water Temp. adjusted to°C              | Meter DO adjusted toppm      |
| Calibration Date: 8/26/10 Calib   | pration Time: 0645                         | Calibration Date: 8/26/10 Calib              | pration Time: 0947           |
| Meter Type: X YSI (meter # PH91-Md)   | Hach MS5                                   | Meter Type: YSI (meter #)                    |                              |
|   |  | ······································       |                              |
| Calibration Water Temperature <u>19.9</u> °C  | DO Solubility 9.07 ppm                     | Calibration Water Temperature <u>20.8</u> °C | DO Solubility <u>8.9</u> ppm |
| Meter Water Temperature <u>19.9</u> °C  | Meter DO <b>8.7</b> ppm                    | Meter Water Temperature°C                    | Meter DOppm                  |
| Meter Water Temp. adjusted to°C   | Meter DO adjusted to 9.0 ppm               | Meter Water Temp. adjusted to°C              | Meter DO adjusted toppm      |
| Calibration Date: 8/26/10 Calib   | notion Times ()751                         | Calibration Date: 8/26/10 Calib              | Time 15419                   |
| Meter Type: X YSI (meter # BH91-mL)   |  | Meter Type: X YSI (meter #)                  |                              |
| Neter Type: $\gamma$ YSI (meter $\# \overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{\overline{$ | Hach MS5                                   | Meter Type: YSI (meter #)                    | Hacn MS5                     |
| Calibration Water Temperature <u>20.D</u> °C  | DO Solubility 9.07 ppm                     | Calibration Water TemperatureC               | DO Solubility ppm            |
| Meter Water Temperature <u></u> 。C  | Meter DO <u> </u>                          | Meter Water Temperature°C                    | Meter DOppm                  |
| Meter Water Temp. adjusted to°C   | Meter DO adjusted to 9.0 ppm               | Meter Water Temp. adjusted to°C              | Meter DO adjusted toppm      |
|   |  |  |                              |

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| abrilia                                |                              | e 1)//12                            |                             |
|--|------------------------------|-------------------------------------|-----------------------------|
| Calibration Date: 82610 Cali           |                              | Calibration Date: 82610 Calib       |                             |
| Meter Type: YSI (meter #)              | Hach MS5                     | Meter Type: YSI (meter #)           | Hach MS5                    |
| Calibration Water Temperature°C        | DO Solubilityppm             | Calibration Water Temperature°C     | DO Solubilityppm            |
| Meter Water Temperature°C              | Meter DO 9.1 ppm             | Meter Water Temperature°C           | Meter DO <u>9.6</u> ppm     |
| Meter Water Temp. adjusted to°C        | Meter DO adjusted toppm      | Meter Water Temp. adjusted to°C     | Meter DO adjusted toppm     |
| Calibration Date: 8/26/(0 Cali         | bration Time: 237            | Calibration Date: 8/26 Calib        | pration Time: 1545          |
| 1                                      |                              | Meter Type: YSI (meter #)           |                             |
| Meter Type: YSI (meter #)              | Hach MS5                     | Meter Type: FSt (meter #)           |                             |
| Calibration Water Temperature°C        | DO Solubility <u>9.1</u> ppm | Calibration Water TemperatureO.O_°C | DO Solubilityppm            |
| Meter Water Temperature°C              | Meter DO <u>9</u> ppm        | Meter Water Temperature 20.0 °C     | Meter DOppm                 |
| Meter Water Temp. adjusted to°C        | Meter DO adjusted toppm      | Meter Water Temp. adjusted to°C     | Meter DO adjusted toppm     |
| Calibration Date: 8/26/10 Cali         | bration Time: 1348           | Calibration Date: 8/26 Calib        | pration Time: 1640          |
|  |                              | Meter Type:YSI (meter #)            |                             |
| Meter Type: YSI (meter #)              | Hacil MISS                   | Neter Type + SI (meter #)           |                             |
| Calibration Water Temperature 210 °C   | DO Solubility <u>9.1</u> ppm | Calibration Water Temperature°C     | DO Solubility <u>9.</u> ppm |
| Meter Water Temperature <u>21.0</u> °C | Meter DOppm                  | Meter Water TemperatureC            | Meter DOppm                 |
| Meter Water Temp. adjusted to°C        | Meter DO adjusted toppm      | Meter Water Temp. adjusted to°C     | Meter DO adjusted toppm     |

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| Dissolved Oxygen and Water Temperature Mete  |  | Page of Z   |
| Calibration Date: 8/27/10 Cali               | bration Time: 0810   | Calibration Date: 82110 Calibration Time: 0840  |
| Meter Type: X YSI (meter # 1098.3)           | Hach MS5   | Calibration Date: <b>8 10</b> Calibration Time: <b>0840</b> Meter Type:      YSI (meter # <u>10983</u> )       Hach MS5 |
| Calibration Water Temperature <u>19.0</u> °C | DO Solubility <u>93</u> ppm  | Calibration Water Temperature <u>19.5</u> °C DO Solubility <u>9, ppm</u>  |
| Meter Water Temperature <u>19.5</u> °C       | Meter DO 8.6 ppm   | Meter Water Temperature <u>19.5</u> °C Meter DO <u>9.8</u> ppm  |
| Meter Water Temp. adjusted to <u>9.0</u> °C  | Meter DO adjusted to 9.26 ppm  | Meter Water Temp. adjusted to <u>N</u> ppm  |
| Calibration Date: 08 27-10 Calib             | pration Time: 0951   | Calibration Date: 8-27-10 Calibration Time: 1055  |
|  | Hach MS5   | Meter Type:         YSI (meter # 10983)         Hach MS5  |
| Calibration Water Temperature 22.6 °C        | DO Solubility <u>8.7</u> ppm   | Calibration Water Temperature <u>ZZ 0</u> °C DO Solubility <u>S</u> # ppm   |
| Meter Water Temperature°C                    | Meter DO <u>8</u> , 9 ppm  | Meter Water Temperature <u>Z1.8</u> °C Meter DO <u>8.9</u> ppm  |
| Meter Water Temp. adjusted to <u>P</u> °C    | Meter DO adjusted to $\underline{\mathcal{S}}, \overline{\mathcal{T}}_{ppm}$ | Meter Water Temp. adjusted to <u><b>22.0</b></u> °C Meter DO adjusted to <u><b>8</b></u> , <del>7</del> ppm             |
| Calibration Date: 18-27-10 Calib             | ration Time: //48  | Calibration Date: 08-27-10 Calibration Time: 1253   |
| Meter Type: YSI (meter #_ <u>10983_</u> )    |  | Meter Type: YSI (meter # <u>/0983</u> ) Hach MS5  |
| Calibration Water Temperature 21.0 °C        | DO Solubility <u>8,9</u> ppm   | Calibration Water Temperature <u>20.5</u> °C DO Solubility <u>9.0</u> ppm   |
| Meter Water Temperature <u>21.5</u> °C       | Meter DO <u>9</u> . O ppm  | Meter Water Temperature <u>20.8</u> °C Meter DO <u>8.8</u> ppm  |
| Meter Water Temp. adjusted to <u>21.0</u> °C | Meter DO adjusted to 8,9 ppm   | Meter Water Temp. adjusted to <u>205</u> °C Meter DO adjusted to <u>9.0</u> ppm   |
|  |  |   |

| Dissolved Oxygen and Water Temperature Mete  |  | DEN BOK   | age Z of Z   |
|--|--|---|--|
| Calibration Date:       08-27-10       Calibration         Meter Type:       VSI (meter # 10983) | pration Time: <u>1350</u><br>Hach MS5        | Calibration Date: <u>08 · 27 · 10</u><br>Meter Type: YSI (meter # <u>/098 ?</u> | Calibration Time: 1448<br>3_) Hach MS5             |
| Calibration Water Temperature <u>20,0</u> °C   | DO Solubility 90 ppm                         | Calibration Water Temperature   | DO Solubility 9.2                                  |
| Meter Water Temperature <u>19.8</u> °C   | Meter DO <u>8.9</u> ppm                      | Meter Water Temperature 19.2  | °C Meter DO <u>87</u>                              |
| Meter Water Temp. adjusted to <u>20</u> °C   | Meter DO adjusted to <u>9</u> , <u>0</u> ppm | Meter Water Temp. adjusted to19.0   | $2^{\circ}$ C Meter DO adjusted to $\underline{9}$ |
|  |  | Calibration Date: 08 27 - 10<br>Meter Type: VSI (meter # 10983                  |  |
| Calibration Water Temperature <u>19.0</u> °C   | DO Solubility 9.2 ppm                        | Calibration Water Temperature 18.8  | _°C DO Solubility 9.3                              |
| Meter Water Temperature <u>19.6</u> °C   | Meter DO 9.0 ppm                             | Meter Water Temperature 18.5  | °C Meter DO <u> </u>                               |
| Meter Water Temp. adjusted to $\underline{\mathcal{A}} \circ C$                                  | Meter DO adjusted to 9.2 ppm                 | Meter Water Temp. adjusted to 18.8  | _°C Meter DO adjusted to                           |
| Calibration Date: 08.27-10 Calib   | ration Time: <u>1743</u>                     | Calibration Date:   | Calibration Time:                                  |
| Meter Type: YSI (meter # <u>/ 0983</u> )   | Hach MS5                                     | Meter Type: YSI (meter #  | )Hach MS5  |
| Calibration Water Temperature <u>19.0</u> °C   | DO Solubility <u>9.2</u> ppm                 | Calibration Water Temperature   | _°C DO Solubility                                  |
| Meter Water Temperature <u>19.0</u> °C   | Meter DO <u>9.0</u> ppm                      | Meter Water Temperature   | °C Meter DOp                                       |
| Meter Water Temp. adjusted to/A°C  | Meter DO adjusted to <u>7. Z</u> ppm         | Meter Water Temp. adjusted to   | _°C Meter DO adjusted to                           |

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Dissolved Oxygen and Water Temperature Meter Calibration Sheet

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| Calibration Date: 82710 Calib                          | pration Time: 0840           | Calibration Date: 8-27-10 Cali               | bration Time: 1055                   |
|--|------------------------------|--|--------------------------------------|
| Meter Type: $\checkmark$ YSI (meter # <u>PH91-M2</u> ) | Hach MS5                     |  | Hach MS5                             |
| Calibration Water Temperature <u>19.5</u> °C           | DO Solubility 9.1 ppm        | Calibration Water Temperature <u>77.0</u> °C | DO Solubility <u>8,7</u> ppm         |
| Meter Water Temperature <u>19.5</u> °C                 | Meter DO <u>8</u> ,5 ppm     | Meter Water Temperature <u>72.0</u> °C       | Meter DO <u>8,3</u> ppm              |
| Meter Water Temp. adjusted to °C                       | Meter DO adjusted to 9.1 ppm | Meter Water Temp. adjusted toA               | Meter DO adjusted to <u>8.7</u> ppm  |
| Calibration Date: 8.27-10 Calib                        | oration Time: 1253           | Calibration Date: 08.27.10 Cali              | hration Time: 1448                   |
| Meter Type: YSI (meter #0492 - W2)                     | Hach MS5                     | Meter Type: YSI (meter # PH91 - M 2)         | Hach MS5                             |
| Calibration Water Temperature <u>20.5</u> °C           | DO Solubility 9.0 ppm        | Calibration Water Temperature <u>19.6</u> °C | DO Solubility <u>9.2</u> ppm         |
| Meter Water Temperature <u>20.2</u> °C                 | Meter DO <u>8.8</u> ppm      | Meter Water Temperature <u>19.</u> C         | Meter DO <u>9.5</u> ppm              |
| Meter Water Temp. adjusted to <u>20.5</u> °C           | Meter DO adjusted to 9.0 ppm | Meter Water Temp. adjusted to9.0 °C          | Meter DO adjusted to <u>9. Z</u> ppm |
| Calibration Date: 08-27- 0 Calib                       | ration Time: 1641            | Calibration Date: Calibration                | pration Time:                        |
| Meter Type: YSI (meter #                               | Hach MS5                     | Meter Type: YSI (meter #)                    |                                      |
| Calibration Water Temperature <u>8.8</u> °C            | DO Solubilityppm             | Calibration Water Temperature°C              | DO Solubilityppm                     |
| Meter Water Temperature <del> &amp; 5</del> ℃          | Meter DOppm                  | Meter Water Temperature°C                    | Meter DOppm                          |
| Meter Water Temp. adjusted to <u>18.9</u> °C           | Meter DO adjusted toppm      | Meter Water Temp. adjusted to°C              | Meter DO adjusted toppm              |

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| Calibration Date: 8/26/10 Cali              | pration Time: 6155                         | Calibration Date: 8/28/10 Cali               | bration Time: 7:54           |
|---|--|--|------------------------------|
| Meter Type: X YSI (meter #PH91-M2)          | Hach MS5                                   | Meter Type: X YSI (meter $\#PH91-M$ )        | Hach MS5                     |
| Calibration Water Temperature <u>K.D</u> °C | DO Solubility 9.45 (4.1) ppm               | Calibration Water Temperature <u>19.0</u> °C |                              |
| Meter Water Temperature                     | Meter DO                                   | Meter Water Temperature <u>19.0</u> °C       | Meter DO <u>9</u> .4 ppm     |
| Meter Water Temp. adjusted to°C             | Meter DO adjusted to 9.50 ppm              | Meter Water Temp. adjusted to°C              | Meter DO adjusted to 9.3 ppm |
| Calibration Date: 8/28/10 Calib             | ration Time: 8:54                          | Calibration Date: 8/28/10 Calil              | antion Time arth             |
|   |  | Meter Type: $X$ YSI (meter # $PH91-M2$ )     | Hach MS5                     |
| Calibration Water TemperatureO°C            |  | Calibration Water Temperature <u>21.0</u> °C | DO Solubility 8.90 ppm       |
| Meter Water Temperature <u>20,0</u> °C      |  | Meter Water Temperature <u>21.0</u> °C       | Meter DO <u>8.8</u> ppm      |
| Meter Water Temp. adjusted to°C             | Meter DO adjusted to $9.1^{\text{ok}}$ ppm | Meter Water Temp. adjusted to°C              | Meter DO adjusted to 8.9 ppm |
| Calibration Date: 8/28 10 Calib             | ration Time: 101                           | Calibration Date: 8/28/10 Calib              | aration Times [1:5]          |
| Meter Type: X YSI (meter $\#PH91-M2$ )      |  | Meter Type: X YSI (meter $\#PH91-M2$ )       | Hach MS5                     |
| Calibration Water Temperature 21.0 °C       | DO Solubility 8.90 ppm                     | Calibration Water Temperature <u>210</u> °C  | DO Solubility 8.9 ppm        |
| Meter Water Temperature°C                   | Meter DO <u><u>S</u> ppm</u>               | Meter Water Temperature <u>200</u> °C        | Meter DO 8.9 ppm             |
| Meter Water Temp. adjusted to°C             | Meter DO adjusted to 69 ppm                | Meter Water Temp. adjusted to°C              | Meter DO adjusted to MAppm   |

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| Calibration Date: 8 28 10 Calib              | bration Time: 12:53                | Calibration Date: 8/26/10 Cali                      | - 18:00                       |
|--|------------------------------------|---|-------------------------------|
| Meter Type: X YSI (meter #PH91-Ma)           |                                    | California Date: <u>946710</u> Cali                 | bration Time: 101.59          |
|  |                                    | Meter Type: X YSI (meter # PHG1-M2)                 | Hach MS5                      |
| Calibration Water Temperature <u>2.6</u> °C  |                                    | Calibration Water Temperature <u><b>21.0</b></u> °C | DO Solubility 8.90 ppm        |
| Meter Water Temperature <u>21.0</u> °C       | Meter DO 8.9 ppm                   | Meter Water Temperature <u>A</u> 1.O <sub>°C</sub>  | Meter DO <u>8.7</u> ppm       |
| Meter Water Temp. adjusted to°C              |                                    | Meter Water Temp. adjusted to°C                     | Meter DO adjusted to 7-1_ppm  |
| Calibration Date: 8/28/10 Calib              | pration Time: 15:56                | Calibration Date: Calibration Calibration           | 11.155                        |
| Meter Type: X YSI (meter # PHGMa             |                                    | Calif   | pration Time: <u>16-35</u>    |
|  |                                    | Meter Type: <u>YSI (meter #PH9-M2</u> )             | Hach MS5                      |
| Calibration Water Temperature <u>21.0</u> °C | DO Solubility 8.90 ppm             | Calibration Water Temperature <u>20.0</u> °C        | DO Solubility <u>4.07</u> ppm |
| Meter Water Temperature <u>21,0</u> °C       | Meter DO <u>89</u> ppm             | Meter Water TemperatureO°C                          | Meter DOppm                   |
| Meter Water Temp. adjusted to°C              |                                    | Meter Water Temp. adjusted to°C                     | Meter DO adjusted toppm       |
| Calibration Date: 8/28/10 Calib              | ration Time: 7:54                  | Calibration Data:                                   |                               |
| L I RIGALS                                   |                                    | Calibration Date: Calib                             | ration Time:                  |
|  |                                    | Meter Type: YSI (meter #)                           | Hach MS5                      |
| Calibration Water Temperature <u>20.0</u> °C | DO Solubility 9,07 (9.1) ppm       | Calibration Water Temperature°C                     | DO Solubilityppm              |
| Meter Water TemperatureO°C                   | Meter DO <u><u><u>G</u></u>ppm</u> | Meter Water Temperature°C                           | Meter DOppm                   |
| Meter Water Temp. adjusted to°C              | Meter DO adjusted to MA_ppm        | Meter Water Temp. adjusted to°C                     | Meter DO adjusted toppm       |

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



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Analysis #0199, 11028 Revision 08 Supersedes Date: 06/23/08 Effective Date: JUL 2 8 2010 Page 1 of 23

### Modification Fecal Coliform by Membrane Filtration

Approvais:

| Prepared by: | Hannel Lanne<br>Microbiologist        | Date: | 7/9/10   |
|--------------|---------------------------------------|-------|----------|
| Approved by: | Environmental Microbiology Management | Date: | 7-13-10  |
| Approved by: | Ann Unní<br>Quality Assurance         | Date: | 07/14/10 |



Analysis #0199, 11028 Revision 08 Supersedes Date: 06/23/08 Effective Date: JUL 2 8 2010 Page 2 of 23

### **Revision Log:**

| LIDISON WERE  |   |   |
|---|---|---|
|   |   |   |
| Document Number<br>(Header)                         | Combine Documents                             | Added analysis 11028  |
| Revision Log  | Formatting requirement per<br>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<br>added OMC-PS-012  |
| Basic Principles                                    | To reflect current practices                  | Removed sentence pertaining to normal volume filtered and minor wording changes                           |
| Interferences                                       | Clarification                                 | Removed ">50ppm"  |
|   | To reflect requirements                       | Chlorine residual not required for QC samples   |
| Safety Precautions<br>and Waste Handling            | Formatting requirement per<br>LOM-SOP-LAB-201 | Added required verbiage   |
| Personnel Training<br>and Qualifications            | Formatting requirement per<br>LOM-SOP-LAB-201 | Added required verbiage   |
| Sample Collection,<br>Preservation, and<br>Handling | Added applicable analysis                     | Added analysis 11028 for non-NPDES permit<br>samples  |
|   | Clarification on analysis hold time           | Incorporated PA # 1 (dated 08/18/08) – Changed 2 <sup>nd</sup> paragraph                                  |
| Apparatus and<br>Equipment                          | To reflect current practices                  | Removed 10- and 1-mL pipettes   |
|   | Addition                                      | Added disposable pipettes to sterile pipette tips   |
|   | Clarification                                 | Removed glass funnels, UV sterilizer, and sterile filters, renumbered section accordingly                 |
| Calibration   | Formatting requirement per<br>LOM-SOP-LAB-201 | Added as new, added reference to OMC-PS-012   |
| Procedure   | To reflect current practices                  | Added direction for testing chlorine positive<br>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.<br>(Previously A.15.)               | Clarification on temperature excursions       | Incorporated PA #3 (dated 02/18/09) – Added text regarding temperature excursion                          |
| Procedure A.17.                                     | To reflect current requirements               | Added use of magnifying lens  |
| (Previously A.16.)                                  | Clarification                                 | Added rounding requirements   |
|   | To reflect current 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<br>and noted the acceptable use of direct filtration    |
| Procedure B.1.                                      | Correction                                    | Incorporated PA #2 (dated 12/03/08) – Updated to include effluents  |



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| Procedure B.2.                        | Correction                      | Incorporated PA #2 (dated 12/03/08) - Updated  |
|---------------------------------------|---------------------------------|--|
|                                       |                                 | to remove effluents  |
|                                       | Information moved               | 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                   | Added reference to Attachment I  |
|                                       | Clarification                   | 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<br>data entry stage                    |
| Data Entry 4.                         | To reflect current requirements | Added new entry information for plates with >200 total CFU                           |
| Quality Assurance/<br>Quality Control | To reflect current practices    | Changed volume of E. coli from 1.0 mL to 0.5 mL                                      |

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



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|---------------------------------------|--|---|
| Procedure B.                          | Provide direction for balance<br>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/<br>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           |

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#### **Reference:**

- 1. Standard Methods for the Examination of Water and Wastewater, Section 9222D, Current Edition.
- "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 I | Reference: |
|---------|------------|
|---------|------------|

| Document                      | Document Title   |
|-------------------------------|--|
| Analysis #0416                | Modification DPD Free Chlorine Residual In Water (Presence/Absence)  |
| Analysis #6477, 6479,<br>8161 | Total Coliform and E. coli Analysis Potable Water (Presence/Absence), 6477<br>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:**

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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



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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.



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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



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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<sup>™</sup> 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



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- 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



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- 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.



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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.



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- 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<sup>™</sup> bag.
- 15. Submerge the bag in the 44.5°C water bath and incubate for  $24 \pm 2$  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.



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- 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<br>Sterile Dilution Water (mL) | Volume of Original Sample<br>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.



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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<sup>™</sup> 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).



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- 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).



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- (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:

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

For a solid sample this formula is used:

MF colonies counted (orverified) grams of sample = CFU/gram

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

D=100 - moisture / 100 Dry weight value = 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.



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### 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.



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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.



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#### **Quality Assurance/Quality Control:**

- 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<sup>-7</sup> dilution of *E. coli* and 10 mL of a 10<sup>-3</sup> 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.



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- 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  $44.5^{\circ} \pm 0.2^{\circ}$ C.
      - (ii) Check for gas fermentation at the end of 24 hours.
      - (iii) Record results in the appropriate databook.



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#### (b) 1x LST

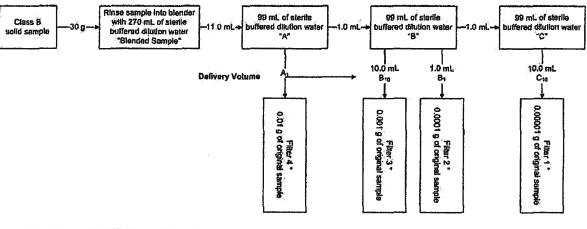
- (i) Incubate for 48 hours at  $35^{\circ} \pm 0.5^{\circ}$ C.
- (ii) Check for gas fermentation.
- (iii) Record results in the appropriate databook.
- c. Tubes positive for 1x LST, but negative for EC
  - (a) Transfer from the 1x LST to a second EC tube.
  - (b) Incubate for 24 hours at  $44.5^{\circ} \pm 0.2^{\circ}$ 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.



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#### 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.

| LO              | CATION:             | Lono Pr   | nd   |  | Investigate   | or: <u>RAB</u>  | JCA   |
|-----------------|---------------------|---|--|--|---|---|---|
| DA              |                     | 16670<br>nddyy  | 2 = Performanc   | deploy monitor (compl<br>e check (complete Sec         | ete Sec 1, 2, 5, 6, & 7 bi<br>tions 1, 2, 3 & 7)<br>alntenance (complete        | elow) 1=<br>4=  | Clear 2=P Cloudy 3=Overc<br>Lt Rain 5= H Rain 6=Fog/H |
| 1 F             | ROJECT              | FLOW / RELEAS   |  |  |   |   | (& /)   |
| N               | lo. of MR l         | Jnits Operating   | (0 to 8)   | Flow from H  | loltwood Eviden   | t: YES or N   | O (circle one)  |
| 2 Y<br>T        | me                  | TER CALIBRATI   | ON: Calibrate the<br>CAL Temp<br>Meter Temp<br>Meter adj. te | 21.D   | _°C CA<br>_°C 0K Met  | air saturated (<br><b>L DO</b><br>er DO<br>er adj to<br>R | aerated) water.<br>56 (mg/l)<br>8 (mg/l)<br>56 (mg/l) |
|                 | H METER             | CALIBRATION:  | Use a one or tw<br>eter reading @                            |  | (7.00 and 4.01 or   | 10.00 su)   | 10.00 su / 0.00                                       |
| 3 P             | RE-RETR<br>Time     | IEVAL "CAL ENI  |  | ERFORMANC  | E CHECK VAL   |   |   |
|                 |                     | <b>_</b>  | DO DO  | mg/l   | DO  | mg/l *<br>su **   | •   |
| 4 M             | ONITOR F            | ETRIEVAL FOR  | DATA DOWNL   | OAD & MAINT  | ENANCE:   |   |   |
|                 |                     | ed (taken out of  |  |  | prevailing, 24 hr) *  |   |   |
|                 |                     | oad Location:<br>alntenance Perfor  |  | or Onsite)<br>1 = None required<br>4 = Batteries repla | Time of Down         ;       2 = Sensors clean         ;ced;       5 = Other () |   | rolyte replaced;                                      |
| 5 Mi            | DO Calib            |   | Conductivit  |  |   |   | OK<br>= Other LDD SAT                                 |
| en la constante | Cal Te              |   |  |  | er; YSI; or Sonde th  |   |   |
| 10.0            | Cal Do<br>pH Calibi | المحيدية المحسب ا | (mg/l) >> DO val<br>00 <u>7.65</u> DK @                      |  |   |   |   |
| Jh -            |                     |   | _  |  | @ 10.00 <u>//</u>   | _   | K for buffer(s) used)                                 |
|                 |                     | e monitor was re  |  |  |   | (prevailing   |   |
| U INN           | Time                | EDEPLOYMENT   |  | 'OINT" MEASI<br>pH Meter                               |   |   |   |
|                 |                     | (prevailing, 24 hr)   |  |  | Temp  | MS5 Monito  | r<br>C **   |
|                 |                     | ·   | DO   | mg/l   | DO  |   | ng/) **   |
|                 |                     |   | рН [   | su   | рH  |   | ng/i<br>su **   |
|                 |                     |   |  |  | •   |   |   |

\* 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.
 Cono Dam MR MS5 Data sheet
 May be done in Lab or Field just prior to deployment, experience to dictate location.

|               | MS5 LDO MONITOR CA  |  | IECK FIELD SHEET  |
|---------------|---|--|---|
|               | LOCATION: Lower River   |  | tigator : SWA / KJT   |
|               | 2 = Performa  | SE 2<br>& deploy monitor (complete Sec 1, 2, 5<br>ince check (complete Sections 1, 2, 3 &<br>for data download & maintenance (cr             | 7) 4=Lt Rain 5= H Rain 6=Eog/Haze   |
|               | 1 PROJECT FLOW / RELEASE CONDITIO   | NS:  |   |
|               | No. of MR Units Operating (0 to B)  | Flow from Holtwood I   | Evident: YES or NO (circle one)   |
|               | 2 YSI DO METER CALIBRATION: Calibrate to<br>Time <u>∂</u> 22 d CAL Ten<br>(prevailing, 24 hr)* Meter Ten<br>Meter adj.                        | $\begin{array}{rcl} np & \underline{23.0} \ ^{\circ}C \\ np & \underline{18.0} \ ^{\circ}C \\ to & \underline{23.0} \ ^{\circ}C \end{array}$ | CAL DO         8.56 (mg/l)           Meter DO         9.2 (mg/l)           Meter adj to         8.56 (mg/l) |
|               | pH METER CALIBRATION: Use a one orTime $0810$ Meter reading @   | wo buffer system (7.00 and a<br>7.00 su <u>7. [/b</u> @ 4.01   | 4.01 or 10.00 su)<br>su or @ 10.00 su 0   |
|               | 3 PRE-RETRIEVAL "CAL END POINT" OR  | PERFORMANCE CHECH  |   |
|               | Time     DO / I       (prevalling, 24 hr) *     Temp  | oH Meter   | MS5 Monitor   |
|               | DO  | mg/l DO  | mg/l **   |
|               | рН  | su pH  | su **   |
|               | 4 MONITOR RETRIEVAL FOR DATA DOWN<br>Time retrieved (taken out of service)<br>Data Download Location:(La<br>Applicable Maintenance Performed: | b or Onsite) (prevailing, 2  | 24 hr) * Download: (24 hr) * ors cleaned; 3 = pH electrolyte replaced;                                      |
| 2-pt          | 5 MONITOR CALIBRATION:<br>DO Calibration*** Method Used:  | 3 1 = Aerated Water; 2 = River   | Water (bucket) vs YSI; 3 = Other LOO SAT%   |
| calibic       | Cal DO         (mg/l) >> DO   | value (from solubility table) for M  | Sonde thermistor for Method 1 or 2<br>ethod 1, or the YSI DO value for Method 2                             |
| July too      | / 11/2  | <b>— •</b>   | 00 10. 00 (Record OK for buffer(s) used)  |
| rate good for | Time that the monitor was redeployed in t   |  | (prevailing, 24 hr) *   |
| 3 .           | 6 MONITOR REDEPLOYMENT "CAL BEGIN<br>Time DO  | / pH Meter   | IS (at monitor location):<br>MS5 Monitor  |
|               | の習之口 (prevalling, 24 hr) * Temp   | ℃  | Temp °C **  |
|               | DO [<br>pH [  | mg/l   | DO mg/l **<br>pH su **  |
|               | .00   |  | pH     su **       Light Moderate Gusty Strong  |

\* 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. Cono Dam MR MS5 Data sheer March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

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| CONOWINGO & MUDDY RUN STATIONS<br>MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET   |
|---|
| LOCATION: Conowingo Pond CP-2+ Investigator: JCA/Chuck Barn   |
| DATE 041310<br>m m d d y y<br>PURPOSE 2<br>PURPOSE 2<br>S = Performance check (complete Sections 1, 2, 3, 8, 7)<br>S = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4, 8, 7)<br>Weather Code 4<br>S = Performance check (complete Sections 1, 2, 3, 4, 8, 7)<br>S = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4, 8, 7) |
| 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         Meter Temp       20.5         Meter adj. to       °C         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):<br>Time DO / pH Meter MS5 Monitor   |
| (prevalling, 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: Conductivity 500ms cm-0x 1412ms/cm-DK  |
| DO Calibration*** Method Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 100 % SAT  |
| (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<br>pH Calibration *** @ 7.00 7 00 0K @ 4.01 @ 10.00 // 00 K method 2   |
| (Record UK 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):<br>Time DO / pH Meter MS5 Monitor  |
|   |
|   |
| pH su pH su **  |
| 7 Air Temperature <u>/0.0</u> °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong<br>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.

Cono Dam MR MSS Data sheet May be done in Lab or Field just prior to deployment, experience to dictate location.

| CONOWINGO & MUDDY RUN STATIONS                            |   |
|---|---|
| <b>MS5 LDO MONITOR CALIBRATION &amp; CHECK FIELD SHEE</b> | Т |

| LOCATION: Lower KI                        | Ver Investigator: SWA  | KJT   |
|---|--|---|
| DATE 04(310<br>mmddyy                     | PURPOSE 2<br>1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)<br>2 = Performance check (complete Sections 1, 2, 3, 6, % 7 below)<br>1=Cie   | ather Code<br>ar 2=P. Cloudy 3=Overcast<br>Rain 5= H. Rain 6=Fog/Haze<br>7) |
| 1 PROJECT FLOW / RELEASE                  | CONDITIONS:  |   |
| No. of MR Units Operating                 | G to 8) Flow from Holtwood Evident: YES or NO  | (circle one)  |
| 2 YSI DO METER CALIBRATION                | I: Calibrate the YSI meter with the DO probe in air saturated (ae  | rated) water.   |
| Time <u>0845</u><br>(prevailing, 24 hr) * | CAL Temp $27.0$ °C CAL DO $\underline{\$}$   | <u>8</u> (mg/i)   |
|   | Meter Temp <u>200</u> °C OK Meter DO <u>8</u><br>Meter adj. to 2/. 2 °C Meter adj to 9   | <u></u>   |
| PH METER CALIBRATION: US                  | e a one or two buffer system (7.00 and 4.01 or 10.00 su)   | <u>.8</u> (mg/l)  |
| Time Mete                                 | er reading @ 7.00 su @ 4.01 su or @ 1(   |   |
|   | POINT" OR PERFORMANCE CHECK VALUES (at DO mo   |   |
| Time                                      | DO / pH Meter MS5 Monitor  | pnitor location):   |
| (prevailing, 24 hr) *                     | Temp °C Temp °C **   |   |
|   | DO mg/l ×*   |   |
|   | pH su pH su **   |   |
| MONITOR RETRIEVAL FOR D                   | ATA DOWNLOAD & MAINTENANCE:  |   |
| Time retrieved (taken out of se           | The second second second second  |   |
| Data Download Location:                   | (Lab or Onsite) Time of Download:  | (24 hr) *   |
| Applicable Maintenance Performe           | d:1 = None required; 2 = Sensors cleaned; 3 = pH electroly   |   |
|   | 4 = Batteries replaced; 5 = Other (  | )   |
|   | onductivity - 500 ms/ BK 1412 ms/cm -  |   |
| ~ ~ ~ · · · ·                             | Diagram di |   |
| SAT . TAT                                 | The second  |   |
| 7Hp 0 Cal DO (m                           | g/I) >> DO value (from solubility table) for Method 1, or the YSI DO val   | ue for Method 2   |
| <b>pH Calibration</b> *** @ 7.00          | <u>7. 〒 <sup>2</sup> @ 4.01 @ 10.00 16 の</u> (Record OK f  |   |
| Time that the monitor was rede            |  |   |
| MONITOR REDEPLOYMENT "C                   | AL BEGIN POINT" MEASUREMENTS (at monitor locat   | ion):   |
|   | DO / pH Meter MS5 Monitor  |   |
|   | DO/pH Meter MS5 Monitor  |   |
| Time<br>(prevailing, 24 hr) *             | Temp °C Temp °C  | **  |
| Time                                      | Temp C Temp °C   | **  |
| Time                                      | Temp C Temp °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.
 Cono Dam MPLMS5 Data sheet
 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

|   |  | 10  |  |   |
|---|--|---|--|---|
| LUCA                                    | ATION: CONO, 6   |   | Investigator : <u>5 (</u>  | RICAB                                     |
| DATE                                    | 542010<br>mmddyy   | PURPOSE       2         1 = Calibrate & deploy monitor (com         2 = Performance check (complete S         3 = Bottime for data duralized by | ections 1, 2, 3 & 7)   | Weather Code                              |
| 4 00                                    |  |   | maintenance (complete Sections 1, 2  | 2, 3, 4 & 7)                              |
|   | OJECT FLOW / RELEAS  |   |  |   |
|   | . of MR Units Operating                                      |   | Holtwood Evident: YES  |   |
| 2 YS<br>Tin                             | I DO METER CALIBRATIO<br>ne  つるるの                            | DN: Calibrate the YSI meter with<br>CAL Temp 24. 9  |  |   |
|   | (prevailing, 24 hr) *  | Meter Temp 20.5   | °C CAL DO  | <u>8. (</u> (mg/l)                        |
|   |  | Meter adj. to 21.0  | °C Meter adj to  | (mg/l)                                    |
| рH                                      | METER CALIBRATION:   | Jse a one or two buffer system  |  |   |
| Tin                                     |  | eter reading @ 7.00 su  |  |   |
| 3 PR                                    | E-RETRIEVAL "CAL END   | POINT" OR PERFORMAN   |  |   |
| <b></b>                                 |  | DO / pH Meter   | MS5 Monito   | r   |
|   | (prevalling, 24 hr) *  | Temp °C   | Temp°C   | **  |
|   |  | DO mg/l   | DOm  | g/l **                                    |
|   |  | pH su   | pH so  | J **                                      |
| 4 MO                                    | NITOR RETRIEVAL FOR  | DATA DOWNLOAD & MAIN  | ITENANCE:  |   |
|   | e retrieved (taken out of                                    |   | (prevailing, 24 hr) *  |   |
|   | a Download Location:   | (Lab or Onsite)   | Time of Download:  | (24 hr) *                                 |
| Арр                                     | licable Maintenance Perform                                  |   | ed; $2 = \text{Sensors cleaned}$ ; $3 = \text{pH}$<br>blaced; $5 = \text{Other}$ ( | electrolyte replaced.                     |
| 5 MOI                                   | NITOR CALIBRATION:   |   |  |   |
| A 167                                   |  | thod Used: 3 1 = Aerated W  | For MR RES. PROF   | 1/2 ON 4-19-10<br>St 3= Other (05/004/5AT |
| 1-19 268 400                            |  |   | eter; YSI; or Sonde thermistor fo  |   |
| GUOD WILL P<br>BUT WILL P<br>BUT WILL P |  | •   |  |   |
|   |  | (mg/l) >> DO value (from solubilit<br>0 @ 4.01  |  |   |
| BUT KLV Time                            | •  |   | [  | ord OK for buffer(s) used)                |
| WC                                      | e that the monitor was re                                    |   |  | ailing, 24 hr) *                          |
|   | Time   | "CAL BEGIN POINT" MEAS<br>DO / pH Meter   |  | •   |
| Г                                       | (prevailing, 24 hr)  |   | MS5 Mo<br>Temp   | °C **                                     |
| L                                       |  |   |  |   |
|   |  | DOmg/l  | DO   | mg/l **                                   |
|   | · · · · · · · · · · · · · · · · · · ·                        | pH  |  | su **                                     |
|   | emperature <u>/3.5</u> °C<br>r Sampling Notes: <u>Arr</u> () | Wind Conditions (Circle on<br>DEAD FISH 035ERVE   | e): Calm (Light) Modera  | te Gusty Strong                           |

\* 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. Cono Dam MPLMS5 Data sheet May be done in Lab or Field just prior to deployment, experience to dictate location.

| CATION: <u>Co</u><br>TE <u>g</u> <u>4</u> <u>2</u> <u>0</u> <u>1</u><br>m m d d y<br>PROJECT FLOW / RE<br>No. of MR Units Operat<br>YSI DO METER CALIB<br>Time <u>3230</u><br>(prevailing, 24 hr) * | LEASE Co<br>ing   | PURPOSE<br>1 = Calibrate & deplo<br>2 = Performance cher<br>3 = Retrieve for data<br>ONDITIONS:<br>(0 to 8)<br>Calibrate the YS<br>CAL Temp<br>Meter Temp<br>Meter adj. to<br>a one or two but<br>reading @ 7.00  | y monitor (complete<br>ck (complete Section<br>download & main<br>flow from Ho<br>I meter with th<br><u>20,1</u><br>ffer system (7<br>su <u>700</u><br>CORMANCE  | ons 1, 2, 3 & 7)<br>Intenance (complete<br>Netwood Evider<br>Netwood Evider | selow)<br>Sections 1, 2,<br>air saturate<br><b>L DO</b><br>ter DO<br>ter adj to<br>r 10.00 su)<br><u>-</u> or   | or NO (circle one)<br>ed (aerated) water.<br>(mg/l)<br>(mg/l)<br>@ 10.00 su0  |
|---|---|---|--|---|---|---|
| m m d d y PROJECT FLOW / RE No. of MR Units Operat YSI DO METER CALIB Time (3230) (prevailing, 24 hr)* DH METER CALIBRAT Time (3215) PRE-RETRIEVAL "CAL Time  | LEASE Co<br>ing   | 1 = Calibrate & deplo<br>2 = Performance cher<br>3 = Retrieve for data<br>ONDITIONS:<br>(0 to 8) F<br>Calibrate the YS<br>CAL Temp<br>Meter Temp<br>Meter adj. to<br>a one or two bur<br>reading @ 7.00<br>INT" OR PERF   | riow from Ho<br>low from Ho<br>low from Ho<br>let system (7<br>su 700  | ons 1, 2, 3 & 7)<br>Intenance (complete<br>Netwood Evider<br>Netwood Evider | Sections 1, 2,<br>at: YES c<br>air saturate<br>L DO<br>ter DO<br>ter adj to<br>r 10.00 su)  | 1=Clear 2=P. Cloudy 3=Overcast         4=Lt Rain 5= H. Rain 6=Fog/Haze         ,3, 4 & 7)         Or NO (circle one)         ed (aerated) water.        (mg/l)        (mg/l)        (mg/l)        (mg/l)        (mg/l)  |
| No. of MR Units Operat<br>YSI DO METER CALIB<br>Time (3230)<br>(prevailing, 24 hr) *<br>OH METER CALIBRAT<br>Time (5015)<br>PRE-RETRIEVAL "CAL<br>Time  | ION: Use a<br>Meter r   | (0 to 8)<br>Calibrate the YS<br>CAL Temp<br>Meter Temp<br>Meter adj. to<br>a one or two but<br>reading @ 7.00<br>INT" OR PERF   | I meter with th<br><u>ZO.1</u><br><u>ZO.1</u><br><u>Formanian</u><br><u>Cornanian</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.1</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO.0</u><br><u>ZO</u> | ne DO probe in<br>°C CA<br>°C Met<br>°C Met<br>7.00 and 4.01 of<br>@ 4.01 su  | air saturate<br>ALDO<br>ter DO<br>ter adj to<br>r 10.00 su)   | ed (aerated) water.<br>(mg/l)<br>(mg/l)<br>(mg/l)<br>@ 10.00 su0  |
| YSI DO METER CALIB<br>Time <u>3230</u><br>(prevailing, 24 hr) *<br>OH METER CALIBRAT<br>Time <u>8415</u><br>PRE-RETRIEVAL "CAL<br>Time  | ION: Use a<br>Meter r   | Calibrate the YS<br>CAL Temp<br>Meter Temp<br>Meter adj. to<br>a one or two bu<br>reading @ 7.00  | I meter with th<br><u>ZO.1</u><br><u>ZO.1</u><br><u>Formanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian</u><br><u>Cornanian<br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/><u>Cornanian</u><br/></u>  | ne DO probe in<br>°C CA<br>°C Met<br>°C Met<br>7.00 and 4.01 of<br>@ 4.01 su  | air saturate<br>ALDO<br>ter DO<br>ter adj to<br>r 10.00 su)   | ed (aerated) water.<br>(mg/l)<br>(mg/l)<br>(mg/l)<br>@ 10.00 su0  |
| oH METER CALIBRAT<br>Time <u>Scis</u><br>PRE-RETRIEVAL "CAL<br>Time   | ION: Use a<br>Meter r<br>- END PO   | CAL Temp<br>Meter Temp<br>Meter adj. to<br>a one or two bu<br>reading @ 7.00  | 20.1<br><u>20.1</u><br>ffer system (7<br>su <u>700</u><br>FORMANCE   | °C         CA           °C         Met           °C         Met           °C         Met           7.00 and 4.01 of         O           O         4.01 su   | ter DO<br>ter adj to<br>r 10.00 su)   | <u>7 10 (mg/l)</u><br><u>7.10 (mg/l)</u><br><u>(mg/l)</u><br>@ 10.00 su <u>100</u>  |
| Fime <u>8 215</u><br>PRE-RETRIEVAL "CAL<br>Time   | Meter r   | reading @ 7.00  | SU 700   | @ 4.01 su   | <u>4</u> or   | @ 10.00 su _1000  |
| PRE-RETRIEVAL "CAL<br>Time  | END PO  | INT" OR PERI  | ORMANCE  | @ 4.01 su<br>CHECK VAL  | <u>4</u> or   | @ 10.00 su  |
|   |   | INT" OR PERI<br>DO / pH Me  |  | CHECK VAL   | HEAL  |   |
|   | 4 hr) * 📑   |   | and the second   |   | .UES (at [<br>5 Monitor   |   |
| <u></u> * ~   |   | Temp  | 7ºc  | Temp  | o monitori<br>D°  |   |
|   | ,   |   |  |   |   |   |
|   |   |   | ]mg/i<br>דייין   | DO  | mg  | ]/  **  |
|   | •   |   | su   | pH  | su  | **  |
|   |   | 1 =<br>4 =  | None required;<br>Batteries replace  | 2 = Sensors clear<br>ed; 5 = Other (  | ned; 3 = pH a   | electrolyte replaced;<br>)  |
|   |   |   |  |   |   |   |
| Cal Temp  | (°C)  | >> °C from har<br>>> DO value (f  | nd thermometer   | ; YSI; or Sonde ti  | hermistor for   | Method 1 or 2   |
| pH Calibration ***  | @ 7.00  | @ 4.0   | 1  | @ 10.00   | (Reco   | ord OK for buffer(s) used)  |
|   |   |   |  |   |   | iling, 24 hr) *   |
|   | IENT "CAI   |   |  | REMENTS (at   | monitor   | location):  |
| F   | 24 6-2 4  |   |  | _   | MS5 Mor   |   |
|   | 24 (1) "  |   |  | Temj  | P   | _°C **  |
|   |   |   | mg/l   | DO  |   | mg/l **   |
|   |   | pH  | su   | pН  |   | su **   |
| r Temperature<br>her Sampling Notes:  | °C W  | ind Condition   | S (Circle one):  | CalinLight  | Moderat   | e Gusty Strong  |
| Record values later from do<br>155 Data sheet<br>May be done in Lab or Field  | wnloaded da<br>just prior to d  | ta at the correspor<br>deployment, experi   | ence to dictate  | location.   |   | Normandeau Associates, Inc  |
|   | ime retrieved (taken or<br>pata Download Location<br>pplicable Maintenance F<br>IONITOR CALIBRATION<br>DO Calibration***<br>Cal Temp<br>Cal DO<br>pH Calibration ****<br>me that the monitor wo<br>ONITOR REDEPLOYN<br>Time<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing,<br>(prevailing, prevailing,<br>(prevailing, prevailing, pre | ime retrieved (taken out of serv<br>pata Download Location:<br>pplicable Maintenance Performed:<br>IONITOR CALIBRATION:<br>DO Calibration*** Method<br>Cal Temp (°C)<br>Cal DO (mg/<br>pH Calibration *** @ 7.00 (mg/<br>pH Calibration *** @ 7.0 | ime retrieved (taken out of service)<br>Pata Download Location:(Lab or C<br>pplicable Maintenance Performed:1 =<br>4 =<br>IONITOR CALIBRATION:<br>DO Calibration*** Method Used:1<br>Cal Temp(°C) >> °C from har<br>Cal DO(mg/l) >> DO value (fr<br>pH Calibration *** @ 7.00 @ 4.0<br>me that the monitor was redeployed in the Ta<br>ONITOR REDEPLOYMENT "CAL BEGIN POIN<br>Time DO / pH fr<br>DO / pH fr<br>DO<br>pH<br>Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr<br>Record values later from downloaded data at the correspor<br>**** May be done in Lab or Field just prior to deployment, experi-   | ime retrieved (taken out of service) (pr<br>pata Download Location: (Lab or Onsite) T<br>pplicable Maintenance Performed: 1 = None required;<br>4 = Batteries replace<br>NONITOR CALIBRATION:<br>DO Calibration*** Method Used: 1 = Aerated Water<br>Cal Temp (°C) >> °C from hand thermometer<br>Cal DO (mg/l) >> DO value (from solubility ta<br>pH Calibration *** @ 7.00 @ 4.01<br>me that the monitor was redeployed in the Tailrace<br>ONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUR<br>Time DO / pH Meter<br>(prevailing, 24 hr) * Temp °C<br>DO mg/l<br>pH su<br>r Temperature °C Wind Conditions (Circle one):<br>her Sampling Notes:<br>Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr<br>Record values later from downloaded data at the corresponding time of po<br>(SS Data sheet<br>May be done in Lab or Field just prior to deployment, experience to dictate  | IONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:         ime retrieved (taken out of service)         imate a Download Location:       (Lab or Onsite)       Time of Down         pplicable Maintenance Performed:       1 = None required; 2 = Sensors clear         4 = Batteries replaced; 5 = Other (         IONITOR CALIBRATION:         DO Calibration***       Method Used:       1 = Aerated Water; 2 = River Water (         Cal Temp       (°C)       >> °C from hand thermometer; YSI; or Sonde the Cal DO         Cal DO       (mg/l) >> DO value (from solubility table) for Method 1         pH Calibration ***       @ 7.00       @ 4.01       @ 10.00         me that the monitor was redeployed in the Tailrace       Image: Cal DO       Image: Cal DO       Image: Cal DO         DO Intror REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at Time       DO / pH Meter       Image: Cal | MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:         ime retrieved (taken out of service)         ime retrieved (taken out of service)       (prevailing, 24 hr) *         ime retrieved (taken out of service)         ime retrieved (taken out of service)       (prevailing, 24 hr) *         ime retrieved (taken out of service)       1 = None required; 2 = Sensors cleaned; 3 = pH integration         ime retrieved (taken out of service)       1 = None required; 2 = Sensors cleaned; 3 = pH integration         ime retrieved (taken out of service)       1 = None required; 2 = Sensors cleaned; 3 = pH integration         ime retrieved (taken out of service)       1 = None required; 2 = Sensors cleaned; 3 = pH integration         ime retrieved (taken out of service)       1 = None required; 2 = Sensors cleaned; 3 = pH integration         ime retrieved (taken out of service)       1 = None required; 2 = Sensors cleaned; 3 = pH integration         ime retrieved (taken out of service)       1 = Aerated Water; 2 = River Water (bucket) vs YS         Cal Temp       (°C)       > °C from hand thermometer; YSI; or Sonde thermistor for         Cal DO       (mg/l) >> DO value (from solubility table) for Method 1, or the YSI       pH Calibration *** @ 7.00 @ 4.01 @ 0 10.00 @ (Recc         ime that the monitor was redeployed in the Tailrace       (prevail       (prevail         ONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor |

|                   | ENCLOSURE 1  |
|-------------------|--|
|                   | CONOWINGO & MUDDY RUN STATIONS<br>MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET  |
|                   | LOCATION: CONG POND Investigator: SWA/CAB  |
|                   | DATE       Image: Section secon section section secon section section secon section section se   |
|                   | 1 PROJECT FLOW / RELEASE CONDITIONS:   |
|                   | No. of MR Units Operating (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)  |
| meter<br>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         Meter Temp       27.2         0°C       CAL DO         Meter Temp       27.2         0°C       Meter DO         Meter adj. to       21.0         °C       Meter DO         Meter adj. to       21.0  |
|                   | 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 **   |
|                   | DOmg/l DOmg/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 ()   |
| TURBIOLTOP<br>CAL | 5 MONITOR CALIBRATION: CONDUCTIVITY ( 71445/cm -06 1413,5/cm -0K<br>DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other_LOO 100% SAT  |
| 20.0-04           | Cal Temp (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2  |
| 20 .9             | Cal DO       (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2       OSUS In         pH Calibration ***       @ 7.00 7.00 °C       @ 4.01       @ 10.00 10.00 (Record OK for buffer(s) used)   |
|                   | Time that the mention was seden by the start of the start |
| -                 | 6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):   |
|                   | Time DO / pH Meter MS5 Monitor   |
|                   | (prevalling, 24 hr) * Temp °C Temp °C **   |
|                   | DOmg/l DOmg/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. Cono Dam MR MSE Data sheet May be done in Lab or Field just prior to deployment, experience to dictate location.

| ENCL | <b>OSURE</b> | 1 |
|------|--------------|---|
|------|--------------|---|

| CONOWINGO & MUDDY RUN STATIONS                       |       |
|--|-------|
| <b>MS5 LDO MONITOR CALIBRATION &amp; CHECK FIELD</b> | SHEET |

|                | LOCATION: LOVER RIVER CONDENTINVestigator: JLA/KI   |
|----------------|---|
|                | DATE       D42010       PURPOSE       Weather Code         mmddy       1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=Lt Rain 5= H. Rain 6=Fog/Haze         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) |
|                | 1 PROJECT FLOW / RELEASE CONDITIONS:  |
|                | No. of MR Units Operating (0 to B) Flow from Holtwood Evident: YES or NO (circle one)   |
| 10984<br>10984 | 2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.         Time       0.55         (prevailing, 24 hr)*       CAL Temp         Meter Temp       0.8         Meter adj. to       0.8         PH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)   |
|                | 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):<br>Time DO / pH Meter Hand MS5 Monitor Reserved   |
|                | TimeDO/pH Meter $H_{\Delta \sim 0}$ MS5 Monitor $B_{\Delta \propto}$ $1 1 \leq 7$ (prevalling, 24 hr)*Temp $168$ °CTemp $16.8$ °C**   |
|                | $DO \left[ \frac{10}{10} \right] mg/l DO \left[ \frac{10}{10} \right] mg/l **$  |
|                | pH 8.1 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 - 71445/cm-04 141345/cm-0K  |
| irbidity       | DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDb 100% SAT   |
| 1.0-014        | Cal Temp (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   |
| 0.0-014        | 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 / @ 4.01 @ 10.00 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 DO / pH Meter MS5 Monitor  |
|                | (prevailling, 24 hr) * Temp °C Temp °C **   |
|                | DO mg/l DO mg/l **  |
|                | pH su pH su **  |
|                | 7 Air Temperature 21.1 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong<br>Other Sampling Notes: 78 °5   |
|                |   |

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.
 Cono Dam MB\_MS5 Data sheet
 May be done in Lab or Field just prior to deployment, experience to dictate location.

| CONOWINGO & MUDDY RUN STATIONS                             |
|--|
| <b>MS5 LDO MONITOR CALIBRATION &amp; CHECK FIELD SHEET</b> |

|         | LOCATION: CONOWINGO POND Investigator: SWA/CAR   |
|---------|--|
|         | LOCATION: CONOWINGO POND Investigator: SWA/CAB   |
|         | DATE       O S O 4 ( O)       PURPOSE       Weather Code         m m d d y y       1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=Lt Rain 5= H. Rain 6=Fog/Haze         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)                  |
|         | 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         25.5       °C         Meter Temp       25.5         26.0       °C         Meter adj. to       26.0         °C       Meter DO         8.1       (mg/l)         Meter adj. to       26.0         °C       Meter adj to |
|         | 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):<br>Time DO / pH Meter MS5 Monitor  |
|         | (prevailing, 24 hr) * Temp °C Temp °C **   |
|         | DOmg/I DOmg/I **<br>pHsu pHsu **   |
|         | 4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:   |
|         | Time retrieved (taken out of service)       (prevailing, 24 hr)*         Data Download Location:       (Lab or Onsite)         Applicable Maintenance Performed:       1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;         4 = Batteries replaced; 5 = Other ()   |
|         | 5 MONITOR CALIBRATION: conductivity 74 sem - OK 1413 MS/cm - 0K  |
| 2BIDITY | DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 100% SA   |
| ok '    | Cal Temp (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2  |
| 010     | 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 K @ 4.01 @ 10.00 10. K (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 DO / pH Meter MS5 Monitor   |
|         | (prevailing, 24 hr) * Temp °C Temp °C **   |
|         | DOmg/l DOmg/l **   |
|         |  |
|         | pHsu pHsu **   |

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.
 Cono Dam MR MS5 Data sheet
 May be done in Lab or Field just prior to deployment, experience to dictate location.

|          | CONOWINGO & MUDDY RUN STATIONS<br>MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET  |
|----------|--|
|          | LOCATION: Lower River Conduingo Investigator: JEN /KJT   |
|          | DATE       Image: Solid symptotic symptot symptotic symptot sy |
|          | 1 PROJECT FLOW / RELEASE CONDITIONS:   |
|          | No. of MR Units Operating (0 to B) 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         CAL Temp       26.0 °C         CAL DO       7.6 (mg/l)   |
| Redlin   | $e \circ k$ (prevailing, 24 hr)* Meter Temp $25.5$ °C Meter DO $7.5$ (mg/l) $O k \vee$<br>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):<br>Time DO / pH Meter MS5 Monitor pH Jew   |
|          | $(prevalling, 24 hr)* Temp \cancel{18,1} °C Temp °C** $  |
| 5        | DO 105 mg/1 DO mg/1** conduction   |
|          | ( pH 8.4 su pH su ** test 720in  |
|          | 4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:   |
|          | Time retrieved (taken out of service)  |
|          | 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:   |
| bidity . | DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 1.00-100/5AT  |
| 10-0K    | Cal Temp (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2  |
| 0-0K     | 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 0/L @ 4.01 @ 10.00 0/ (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 DO / pH Meter MS5 Monitor   |
|          | (prevalling, 24 hr) * Temp °C Temp °C **   |
|          | DO mg/l DO mg/l **   |
|          | pH su pH su **   |
|          | Air Temperature <u>21,9</u> °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong  |

\* 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. Cono Dam MPLMS5 Data street March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

| LUC                 | CATION: URING CO.  | Dond as   | <u>CP-6</u>  | investi   | gator :  | JEA/CAB  |
|---------------------|--|---|--|---|--|--|
| DAT                 | re 05/110<br>mmddyy  | PURPOSE<br>1 = Calibrate & de<br>2 = Performance c<br>3 = Retrieve for de | bloy monitor (comp<br>heck (complete Sec                               | tions 1, 2, 3 & 7)                                      |  | Weather Code 3<br>1=Clear 2=P. Cloudy 3=Overcast<br>4=Lt.Rain 5= H. Rain 6=Fog/Haze<br>2, 3, 4 & 7)  |
| 1 P                 | PROJECT FLOW / RELEASE C   | ONDITIONS:  | i i i i i i i i i i i i i i i i i i i                                  |   |  |  |
|                     | lo. of MR Units Operating  | (0 to 8)  |  |   |  | or NO (circle one)   |
| ו<br><u>^/</u><br>P | SI DO METER CALIBRATION<br>Time 751<br>(prevailing, 24 hr) *<br>he he to 983<br>H METER CALIBRATION: Use<br>Time Meter | CAL Temp<br>Meter Temp<br>Meter adj. to<br>a one or two                   | 9<br>19<br>N/A<br>buffer system  | <b>°C</b><br>_°C<br>_°C<br>(7.00 and 4.                 | CAL DO<br>Meter DO<br>Meter adj to<br>01 or 10.00 st | <u>9,26</u> (mg/l)<br><u>9,2</u> (mg/l)<br><u>↑,06</u> (mg/l)  |
|                     |  |   |  |   |  | or @ 10.00 su  |
|                     | RE-RETRIEVAL "CAL END PC<br>Time<br>(prevailing, 24 hr) *  | DO / pH I<br>Temp   |  | Temp<br>DO<br>pH  | MS5 Monito<br>°(                                     |  |
| D                   | ime retrieved (taken out of se<br>ata Download Location:<br>pplicable Maintenance Performe                             | (Lab c  | r Onsite)  |   | ownload:<br>s cleaned; 3 = pl                        | H electrolyte replaced;  |
|                     | Cal Temp <u>69.3</u> F (10   | g/l) >> DO valu<br><u> Ø/</u> @ 4<br>@ 74µS/cm<br>@ 0 NTU _ 0<br>.3       | hand thermome<br>e (from solubility<br>4.01<br><u>0 </u><br><u>K</u> @ | ter; YSI; or S<br>/ table) for Me<br>@ 10.0<br>@ 718μS/ | thod 1, or the Y<br>00 <u>OK</u> (Re<br>cm <u>DK</u> | YSI; $3 \approx \text{Other}$ /00<br>for Method 1 or 2<br>SI DO value for Method 2<br>ecord OK for buffer(s) used)<br>@ 1413µS/cm<br>@ 20 NTU/ |
|                     | ONITOR REDEPLOYMENT "C   |   |  |   |  | /ailing, 24 hr) *  |
|                     | Time<br>(prevailing, 24 hr) *  |   | H Meter  |   | MS5 M<br>Temp  | •  |

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.
 March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

|   | Investigator :   | SWA/KJT   |
|---|--|---|
| DATE 05///0<br>mmddyy   | 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 Section)  | 4=Lt.Rain 5= H. Rain 6=Fog/Haze   |
| 1 PROJECT FLOW / RELEASE C  | CONDITIONS:  | <u> </u>  |
| No. of MR Units Operating   | (0 to 8) Flow from Holtwood Evident:   |   |
| Time 0755<br>(prevailing, 24 hr) *<br>10989<br>pH METER CALIBRATION: Use  | CAL Temp       (9.0 °C       CAL Do         Meter Temp       18.8 °C       Meter D         Meter adj. to       9.2 °C       Meter D         Meter adj. to       9.2 °C       Meter adj.         e a one or two buffer system (7.00 and 4.01 or 10.       r reading @ 7.00 su       @ 4.01 su   | 0 <u>9.26</u> (mg/l)<br>0 <u>9.8</u> (mg/l)<br>dj to <u>9.26</u> (mg/l) 0K<br>00 su)  |
|   |  |   |
| Time  | DINT" OR PERFORMANCE CHECK VALUES<br>DO / pH Meter MS5 M   |   |
| (prevailing, 24 hr) *   |  | °C **   |
|   |  | — •   |
|   | DO mg/I DO   | mg/l **   |
|   | pH su pH   | su **   |
| Applicable Maintenance Performe   | d: 1 = None required; 2 = Sensors cleaned;<br>4 = Batteries replaced; 5 = Other.   | d: (24 hr) *<br>3 = pH electrolyte replaced;  |
| 5 MONITOR CALIBRATION:  | BP= 759.7  |   |
| DO Calibration*** Metho   | od Used: 3 1 = Aerated Water; 2 = River Water (buck  | et) vs YSI; 3 = Other <u>LDO 100%</u> S   |
| Cal Temp $652^{4}$ (°C  | C) >> °C from hand thermometer; YSI; or Sonde therm  | nistor for Method 1 or 2  |
|   | (1) >> DO value (from polybility table) for Mathed 4. or   |   |
| Cal DO 9-35 (m  | Ig/I) >> DO value (from solubility table) for Method 1, or   | the YSI DO value for Method 2   |
| pH Calibration *** @ 7.00   | <u>7.30</u> 0 4.01 @ 10.00 <u>/ 0.00</u>   | (Record OK for buffer(s) used)  |
| pH Calibration *** @ 7.00<br>Conductivity Calibration***  | <u>7.30</u> <sup>26</sup> @ 4.01 @ 10.00 <u>/ 0.00</u><br>@ 74μS/cm <u>74</u> 0E @ 718μS/cm <u>76</u>  | (Record OK for buffer(s) used)  |
| pH Calibration *** @ 7.00   | <u>7.30</u> 0 4.01 @ 10.00 <u>/ 0. 00</u>  | (Record OK for buffer(s) used)  |
| pH Calibration *** @ 7.00<br>Conductivity Calibration***  | $\frac{7.32}{@} = \frac{10.00}{$} 1$ | (Record OK for buffer(s) used)  |
| pH Calibration *** @ 7.00<br>Conductivity Calibration***<br>Turbidity Calibration***<br>Time that the monitor was rede                                    | $\frac{7.32}{@} = \frac{10.00}{$} 1$ | <ul> <li>(Record OK for buffer(s) used)</li> <li>20 P@ 1413µS/cm</li> <li>20 NTU 20 0 €</li> <li>(prevailing, 24 hr) *</li> </ul> |
| pH Calibration *** @ 7.00<br>Conductivity Calibration***<br>Turbidity Calibration***<br>Time that the monitor was rede                                    | 7.30       @ 4.01       @ 10.00 /0.00         @ 74μS/cm       74       0F       @ 718μS/cm       76         @ 0 NTU       0.3       0F       @ 10 NTU       0         ployed in the Tailrace       10       10       10         AL BEGIN POINT" MEASUREMENTS (at model)       0       10       10  | <ul> <li>(Record OK for buffer(s) used)</li> <li>20 P@ 1413µS/cm</li> <li>20 NTU 20 0 €</li> <li>(prevailing, 24 hr) *</li> </ul> |
| pH Calibration **** @ 7.00<br>Conductivity Calibration***<br>Turbidity Calibration***<br>Time that the monitor was rede<br>6 MONITOR REDEPLOYMENT "C      | 7.30       @ 4.01       @ 10.00 /0.00         @ 74μS/cm       74       0F       @ 718μS/cm       76         @ 0 NTU       0.3       0F       @ 10 NTU       0         ployed in the Tailrace       10       10       10         AL BEGIN POINT" MEASUREMENTS (at model)       0       10       10  | (Record OK for buffer(s) used)<br>2 ○ ← @ 1413µS/cm<br>@ 20 NTU 20 ○ ←<br>(prevailing, 24 br) *                                   |
| pH Calibration *** @ 7.00<br>Conductivity Calibration***<br>Turbidity Calibration***<br>Time that the monitor was rede<br>MONITOR REDEPLOYMENT "C<br>Time | 7.30       @ 4.01       @ 10.00 /0.00         @ 74μS/cm       74       0F       @ 718μS/cm       76         @ 0 NTU       0.3       0F       @ 10 NTU       10         ployed in the Tailrace       0       0       0       0         AL BEGIN POINT" MEASUREMENTS (at monopolymetric data content of the ter of te   | (Record OK for buffer(s) used)<br>20 A 1413µS/cm<br>20 NTU 20 K<br>(prevailing, 24 hr) *<br>Ponitor location):<br>55 Monitor      |

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

Cono Dam MR MS5 Data Sheet March 2010<sup>\*\*</sup> May be done in Lab or Field just prior to deployment, experience to dictate location.

|     | DATE   |                        | DAD HON             | acri                                    |   | Investig              | jator :                            | JCA CAB  |  |  |  |
|-----|--|------------------------|---------------------|---|---|-----------------------|------------------------------------|--|--|--|--|
|     |  | 0 ≤ /<br>m m d         | 210<br>dyy          | 2 = Performance                         | ploy monitor (complet<br>heck (complete Section | ions 1, 2, 3 & 7)     |                                    | Weather Code<br>1=Clear 2=P. Cloudy 3=Overcas<br>4=LL.Rain 5=H. Rain 6=Fog/Haz |  |  |  |
| -   | 3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) 1 PROJECT FLOW / RELEASE CONDITIONS: |                        |                     |   |   |                       |                                    |  |  |  |  |
|     |  | MR Units C             |                     | (0 to 8)                                | Flow from H                                     | oltwood Ev            | ident: YES                         | or NO (circle one)   |  |  |  |
| •   |  |                        | · • •               | N: Calibrate the                        |   |                       |                                    | ated (aerated) water.  |  |  |  |
| 183 | Time -   | 0757<br>(prevailing, : |                     | CAL Temp<br>Meter Temp<br>Meter adj. to | 21.0<br>20.5<br>21.0                            | °C<br>°C              | CAL DO<br>Meter DO<br>Meter adj to | 8.9 (mg/l)<br>8.8 (mg/l)<br>8.9 (mg/l) K                                       |  |  |  |
|     | pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)                                     |                        |                     |   |   |                       |                                    |  |  |  |  |
| _   | Time   |                        |                     |   |   |                       |                                    | or @ 10.00 su  |  |  |  |
| -   | 3 PRE-R  | ETRIEVAL               | "CAL END P          | OINT" OR PE                             | RFORMANCE                                       | CHECK V               | ALUES (at                          | DO monitor location):  |  |  |  |
|     | Tim  | e                      |                     | DO / pH                                 |   |                       | MS5 Monit                          | -  |  |  |  |
|     | 13   | 4S (prev               | ailing, 24 hr) *    | Temp 1 2                                | 9 °C  | Temp_                 | 18,                                | C **   |  |  |  |
|     |  |                        |                     | DO 10                                   | 1 mg/l  | DO                    | 10.9 n                             | ng/l **  |  |  |  |
|     |  |                        |                     | рН                                      | su  | pН                    | 7.6                                | SU **  |  |  |  |
| -   | 4 MONIT  | OR RETR                | EVAL FOR D          |   | AD & MAINT                                      | -                     |                                    | North Contractor Street  |  |  |  |
|     |  |                        | aken out of s       |   | <u> </u>  | revailing, 24         | hr) *                              |  |  |  |  |
|     | Data Do  | ownload L              | ocation:            | (Lab o                                  |   | Time of Do            |                                    | (24 hr)  |  |  |  |
|     | Applica  | ble Mainter            | ance Perform        | ed:                                     | 1 = None required<br>4 = Batteries repla        |                       |                                    | H electrolyte replaced;  |  |  |  |
| -   | 5 MONIT  | OR CALIB               | RATION:             |   |   | RP                    | 5715                               |  |  |  |  |
|     | DO   | Calibratio             | n*** Meth           | nod Used: [3                            | 1 = Aerated Wate                                | רט<br>er; 2 = River W | / 5 →<br>/ater (bucket) vs         | LD T YSI; 3 = Other $170%$   |  |  |  |
|     | c  | al Temp                |                     |   | •   |                       |                                    | for Method 1 or 2  |  |  |  |
|     | c  | cal DO                 | 8881                |   |   |                       |                                    | SI DO value for Method 2   |  |  |  |
|     |  | Calibration            | *** @ 7.00          |   |   |                       |                                    | ecord OK for buffer(s) used)   |  |  |  |
|     | Con  | ductivity (            | -                   | @ 74µS/cm                               | 1   | -                     |                                    | @ 1413µS/cm  |  |  |  |
|     | Turb   | oidity Calib           | oration***          | @ 0 NTU                                 |   | 10 NTU                |                                    | @ 20 NTU   |  |  |  |
|     | Time th  | at the moi             | nitor was red       | eployed in the                          |   |                       |                                    | vailing, 24 hr) *  |  |  |  |
|     |  |                        |                     | CAL BEGIN PO                            |   | REMENTS               |                                    |  |  |  |  |
|     |  | ïme                    |                     |   | H Meter   |                       | MS5 M                              | Ŧ  |  |  |  |
|     |  | (pi                    | revailing, 24 hr) * | Temp                                    | °C  | Т                     | emp                                | °C **  |  |  |  |
|     |  |                        |                     |   | mg/l  |                       | 0                                  | mg/l **  |  |  |  |
|     |  |                        |                     | рн                                      |   |                       | ю.<br>Н                            | ng/  |  |  |  |

Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
 Cono Dam MR MSS Data Sheet
 March 2010
 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

| -   | 1 PROJECT F                  | 17LO<br>ddyy  | 2 = Performance                         | - A A A A A A A A A A A A A A A A A A A | mvestig                                   | ator : <u>5</u> 0     | Weather Code                              |                      |
|-----|------------------------------|---|---|---|---|-----------------------|---|----------------------|
| _   |                              |   |   |   | olete Sec 1, 2, 5, 6, 8                   | 7 below)              | 1=Clear 2=P. Cloudy 3=Ove                 | <u>کا</u><br>ercast  |
| _   |                              |   | 3 = Retrieve for                        |   | ctions 1, 2, 3 & 7)<br>naintenance (compl | ete Sections 1, 2     | 4≃Lt.Rain 5= H. Rain 6=Fog<br>, 3, 4 & 7) | /Haze                |
| ter | No. of MR LL                 | LOW / RELEASE   | CONDITIONS                              |   |   |                       |   |                      |
| ter |                              | nits Operating  | (0 to 8)                                |   |   |                       | or NO (circle one)                        |                      |
| ter | 2 YSI DO MET                 | ER CALIBRATIO   | N: Calibrate the                        | YSI meter with                          |   |                       | ted (aerated) water.                      | وريني القطاط المحادي |
|     |                              | <u>59</u><br>iling, 24 hr) *                              | CAL Temp                                | 21.0                                    |   | CAL DO                | <u>89</u> (mg/l)                          |                      |
| 484 | (preva                       | mig, 27 m/  | Meter Temp<br>Meter adj. to             | 21.2                                    | -t-                                       | Meter DO              | <u> </u>                                  | N/C                  |
|     | pH METER                     | CALIBRATION: U  |   | buffer system                           |   | Meter adj to          | <u>    8.9   (mg/l) (</u>                 | 1                    |
|     | Time                         |   | er reading @ 7                          |   |   |                       | -   |                      |
| -   | 3 PRE-RETRI                  |   |   |   |   |                       | O monitor location)                       |                      |
|     | Time                         |   | DO / pH                                 |   |   | NS5 Monito            | -   | •                    |
|     |                              | (prevailing, 24 hr) *                                     | Temp                                    | ⊡°c                                     | Temp _                                    | °C                    | **  |                      |
|     |                              |   | DO                                      | mg/l                                    | DO  | m                     | g/l **                                    |                      |
|     |                              |   | рН                                      | su                                      | pH _                                      | st                    | u **                                      |                      |
| 4   | Time retrieve<br>Data Downlo | ETRIEVAL FOR D<br>ed (taken out of s<br>pad Location:<br> | ervice) [(Lab                           | or <b>Onsite</b> )                      | (prevailing, 24<br><b>Time of Do</b>      | wnload:               | electrolyte replaced; (24                 | hr) *                |
| _   |                              |   |   | 4 = Batteries rep                       | laced; 5 = Other                          | (                     | )   |                      |
| ł   | 5 MONITOR C                  |   |   | = 765.                                  |   |                       |   |                      |
|     | DO Calibi                    | mp 70.8 (21.5)  |   |   |   |                       | 'SI; 3 = Other <u>100 % 1</u>             | 200                  |
|     |                              |   |   |   |   |                       | for Method 1 or 2                         |                      |
|     | Cal DC                       |   |   |   |   |                       | SI DO value for Method 2                  | !                    |
|     | pH Calibr                    | ation @ 7.00  |   | 4.01                                    | @ 10.00                                   |                       | cord OK for buffer(s) used)               |                      |
|     |                              | vity Calibration***<br>Calibration***                     |   |   |   |                       |   |                      |
|     | -                            | monitor was red   |   |   |   | · · · · · · · ·       | @ 20 NTU_OK                               |                      |
|     |                              | EDEPLOYMENT "   |   |   |   |                       | ailing, 24 hr) *                          |                      |
| Ŭ   | Time                         |   |   | H Meter                                 | UKEMEN 15                                 | (at monitor<br>MS5 Mo | •   |                      |
|     |                              | (prevailing, 24 hr) *                                     | ,                                       |   | т.  |                       |   |                      |
|     |                              | (p:01011119, 24 11)                                       | · • • • • • • • • • • • • • • • • • • • |   |   | emp                   |   |                      |
|     |                              |   | DO                                      | mg/i                                    | D   | 0                     | mg/l **                                   |                      |
|     |                              |   | pН                                      | su                                      | pł  | 1                     | su **                                     |                      |
| 7   | Air Temperat                 |   | Wind Condit                             | ions (Circle on                         | e): Calm                                  | ight Modera           | ate Gusty Strong                          | nii amaga            |

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

Cono Dam MR MS5 Data sheet from downloaded data at the corresponding time of portable meter measurements. March 2010<sup>\*\*</sup> May be done in Lab or Field just prior to deployment, experience to dictate location.

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

|         | LC | CAT           | ION:              | С               | P-8                                    | ,  |                               |                                     | Inves                                | tigator :_                                       | 5            | CALC   | hicle         |
|---------|----|---------------|-------------------|-----------------|--|--|-------------------------------|-------------------------------------|--------------------------------------|--|--------------|--|---------------|
|         | DA | TE            | os<br>m m         | 2 4<br>d d      | ( 0<br>y y                             | 2 = Perfor                                 | L<br>ate & deplo<br>mance che | ck (complete S                      | ections 1, 2, 3 8                    | 5, 6, & 7 below)<br>7)<br>complete Section       | 1=Cl<br>4=Lt | eather Code<br>ear 2=P. Cloudy<br>Rain 5= H. Rain<br>37) | 3=Overcast    |
|         | 1  | PRO           | JECT F            | LOW / F         | RELEASE C                              | ONDITIC                                    | ONS:                          |                                     |                                      |  |              |  |               |
|         |    |               |                   | nits Ope        |  | (0 to 8)                                   |                               |                                     |                                      | Evident: Y                                       |              | • •  |               |
| Muter # |    | YSI [<br>Time | 07.               | Iling, 24 t     |  | Calibrate<br>CAL To<br>Meter To<br>Meter a | emp<br>emp                    | 1 meter wit<br>24.0<br>23.8<br>24.0 | h the DO pi<br><b>°C</b><br>°C<br>°C | robe in air sa<br>CAL DC<br>Meter DC<br>Meter ad |              | aerated) wate<br>  | 11)<br>1) 0 K |
|         |    |               |                   | CALIBR          | ATION: Use                             |  |                               | -                                   | -                                    |  | •            |  |               |
|         |    | Time          |                   |                 |  |  |                               |                                     |                                      | 1 su   |              |  |               |
|         | 3  |               |                   | EVAL "C         | AL END PO                              |  |                               |                                     | CE CHECH                             |  |              | onitor locat   | ion);         |
|         | 1  |               | ime               | 1               |  | DO<br>F                                    | / pH M                        | eter                                |                                      | MS5 Mo   | onitor       | VSC  | 20            |
|         |    | 15            | S                 | (prevailing     | g, 24 hr) *                            | Temp                                       |                               | ſċ                                  | Terr                                 | ıp   | °C **        | YS_  | I BOX         |
|         |    |               |                   |                 |  | DO   | $\square$                     | mg/l                                | DO                                   |  | mg/l **      | terp   | - ZO,4        |
|         |    |               |                   |                 |  | рН [                                       |                               | su                                  | pH                                   |  | su **        | D., O, -   |               |
|         |    | Data          | Downlo            | oad Loca        | n out of sel<br>ation:<br>ce Performed | (  | 1                             |                                     |                                      | Download<br>sors cleaned; 3                      |              | Divte replaced;  | (24 hr) *     |
|         | 5  | MON           | ITOR C            | ALIBRA          | TION:                                  |  |                               |                                     |                                      | 1  | · · · · · ·  |  |               |
|         |    | D             | O Calibr          | ration***       |  | od Used:                                   | 3                             | 1 = Aerated V                       | later; 2 = Riv                       | er Water (bucke                                  | t) vs YSI; 3 | = Other LOC  | 100-90 SA-    |
|         |    |               | Cal Te            |                 | <u>1.9       (°C</u>                   | •  |                               |                                     |                                      | Sonde therm                                      |              |  |               |
|         |    |               | Cal DC            |                 | 834 (m                                 | <b>g/l)</b> >> d                           | O value                       | (from solubi                        | ity table) for                       | Method 1, or t                                   | he YSI DO    | value for Met  | hod 2         |
|         |    | -             |                   | ation           | ° @ /.00                               | <u>ok</u>                                  | @4.                           | 01                                  | @ 10                                 | 0.00   | (Record O    | K for buffer(s) u  | sed)          |
|         |    |               |                   |                 | bration***                             |  |                               |                                     |                                      | S/cm <u> </u>                                    |              | •  | h.            |
|         | _  |               | •                 | Calibrat        |  | @ 0 NT                                     |                               | _ `                                 | 10 NIU                               |  | -            | 20 NTU <u></u>   | K             |
| -       |    |               |                   |                 | or was rede                            |  |                               |                                     |                                      |  | prevailing   |  |               |
|         | 6  | MONI          |                   | EDEPLO          | YMENT "C                               |  |                               |                                     | SUREMEN                              | -  |              | •  |               |
|         |    |               | Time              | <b>-</b>        |  |  | O/pH                          | <b></b>                             |                                      |  | 5 Monito     |  |               |
|         |    | L             |                   | (preva          | iling, 24 hr) *                        | Tem  |                               | ∐°C                                 |                                      | Temp   |              | C **   |               |
|         |    |               |                   |                 |  | DO   |                               | mg/l                                |                                      | DO   | r            | ng/i **  |               |
| _       |    |               |                   |                 |  | рН   |                               | s                                   | L                                    | рН   |              | su **  |               |
|         |    |               | mperat<br>Samplin | ure<br>g Notes: |  | Wind Co                                    | onditio                       | <b>ns</b> (Circle o                 | ne): Calr                            | r Light Mo                                       | oderate (    | Gusty Stro   | ng            |
|         |    |               |                   |                 |  |  |                               |                                     |                                      |  |              |  |               |

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

Cono Dam MR MS5 Data Sheet March 2010<sup>\*\*</sup> May be done in Lab or Field just prior to deployment, experience to dictate location.

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

|      | Ē | OCATION: Lo           | WER RIVE                              | 5R   | Investigator :   | KJT                    |
|------|---|-----------------------|---------------------------------------|--|--|------------------------|
|      | D | ATE 052<br>mmd        | 410<br>dyy                            | PURPOSE       2         1 = Calibrate & deploy monitor (complete         2 = Performance check (complete Section         3 = Retrieve for data download & main | e Sec 1, 2, 5, 6, & 7 below) 1=<br>ons 1, 2, 3 & 7) 4= | /eather Code           |
|      | 1 | PROJECT FLOW          | N / RELEASE                           | CONDITIONS:  |  |                        |
|      |   | No. of MR Units       |                                       | (0 to 8) Flow from He  | oltwood Evident: YES or I                              |                        |
|      | 2 |                       |                                       | N: Calibrate the YSI meter with t  |  |                        |
| 2    |   | Time 0800             | 2                                     | CAL Temp 24.0  | °C CAL DO  | 8.4 (mg/l)             |
| 1098 | 4 | (prevailing,          | 24 hr) *                              | Meter Temp 23.2  | °C 🔏 Meter DO  | 8 6 (mg/l)             |
|      |   |                       |                                       |  |  | <u> 8. └(</u> (mg/l)   |
|      |   | pH METER CAL          |                                       | e a one or two buffer system (   | -  |                        |
|      | _ |                       | Mete                                  | er reading @ 7.00 su   | @ 4.01 su or @   | ) 10.00 su             |
|      | 3 | PRE-RETRIEVA          | L "CAL END P                          | OINT" OR PERFORMANCE   | CHECK VALUES (at DO                                    | nonitor location):     |
|      |   | Time                  |                                       | DO / pH Meter  | MS5 Monitor  |                        |
|      |   | (pre                  | vailing, 24 hr) *                     | Temp   | Temp °C **   |                        |
|      |   | G                     |                                       |  | DO mg/l  | **                     |
|      |   |                       |                                       | DO   | DO   |                        |
|      |   |                       |                                       | pH su  | pH su **   |                        |
|      | 4 | MONITOR RETR          | IEVAL FOR D                           | ATA DOWNLOAD & MAINTI  | ENANCE:  |                        |
|      |   | Time retrieved (      | taken out of so                       | ervice) (p   | revailing, 24 hr) *                                    |                        |
|      |   | Data Download         | Location: _                           | (Lab or Onsite)  | Time of Download:                                      | (24 hr) *              |
|      |   | Applicable Mainte     | nance Performe                        |  | 2 = Sensors cleaned; $3 =$ pH elec                     | trolyte replaced;      |
| I    | 5 | MONITOR CALIE         | PATION.                               | 4 = Batteries repla  |  | )                      |
|      | 0 | DO Calibratio         |                                       |  |  |                        |
|      |   |                       | F                                     |  | er; 2 = River Water (bucket) vs YSI;                   |                        |
|      |   | Cal Temp              | · · · · · · · · · · · · · · · · · · · |  | er; YSI; or Sonde thermistor for N                     |                        |
|      |   | Cal DO                | 8,35(n                                | ng/i) >> DO value (from solubility   | table) for Method 1, or the YSI D                      | O value for Method 2   |
|      |   | pH Calibratio         | n *** @ 7.00                          | <u>V⊴k</u> @4.01   | @ 10.00 <u>/0</u> (Record                              | OK for buffer(s) used) |
|      |   | Conductivity          | Calibration***                        | @.74µS/cm <u>√ ≥</u> ⊨ (   | @ 718μS/cm <u>○k √</u> @                               | 1413µS/cm              |
|      |   | <b>Turbidity Cali</b> | bration***                            | @ 0 NTU <u>0(L /</u> @ 1   | 0 NTU @  | 20 NTU <u>ok</u>       |
|      |   | Time that the mo      | nitor was red                         | eployed in the Tailrace  | (prevailir   | ıg, 24 hr) *           |
|      | 6 | MONITOR REDE          | PLOYMENT "(                           | CAL BEGIN POINT" MEASU   | <b>REMENTS (at monitor lo</b>                          | cation):               |
|      |   | Time                  |                                       | DO / pH Meter  | MS5 Monit  | or                     |
|      |   |                       | prevailing, 24 hr) *                  | Temp   | Temp   | °C **                  |
|      |   |                       |                                       |  | DO   | mg/l **                |
|      |   |                       |                                       |  |  |                        |
|      |   |                       |                                       |  |  |                        |
| -    |   | Air Temperature       |                                       | pH su  | рН   | su **                  |

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

\*\* Cono Dam MR MS5 Data sheet later from downloaded data at the corresponding time of portable meter measurements. March 2010<sup>®</sup> May be done in Lab or Field just prior to deployment, experience to dictate location.

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

|     | LOCATION: COND PG  | Investigator : <u>CXB/SWA</u>  |
|-----|--|--|
|     |  | PURPOSE       2       Weather Code       2         1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast  |
|     | N III II II II I I I   | I = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=Lt.Rain 5= H. Rain 6=Fog/Haze   |
|     |  | 3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)  |
|     | 1 PROJECT FLOW / RELEASE   | CONDITIONS:  |
|     | No. of MR Units Operating  | (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)  |
|     |  | N: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.<br>CAL Temp 26 c CAL DO 8, ( (mg/l)   |
| der | 10983 (prevailing, 24 hr) *  |  |
|     | ((   |  |
|     | DH METER CALIBRATION: 11   | Meter adj. to $\underline{\ } \underline{\ } $ |
|     |  | ter reading @ 7.00 su @ 4.01 su or @ 10.00 su  |
| 1   |  |  |
|     | Time   | POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):<br>DO / pH Meter MS5 Monitor  |
|     |  | DO / pH Meter MS5 Monitor  |
|     | (prevailing, 24 hr) *  | Temp°C   |
|     |  | DO mg/l DO mg/l **   |
|     |  |  |
|     |  | pH su pH su **   |
|     |  | DATA DOWNLOAD & MAINTENANCE:   |
|     | Time retrieved (taken out of s Data Download Location: _   | ervice)       (prevailing, 24 hr) *         (Lab or Onsite)       Time of Download:       (24 hr) *  |
| _   | -  | (Lab or Onsite) Time of Download: (24 hr) *  |
| -   | Data Download Location:  | (Lab or Onsite) Time of Download: (24 hr) *<br>ed: 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;  |
| -   | Data Download Location:<br>Applicable Maintenance Perform 5 MONITOR CALIBRATION:   | (Lab or Onsite) Time of Download: (24 hr) *<br>ted: 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other ()<br>BP = -744,9  |
|     | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75 %   | (Lab or Onsite) Time of Download: (24 hr) *<br>red: 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other ()<br>BP = 744,9<br>hod Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other Ubo 160% Sf<br>°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   |
|     | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75 %   | (Lab or Onsite) Time of Download: (24 hr) *<br>red: 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other ()<br>BP = 744,9<br>hod Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other Ubo 160% Sf<br>°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   |
|     | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75         Cal DO         8 2 (n)  | (Lab or Onsite) Time of Download: (24 hr) *<br>red: 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other ()<br>BP = 744,9<br>hod Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other Ubo 160% Sf<br>°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2<br>mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2   |
| -   | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75         8         2   | (Lab or Onsite) Time of Download: (24 hr) *<br>Hed:1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other ()<br>BP = 744,9<br>hod Used: $\boxed{3}$ 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other $\underline{LDo} + 60\%$ Sf<br>$^{\circ}C$ ) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2<br>mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2<br>O - CK = @ 4.01 / @ 10.00 - CK (Record OK for buffer(s) used)   |
| -   | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75         Cal DO         8 2 (not ph Calibration ***         @ 7.00   | (Lab or Onsite) Time of Download: (24 hr) *<br>ted:1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other ()<br>BP = 744,9<br>hod Used: $\Box$ 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other $LDo 100\%$ Sf<br>°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2<br>mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2<br>O - OK @ 4.01 @ 10.00 OK (Record OK for buffer(s) used)   |
|     | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75         Cal DO         8 2 (r         pH Calibration ***         @ 7.00         Conductivity Calibration***   | (Lab or Onsite) Time of Download: (24 hr) *<br>red: 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other ()<br>BP = 744,9<br>hod Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other $\angle Do + 60\%$ Sf<br>°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2<br>mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2<br>O - OK = 0.01 - 0K = 0.00 - OK (Record OK for buffer(s) used)<br>* @ 074µS/cm $/ 0K = 0.18\mu$ S/cm $/ 0K = 0.18\mu$ S/cm $/ 0K = 0.01413\mu$ S/cm $/ 0K = 0.01413\mu$   |
| -   | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75-9;         (1)         Cal DO         9 2 (n         pH Calibration ***         Turbidity Calibration***         Time that the monitor was red                    | (Lab or Onsite) Time of Download: (24 hr) *<br>ted:1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other ()<br>BP = 744,9<br>hod Used: $\bigcirc$ 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other $\underline{Ubo} + 60\%$ Sf<br>°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2<br>mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2<br>O = OK = 0.01 = 0.00 = OK (Record OK for buffer(s) used)<br>O = OK = 0.01 = 0.00 = 0.01 (Record OK for buffer(s) used)<br>O = OK = 0.01 = 0.00 = 0.01 (Record OK for buffer(s) used)<br>O = 0.014 = 0.01 = 0.01 = 0.01 (Record OK for buffer(s) used)<br>O = 0.014 = 0.01 = 0.01 (Record OK for buffer(s) used)<br>O = 0.014 = 0.01 = 0.01 = 0.014 (Record OK for buffer(s) used)<br>O = 0.014 = 0.01 = 0.014 = 0.014 = 0.014 = 0.014  |
| -   | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75-9;         (1)         Cal DO         9 2 (n         pH Calibration ***         Turbidity Calibration***         Time that the monitor was red                    | (Lab or Onsite) Time of Download: (24 hr) *<br>red:1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other ()<br>BP = 744,9<br>hod Used: $\boxed{2}$ 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other $\underline{Ubo} + 60\%$ SF<br>$^{\circ}C$ ) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2<br>mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2<br>O = OK = 0.01 = 0.00 $OK$ (Record OK for buffer(s) used)<br>$^{\circ}CO = 0.074\mu$ S/cm $\underline{VOK} = 0.18\mu$ S/cm $\underline{OV} = 0.01413\mu$ S/cm $\underline{VOK} = 0.01413\mu$ C/ $\underline{OV} = 0.01413\mu$<br>$C = 0.014\mu$ $C = 0.01412\mu$ $C = 0.01412\mu$<br>$C = 0.014\mu$ $C = 0.014\mu$ $C = 0.01412\mu$ $C = 0.01412\mu$<br>$C = 0.014\mu$ $C = 0.014\mu$ $C$  |
| -   | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75%         (1)         Cal DO         9         PH Calibration ***         Turbidity Calibration***         Time that the monitor was red         6                 | (Lab or Onsite) Time of Download: (24 hr) *<br>red:1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other ()<br>BP = 744.9<br>hod Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other $Ubo 160\%$ SF<br>°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2<br>mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2<br>$O = OK = 0.074\mu$ S/cm $10K = 0.100 = OK$ (Record OK for buffer(s) used)<br>$O = OK = 0.074\mu$ S/cm $10K = 0.18\mu$ S/cm $0K = 0.1413\mu$ S/cm<br>$@ 0 NTU = 0K = 0.18\mu$ S/cm $0K = 0.1413\mu$ S/cm<br>$@ 0 NTU = 0K = 0.18\mu$ S/cm $0K = 0.1413\mu$ S/cm<br>$@ 0 NTU = 0K = 0.18\mu$ S/cm $0K = 0.1413\mu$ S/cm<br>$@ 0 NTU = 0K = 0.18\mu$ S/cm $0K = 0.1413\mu$ S/cm<br>$@ 0 NTU = 0K = 0.18\mu$ S/cm $0K = 0.1413\mu$ S/cm<br>$@ 0 NTU = 0.1413\mu$ $0K = 0.1413\mu$ S/cm<br>$@ 0 NTU = 0.1413\mu$ $0K = 0.1413\mu$ S/cm<br>$0 = 0.074\mu$ S/cm $10 NTU = 0.1413\mu$ S/cm<br>$0 = 0.074\mu$ S/cm $10 = 0.014\mu$ $0.00 = 0.014\mu$ $0.014\mu$ $0.014$   |
| -   | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75         Cal DO         8 2 (r         pH Calibration ***         Turbidity Calibration***         Time that the monitor was red         6 MONITOR REDEPLOYMENT ** | (Lab or Onsite)       Time of Download:       (24 hr)*         red:       1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;       4 = Batteries replaced; 5 = Other ( $BP = 744,9$ $BP = 744,9$ hod Used:       3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other $\underline{LDo} + 60\%$ SF         °C)       >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2         mg/l)       >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2         0 $M$ 0 10.00 $OK$ (Record OK for buffer(s) used)         * $0.74\mu$ S/cm $0.K$ $0.718\mu$ S/cm $0.K$ $0.13\mu$ S/cm         @ 0 NTU $0.K$ $0.10$ NTU $0.20$ NTU $0.100$ Heployed in the Tailrace       (prevailing, 24 hr) *         CAL BEGIN POINT" MEASUREMENTS (at monitor location):       MS5 Monitor  |
| -   | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75         Cal DO         8 2 (r         pH Calibration ***         Turbidity Calibration***         Time that the monitor was red         6 MONITOR REDEPLOYMENT ** | (Lab or Onsite)       Time of Download:       (24 hr)*         i = None required;       2 = Sensors cleaned;       3 = pH electrolyte replaced;         4 = Batteries replaced;       5 = Other () $BP = -744,9$ hod Used:       I = Aerated Water;       2 = River Water (bucket) vs YSI;       3 = Other LDo 160% SF         °C)       >> °C from hand thermometer;       YSI; or Sonde thermistor for Method 1 or 2         mg/l)       >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2         0 $\Delta K$ @ 4.01       @ 10.00 $\Delta K$ (Record OK for buffer(s) used)         * @ 074µS/cm $V \circ K$ @ 718µS/cm $O K$ @ 1413µS/cm         @ 0 NTU $O K$ @ 10 NTU       @ 20 NTU $O M K$ leployed in the Tailrace       (prevailing, 24 hr) *         CAL BEGIN POINT" MEASUREMENTS (at monitor location):       DO / pH Meter       MS5 Monitor         Temp       °C       Temp       °C **   |
| _   | Data Download Location:         Applicable Maintenance Perform         5 MONITOR CALIBRATION:         DO Calibration***         Method         Cal Temp 75         Cal DO         8 2 (r         pH Calibration ***         Turbidity Calibration***         Time that the monitor was red         6 MONITOR REDEPLOYMENT ** | (Lab or Onsite)       Time of Download:       (24 hr)*         red:       1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;       4 = Batteries replaced; 5 = Other (   |

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

Cono Dam MR MS5 Data Sheet March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

| DATE  | -     | LOCAT                    | 'ION:           | LOVER               | RIVER                    |   | Investigat          | or :                   | CAKJT  |           |
|---|-------|--------------------------|-----------------|---------------------|--------------------------|---|---------------------|------------------------|--|-----------|
| 2 = heteres becks (compare Section 1, 2, 3, 7)  |       | DATE                     | 060             | 112                 | PURPOSE                  | Z                                       |                     |                        | /<br>Weather Code  | 15        |
| 3 - Retrieve for data download & maintannone (complete Sections 1, 2, 3, 4, 6, 7)         1 PROJECT FLOW / RELEASE CONDITIONS:         No. of MR Units Operating [ (0 to 9)         Colspan="2">Colspan="2"Colspan="2"Colspan="2">Colspan="2"C  |       |                          | m m d           | dyy                 |                          |   |                     | below)                 | 1=Clear 2=P. Cloudy 3  | =Overcast |
| 1 PROJECT FLOW / RELEASE CONDITIONS:         No. of MR Units Operating       (a to a)       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 (careted) water.       (mg/l)         Imme       26.0       *C       CAL DO       2.1       (mg/l)         Meter adj. to       26.0       *C       Meter adj. to       2.1       (mg/l)         PH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)       Time       Meter rading @ 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       D0   pH Meter       MS5 Monitor         1 (prevailing. 24 hr)*       Temp       *C **       D0   mg/l       D0   mg/l **       pH       su **         4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:       Time retrieved (taken out of service)       (Lab or Onsite)       Time of Download:       (24 hr)*         Data Download Location:       (Lab or Onsite)       Time of Download:       (24 hr)*       2 holtendow value (rem solubility table) for Method 1 or 2       Cal Temp       70.4       (C * **       0       (24 hr)*         Data Download Location:       1 = hore required; 2 = fore: Water (budet) va Vs; 3 = Other Loo V/v       Cal Temp       70.4       90   |       |                          |                 |                     |                          |   | ••• •               | Sections 1 2           |  | =Fog/Haze |
| No. of MR Units Operating       [0 + 0 + 0]       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.<br>Time  | •     | 1 PRO                    | JECT FLO        | W / RELEASE         |                          |   |                     |                        | 0,4 0,7  |           |
| 2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.<br>Time   |       |                          |                 | 1                   |                          | Flow from Ho                            | oltwood Evide       | nt: YES c              | or NO (circle one)   |           |
| Time       String       CAL Temp       26.0       C       CAL DO       C       Meter 700       C       C       Meter 700       C       Meter 700       Meter 700<   | •     | 2 YSI C                  | <b>DO METER</b> | CALIBRATIO          | N: Calibrate the         |   |                     |                        |  | r.        |
| Meter adj to       Beter adj to       C       Meter adj to       C       (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 DD monitor location):       Time       DO / pH Meter       MS5 Monitor         image: the probability of  | . 1.0 | Time                     | 08/1            |                     |                          |   |                     |                        |  |           |
| 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       D0 / pH Meter       MS5 Monitor         Image: the subscript of  | 107   | 84                       | (prevailing     | , 24 hr) *          | Meter Temp               | 26.0                                    | °C Me               | ter DO                 | <u>∽</u> (mg/l   | )OK       |
| Time       Meter reading @ 7.00 su       @ 4.01 su       or @ 10.00 su         3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at D0 monitor location):       Time       D0 / pH Meter       MS5 Monitor         Image: State of the sta   |       |                          |                 |                     |                          |   |                     | · · · · · ·            | <u>8.1</u> (mg/l   | )         |
| 3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at D0 monitor location):         Time       D0 / pH Meter         MS5 Monitor         (prevailing, 24 h)*       Temp         PH       D0         mg/l       Su         PH       Su   |       | pH M                     | IETER CAL       |                     |                          |   |                     |                        |  |           |
| Time       DO / pH Meter       MS5 Monitor         Image: Constraint of the second secon | _     | Time                     |                 | Me                  | ter reading @ 7          | .00 su                                  | @ 4.01 su _         | or                     | @ 10.00 su   |           |
| Time       DO / pH Meter       MS5 Monitor         Image: Construction of the service of the ser | -     | 3 PRE-                   | RETRIEVA        | L "CAL END          | POINT" OR PE             | RFORMANCE                               | CHECK VAL           | UES (at D              | O monitor locati   | on):      |
| DO       mg/l       DO       mg/l **         pH       mg/l       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       (24 hr) *         Applicable Maintenance Performed:       1 = Acrated Water;       2 = River Water (bucket) vs YSI;       3 = Other  |       |                          |                 |                     |                          |   |                     |                        |  | •         |
| pH       gl       gl <t< td=""><td></td><td></td><td>(pre</td><td>ovailing, 24 hr) *</td><td>Temp</td><td>⊡°C</td><td>Temp</td><td>°C</td><td>**</td><td></td></t<>  |       |                          | (pre            | ovailing, 24 hr) *  | Temp                     | ⊡°C                                     | Temp                | °C                     | **   |           |
| 4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:         Time retrieved (taken out of service)  |       |                          |                 |                     | ро                       | mg/i                                    | DO                  | mg                     | ı/l **   |           |
| Time retrieved (taken out of service)       (Lab or Onsite)       Time of Download:       (24 hr)*         Applicable Maintenance Performed:       1 = None required;       2 = Sensors cleaned;       3 = pH electrolyte replaced;         5       MONITOR CALIBRATION:       Br = 744.9         DO Calibration***       Method Used:       1 = Acreted Water;       2 = River Water (bucket) vs YSI;       3 = Other       1 = 000 %.         Cal Temp       76.4       (°C)       > °C from hand thermometer;       YSI; or Sonde thermistor for Method 1 or 2         Cal DO       71.4       (°C)       > °C from solubility table) for Method 1, or the YSI DO value for Method 2         pH Calibration***       @ 7.00       01       @ 10.00       01       (Record OK for buffer(s) used)         Conductivity Calibration***       @ NTU       01       @ 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       MS5 Monitor         PH   |       |                          |                 |                     | рН                       | su                                      | рН                  | su                     | **   |           |
| Time retrieved (taken out of service)       (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       (24 hr)*         5 MONITOR CALIBRATION:       Br = 744.9         DO Calibration***       Method Used:       1 = Aerated Water;       2 = River Water (bucket) vs VSI;       3 = Other       (26 LPD %)         Cal Temp       76.6       (°C)       > °C from hand thermometer;       VSI; or Sonde thermistor for Method 1 or 2         Cal DO       71.4       (%C)       > °C from solubility table) for Method 1, or the YSI DO value for Method 2         pH Calibration ***       @ 7.00       0/C       @ 4.01       @ 10.00       0/C (Record OK for buffer(s) used)         Conductivity Calibration***       @ 7.00       0/C       @ 4.01       @ 10.00       0/C (Record OK for buffer(s) used)         Conductivity Calibration***       @ 7.00       0/C       @ 4.01       @ 10.00       0/C (Record OK for buffer(s) used)         Conductivity Calibration***       @ 7.00       0/C       @ 4.01       @ 10.00       0/C (Record OK for buffer(s) used)       0/C (revalling, 24 hr)*         Time that the monitor was redeployed in the Tailrace       (prevalling, 24 hr)*   |       | 4 MON                    | ITOR RET        | RIEVAL FOR I        | DATA DOWNLO              | AD & MAINTE                             | ENANCE:             | Alexandra and a second |  |           |
| 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       (24 hr)*         5       MONITOR CALIBRATION:       Br = 744.9       DO Calibration***       Method Used:       1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other       100 100 100 100 100 100 100 100 100 100   |       |                          |                 |                     |                          | 1 - T - T - T - T - T - T - T - T - T - |                     | *                      |  |           |
| Applicable Maintenance Performed:       1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other   |       |                          |                 | •                   | · · · · ·                |   |                     | _                      |  | (24 hr) * |
| 5 MONITOR CALIBRATION:       BP = 744.9         DO Calibration***       Method Used:       1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other  |       | Applic                   | cable Mainte    | -<br>enance Perform | ned:                     |   |                     | ined; 3 = pH           | land and the second | . ,       |
| DO Calibration***       Method Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other %         Cal Temp       76.4       (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2         Cal DO       74.4.4       (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2         pH Calibration ***       @ 7.00       014       @ 401       @ 10.00       014       (Record OK for buffer(s) used)         Conductivity Calibration***       @ 700       014       @ 10 NTU       @ 20 NTU         Turbidity Calibration***       @ NTU       014       @ 10 NTU       @ 20 NTU         Time that the monitor was redeployed in the Tailrace       (prevailing, 24 hr)*       Monitor         Time       DO / pH Meter       MS5 Monitor         Time       DO / pH Meter       MS5 Monitor         Mg/l       DO       mg/l **         pH       su       pH       su **  | -     |                          |                 |                     |                          |   | ced; 5 = Other (    |                        |  | )         |
| Cal Temp       76.4       (°C)       >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2         Cal DO       74.4       (mg/l)       >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2         pH Calibration ***       @ 7.00       014       @ 4.01       @ 10.00       014       (Record OK for buffer(s) used)         Conductivity Calibration***       @ 74,µS/cm       014       @ 10.00       014       (Record OK for buffer(s) used)         Conductivity Calibration***       @ 718µS/cm       014       @ 10.NTU       @ 20 NTU         Turbidity Calibration***       @ 9 NTU       014       @ 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         Image: (prevailing, 24 hr)*       Temp       °C       Temp       °C **         DO       mg/l       DO       mg/l       No       gu **         7 Air Temperature       ?C       Wind Conditions (Circle one):       Calim Light Moderate Gusty Strong   |       |                          |                 |                     |                          |   |                     |                        |  |           |
| Cal DO       74 4 4 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2         pH Calibration ***       07.00       01       0       10.00       01       (Record OK for buffer(s) used)         Conductivity Calibration***       07.00       01       0       01.00       01       (Record OK for buffer(s) used)         Conductivity Calibration***       07.00       01       01.00       01       (Record OK for buffer(s) used)         Turbidity Calibration***       07.00       01       01.00       01.00       01.00       01.00         Turbidity Calibration***       07.00       01       01.00       01.00       01.00       01.00       01.00         Turbidity Calibration***       07.00       01       01.00       01.00       01.00       01.00       01.00         Time that the monitor was redeployed in the Tailrace       01.00       00.00  |       | D                        | O Calibratio    |                     | thod Used: 🔁             | 1 = Aerated Wate                        | er; 2 = River Water | (bucket) vs Y          | SI; 3 = Other <u>L0</u>  | 100 %     |
| Cal DO       7 4 4 9 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2         pH Calibration ***       @ 7.00 / ol C       @ 4.01 / @ 10.00 / ol C (Record OK for buffer(s) used)         Conductivity Calibration***       @ 74.uS/cm / ol C       @ 718µS/cm / ol C       @ 1413µS/cm / ol C         Turbidity Calibration***       @ NTU / ol C       @ 10 NTU / ol C       @ 10 NTU / ol C       @ 1413µS/cm / ol C         Time that the monitor was redeployed in the Tailrace       (prevailing, 24 hr) *       @ 0 / pH Meter       (prevailing, 24 hr) *         6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):       Time       DO / pH Meter       MS5 Monitor         Time       DO / pH Meter       MS5 Monitor       0 / mg/l **       DO       mg/l **         Ø       Immediation ***       OC       Temp       °C **       0 / mg/l **         Immediation       Immediation ***       OC       Temp       °C **         Immediation       Immediation       Immediation ***       Temp       °C **         Immediation       Immediation       Immediation       Immediation ***       Immediation ***         6 MONITOR REDEPLOYMENT "CAL BEGIN POINT"       Immediation ***       Immediation ***       Immediation ***       Immediation ***         Immediation       I  |       |                          |                 | 16.                 | (°C) >> °C from          | hand thermometer                        | er; YSI; or Sonde   | thermistor fo          | or Method 1 or 2   |           |
| pH Calibration ***       @ 7.00       Ø 10       @ 10.00       Ø 1413µS/cm         Conductivity Calibration***       @ NTU       Ø 10 NTU       @ 20 NTU         Turbidity Calibration***       @ NTU       Ø 10 NTU       @ 20 NTU         Time that the monitor was redeployed in the Tailrace       (prevailing, 24 hr)*       @ 0/ pH Meter       MS5 Monitor         Time       DO / pH Meter       MS5 Monitor         Temp       °C       Temp       °C **         D0       mg/l       D0       mg/l **         pH       Su       pH       su **   |       | $\overline{\mathcal{A}}$ |                 | 7449                | ( <b>ma/l)</b> >> DO val | ie (from solubility)                    | table) for Method   | 1 or the VS            | I DO value for Meth  | od 2      |
| Conductivity Calibration***       O AuS/cm       O K       0       718μS/cm       O K       0       1413μS/cm   |       | - d                      |                 | on *** @ 7.0        | o le a                   | 4.01                                    | @ 10 00 ¥           | OIL (Rec               | ord OK for huffer(s) us  | ed)       |
| Turbidity Calibration****       @ 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         Time       DO / pH Meter       MS5 Monitor         Image: Control (prevailing, 24 hr) *       Temp °C       Temp °C **         DO       mg/l       DO       mg/l       Su       pH       su       pH       su **         7 Air Temperature       Of °C       Wind Conditions (Circle one):       Calm Light Moderate Gusty Strong   | 1     | •                        |                 | -                   |                          |   |                     |                        |  |           |
| 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         Image: Image  | ms /  |                          | -               |                     |                          |   |                     |                        |  |           |
| 6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):         Time       DO / pH Meter       MS5 Monitor         Image: Image                                       | Í     |                          | -               |                     | - <u></u>                |   |                     |                        |  |           |
| Time     DO / pH Meter     MS5 Monitor       (prevailing, 24 hr)*     Temp     °C     Temp       DO     mg/l     DO     mg/l **       DH     Su     PH     Su       7 Air Temperature     205 °C     Wind Conditions (Circle one):     Calm   |       |                          |                 |                     |                          |   | REMENTS (a          |                        |  |           |
| (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  |       |                          |                 |                     |                          |   |                     |                        | •  |           |
| pH     su     pH     su **       7 Air Temperature     205 °C     Wind Conditions (Circle one):     Calm Light Moderate Gusty Strong  |       |                          |                 | (prevailing, 24 hr) |                          |   | Ten                 |                        |  |           |
| 7 Air Temperature 205 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong   |       |                          |                 |                     | DO                       | mg/l                                    | DO                  |                        | mg/l **  |           |
|   |       |                          |                 |                     | рН                       | su                                      | рН                  |                        | su **  |           |
|   | 8     |                          | •               |                     |                          |   | ( ~                 | )                      | 1 N N  | ng        |
|   |       |                          |                 |                     |                          |   |                     |                        |  |           |

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

Cono Dam MR MS5 Data sheet from downloaded data at the corresponding time of portable meter measurements. March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

| LOCAT   | ION:      | CONO            | PONE      | >                 |   | Investi             | gator : <u></u> ऽ। | JAL.  |                     |
|---------|-----------|-----------------|-----------|-------------------|---|---------------------|--------------------|---|---------------------|
| DATE    | 06<br>m m | 08(<br>d d y    | y         | 2 = Performance o | ploy monitor (comp<br>heck (complete Se | ctions 1, 2, 3 & 7) |                    | Weather Code<br>1=Clear 2=P. Cloudy<br>4=Lt.Rain 5= H. Rain<br>2. 3. 4 & 7) | اسلیا<br>3=Overcast |
| 1 PRO   | JECT F    | LOW / RELI      |           |                   |   |                     |                    |   |                     |
| No. o   | f MR U    | nits Operatin   | g         | (0 to 8)          | Flow from                               | -loltwood E         | vident: YES        | or NO (circle one   | )                   |
| 2 YSI D | O MET     | ER CALIBR       | ATION:    | Calibrate the `   |   |                     |                    | ated (aerated) wa   |                     |
| Time    | 07        | 46              |           | CAL Temp          | 24.0                                    | °C                  | CAL DO             | <u>8.4</u> (m   |                     |
| der #   | (preva    | iling, 24 hr) * |           | Meter Temp        | <u>a4.</u>                              |                     | Meter DO           | <u>8.3</u> (mg  |                     |
|         |           | · · ·           |           | Meter adj. to     | 10                                      | _°C                 | Meter adj to       | <u>8.4</u> (mg  | J/I)                |
| Time    | CIER      | CALIBRATIC      |           |                   |   |                     |                    | u)<br>or @ 10.00 su _   |                     |
| 3 PRF-  | RETRI     |                 |           |                   |   |                     |                    | DO monitor loca   |                     |
|         | me        |                 |           | DO / pH           |   |                     | MS5 Monit          |   | uonj:               |
|         |           | (prevailing, 24 | hr) *     |                   | П∘с                                     | Temp                |                    | C **  |                     |
| L       | <u></u>   |                 |           |                   |   | •                   |                    | -   |                     |
|         |           |                 |           |                   |   | DO                  |                    | ng/l **   |                     |
|         |           |                 | F         | он 🛄              | su                                      | рН                  |                    | SU **   |                     |
| 4 MONI  | TOR R     | ETRIEVAL P      | OR DAT    | A DOWNLO          | AD & MAIN                               | TENANCE:            |                    |   |                     |
|         |           | ed (taken ou    |           | ice)              |   | prevailing, 2       | 4 hr) *            |   |                     |
|         |           | ad Locatio      |           | (Lab o            | or <b>Onsite</b> )                      | Time of D           |                    |   | (24 hr) *           |
| Applic  | able Ma   | intenance Po    | erformed: |                   | 1 = None require<br>4 = Batteries rep   |                     |                    | H electrolyte replaced;   | _)                  |
| 5 MONI  | TOR C     | ALIBRATIO       | N:        |                   | BP=                                     | 750.8               |                    |   |                     |
| DC      | ) Calib   | ration***       | Method    | Used: 3           | 1 = Aerated W                           | ater; 2 = River     | Water (bucket) vs  | YSI; 3 = Other  | 1280SA              |
|         | Cal Te    | mp 74 <u>.8</u> | (°C)      | >> °C from        | hand thermom                            | eter; YSI; or S     | onde thermistor    | for Method 1 or 2   | - •                 |
|         | Cal DO    |                 | 4 (mg     |                   |   |                     |                    | Si DO value for Me  | thad 2              |
| pН      | Calibr    | ation *** (     | @ 7.00    | K @               | 4.01                                    | @ 10.0              |                    | ecord OK for buffer(s)  | used)               |
| Co      | nducti    | vity Calibrat   | ion*** (  |                   |   |                     | cm_0k              | @ 1413µS/cm   | ۰<br>۱              |
|         |           | Calibration*    |           | 🔊 0 NTU <         |   |                     |                    |   |                     |
| Time t  | hat the   | e monitor wa    | as redepl | oyed in the       | Tailrace                                |                     | (pre               | vailing, 24 hr) *   |                     |
| 6 MONI  | FOR R     | DEPLOYM         | ENT "CA   | L BEGIN PC        | INT" MEAS                               | UREMENT             | S (at monito       | or location):   |                     |
|         | Time      |                 |           |                   | H Meter                                 |                     | MS5 M              |   |                     |
|         |           | (prevailing,    | 24 hr) *  | Temp              | ℃                                       |                     | Temp               | °C **   |                     |
|         |           |                 |           | do 🗌              | mg/l                                    |                     | DO                 | mg/l **   |                     |
|         |           |                 |           | рН                | su                                      |                     | <br>рН             | su **   |                     |
|         |           |                 |           |                   |   |                     |                    |   |                     |

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

Cono Dam MR MS5 Data Sheet March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

| LOCATION: LOWEN 12.                | Investigators Tes I can   |
|------------------------------------|---|
|                                    |   |
|                                    | PURPOSE 235 Weather Code  |
| -                                  | = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=Lt Rain 5= H Rain 6=Eno/Haze |
|                                    | a Performance check (complete Sections 1, 2, 3 & /)       4=L1.Rain 5= H. Rain 6=Fog/Haze         b = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)                         |
| 1 PROJECT FLOW / RELEASE CO        | NDITIONS:   |
|                                    | (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)   |
| 2 YSI DO METER CALIBRATION: C      | CAL Temp 23.5 °C CAL DO 844 (mg/l)  |
|                                    |   |
| he klasse                          | Meter Temp     23.5     °C     Meter DO     8.5     (mg/l)       Meter adj. to     OK     °C     Meter adj to     8.4     (mg/l)  |
| E                                  | Meter adj. to $\bigcirc$ (mg/l) $\bigcirc$ One or two buffer system (7.00 and 4.01 or 10.00 su)   |
|                                    | eading @ 7.00 su @ 4.01 su or @ 10.00 su  |
| 3 PRE-RETRIEVAL CAL END POIN       | NT" OR PERFORMANCE CHECK VALUES (at DO monitor location):   |
| Time                               | DO / pH Meter MS5 Monitor   |
| (prevailing, 24 hr) * T            | Temp 9,0°C Temp 8.9 °C **   |
| Ľ                                  | DO 27.0 mg/l DO 26.9 mg/l **  |
| p                                  | 0H Su pH 7. ( su **   |
| 4 MONITOR RETRIEVAL FOR DATA       |   |
| Time retrieved (taken out of servi |   |
| 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=750.82   |
| DO Calibration*** Method           | Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other <u>Ub ( bb % 5</u> AT   |
| Cal Temp $2S$ (°C)                 | >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   |
| Cal DO (mg/                        | I) >> 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*** @      | 2 74μS/cm @ 718μS/cm @ 1413μS/cm  |
| Turbidity Calibration***           | 0 NTU @ 10 NTU @ 20 NTU   |
| Time that the monitor was redeple  | oyed in the Tailrace (prevailing, 24 hr) *  |
| 6 MONITOR REDEPLOYMENT "CAI        | BEGIN POINT" MEASUREMENTS (at monitor location):  |
| Time                               | DO / pH Meter MS5 Monitor   |
| (prevailing, 24 hr) *              | Temp °C **  |
|                                    | DOmg/l DOmg/l **  |
|                                    | pH su pH su **  |
|                                    | ind Conditions (Circle one): Calm Light Moderate Gusty Strong   |
| Other Sampling Notes:              | Still beging after sund off   |
|                                    |   |

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

Cono Dam MR MS5 Data sheet March 2010<sup>\*\*</sup> May be done in Lab or Field just prior to deployment, experience to dictate location.

to dictate location. Normandeau Associates, Inc

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

| LOCATION: CONO P   | QNO   | Investigator : <u>Sk</u>  | IA/KJT  |
|--|---|---|---|
| DATE 61510<br>mmddyy   | PURPOSE       2         1 = Calibrate & deploy monitor (complete Se         2 = Performance check (complete Se         3 = Retrieve for data download & m | ctions 1, 2, 3 & 7)   | Weather Code 2/3/4<br>1=Clear 2=P. Cloudy 3=Overcast<br>4=LL.Rain 5= H. Rain 6=Fog/Haze<br>2, 3, 4 & 7) |
| 1 PROJECT FLOW / RELEA   | ASE CONDITIONS:   |   |   |
| No. of MR Units Operating  |   | Holtwood Evident: YES   |   |
| Time <u>0745</u><br>(prevailing, 24 hr) *  | Meter adj. toK  | °C     CAL DO       °C     Meter DO       °C     Meter adj to   | <u></u>   |
| Time   | N: Use a one or two buffer system<br>Meter reading @ 7.00 su  |   | •   |
|  | ND POINT" OR PERFORMANC   | E CHECK VALUES (at  | DO monitor location):   |
|  | DO / pH Meter   | MS5 Monite  |   |
| (prevailing, 24 h  | ")* Temp°C  | Temp°(  | C **  |
|  | DOmg/l  | DOm   | ng/l **   |
|  | pH su   |   | u **  |
| Time retrieved (taken out<br>Data Download Location:<br>Applicable Maintenance Per | (Lab or Onsite)<br>formed: 1 = None require   | (prevailing, 24 hr) *<br><b>Time of Download:</b><br>ed; 2 = Sensors cleaned; 3 = pl<br>placed; 5 = Other ( | d electrolyte replaced;   |
| 5 MONITOR CALIBRATION  | 0750 hr BP=   | 748.6   |   |
| DO Calibration***  | Method Used: 3 1 = Aerated W  | ater; 2 = River Water (bucket) vs   | YSI; 3 = Other <u>LO 0 160</u> %5 A   |
| Cal Temp 76.1  | (°C) >> °C from hand thermom  | eter; YSI; or Sonde thermistor  | for Method 1 or 2   |
| Cal DO 8,1   | 니(mg/l) >> DO value (from solubili  | ty table) for Method 1, or the Y  | SI DO value for Method 2  |
| pH Calibration *** @   | 7.00 0 6 @ 4.01   | @ 10.00 <u>OK</u> (Re   | cord OK for buffer(s) used)   |
|  | on*** @-24µS/cmOK   |   |   |
| Turbidity Calibration**  |   | 10 NTU  | @ 20 NTU OIC  |
| Time that the monitor was  | redeployed in the Tailrace  | (prev   | /ailing, 24 hr) *   |
|  | NT "CAL BEGIN POINT" MEAS   | UREMENTS (at monito   | r location):  |
| Time   | DO / pH Meter   | MS5 M   | onitor  |
| (prevailing, 24  | thr) * Temp °C  | Temp  | °C **   |
|  | DO mg/l   | DO  | mg/i **   |
|  | pH  | рН  | su **   |
| 7 Air Temperature <u> </u>   | C Wind Conditions (Circle or  | ne): Calm Light Moder   |   |
|  |   |   |   |

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

Cono Dam MR MS5 Data sheet March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

| ENCLOSURE 1<br>CONOWINGO & MUDDY RUN STATIONS<br>MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET   |
|--|
| LOCATION: $LR 6/15/10$ Investigator: $JCA/CAB$   |
| DATE       DATE       DATE       DURPOSE       Weather Code         mmddy       mmddy       1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=Lt.Rain 5= H. Rain 6=Fog/Haze         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)   |
| 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)*       CAL Temp         Meter Temp       25.5         °C       CAL DO         8.15       (mg/l)         8.3       (mg/l)         Meter adj. to       0/6         °C       Meter adj to         8.15       (mg/l)         9.15       (mg/l) |
| Time Meter reading @ 7.00 su @ 4.01 su or @ 10.00 su   |
| 3 PRE-RETRIEVAL "OAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):         Time       DO / pH Meter       MS5 Monitor         1 3 4 0 (prevailing, 24 hr)*       Temp 26.7 °C **       DO       8.1 mg/l **         DO       8.5 mg/l       DO       8.1 mg/l **       END  |
| 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:       BF = 748 6         DO Calibration***       Method Used: ③ 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other for   |
| 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         su **  |
| 7 Air Temperature 765 °C/233 F Wind Conditions (Circle one): Calm Light Moderate Gusty Strong<br>Other Sampling Notes: 7233 F Light Zair   |

Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
 Cono Dam MR MS2 Data Sheet
 March 2010
 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

| LOCATION: COND PON                           | 0 Investigator :_ SWP/KJT   |
|--|---|
| DATE 062210<br>mmddyy                        | Weather Code       Image: Colored state in the state in |
| 1 PROJECT FLOW / RELEASE C                   | ONDITIONS:  |
| No. of MR Units Operating                    | [(0 to 8) Flow from Holtwood Evident: YES or NO (circle one)  |
| 2 YSI DO METER CALIBRATION:<br>Time 0つくる     | Calibrate the YSI meter with the DO probe in air saturated (aerated) water.         CAL Temp       26.0       °C       CAL DO       8.1       (mg/l)  |
| (prevailing, 24 hr) *<br>muter & 60983       | Meter Temp     26.0     °C     Meter DO     8.0     (mg/l)       Meter adj. to     0K     °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)  |
|  | reading @ 7.00 su @ 4.01 su or @ 10.00 su   |
|  | DINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):   |
| Time   | DO / pH Meter MS5 Monitor   |
| (prevailing, 24 hr) *                        | Temp °C Temp °C **  |
|  | DOmg/l DOmg/l **  |
|  | pH su pH su **  |
| <b>4 MONITOR RETRIEVAL FOR DA</b>            | TA DOWNLOAD & MAINTENANCE:  |
| Time retrieved (taken out of se              | rvice) (prevailing, 24 hr) *  |
| Data Download Location:                      | (Lab or Onsite) Time of Download: (24 hr) *   |
| Applicable Maintenance Performed             | d: 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other ()   |
| 5 MONITOR CALIBRATION: 98                    | achi RP 751.75  |
| DO Calibration*** Metho                      | Dd Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 100 100 % SA   |
| °C (°C                                       |   |
| Cal DO 8.06 (m                               | g/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2   |
| pH Calibration *** @ 7.00                    |   |
| Conductivity Calibration***                  | @ 74µS/cm @ 718µS/cm @ 1413µS/cm  |
| Turbidity Calibration***                     | @ 0 NTU <u>0 K</u> @ 10 NTU @ 20 NTU <u>0 K</u>   |
| Time that the monitor was rede               | ployed in the Tailrace (prevailing, 24 hr) *  |
| 6 MONITOR REDEPLOYMENT "C                    | AL BEGIN POINT" MEASUREMENTS (at monitor location):   |
| Time   | DO / pH Meter MS5 Monitor   |
| (prevailing, 24 hr) *                        | Temp °C **  |
|  | DOmg/l DOmg/l **  |
|  | pH su pH su **  |
| 7 Air Temperature°C<br>Other Sampling Notes: | Wind Conditions (Circle one): Calm Light Moderate Gusty Strong  |
|  |   |

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

Cono Dam MR MS5 Data Street later from downloaded data at the corresponding time of portable meter measurements. March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

| ENCLOSURE 1  |
|--|
| CONOWINGO & MUDDY RUN STATIONS<br>MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET  |
|  |
| LOCATION: LOWER RIVER 62210 Investigator: JCA/CAN  |
| DATE 0 6 2 2 / 0 PURPOSE D Weather Code /  |
| m m d d y y 1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below) 1=Clear 2=P. Cloudy 3=Overcast   |
| 2 = Performance check (complete Sections 1, 2, 3 & 7)<br>3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)   |
| 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     O152     CAL Temp     Call Temp |
| (prevailing, 24 hr) * Meter Temp <u>25.8</u> °C K Meter DO <u>7.8</u> (mg/l) 0 K<br>Meter adj. to <u>26.0</u> °C Meter adj to <u>8.1</u> (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 **   |
|  |
| 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: $BP = 751, 75$  |
| DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LOG 100% SAT  |
| <b>Cal Temp</b> $27.0^{\circ}$ (°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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0  |
| Conductivity Calibration*** @ 74µS/cm OK @ 718µS/cm / 0L @ 1413µS/cm   |
| Turbidity Calibration***       @ 0 NTU       ✓ ८/८       @ 10 NTU       @ 20 NTU       ØL         0.3       0.3       0.3       0.3       0.3       0.3       0.3       0.3  |
| 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 78.2 °C **  |
| DOmg/l DOmg/l **   |
| pH su pH su **   |
| 7 Air Temperature°C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong   |
| Other Sampling Notes: Coldrated deep in A+ 00  |
|  |

\* 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. *March* 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

|        | LOCATION: CONOWINGO  | TOND Investigator: KJT. CMB  |
|--------|--|--|
|        |  |  |
|        |  | PURPOSE       CAL 16RATE + COLLETT       Weather Code         1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcas              |
|        |  | 2 = Performance check (complete Sections 1, 2, 3 & 7)       4=Lt.Rain 5= H. Rain 6=Fog/Hat         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) |
|        | 1 PROJECT FLOW / RELEASE CO                                    |  |
|        | No. of MR Units Operating                                      | (0 to 8) Flow from Holtwood Evident: YES of NO (circle one)  |
|        |  | Calibrate the YSI meter with the DO probe in air saturated (aerated) water.  |
| T 1 11 |  | CAL Temp <u>25.5</u> °C CAL DO <u>8.15</u> (mg/l)  |
| 9000   | FRAM   | Meter Temp <u>Z5-</u> °C Meter DO <u>8.15 (mg/l)</u>   |
| erz da | 11   | Meter adj. to 25.5 °C Meter adj to DIA (mg/l)  |
| 1      |  | a one or two buffer system (7.00 and 4.01 or 10.00 su)<br>reading @ 7.00 su @ 4.01 su or @ 10.00 su  |
|        |  | INT" OR PERFORMANCE CHECK VALUES (at DO monitor location):   |
|        | Time   | DO / pH Meter MS5 Monitor  |
|        | (prevailing, 24 hr) *  | Temp °C Temp °C **   |
|        |  |  |
|        | C .  | DOmg/l DOmg/l **   |
|        | ۲. F   | pH su pH su **   |
|        | 4 MONITOR RETRIEVAL FOR DAT                                    | A DOWNLOAD & MAINTENANCE:  |
|        | Time retrieved (taken out of serv                              | vice) (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:   | 40-74215   |
|        |  | d Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 100% 547   |
|        |  | >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2  |
|        |  | (/I) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2  |
|        | pH Calibration *** @ 7.00 _7                                   |  |
|        |  | @ 74µS/cm @ 718µS/cm @ 1413µS/cm   |
|        |  | @ 0 NTU <u>13 NTU</u> @ 10 NTU <u>NIA</u> @ 20 NTU <u>20 NT</u>  |
|        |  |  |
|        | Inne unal mic monitor was leven                                |  |
|        | Time that the monitor was redepl<br>6 MONITOR REDEPLOYMENT "CA | AL DEVINE FUILL INFRAUKEMENTS (21 MANIAP IAASIAA)  |
|        | 6 MONITOR REDEPLOYMENT "CA<br>Time                             | •  |
|        | 6 MONITOR REDEPLOYMENT "CA<br>Time                             | DO / pH Meter MS5 Monitor  |
|        | 6 MONITOR REDEPLOYMENT "CA                                     | DO / pH Meter         MS5 Monitor           Temp         0°C         Temp         °C **  |
|        | 6 MONITOR REDEPLOYMENT "CA<br>Time                             | DO / pH Meter MS5 Monitor  |

\* 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. March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

CONOWINGO & MUDDY RUN STATIONS MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET 013 LOCATION: JZN LP 6 Investigator : PURPOSE 2 DATE **Weather Code** m m d d 1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below) 1=Clear 2=P. Cloudy 3=Overcast 2 = Performance check (complete Sections 1, 2, 3 & 7) 4=Lt.Rain 5= H. Rain 6=Foo/Haze 3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) **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 CAL Temp 25,2 °C CAL DO 84 (mg/l) (prevailing, 24 hr) \* Meter Temp 7 ℃ Meter DO (mg/l)Meter adj. to °C Meter adi to (mg/l)pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su) Meter reading @ 7.00 su \_\_\_\_\_ @ 4.01 su \_\_\_\_\_ or @ 10.00 su Time 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 DO DO mg/l \*\* pН рΗ 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 (\_\_\_\_\_ B1=743,65 **5 MONITOR CALIBRATION:** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LOD (00 % SAT **DO Calibration\*\*\*** 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 @ 4.01 @ 10.00 (Record OK for buffer(s) used) pH Calibration \*\*\* @ 7.00 6 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): **DO / pH Meter** Time **MS5** Monitor (prevailing, 24 hr) \* Temp °C Temp °C \*\* DO mg/l DO ma/l \*\* рH 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

ENCLOSURE 1

Cono Dam MR MS5 Data sheet

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

| LOCATION: Conowing  | Investigator: JLA MAM   |
|---|---|
| DATE 070710<br>mmddyy                                       | PURPOSE       Weather Code         1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=LL.Rain 5= H. Rain 6=Fog/Haze         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) |
| 1 PROJECT FLOW / RELEASE CO                                 | ONDITIONS:  |
| No. of MR Units Operating                                   | (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)   |
| Time <u>1/05 An</u><br>(prevailing, 24 hr) *                | Calibrate the YSI meter with the DO probe in air saturated (aerated) water.CAL Temp $23.4$ °CCAL DO $8.56$ (mg/l)Meter Temp $23.6$ °CMeter DO $7.9$ (mg/l) $0 \not \leftarrow v$ Meter adj. to $23.4$ °CMeter adj to $8.56$ (mg/l)  |
|   | a one or two buffer system (7.00 and 4.01 or 10.00 su)  |
|   | reading @ 7.00 su @ 4.01 su or @ 10.00 su   |
| 3 PRE-RETRIEVAL "CAL END PO<br>Time                         | DINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):   |
|   | DO / pH Meter MS5 Monitor   |
| (prevailing, 24 hr) *                                       | Temp°C Temp°C **  |
|   | DO mg/l DO mg/l **  |
|   | pH su pH su **  |
| Data Download Location:<br>Applicable Maintenance Performed | (Lab or Onsite) Time of Download: (24 hr) *<br>1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batteries replaced; 5 = Other (  |
| 5 MONITOR CALIBRATION:                                      | BP _749.58  |
|   | d Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other L00 1 00 %5AT   |
| Cal Temp 7 <u>7.5%</u> (°C                                  |   |
| Cal DO 815 (mg  | g/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 redep                             | ployed in the Tailrace (prevailing, 24 hr) *  |
| MONITOR REDEPLOYMENT "CA                                    | AL BEGIN POINT" MEASUREMENTS (at monitor location):   |
| Time  | DO / pH Meter MS5 Monitor   |
| (prevailing, 24 hr) *                                       | Temp°C **   |
|   | DOmg/l DOmg/l **  |
|   | pH su pH su **  |
|   |   |

Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
 The corresponding time of portable meter measurements.
 March 2010
 May be done in Lab or Field just prior to deployment, experience to dictate location.

| <b>ENCL</b> | OSURE | 1 |
|-------------|-------|---|
|-------------|-------|---|

|     | CONOWINGO & MUDDY RUN STATIONS<br>MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET  |
|-----|--|
|     | LOCATION: LR - Below Cononimo Day Investigator: SWA/KJT  |
|     | DATE       Image: Market Additional and Additional Additiona Additiona Additional Additiona Additional Additiona Add |
|     | 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       //05         CAL Temp       29.0 °C       CAL DO         (prevailing, 24 hr)*       Meter Temp       29.5 °C       Meter DO   |
| m   | 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)         0  |
|     | 3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):<br>Time DO / pH Meter MS5 Monitor  |
|     | (prevailing, 24 hr) * Temp C **  |
|     | DOmg/I DOmg/I **<br>pHsu pHsu **   |
|     | 4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:         Time retrieved (taken out of service)         Data Download Location:       (prevailing, 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   |
| >8< | DO Calibration*** Method Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other <u>LOO</u> (200) SP   |
|     | Cal Temp 74.7 (°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):<br>Time DO / pH Meter MS5 Monitor   |
|     |  |
|     | terrenterenderend " " " ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '  |
|     | DO mg/l DO mg/l **   |
|     |  |
|     | pHsu pHsu **   |

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. March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

|         | CONOWING | 30 & MUDDY R | UN STATIC | NS          |
|---------|----------|--------------|-----------|-------------|
| MS5 LDO | MONITOR  | CALIBRATION  | & CHECK I | FIELD SHEET |

| LOCATION: COND Investigator: SCA Charl   |
|--|
| LOCATION: COND Investigator: JCD Chad  |
| DATE       Image: Market and Market a |
| 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 CAL Temp 25.5 °C CAL DO 8,1.5 (mg/l)   |
| (prevailing, 24 hr)* Meter Temp 25.8 °C OF Meter DO 83 (mg/l) OF   |
| 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 DO / pH Meter MS5 Monitor   |
| (prevailing, 24 hr) * Temp °C Temp °C **   |
|  |
| DOmg/i DOmg/i **   |
| 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 746-3  |
| <b>DO Calibration***</b> Method Used: <u>3</u> 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other <u>100</u> 9.5 A  |
| Cal Temp 78.2 (°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 **   |
| DOmg/l DOmg/l **   |
| pHsu pHsu **   |
|  |
| 7 Air Temperature°C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong<br>Other Sampling Notes:  |
|  |

Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
 Cono Dam MR MSS Data sheet
 March 2010
 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

| LOCATION: $\angle$ , S, $R_{\perp}$ Investigator: $\underline{S} \omega A K T \underline{T}$  |
|---|
| DATE       7 / 3 / 0       PURPOSE       2       Weather Code       4         1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast       1=Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=Lt.Rain 5= H. Rain 6=Fog/Haze         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) |
| 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  |
| 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 **  |
| 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 4. 20. SAT   |
| Cal Temp 78.1 (2) >> °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 @ 4.01 @ 10.00 10.0 (Record OK for buffer(s) used)  |
| Conductivity Calibration*** @ 74µS/cm @ 718µS/cm7.8 @ 1413µS/cm   |
| Turbidity Calibration***         @ 0 NTUO_3         @ 10 NTUN_A         @ 20 NTUZO_O  |
| 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 **  |
| DOmg/l DOmg/l **  |
| pH su pH su **  |
| 7 Air Temperature°C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong<br>Other Sampling Notes:   |

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

The control clock, e.g., o All = 0000 fm of PM = 1000 fm Cono Dam MR MS5 Data Sheet March 2010 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** CONG POND Investigator: 5WA/CAB LOCATION: DATE PURPOSE Weather Code d d V 1 = Callbrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below) 1=Clear 2=P. Cloudy 3=Overcast 2 = Performance check (complete Sections 1, 2, 3 & 7) 4=Lt.Rain 5= H. Rain 6=Foo/Haze 3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) **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 **CAL Temp** 27,5 °C CAL DO (mg/l)27.2 °C OIC (prevailing, 24 hr) \* Meter Temp Meter DO (mg/I) moter # 10984 27.50 Meter adj. to Meter adi to (mg/l)pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su) Meter reading @ 7.00 su @ 4.01 su or @ 10.00 su Time 3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location): **DO / pH Meter** Time **MS5 Monitor** (prevailing, 24 hr) \* °C \*\* Temp Temp mg/l \*\* DO ma/l DO su \*\* bНа DН **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 (\_ RP 747.03 5 MONITOR CALIBRATION: 0780 Kr Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 40% SAT **DO Calibration\*\*\*** Cal Temp 79.0°F (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2 ? | 4 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2 Cal DO @ 4.01 @ 10.00 VOK (Record OK for buffer(s) used) @ 7.00 VOK pH Calibration \*\*\* @ 718uS/cm 🗸 0 K @ 1413uS/cm @ 74uS/cm 101 Conductivity Calibration\*\*\*  $@ 0 \text{ NTU } \sqrt{9} = 0 \text{ ATU}$ @ 20 NTU V 0K **Turbidity Calibration\*\*\*** Time that the monitor was redeployed in the Tailrace (prevailing, 24 hr) \* 6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location): **DO / pH Meter MS5 Monitor** Time (prevailing, 24 hr) \* Temp °C \*\* Temp °C mg/l DO DO mg/l \*\* su \*\* Hα su pH °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong 7 Air Temperature **Other Sampling Notes:** 

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

Cono Dam MR MS5 Data Sheet

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

| LOCATION: CONDWINGO-L.S.R. Investigator: JCA KIT   |
|--|
| DATE       7 2 0 0       0       1 = Callbrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       Weather Code       1         1 = Callbrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1 = Clear 2=P. Cloudy 3=Overcast       1 = Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=Lt.Rain 5= H. Rain 6=Fog/Haze         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)  |
| 1 PROJECT FLOW / RELEASE CONDITIONS:   |
| No. of MR Units Operating (0 to 8) Flow from Holtwood Evident: YES OF 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         Meter Temp       27.0         NA       %         Meter adj. to       NA   |
| 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 **   |
| 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;       (24 hr) *         4 = Batteries replaced; 5 = Other ()  |
| 5 MONITOR CALIBRATION: BP 747.03   |
| DO Calibration*** Method Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other (D) 100% SAR<br>Cal Temp <sup>9,00</sup> , (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   |
|  |
| Cal DO       7.9.4 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2         pH Calibration       ***       @ 7.00       7.60       @ 4.01       @ 10.00       10.00 |
| 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 **   |
| DOmg/l DOmg/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
 Cono Dam MR MSS Data Sheet
 March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

| 2 = Performance drack (complete Sections 1, 2, 3, 4, 7)         →LLRan 5=R, Rom 6=Fog           3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4, 4, 7)         1           1 PROJECT FLOW / RELEASE CONDITIONS:   |                               | PURPOSE 2 Weather Code 2   |
|--|-------------------------------|--|
| No. of MR Units Operating       [0 to s)       Flow from Holtwood Evident: YES o(N)(circle one)         2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.<br>Time       74       CAL Tomp       25.0       °C       CAL DO       8.24       (mg/l)         (prevailing, 24 hr)*       Meter Temp       25.0       °C       CAL DO       8.24       (mg/l)         pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)       0       9.24       (mg/l)         Time       Meter adji. to       25.0       °C       K Meter DO       9.24       (mg/l)         pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)       0       9.24       (mg/l)         Time       Meter adji. to       25.0       °C       K Meter DO       9.24       (mg/l)         3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):       Time       DO       mg/l       0       mg/l       10.00 su   |                               | 1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=Lt.Rain 5= H. Rain 6=Fog/Haze |
| 2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.         Time       25.0       °C       CAL DO       2.24 (mg/l)         (prevailing, 24 hr)*       Meter Temp       25.0       °C       CAL DO       2.24 (mg/l)         pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)       Time   | 1 PROJECT FLOW / RELEASE      | CONDITIONS:  |
| Time       ○ 74 \  |                               |  |
| Meter adj. to       State       Meter adj. to       Meter  | Time _ 374.5                  | CAL Temp 25.0 ℃ CAL DO 8.2.4 (mg/l)  |
| Time       Meter reading @ 7.00 su       @ 4.01 su       or @ 10.00 su         3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at D0 monitor location):         Time       D0 / pH Meter       MS5 Monitor         Image: D0 / pH Meter       mg/l **         pH /// metric:       Image: D0 / pH Meter         MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:       Image: D0 / pH Meter         Image: D0 / pH Meter       Image: D0 / pH Meter         Applicable Maintenance Performed:       Image: D0 / pH Meter         Image: D0 / pH Meter       MS5 Monitor         Image: D0 / pH Meter       Method Used:         Image: D0 / pH Meter       Met  |                               | $\begin{array}{c ccccccccccccccccccccccccccccccccccc$  |
| 3       PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at D0 monitor location):         Time       D0 / pH Meter       MS5 Monitor         Image: D0 / pH Meter       mg/l **         pH /   |                               |  |
| Time       DO / pH Meter       MS5 Monitor         Image: Do (prevailing, 24 hr)*       Temp       °C       Temp       °C       **         DO       mg/l       DO       mg/l       DO       mg/l **         pH       Image: Do       Image: Do       mg/l **       mg/l **         pH       Image: Do       Image: Do       mg/l **       mg/l       mg/l **         4       MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:       Image: Do       Image: Do </td <td></td> <td></td>  |                               |  |
| image: the second s |                               | •  |
| D0       mg/l       D0       mg/l **         pH       su       pH       su       r*         4       MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:         Time retrieved (taken out of service)       (prevailing, 24 hr) *         Data Download Location:       (Lab or Onsite)       (prevailing, 24 hr) *         Data Download Location:       (Lab or Onsite)       (prevailing, 24 hr) *         Applicable Maintenance Performed:       1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;         4       Batteries replaced; 5 = Other       5         5       MONITOR CALIBRATION:       S         S       S1.98   | F                             |  |
| pH       su       pH       su       su <t< td=""><td>(prevailing, 24 hr) *</td><td>Temp°C **</td></t<>  | (prevailing, 24 hr) *         | Temp°C **  |
| 4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:         Time retrieved (taken out of service)   |                               | DOmg/I DOmg/I **   |
| Time retrieved (taken out of service)  |                               | pH su pH su **   |
| 5 MONITOR CALIBRATION:       Image: Stress of the stress o           | Data Download Location:       | (Lab or Onsite) Time of Download: (24 hr)<br>1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;  |
| Cal Temp (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   Cal Temp (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   Cal DO   Cal DO   (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   Cal DO   (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   Cal DO   (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   Cal DO   (°C) >> °C from solubility table) for Method 1, or the YSI DO value for Method 2   pH Calibration ***   (°C) O   |                               |  |
| Cal DO       Image: Construction of the construle of the construc          | 1.                            |  |
| pH Calibration ***       @ 7.00 △K / @ 4.01 _ @ 10.00 √ ○K (Record OK for buffer(s) used)         Conductivity Calibration***       @ 74µS/cm / ○/K       @ 718µS/cm / ○K       @ 1413µS/cm / ○ K         Turbidity Calibration***       @ 0 NTU / ○ K       @ 10 NTU _ @ 20 NTU / ○ K       @ 20 NTU / ○ K         Time that the monitor was redeployed in the Tailrace       _ (prevailing, 24 hr) *       @ 0 / pH Meter       (prevailing, 24 hr) *         6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):       _ DO / pH Meter       MS5 Monitor         Time       DO / pH Meter       MS5 Monitor         _ DO _ mg/l       DO _ mg/l **         _ DO _ mg/l       DO _ mg/l **         _ PH U       Su       pH _ su **   | Cal Temp 7.7 (                | *C) >> *C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2  |
| pH Calibration ***       @ 7.00 △K / @ 4.01 _ @ 10.00 √ ○K (Record OK for buffer(s) used)         Conductivity Calibration***       @ 74µS/cm / ○/K       @ 718µS/cm / ○K       @ 1413µS/cm / ○ K         Turbidity Calibration***       @ 0 NTU / ○ K       @ 10 NTU _ @ 20 NTU / ○ K       @ 20 NTU / ○ K         Time that the monitor was redeployed in the Tailrace       _ (prevailing, 24 hr) *       @ 0 / pH Meter       (prevailing, 24 hr) *         6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):       _ DO / pH Meter       MS5 Monitor         Time       DO / pH Meter       MS5 Monitor         _ DO _ mg/l       DO _ mg/l **         _ DO _ mg/l       DO _ mg/l **         _ PH U       Su       pH _ su **   | Cal DO 809(                   | mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2   |
| Turbidity Calibration***       @ 0 NTU       @ 10 NTU       @ 20 NTU       @ 0 C         Time that the monitor was redeployed in the Tailrace  | pH Calibration *** @ 7.00     | 0 <u>△K /</u> @ 4.01 @ 10.00 <u>∕ ○ K</u> (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       DO / pH Meter       MS5 Monitor         Image: the phase of t   |                               |  |
| 6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):         Time       DO / pH Meter       MS5 Monitor         (prevailing, 24 hr)*       Temp       °C       Temp         OD       mg/l       DO       mg/l **         pH       su       pH       su **  | Turbidity Calibration***      | @ 0 NTU <u>✓ 0</u> F_ @ 10 NTU @ 20 NTU <u>✓ 0</u> (<  |
| Time         DO / pH Meter         MS5 Monitor           (prevailing, 24 hr)*         Temp         °C         Temp         °C **           DO         Img/I         DO         mg/I **           pH         Img         su         pH         su **  | Time that the monitor was red | leployed in the Tailrace (prevailing, 24 hr) *   |
| (prevailing, 24 hr) *         Temp         °C         Temp         °C **           DO         mg/l         DO         mg/l **           pH         su         pH         su **   | 6 MONITOR REDEPLOYMENT "      | CAL BEGIN POINT" MEASUREMENTS (at monitor location):   |
| DOmg/i DOmg/i **<br>pHsu pHsu **   | Time                          | DO / pH Meter MS5 Monitor  |
| pH su pH su **   | (prevailing, 24 hr) *         | • Temp °C Temp °C **   |
|  |                               | DOmg/l DOmg/l **   |
| 7 Air Temperature 26.9 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong   |                               | pH su pH su **   |
| Other Sampling Notes:  |                               | Wind Conditions (Circle one): Calm Light Moderate Gusty Strong   |

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

Cono Dam MR MS5 Date Sheet March 2010<sup>\*\*</sup> May be done in Lab or Field just prior to deployment, experience to dictate location.

| OCATION: LR 7/  | 27/10 Investigator : (co)   |
|---|---|
|   | PURPOSE       Weather Code         1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overce         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=LL.Rain 5= H. Rain 6=Fog/Ha         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) |
| PROJECT FLOW / RELEASE                                    | CONDITIONS:   |
| No. of MR Units Operating                                 | (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)   |
| Time<br>(prevailing, 24 hr) *                             | DN: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.         CAL Temp       34.1       °C       CAL DO       6.4       (mg/l)         Meter Temp       34.1       °C       Meter DO       5.4       (mg/l)         Meter adj. to       °C       Meter adj to       (mg/l)                                |
| -   | Use a one or two buffer system (7.00 and 4.01 or 10.00 su)<br>enter reading @ 7.00 su @ 4.01 su or @ 10.00 su   |
|   |   |
| Time  | POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):<br>DO / pH Meter MS5 Monitor   |
| (prevailing, 24 hr) *                                     | Temp °C Temp °C **  |
|   | DOmg/l DOmg/l **  |
|   | pH su pH su **  |
| 4 MONITOR RETRIEVAL FOR [                                 | DATA DOWNLOAD & MAINTENANCE:  |
| Time retrieved (taken out of s                            |   |
| Data Download Location:<br>Applicable Maintenance Perform | (Lab or Onsite) Time of Download: (24 h<br>ned: 1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;  |
|   | 4 = Batteries replaced; 5 = Other ()  |
| 5 MONITOR CALIBRATION:                                    | BP=757,98   |
|   | thod Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 1001/55  |
|   | (°E) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2  |
|   | (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2   |
|   | 00 @ 4.01 @ 10.00 (Record OK for buffer(s) used)  |
| Conductivity Calibration**<br>Turbidity Calibration***    |   |
|   |   |
| -   | deployed in the Tailrace (prevailing, 24 hr) *  |
| Time that the monitor was rec                             |   |
| Time that the monitor was red<br>6 MONITOR REDEPLOYMENT   | "CAL BEGIN POINT" MEASUREMENTS (at monitor location):   |
| Time that the monitor was red<br>6 MONITOR REDEPLOYMENT   | "CAL BEGIN POINT" MEASUREMENTS (at monitor location):<br>DO / pH Meter MS5 Monitor  |
| Time that the monitor was red<br>6 MONITOR REDEPLOYMENT   | * Temp       °C       Temp       °C **  |
| Time that the monitor was red<br>6 MONITOR REDEPLOYMENT   | "CAL BEGIN POINT" MEASUREMENTS (at monitor location):<br>DO / pH Meter MS5 Monitor  |

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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.
 March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

| Applicable Maintenance Performed:       1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;<br>4 = Batterles replaced; 5 = Other ()         5 MONITOR CALIBRATION:       BP   | LOCATION: CONS PO              | NO Investigator : SC/ALACS   |
|--|--------------------------------|--|
| No. of MR Units Operating       [0/10:0]       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       So       CAL Tomp         prevailing, 24 hr)*       Meter Temp       So       C       CAL DO       So       (mg/l)         prevailing, 24 hr)*       Meter adj. to       So       C       Meter adj. to       So       (mg/l)         prevaling, 24 hr)*       Meter reading @ 7.00 su       @ 4.01 su       or @ 10.00 su  |                                | 1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=Lt.Rain 5= H. Rain 6=Fog/Haze |
| 2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.         Time       CAL Temp         (prevailing, 24 hr)*       Meter Temp         Meter adj to       2.5         CC       CAL DO         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         MSS Monitor         (prevailing, 24 hr)*       Temp         @ (prevailing, 24 hr)*       Temp         @ (prevailing, 24 hr)*       Temp         @ DO       mg/l         Time ertrieved (taken out of service)       (prevailing, 24 hr)*         Data Download Location:       (Lab or Onsite)       Time of Download:         Time retrieved (taken out of service)       1 = Aerated Water; 2 =  | 1 PROJECT FLOW / RELEASE       | CONDITIONS:  |
| Time       CAL Temp       25.5       °C       CAL DO       2.5       (mg/l)         iprevailing, 24 hr)*       Meter Temp       2.5       °C       Meter DO       9.5       (mg/l)         pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)       image: constraint of the system (7.00 and 4.01 or 10.00 su)         3       PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at Do monitor location):         Time       DO / pH Meter       MS5 Monitor         image: constraint of the system (7.00 and 4.01 or 10.00 su)       image: constraint of the system (7.00 and 4.01 or 0.00 su)         3       PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at Do monitor location):         Time       DO       mg/l       mg/l         image: constraint of the system (7.00 and 4.01 or 10.00 su)       image: constraint of the system (7.00 su)       image: constraint of the system (7.00 su)         image: constraint of the system (7.00 and 4.01 or 10.00 su)       image: constraint of the system (7.00 su)       image: constraint of the system (7.00 su)       image: constraint of the system (7.00 su)         image: constraint of the system (7.00 su)       image: constraint of the system (7.00 su)       image: constraint of the system (7.00 su)       image: constraint of the system (7.00 su)         image: constraint of the system (7.00 su)       image: constraint on the system (7.00 su)       image: conste  |                                |  |
| 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 D0 monitor location):         Time       D0 / pH Meter       MS5 Monitor         Ime       D0 / pH Meter       Ms1 https://philos.com/phi  | Time (prevailing, 24 hr) *     | CAL Temp         25.5         °C         CAL DO         8.15         (mg/l)           Meter Temp         25.8         °C         Meter DO         9.35         (mg/l)  |
| Time       Meter reading @ 7.00 su       @ 4.01 su       or @ 10.00 su         3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at D0 monitor location):         Time       DO / pH Meter       MS5 Monitor         Image: Do / pH Meter       mg/l **         pH       Image: Do / pH Meter         Image: Do / pH Meter       mg/l **         Image: Do / pH Meter       Image: Do / pH Meter         Applicable Maintenance Performed:       Image: Network (bucket) vs Ysl; 3 = Other (location);         Image: Do Calibration***       Method Used:       Image: Network (bucket) vs Ysl; 3 = Other (location);         Image: Do Calibration***       Method Used:       Image: Network (bucket) vs Ysl; 3 = Other (location);   |                                |  |
| Time       DO / pH Meter       MS5 Monitor         Image: Do                                   | •                              |  |
| Time       DO / pH Meter       MS5 Monitor         Image: Do / pH Meter         Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter         Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter         Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter         Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter         Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter         Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter         Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter       Image: Do / pH Meter <td></td> <td></td>   |                                |  |
| DO       mg/l       DO       mg/l **         DO       mg/l       DO       mg/l **         pH       su       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;       5 = Other (   | Time                           | DO / pH Meter MS5 Monitor  |
| pH       grid   | (prevailing, 24 hr) *          | Temp °C Temp °C **   |
| pH       grid   |                                | DO mg/l DO mg/l **   |
| 4 MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:         Time retrieved (taken out of service)   |                                |  |
| Time retrieved (taken out of service)  |                                |  |
| Data Download Location:       (Lab or Onsite) Time of Download:       (24 hr) *         Applicable Maintenance Performed:       1 = None required; 2 = Sensors cleaned; 3 = pH electrolyte replaced;         5 MONITOR CALIBRATION:       BP   |                                |  |
| 4 = Batteries replaced; 5 = Other ()         5 MONITOR CALIBRATION:       BP2         Bot Calibration***       Method Used:       1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other (6 models)         Cal Temp 78.5°F       (°C)       >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2         Cal DO       GO       (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 NTU       @ 10 NTU       @ 20 NTU  | •                              |  |
| DO Calibration***       Method Used:       ]       1 = Aerated Water; 2 = River Water (bucket) vs YSi; 3 = Other books in the second of the                  | Applicable Maintenance Perform |  |
| Cal Temp 78.56       (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2         Cal DO       Image: Conductive conduction in the equation is conducted in the equation is conducted in the equation in the equation in the equation in the equation is conducted in the equation in the equation in the equation in the equation is conducted in                                    | 5 MONITOR CALIBRATION:         | BP 7521  |
| Cal DO       Image: Construction for the form of | DO Calibration*** Met          | hod Used: 3 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDo 100% S   |
| pH Calibration ****       @ 7.00       @ 4.01       @ 10.00       (Record OK for buffer(s) used)         Conductivity Calibration***       @ #4µS/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         Time       DO / pH Meter       MS5 Monitor         D0       mg/l       D0       mg/l **  | Cal Temp 78.5°F (              | <b>*C)</b> >> *C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   |
| Conductivity Calibration***       @ #4µS/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         Temp       °C **         D0       mg/l         D0       mg/l  |                                |  |
| 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         Image: the prevailing, 24 hr)*       Temp       °C       Temp       °C **         DO       mg/l       DO       mg/l **       DO       mg/l **   |                                |  |
| 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         0         mg/l         DO         mg/l   | •                              |  |
| 6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):         Time       DO / pH Meter       MS5 Monitor         Image: Colspan="2">Image: Colspan="2">Colspan="2"         Colspan="2">Colspan="2">Colspan="2"         Colspan="2">DO Imag/I       DO Imag/I       DO Imag/I       DO Imag/I **   | ·                              |  |
| Time     DO / pH Meter     MS5 Monitor       (prevailing, 24 hr)*     Temp     °C     Temp     °C **       DO     mg/l     DO     mg/l **  |                                |  |
| (prevailing, 24 hr)*         Temp         °C         Temp         °C **           DO         mg/I         DO         mg/I **   |                                |  |
| DOmg/l DOmg/l **   |                                |  |
|  |                                |  |
|  |                                |  |

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Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
 The corresponding time of portable meter measurements.
 Cono Dam MR MSD Data sneet
 March 2010
 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: Investigator : JLA C 10 PURPOSE DATE Weather Code mmdd У 1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below) y 1=Clear 2=P. Cloudy 3=Overcast 2 = Performance check (complete Sections 1, 2, 3 & 7) 4=Lt.Rain 5= H. Rain 6=Fog/Haze 3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) **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 しんい CAL Temp 26 °C CAL DO 8,06 (mg/l) (prevailing, 24 hr) \* °C Meter Temp Meter DO 4 (ma/l)15436 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) \_ @ 4.01 su \_\_\_ \_\_\_\_\_ or @ 10.00 su 🖉 Meter reading @ 7.00 su Time 3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location): **DO / pH Meter** Time **MS5** Monitor (prevailing, 24 hr) \* °C \*\* Temp Temp DO ma/l DO ma/l \*\* su \*\* pH su pH **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: 0.6900 152. 156% SAT Method Used: 2 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other **DO Calibration\*\*\*** (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2 **Cal Temp** (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2 Cal DO @ 7.00 🖌 pH Calibration \*\*\* @ 10.00 (Record OK for buffer(s) used) @ 4.01 Conductivity Calibration\*\*\* @UTAUS/cm @ 0 NTU\_ **Turbidity Calibration\*\*\*** @ 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 ma/l DO mg/l \*\* pН SU su \*\* pH °C Wind Conditions (Circle one): Calm Light (Moderate Gusty Strong 7 Air Temperature **Other Sampling Notes:** 

Cono Dam MR MSS Data sheet

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

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

| LOCATION                | : COND FO                 | ND Investigator: SWA/mDm   |
|-------------------------|---------------------------|--|
|                         | 81010                     | PURPOSE  |
| m                       | m d d y y                 | 1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below) 1=Clear 2=P. Cloudy 3=Overcast     |
|                         |                           | 2 = Performance check (complete Sections 1, 2, 3 & 7) 4=LL.Rain 5= H. Rain 6=Fog/Haze                  |
|                         |                           | 3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)                        |
|                         | T FLOW / RELEASE (        |  |
|                         | R Units Operating         | (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)  |
| 2 YSI DO M<br>Time <    |                           | : Calibrate the YSI meter with the DO probe in air saturated (aerated) water.                          |
|                         | evailing, 24 hr) *        | CAL Temp <u>25.8</u> °C CAL DO <u>8.1</u> (mg/l)   |
| neter A                 |                           | Meter Temp $25.2 \text{ °C } 0/2$ Meter DO $7.5 \text{ (mg/l) } 0/2$                                   |
| -                       |                           | Meter adj. to <u>25.8</u> °C Meter adj to <u>8.1</u> (mg/l)  |
| -                       |                           | e a one or two buffer system (7.00 and 4.01 or 10.00 su)   |
| Time                    |                           | er reading @ 7.00 su @ 4.01 su or @ 10.00 su   |
|                         | <b>FRIEVAL "CAL END P</b> | OINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):  |
| Time                    |                           | DO / pH Meter MS5 Monitor  |
|                         | (prevailing, 24 hr) *     | Temp °C Temp °C **   |
|                         |                           | DO mg/i DO mg/i **   |
|                         |                           | pH su pH su **   |
|                         |                           |  |
| 4 MONITO                | R RETRIEVAL FOR D         | ATA DOWNLOAD & MAINTENANCE:  |
| Time ret                | ieved (taken out of s     | ervice) (prevailing, 24 hr) *  |
| Data Dov                | vnload Location:          | (Lab or Onsite) Time of Download: (24 hr) *  |
| Applicable              | e Maintenance Perform     |  |
|                         |                           | 4 = Batteries replaced; 5 = Other ()   |
|                         |                           | 3P 746,9   |
| DO Ca                   | alibration*** Meth        | <b>1</b> = Aerated Water; <b>2</b> = River Water (bucket) vs YSI; <b>3</b> = Other <u>LDb 100 %</u> SA |
| Ca                      | I Temp <u>78.8</u> (*     | C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2                             |
| Ca                      | 100 791(r                 | ng/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2               |
| рН Са                   | libration *** @ 7.00      | @ 4.01 @ 10.00 (Record OK for buffer(s) used)  |
| Conde                   | uctivity Calibration***   |  |
| Turbio                  | lity Calibration***       | @ 0 NTU / OK @ 10 NTU @ 20 NTU / OK  |
| Time that               | the monitor was red       | eployed in the Tailrace (prevailing, 24 hr) *  |
| 6 MONITO                | R REDEPLOYMENT "          | CAL BEGIN POINT" MEASUREMENTS (at monitor location):   |
| Tin                     |                           | DO / pH Meter MS5 Monitor  |
|                         | (prevailing, 24 hr) *     |  |
| L                       | [](prevaining, 24 iii) "  |  |
|                         |                           | DO mg/l DO mg/l **   |
|                         |                           | pH su pH su **   |
| 7 Air Temp<br>Other Sam | erature°C<br>pling Notes: | Wind Conditions (Circle one): Calm Light Moderate Gusty Strong   |
|                         | · · ·                     |  |

Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
 A Record values later from downloaded data at the corresponding time of portable meter measurements.
 March 2010 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** Basi Cono Vam Investigator : 145 LOCATION: 1.5 TCA DATE PURPOSE 2 Weather Code mmddyy 1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below) 1=Clear 2=P. Cloudy 3=Overcast 2 = Performance check (complete Sections 1, 2, 3 & 7) 4=Lt.Rain 5= H. Rain 6=Fog/Haze 3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) **1 PROJECT FLOW / RELEASE CONDITIONS:** (0 to 8) Flow from Holtwood Evident: YES or NO [circle one) No. of MR Units Operating 2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water. Time OKZ 7.5.5 °C CAL Temp CAL DO **ダい)(mg/l)** (prevailing, 24 hr) \* Meter Temp 25.8 °C Meter DO 8,6 (mg/l) 25.5 0 Meter adj. to Meter adj to (mg/l) pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su) Meter reading @ 7.00 su \_\_\_\_\_ @ 4.01 su \_\_\_\_\_ or @ 10.00 su Time PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location): **DO / pH Meter MS5 Monitor** Time °C \*\* (prevailing, 24 hr) \* Temp Temp mg/l \*\* DO DO su \*\* pH SU pH **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 Method Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LOD 100% SAT DO Calibration\*\*\* 25.5 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2 Cal Temp 0 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2 Cal DO pH Calibration \*\*\* (@ 10.00 / 0, 0 (Record OK for buffer(s) used) @ 7.00 7,00 @ 4.01 Conductivity Calibration\*\*\* @ 74µS/cm @ 718µS/cm 718 @ 1413µS/cm NA @ 0 NTU 6.00 **Turbidity Calibration\*\*\*** @ 10 NTU /0.0 @ 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): Time DO / pH Meter **MS5** Monitor (prevailing, 24 hr) \* Temp °C Temp °C \*\* DO DO ma/l \*\* ma/l su bНа su \*\* рН 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

Cono Dam MR MS5 Date sneet

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

| LOCAI | FION:  | CONO                    | PON      | D                  |   | Investi            | gator : <u>S</u> u  | JA/ACS  |           |
|-------|--|-------------------------|----------|--------------------|---|--------------------|---|---|-----------|
| DATE  | 08   | 1610                    | F        | VRPOSE             | 2   |                    |   | Weather Code                                  | 3         |
|       | m m  | d d y y                 | 1        | = Calibrate & de   | eploy monitor (comple                     | ate Sec 1, 2, 5, 6 | 6, & 7 below)   | 1≖Clear 2=P. Cloudy 3                         | =Overcast |
|       |  |                         |          |                    | check (complete Sec<br>lata download & ma | •                  |   | 4=Lt.Rain 5= H. Rain 6                        | =Fog/Haze |
| 1 PRC | JECT F   | LOW / RELEA             |          |                    | · · · · · · · · · · · · · · · · · · ·     |                    |   |   |           |
|       |  | nits Operating          | <b></b>  | 0 to 8)            |   | loltwood Ev        | vident: YES   | or NO (circle one)                            |           |
|       |  |                         |          |                    |   |                    |   | ated (aerated) wate                           |           |
| Tim   | e <u>07</u>  |                         |          | AL Temp            | 25.5                                      | •                  | CAL DO  | <u>8.15</u> (mg/                              |           |
|       | the second secon | <b>illing, 24 hr) *</b> |          | leter Temp         | 25.0                                      | ຼາດ<br>ວາ          | Meter DO  | <u>8, 20</u> (mg/l                            |           |
|       |  |                         |          | leter adj. to      | <u>buffer curter</u>                      | -                  | Meter adj to  | <u>8.15</u> (mg/I                             | )         |
| Time  |  |                         |          |                    | •   | -                  |   | or @ 10.00 su                                 | <u> </u>  |
|       |  | EVAL "CAL E             | ND POIN  |                    |   | E CHECK            | -   | DO monitor locati                             | on):      |
| T     | 'ime   | -                       |          | DO / pH            | Meter                                     |                    | MS5 Monit   | or  |           |
|       |  | (prevailing, 24 hr      | )* T     | emp                | °C  | Temp               | <u> </u>  | C **  |           |
|       |  |                         | D        | 0                  | mg/l                                      | DO                 | n   | ng/l **                                       |           |
|       |  |                         | p        | н 🔲                | su  | pН                 |   | su **   |           |
| 4 MON | NITOR F  | ETRIEVAL FO             | OR DAT/  | DOWNLO             | DAD & MAINT                               | ENANCE:            |   |   |           |
| Time  | e retriev  | ed (taken out           | of servi | ce)                |   | prevailing, 2      | 4 hr) *   | <u>N</u>                                      |           |
| Data  | Downi  | oad Location:           |          | (Lab               | or <b>Onsite</b> )                        | Time of D          | )ownload:   |   | (24 hr) * |
| Appl  | icable M   | aintenance Per          | formed:  |                    | 1 = None require<br>4 = Batteries rep     |                    |   | H electrolyte replaced;                       | )         |
| 5 MON |  | ALIBRATION              |          | 747.4              |   |                    | 4   |   |           |
| D     | O Calib  | ration***               | Method   | Used: 3            | 1 = Aerated Wa                            | ter; 2 = River     | Water (bucket) vs   | YSI; $3 \approx \text{Other} \frac{LDa}{LDa}$ | 100 % 54  |
|       | Cal T  | emp 78 <u>.9°F</u>      | (°C)     |                    | -   |                    |   | for Method 1 or 2                             |           |
|       | Cal D  |                         |          |                    |   |                    |   | SI DO value for Meth                          |           |
| р     | H Calib  | ration *** @            | 7.00 🗹   | <u>` 0 /&lt;</u> @ | 4.01                                      | @ 10.              | 00 <u>/ 0K</u> (R   | ecord OK for buffer(s) us                     | ed)       |
| C     | onduct   | ivity Calibratio        | -        |                    |   |                    |   | @ 1413µS/cm                                   |           |
| Т     | urbidity   | Calibration**           | * @      | 0 NTU              | GK @                                      | 10 NTU             | OK  | @ 20 NTU                                      | 6,9126    |
| Time  | e that th  | e monitor was           | s redepl | oyed in the        | e Tailrace                                |                    | (pre  | vailing, 24 hr) *                             |           |
| 6 MON | ITOR R   | EDEPLOYME               | NT "CAI  | BEGIN P            | OINT" MEAS                                | UREMENT            | S (at monito  | or location):                                 |           |
|       | Time   |                         |          | DO / J             | pH Meter                                  |                    | MS5 N   | lonitor                                       |           |
|       |  | (prevailing, 2          | 4 hr) *  | Temp               | °C  |                    | Temp  | °C **   |           |
|       |  |                         |          | DO 🗌               | mg/l                                      |                    | DO  | mg/l **                                       |           |
|       |  |                         |          | рН                 | su  |                    | рН  | su **   |           |
|       |  |                         |          |                    |   |                    |   |   |           |
|       | empera   | ture°(<br>ng Notes:     | C W      | ind Condi          | tions (Circle or                          | e): Calm           | Light <mode< td=""><td>rate Gusty Stror</td><td>ng</td></mode<> | rate Gusty Stror                              | ng        |

Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr ۰

\*\* Record values later from downloaded data at the corresponding time of portable meter measurements. Cono Dam MR MS5 Data sneet March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

| 5)           |   |
|--------------|---|
|              | LOCATION: L.S. R. BELOW CONO Investigator: KIT, MDM   |
| ]            | DATE 081610 PURPOSE 2 Weather Code 3  |
|              | m m d d y y 1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below) 1=Clear 2=P. Cloudy 3=Overcast  |
|              | 2 = Performance check (complete Sections 1, 2, 3 & 7)<br>4=Lt.Rain 5= H. Rain 6=Fog/Haze  |
|              | 3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)   |
| /            | 1 PROJECT FLOW / RELEASE CONDITIONS:  |
| $\checkmark$ | 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 <u>/029</u> CAL Temp <u>24.0</u> ℃ CAL DO <u>8.4</u> (mg/l)  |
| 7            | (prevailing, 24 hr) * Meter Temp ZYZ°C Meter DO 8, 6 (mg/l)   |
|              | Meter adj. to 24.0 °C Meter adj to 8.4 (mg/l)   |
| J            |   |
|              | 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  |
|              | <b>3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):</b>  |
|              | Time DO / pH Meter MS5 Monitor  |
|              | (prevailing, 24 hr) * Temp °C Temp °C **  |
| 14           |   |
| 1.           | 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) *   |
| Arc          | Data Download Location: (Lab or Onsite) Time of Download: (24 hr) *   |
| Pl.          | 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: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LDO 1/00 % SAT   |
|              | Cal Temp 25.6 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2  |
| /            | Cal DO [796] (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2  |
|              | pH Calibration *** @ 7.00 <u>6.97→7.00</u> @ 4.01 <u>N A</u> @ 10.00 <u>0.05</u> → (Record OK for buffer(s) used)   |
| V            | Conductivity Calibration*** @ 74µS/cm <u> ∧ / A</u> @ 718µS/cm <u>7/8 → 7/8</u> @ 1413µS/cm <u>∧/ A</u>   |
|              | Turbidity Calibration***@ 0 NTU $\underline{\rho}, \underline{\rho}$ @ 10 NTU $\underline{g}, \underline{z} \neq \rho, \overline{\rho}$ @ 20 NTU $\underline{\gamma}/\underline{A}$ |
|              | Time that the monitor was redeployed in the Tailrace       Image: A line in the tailrace       Image: A line in the tailrace  |
|              | 6 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):  |
|              | Time DO / pH Meter MS5 Monitor  |
| Ala          | (prevailing, 24 hr) * Temp °C Temp °C **  |
| Ч).          | DOmg/l DOmg/l **  |
|              | pH su pH su **  |
| •            | 7 Air Tamparature 78 4 90 Mind Candidiana (0:1) Oalm Links Madante Out  |
|              | 7 Air Temperature 28.4 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong<br>Other Sampling Notes: のいろ Dる  |
|              |   |

Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
 Cono Dam MR MS5 Data sheet
 March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

| LOCATION: CONO POND Investigator: SWA/ACS  |
|--|
| DATE       PURPOSE       Weather Code       3         1 = Callbrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast       1=Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=LLRain 5= H. Rain 6=Fog/Haze         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)   |
| 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         (prevailing, 24 hr)*       Meter Temp         26.5       °C       Meter DO         7.9       (mg/l)         0/c       °C         Meter adj. to       0/c         °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 |
| 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 **   |
|  |
| pHsu pHsu **   |
| 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;   |
| Appricable manuemance Performed.   |
| 5 MONITOR CALIBRATION: BP 748.6  |
| DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 100 100 % SA-   |
| Cal Temp 79.9 (°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 / 0K @ 4.01 @ 10.00 / 0K (Record OK for buffer(s) used)  |
| Conductivity Calibration*** @ ૐμS/cm <u>0</u> 6 (- @ 718μS/cm <u>0/</u> @ 1413μS/cm  |
| Turbidity Calibration*** @ 0 NTU <u>/ 0 に</u> @ 10 NTU @ 20 NTU <u>/ 6 に</u>   |
| 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 **   |
| DOmg/l DOmg/l **   |
| pH su pH su **   |
| 7 Air Temperature°C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong<br>Other Sampling Notes:  |

The cord values later from downloaded data at the corresponding time of portable meter measurements. March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

|   | LOCATION         | : <u> </u>             | ower Ri                                  | ver .                                   |  | Investig   | ator : <u> </u>                        | IT /C+B  |                 |
|---|------------------|------------------------|--|---|--|--|--|--|-----------------|
|   | DATE 0<br>m      | M d d                  | 4)0<br>4 y y                             | 2 = Performance c                       | ploy monitor (complete<br>heck (complete Sectio<br>ata download & main | ns 1, 2, 3 & 7)  |  | Weather Code [<br>1=Clear 2=P. Cloudy 3=Ow<br>4=Lt.Rain 5= H. Rain 6=For<br>2, 3, 4 & 7) |                 |
|   | 1 PROJEC         | <b>FLOW</b>            | / RELEASE                                | CONDITIONS:                             |  |  |  |  |                 |
|   | No. of MR        |                        |  | (0 to 8)                                |  |  |  | or NO (circle one)   |                 |
| r | Time _()<br>(pre | 820<br>evailing, 2     | 4 hr) *                                  | CAL Temp<br>Meter Temp<br>Meter adj. to | 26.8<br>26.8<br><u>NIA</u>   | °C ()<br>°C N<br>°C N  | CAL DO<br>Neter DO<br>Neter adj to     | ted (aerated) water.<br>7.95 (mg/l)<br>7.9 (mg/l)<br>4)1 (mg/l)                          |                 |
|   |                  | R CALIE                |  | se a one or two                         |  |  |  | •  |                 |
|   |                  |                        |  | er reading @ 7.                         |  |  |  | or @ 10.00 su<br>DO monitor location)  |                 |
|   | Time             |                        | iling, 24 hr) *                          | <b>DO / рН I</b><br>Temp<br>DO<br>рН    |  |  | <b>IS5 Monito</b><br>۳۵<br>۳۵          | -  |                 |
|   | 4 MONITOR        |                        | VAL FOR D                                | ATA DOWNLO                              | AD & MAINTE  | NANCE:   | ······································ | •  |                 |
|   | Data Dow         | nload Lo               | ken out of s<br>ocation:<br>ance Perform | (Lab o                                  | or Onsite) T   | evailing, 24 h<br><b>ime of Dov</b><br>2 = Sensors cl<br>ed; 5 = Other | vnload:<br>eaned; 3 = pH               | l electrolyte replaced;  | hr) *           |
|   | 5 MONITOR        |                        |  | BF                                      | = 748.6  |  |  |  |                 |
|   |                  |                        |  |   |  |  |  | /Si; 3 = Other <u>LDD [01</u>  | <u>&gt;%</u> 5A |
|   |                  | Temp                   | · · · · · · · · · · · · · · · · · · ·    |   | hand thermometer   |  |  |  |                 |
|   |                  |                        | 1.46 (                                   | mg/l) >> DO value                       | e (from solubility ta  | able) for Metho  | d 1, or the YS                         | SI DO value for Method 2   | 2               |
|   | -                | ibration<br>ctivity C: | -  | )_ <b>0 k</b> @4<br>⊡@ 74μS/cm _        | 4.01   | -  |  | cord OK for buffer(s) used)  | ð.              |
|   |                  | ity Calibi             |  |   | @ 10   |  |  | @ 1413µS/cm<br>@ 20 NTU ∂K   |                 |
|   |                  | •                      |  | eployed in the                          |  |  |  | ailing, 24 hr) *   |                 |
|   |                  |                        |  | CAL BEGIN PO                            |  | REMENTS  |  |  |                 |
|   | Tim              |                        |  |   | H Meter  |  | MS5 Mc                                 | •  |                 |
|   |                  | (pre                   | evailing, 24 hr) *                       |   | D₀C  | Те   | mp                                     | °C **  |                 |
|   |                  |                        |  |   | mg/l   | DC   |  | <br>mg/l **  |                 |
|   |                  |                        |  |   |  |  |  |  |                 |

Use 24 hour clock; e.g., 3 AM = 0300 hr 3 PM = 1500 hr
 Cono Dam MR MSS Data sheet
 March 2010
 May be done in Lab or Field just prior to deployment, experience to dictate location.

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

| LOCATION: CONG PON                             | nl <i>00</i>  | nvestigator : <u>SWA MOM</u>                                    |
|--|---|---|
| DATE 083110<br>mmddyy                          | PURPOSE       Image: Complete Set Set Set Set Set Set Set Set Set   | , 2, 3 & 7) 4=Lt.Rain 5= H. Rain 6=Fog/Haze                     |
| 1 PROJECT FLOW / RELEASE CO                    | ONDITIONS:  |   |
| No. of MR Units Operating                      | ,   | vood Evident: YES or NO (circle one)                            |
| Time 0750<br>(prevailing, 24 hr) *             | CAL Temp $25.5 \circ C$ Meter Temp $26.V \circ C$ Meter adj. to $25.5 \circ C$                                  | Meter adj to 8.1 (mg/!)   |
| 0.6  |   | 2 4.01 su or @ 10.00 su   |
|  |   | IECK VALUES (at DO monitor location):<br>MS5 Monitor            |
| (prevailing, 24 hr) *                          | Temp  | Temp °C **  |
|  | DO mg/i   | DO mg/l **  |
| 97 - 27<br>10                                  | pH su   | pH su **  |
| <b>4 MONITOR RETRIEVAL FOR DAT</b>             | A DOWNLOAD & MAINTEN  | ANCE:   |
| Time retrieved (taken out of serv              | " I have a second se | ailing, 24 hr) *  |
| Data Download Location:                        | · · · · · · · · · · · · · · · · · · ·   | e of Download: (24 hr) *  |
| Applicable Maintenance Performed               | 1 = None required; 2<br>4 = Batteries replaced;   | = Sensors cleaned; 3 = pH electrolyte replaced;<br>5 = Other () |
| 5 MONITOR CALIBRATION:                         | BP 754.23   |   |
| DO Calibration*** Metho                        | d Used: 1 = Aerated Water; 2  | e River Water (bucket) vs YSI; 3 = Other 000 100%               |
| Cal Temp 7 <u>2.2 (</u> °C)                    | >> °C from hand thermometer; Y  | SI; or Sonde thermistor for Method 1 or 2                       |
| Cal DO 797 (mg                                 | I/I) >> DO value (from solubility table   | e) 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***                    | @ ≇µS/cm <u></u> @ :  | 718μS/cm <u></u> @ 1413μS/cm                                    |
| Turbidity Calibration***                       | @ 0 NTU <u>/</u> @ 10 N   | NTU @ 20 NTU  |
| Time that the monitor was redep                | loyed in the Tailrace   | (prevailing, 24 hr) *   |
| 6 MONITOR REDEPLOYMENT "CA                     | L BEGIN POINT" MEASURE  | MENTS (at monitor location):                                    |
| Time   | DO / pH Meter   | MS5 Monitor   |
| (prevailing, 24 hr) *                          | Temp°C  | Temp °C **  |
|  | DOmg/l  | DOmg/l **   |
|  | pH su   | pH su **  |
| 7 Air Temperature°C V<br>Other Sampling Notes: | Vind Conditions (Circle one):   | Calm Light Moderate Gusty Strong                                |

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

Cono Dam MR MS5 Data Sheet March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

| ENCLOSURE 1<br>CONOWINGO & MUDDY RUN STATIONS   |
|---|
| MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET   |
| LOCATION: LOWER HVER Investigator: ACS / KJ T   |
| DATE       Image: Second                         |
| 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  |
| 3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):<br>Time DO / pH Meter MS5 Monitor   |
| Image: comparison of the company o |
| 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;       (24 hr) *   |
| 5 MONITOR CALIBRATION: BP 754.23<br>DO Calibration*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other 00 100 % S<br>Cal Temp 78.6 (°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 $\checkmark$ @ 4.01 $\checkmark$ @ 10.00 $\checkmark$ (Record OK for buffer(s) used)<br>Conductivity Calibration*** @ $\Rightarrow$ $\square$ S/cm $\checkmark$ 0 $\checkmark$ @ 718µS/cm $\checkmark$ 0 $\checkmark$ @ 1413µS/cm $\land$ $\square$ $\land$ $\square$ $\square$   |
| Turbidity Calibration*** @ 0 NTU $\checkmark 0 \ltimes$ @ 10 NTU $\downarrow 0 \ltimes$ @ 20 NTU $\checkmark 0 \ltimes$   |
| Time that the monitor was redeployed in the Tailrace r <sup>1</sup> (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   |
| DOmg/i DOmg/i **  |
| pHsu pHsu **  |
| 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. March 2010 May be done in Lab or Field just prior to deployment, experience to dictate location.

Normandeau Associates, Inc

| <b>ENCL</b> | <b>OSU</b> | RE | 1 |
|-------------|------------|----|---|
|             |            |    |   |

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

| (prevailing, 24 hr) *<br>Meter # 15436<br>pH METER CALIBRATION: Use<br>Time Meter #<br>MONITOR CALIBRATION:   | (0 to 8)<br>Calibrate the YS<br>CAL Temp<br>Meter Temp<br>Meter adj. to<br>a one or two b<br>reading @ 7.0<br>Barc<br>od Used: | Flow from I-<br>SI meter with<br>25.0<br>24.0<br>8.24<br>uffer system<br>0 su       | tions 1, 2, 3 & 7<br>intrenance (co<br>loltwood E<br>the DO pro<br>°C<br>°C<br>°C<br>°C<br>(7.00 and 4<br>(7.00 and 4 | Timplete Sections 1<br>Evident: YES<br>Obe in air satur<br>CAL DO<br>Meter DO<br>Meter adj to<br>4.01 or 10.00 s<br>Su | or NO (circle one)<br>rated (aerated) water.<br><u> </u>  |
|---|--|---|---|--|---|
| No. of MR Units Operating          YSI DO METER CALIBRATION:         Time       0800         (prevailing, 24 hr) *         Meter #       15436         pH METER CALIBRATION: Use         Time       Meter         Meter       Meter | (0 to 8)<br>Calibrate the YS<br>CAL Temp<br>Meter Temp<br>Meter adj. to<br>a one or two b<br>reading @ 7.0<br>Barc<br>od Used: | SI meter with<br>25.6<br>24.0<br>8.24<br>uffer system<br>0 sy<br>pometric pressu    | the DO pro<br>°C<br>°C<br>°C<br>(7.00 and 4<br>_ @ 4.01   | De in air satur<br>CAL DO<br>Meter DO<br>Meter adj to<br>4.01 or 10.00 s<br>Su   | rated (aerated) water.<br><u> タ み 4</u> (mg/l)<br><u> 夏 の</u> (mg/l)<br><u> 夏 久 4</u> (mg/l)<br>su) |
| YSI DO METER CALIBRATION:         Time       0800         (prevailing, 24 hr)*         Meter #       15436         pH METER CALIBRATION: Use         Time       Meter         Monitor Calibration:                                  | Calibrate the YS<br>CAL Temp<br>Meter Temp<br>Meter adj. to<br>a one or two b<br>reading @ 7.0<br>Barc<br>od Used:             | SI meter with<br>25.6<br>24.0<br>8.24<br>uffer system<br>0 sy<br>pometric pressu    | the DO pro<br>°C<br>°C<br>°C<br>(7.00 and 4<br>_ @ 4.01   | De in air satur<br>CAL DO<br>Meter DO<br>Meter adj to<br>4.01 or 10.00 s<br>Su   | rated (aerated) water.<br><u> タ み 4</u> (mg/l)<br><u> 夏 の</u> (mg/l)<br><u> 夏 久 4</u> (mg/l)<br>su) |
| Time       0800         (prevailing, 24 hr)*         Meter #       15436         pH METER CALIBRATION: Use         Time       Meter         MONITOR CALIBRATION:  | CAL Temp<br>Meter Temp<br>Meter adj. to<br>a one or two b<br>reading @ 7.0<br>Baro<br>od Used:                                 | $\frac{25.6}{24.0}$ $\frac{24.0}{8.24}$ uffer system $0 \text{ sy}$ cometric pressu | <b>°C</b><br><sup>°</sup> C<br>(7.00 and 4<br>_ @ 4.01  | CAL DO<br>Meter DO<br>Meter adj to<br>4.01 or 10.00 s<br>su  | <u> </u>  |
| (prevailing, 24 hr) *<br>Meter # الإلام الك<br>PH METER CALIBRATION: Use<br>Time Meter<br>MONITOR CALIBRATION:  | Meter Temp<br>Meter adj. to<br>a one or two b<br>reading @ 7.0<br>Baro<br>od Used:   | 44.0<br>8.24<br>uffer system<br>0 su  | °C<br>°C<br>(7.00 and 4<br>_ @ 4.01   | Meter DO<br>Meter adj to<br>4.01 or 10.00 s<br>su  | <u>रि</u> (mg/l)<br>७ <u>८ २५</u> (mg/l)<br>su)   |
| Meter # 15436<br>pH METER CALIBRATION: Use<br>Time Meter<br>MONITOR CALIBRATION:  | Meter adj. to<br>a one or two b<br>reading @ 7.0<br>Baro<br>d Used:  | 8.24<br>uffer system<br>0 sy  | _°C<br>(7.00 and 4<br>_ @ 4.01  | Meter adj to<br>4.01 or 10.00 s<br>su  | 9 <u>8 24</u> (mg/l)<br>su)   |
| pH METER CALIBRATION: Use         Time       Meter         MONITOR CALIBRATION:   | a one or two b<br>reading @ 7.0<br>Baro<br>od Used:  | 0 su  |   | 4.01 or 10.00 s  | su)   |
| Time   Meter     MONITOR CALIBRATION:   | reading @ 7.0<br>Barc<br>od Used: [3]  | 0 su  | @ 4.01  | su   | •   |
| MONITOR CALIBRATION:  | Baro<br>od Used: 🚺   | ometric press   | _   |  |   |
|   | d Used: 🚺  |   | ure = / )   |  |   |
| DO Calibration*** Metho   |  | 4 - 4 - 1 - 1 - 1 - 1 - 1   |   | う. レン  |   |
|   |  |   |   |  | vs YSI; 3 = LDO 100% SAT  |
| Cal Temp 76.9 (°C   |  | 4 = Other   |   |  |   |
|   |  |   |   |  | or for Method 1 or 2  |
|   |  |   |   |  | YSI DO value for Method 2   |
| pH Calibration *** @ 7.00 _   |  |   | -   |  | (Record OK for buffer(s) used)  |
| Conductivity Calibration***   | @ 0 μS/cm _  |   | @ 718 µ   | ıS/cm  | @_1413 μS/cm  |
| Turbidity Calibration***  | @ <1 NTU   | @   | 10 NTU _  |  | @ 20 NTU 🟒  |
| PRE-RETRIEVAL "CAL END POI  | NT" OR PER   | FORMANCE  | CHECK   | VALUES (at   | DO monitor location):   |
| Time  | DO / pH M  |   |   | MS5 Monif  |   |
| (prevailing, 24 hr) *   | Temp   | ີາເ   | Temp  | ) "  | °C **   |
| i i i i i i i i i i i i i i i i i i i   |  |   | DO  |  | ng/i **   |
|   |  |   |   |  | -   |
|   | рН <u>   </u>  | su  | pН  |  | SU **   |
| MONITOR REDEPLOYMENT "CA  |  |   | UREMEN  |  |   |
|   | DO / pł  |   |   |  | Monitor   |
| (prevailing, 24 hr) *   | Temp   | °C  |   | Temp   | °C **   |
|   | DO   | mg/l  |   | DO   | mg/l **   |
|   | рН   | su  |   | рН   | su **   |
| Air Temperature 27.2 °C V<br>Other Sampling Notes:  | Wind Condition   | <b>DNS</b> (Circle on   | e): Calı  | h Light Mod  | erate Gusty Strong  |
|   |  |   |   |  |   |

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.

| <br>L   | OCATION: LS, R. H20 G   | Investigator   | KJT, CAB   |  |  |
|---|---|--|--|--|--|
| D   | DATE 690710 P<br>mmddyy 1<br>2  | URPOSE 2<br>= Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below<br>= Performance check (complete Sections 1, 2, 3 & 7)<br>= Retrieve for data download & maintenance (complete Sect | () 1=Clear 2=P. Cloudy 3=Overcast<br>4=LLRain 5= H. Rain 6=Fog/Hazu                  |  |  |
| 1   | PROJECT FLOW / RELEASE CON  | DITIONS:   |  |  |  |
|   | No. of MR Units Operating   | (x 8) Flow from Holtwood Evident:  | YES or NO (circle one)   |  |  |
| 2   | Time0820C(prevailing, 24 hr)*M  | AL Temp       25.0°C       CAL E         eter Temp       25.0°C       Meter E         eter adj. to       25.0°C       Meter E  | Ø         ½         2         (mg/l)           DO         8         0         (mg/l) |  |  |
|   | •   | one or two buffer system (7.00 and 4.01 or 10  | •  |  |  |
| -   | Time Meter re   | ading @ 7.00 su @ 4.01 su  |  |  |  |
| 3   | <b>MONITOR CALIBRATION:</b>   | Barometric pressure = 753, 25  |  |  |  |
| DO Calibration*** Method Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% |   |  |  |  |  |
|   | 4 = Other<br>Cal Temp 76 6 (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2 |  |  |  |  |
|   |   | >> DO value (from solubility table) for Method 1,  |  |  |  |
|   | pH Calibration *** @ 7.00 _6  |  |  |  |  |
|   |   | 0 μS/cm <u>0 μ</u> @ 718 μS/cm   |  |  |  |
|   |   | <1 NTU <u>0. K</u> @ 10 NTU <u>P A</u>   |  |  |  |
| 4   | PRE-RETRIEVAL "CAL END POIN"  | T" OR PERFORMANCE CHECK VALUE  | S (at DO monitor location):  |  |  |
|   | Time  | DO / pH Meter MS5 N  | lonitor  |  |  |
|   | (prevailing, 24 hr) * Te  | emp°C Temp   | °C **  |  |  |
|   | D   | Dmg/l DO   | mg/l **  |  |  |
|   | pH  | I SU pH  | su **  |  |  |
| 5   | MONITOR REDEPLOYMENT "CAL   | BEGIN POINT" MEASUREMENTS (at n  | nonitor location):   |  |  |
|   | Time  | DO / pH Meter N  | IS5 Monitor  |  |  |
| 8   | (prevailing, 24 hr) *   | Temp °C Temp   | °C **  |  |  |
| `   |   | DO mg/l DO   | mg/l **  |  |  |
|   |   | pH su pH   | su **  |  |  |
| -   | Air Temperature°C W<br>Other Sampling Notes:  | ind Conditions (Circle one): Calm Light  | Moderate Gusty Strong  |  |  |
| 6   |   |  |  |  |  |

\*\* 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

|  |   | DY RUN STATIOI  |  |
|--|---|---|--|
| LOCATION: Conowhyd   | Brd   | Investigator :  | (AB. Acs   |
| DATE 091410<br>mmddyy  | 2 = Performance check (compl  | (complete Sec 1, 2, 5, 6, & 7 below)<br>ate Sections 1, 2, 3 & 7)<br>of & maintenance (complete Section           | Weather Code<br>1=Clear 2=P. Cloudy 3=Overcast<br>4=LLRain 5= H. Rain 6=Fog/Haze<br>\$ 1, 2, 3, 4 & 7) |
| 1 PROJECT FLOW / RELEASE   | CONDITIONS:   |   |  |
| No. of MR Units Operating  |   | om Holtwood Evident: YI   |  |
| 2 YSI DO METER CALIBRATIO<br>Time 9910<br>(prevailing, 24 hr)*<br>Meter # 1<br>pH METER CALIBRATION: U | CAL Temp     Image: Calculation of the second | 4. 2         ℃         CAL DO           4.5         ℃         Meter DO           1.2         ℃         Meter adj  | to $\frac{8.4}{7.3}$ (mg/l)<br>(mg/l)  |
| Time Me  | ter reading @ 7.00 su _   | @ 4.01 su   | _ or @ 10.00 su  |
| <b>3 MONITOR CALIBRATION:</b>  | Barometric  | pressure = 746.425  |  |
| Cal Temp 77<br>Cal DO 618  | 4 = Othe<br>(°C) >> °C from hand the<br>(mg/i) >> DO value (from s  | nted Water; 2 = River Water (bucker<br>r<br>rmorneter; YSI; or Sonde therm<br>plubility table) for Method 1, or t | istor for Method 1 or 2<br>the YSI DO value for Method 2   |
| •  |   | @ 718 μS/cm   | (Record OK for buffer(s) used)   |
| 4 PRE-RETRIEVAL "CAL END I   | POINT" OR PERFORM   | ANCE CHECK VALUES (   | at DO monitor location):   |
| Time   | DO / pH Meter   | MS5 Mo  | nitor  |
| (prevailing, 24 hr) *  | Temp  | Temp  | _°C **   |
|  | DOmg/l  | DO  | _mg/l **   |
|  | pH s  | su pH   | SU **  |
| 5 MONITOR REDEPLOYMENT   | "CAL BEGIN POINT" M   | EASUREMENTS (at mo  | nitor location):   |
| Time   | DO / pH Mete  | r MS:   | 5 Monitor  |
| (prevailing, 24 hr)  | • Temp °(   | C Temp  | °C **  |
|  | DO m  | g/i DO  | mg/l **  |
|  | pH  | <br>]su pH  | SU **  |
| 6 Air Temperature <u>25.0</u> °C<br>Other Sampling Notes:  | Wind Conditions (Ci   |   | oderate Gusty Strong   |
|  |   |   |  |

\* 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.

|    | CATIONS MOTOR OTAGONO IN LA CONTACCE TO Dark Investigation VIT M DA   | =     |
|----|---|-------|
| Ľ  | CATION: MRPSP STA004-Cylinder or STA005-TR Deck Investigator : KTT, MDM   |       |
| D  | TE       0 9 / 1 4 / 1 0       Weather Code         m m d d y y       1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below)       1=Clear 2=P. Cloudy 3=Overcast         2 = Performance check (complete Sections 1, 2, 3 & 7)       4=LtRain 5= H. Rain 6=Fog/Haze         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7)         4 = Download only (complete sections 1, 2, 3, 4, & 7) | _     |
| /1 | PROJECT FLOW / RELEASE CONDITIONS: Reservoir Elevation  | •     |
|    | No. of MR Units Operating (0 to 8) Flow from Holtwood Evident: YES or NO (pircle one)   |       |
| 2  | YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.         Time  | -     |
| _  | 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):<br>Time DO / pH Meter DS5X Monitor MS5 Monitor  |       |
|    | (prevailing, 24 hr) * Temp °C Temp °C ** Temp   | °C    |
| 6  | DO mg/l DO mg/l ** DO   | _mg/l |
|    | pH su pH su pH su ** pH su<br>Cond μS/cm** Cond   | μS/c  |
|    | MONITOR RETRIEVAL FOR DATA DOWNLOAD & MAINTENANCE:  | ;     |
| -  | Time retrieved (taken out of service)   |       |
|    | 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  | 1     |
| •  | DO Calibration*** Method Used: 3 1 = Aerated Water, 2 = River Water (bucket) vs YSt; 3 = LDO 100% SAT<br>4 = Other  |       |
|    | Cal Temp 24.4 (°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 $(D)$ $@$ 4.01 $(D)$ $(Peccord OK for buffer(s) used)$   |       |
|    | Conductivity Calibration*** @ 0 $\mu$ S/cm $O$ $\mu$ @ 718 $\mu$ S/cm $O$ $\mu$ @ 1413 $\mu$ S/cm $P$   |       |
|    | Fime that the monitor was redeployed in the Tailrace  | י זיד |
| 6  | MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):  |       |
|    | Time DO / pH Meter DS5X Monitor MS5 Monitor   |       |
|    |   | °C    |
|    |   | mg/l  |
|    | pH     su pH su ** pH su  |       |

\*

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. -

| ENCLOSURE 1   | INGO & MUDDY RU  | IN STATIONS   |
|---|--|---|
|   |  | CHECK FIELD SHEET   |
| LOCATION: CONO PON  |  | nvestigator: SWA/   |
| mmdd y y  | PURPOSE 2<br>1 = Calibrate & deploy monitor (complete Se<br>2 = Performance check (complete Sections 1<br>3 = Retrieve for data download & mainten | (, 2, 3 & 7) 4=LLRain 5= H Rain 6=Fog/Haze  |
| 1 PROJECT FLOW / RELEASE CO                                 | NDITIONS:  |   |
| No. of MR Units Operating                                   | (0 to 8) Flow from Holtw   | rood Evident: YES or NO (circle one)  |
| Time 0740<br>(prevailing, 24 hr) *                          | CAL Temp $2S. 0$ °CMeter Temp $2S. 0$ °CMeter adj. to $OK$ °C  | DO probe in air saturated (aerated) water.<br>CAL DO 8.24 (mg/l)<br>Meter DO 8.3 (mg/l) 0 K<br>Meter adj to 8.24 (mg/l)                               |
|   |  | 9 4.01 su or @ 10.00 su   |
| 3 MONITOR CALIBRATION:                                      | Barometric pressure =  |   |
| Cal Temp 76 JOF (°C)  | 4 = Other<br>>> °C from hand thermometer;  | 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT<br>YSI; or Sonde thermistor for Method 1 or 2<br>le) for Method 1, or the YSI DO value for Method 2 |
| Conductivity Calibration***                                 | @ 0 μS/cm <u>√ 0/</u> @  | @ 10.00 <u>✓ ಁ (Record OK for buffer(s) used)</u><br>718 μS/cm <u>✓ ಁ ಁ </u> @ 1413 μS/cm <u>/ Α</u><br>NTU <u>ΜΑ</u> @ 20 NTU <u>✓ ፩ K</u>           |
| 4 PRE-RETRIEVAL "CAL END POI<br>Time                        | NT" OR PERFORMANCE CH<br>DO / pH Meter   | IECK VALUES (at DO monitor location):<br>MS5 Monitor  |
|   |  | Temp °C **<br>DO mg/l **<br>pH su **  |
| 5 MONITOR REDEPLOYMENT "CA                                  |  |   |
| Time<br>(prevailing, 24 hr) *                               | DO / pH Meter<br>Temp  | MS5 Monitor<br>Temp°C **  |
|   | DOmg/i   | DO mg/i **  |
|   | pH su  | pH su **  |
| 6 Air Temperature <u>20.0</u> °C V<br>Other Sampling Notes: |  | Calm Light Moderate Gusty Strong  |
|   | ·····  |   |

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.

**ENCLOSURE 1 CONOWINGO & MUDDY RUN STATIONS MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHFFT** LOCATION: Welg Investigator: KJT NET  $\Theta$ JCA DATE PURPOSE 17 Weather Code m m d d y 1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below) 1=Clear 2=P. Cloudy 3=Overcast 2 = Performance check (complete Sections 1, 2, 3 & 7) 4=LI.Rain 5= H. Rain 6=Fog/Haze 3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) **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 **CAL Temp** °C CAL DO (mg/l) (prevailing, 24 hr) \* Meter Temp 6 °C Meter DO (mg/l)249 0 Meter adj. to Meter adj to (mg/l)pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su) Meter reading @ 7.00 su \_\_\_\_\_ @ 4.01 su \_\_\_\_\_ or @ 10.00 su \_ **\K** Time 3 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location): Time **DO / pH Meter MS5** Monitor (prevailing, 24 hr) \* °C °C \*\* Temp Temp DO DO ma/l \*\* ma/l рH su \*\* su pH **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 (\_\_\_\_\_ 9.88 **5 MONITOR CALIBRATION:** КP Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = Other LOD **DO Calibration\*\*\*** >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2 **Cal Temp** Cal DO 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\_JIN @ 10.00 \_ < (Record OK for buffer(s) used) @ ZauS/cm Conductivity Calibration\*\*\* @ 718µS/cm @ 1413uS/cm JIA **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 ma/l DO mg/l \*\* su \*\* pН SU pH 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

Cono Dam MR MS5 Data Sheet

| OCATION: COND PON   | Inve  | estigator: <u>SWA/ACS</u>   |
|---|---|---|
|   | PURPOSE       2         1 = Calibrate & deploy monitor (complete Sec 1, 2         2 = Performance check (complete Sections 1, 2, 3         3 = Retrieve for data download & maintenance | 3 & 7) 4=Lt.Rain 5= H. Rain 6=Fog/Haze  |
| PROJECT FLOW / RELEASE C  | CONDITIONS:   |   |
| No. of MR Units Operating   |   | d Evident: YES or NO (circle one)   |
| Time 0750<br>(prevailing, 24 hr) *<br>Meter # 10983<br>pH METER CALIBRATION: Use  | Calibrate the YSI meter with the DO<br>CAL Temp 24.5 °C<br>Meter Temp 24.5 °C<br>Meter adj. to 0/C °C<br>e a one or two buffer system (7.00 ar<br>r reading @ 7.00 su @ 4               | -   |
| <b>3 MONITOR CALIBRATION:</b>   | Barometric pressure =   | 139.9   |
| Cal DO <b>Sal 10</b> (n<br>pH Calibration *** @ 7.00  | ng/l) >> DO value (from solubility table) f<br>$20$ $\leq$ @ 4.01 @<br>@ 0 μS/cm $20$ $\leq$ @ 71   | ; or Sonde thermistor for Method 1 or 2<br>for Method 1, or the YSI DO value for Method 2<br>10.00 (Record OK for buffer(s) used)<br>.8 μS/cm (0 /           .8 μS/cm         0 /         6         1413 μS/cm           .0         0 /         0         0         0 |
| PRE-RETRIEVAL "CAL END PO   | DINT" OR PERFORMANCE CHEC   | CK VALUES (at DO monitor location):   |
| Time  | DO / pH Meter   | MS5 Monitor   |
| (prevailing, 24 hr) *   | Temp C Te<br>DO mg/l DC<br>pH su pH   |   |
| 5 MONITOR REDEPLOYMENT "C   | CAL BEGIN POINT" MEASUREM   |   |
| Time  | DO / pH Meter   | MS5 Monitor   |
| (prevailing, 24 hr) *   | Temp  | Temp °C **  |
|   | DOmg/l  | DOmg/l **   |
|   | pH su   | pH su **  |
| and the second se | Wind Conditions (Circle one): C   | alm Light Moderate Gusty Strong   |

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.

| OCATIO                | N: Lowe  | er Ri        | ver                                     |   | Invest                           | igator :                          | JCA, C.              | AG                                      |
|-----------------------|--|--------------|---|---|----------------------------------|-----------------------------------|----------------------|---|
|                       | 09 <b>28</b> /<br>mmddy  | -            | 2 = Performance                         | eploy monitor (comp<br>check (complete Sed<br>data download & m | tions 1, 2, 3 & 7                | 0                                 | 4=Lt.Rain 5=         | Cloudy 3=Overcast<br>H. Rain 6=Fog/Haze |
| 1 PROJE               | CT FLOW / REI  | LEASE CO     | NDITIONS                                |   |                                  |                                   |                      | sa demo                                 |
|                       | IR Units Operat  |              | (0 to 8)                                |   |                                  |                                   | S or NO (circ        |   |
| Time<br>( <br>Meter # | METER CALIB<br>0845<br>prevailing, 24 hr)<br>1<br>TER CALIBRAT | •            | CAL Temp<br>Meter Temp<br>Meter adj. to | 21.0  | <b>ວ</b><br>ວີ<br>ວີ             | CAL DO<br>Meter DO<br>Meter adj t | 8.40<br>8.50<br>8.41 | (mg/l)                                  |
| Time                  | ER CALIDRA I   |              |   | 0 Dutter system<br>7.00 su                                      | •                                |                                   | •                    | ) su                                    |
| MONIT                 | OR CALIBRATI   |              |   | arometric press   |                                  |                                   |                      |   |
| c                     | Calibration***<br>Cal Temp 7<br>Cal DO 8                       | 4.9 (°C      | ) >> °C fro<br>(//) >> DO va            | 4 = Other<br>hand thermorr<br>hand thermorr                     | eter; YSI; or<br>ty table) for I | Sonde thermis<br>Method 1, or th  | tor for Method       | 1 or 2                                  |
| Con                   | Calibration ***<br>ductivity Calibr<br>oldity Calibratio       | ration***    | @ 0 µS/cm                               |   | @ 718 µ                          | ıS/cm 📉                           |                      | μS/cm                                   |
| PRE-RE                | TRIEVAL "CAL   | END POI      | NT" OR PE                               | RFORMANC  | E CHECK                          | VALUES (a                         | t DO monito          | location):                              |
| Time                  | -  |              | DO / pH                                 |   |                                  | MS5 Mon                           |                      |   |
|                       | (prevailing, 2   |              |   |   | Temp                             |                                   | °C **                |   |
|                       |  |              |   |   | DO                               |                                   | mg/l **              |   |
| MONITO                | OR REDEPLOY  |              |   |   | PH                               | TS (at mon                        | SU **                |   |
|                       | ime  |              |   | pH Meter  |                                  |                                   | Monitor              | •/-                                     |
|                       | <u> </u>   | ig, 24 hr) * | Temp                                    | <b>⊡</b> •c   |                                  | Temp                              |                      |   |
|                       |  |              | DO                                      | mg/l  |                                  | DO                                | <br>mg/l '           | brit:                                   |
|                       |  |              | рн [                                    | sı  | I                                | pH                                | <br>su **            |   |
|                       | perature<br>mpling Notes:                                      | _°C          |   | itions (Circle o  |                                  |                                   |                      |   |

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.

**ENCLOSURE 1 CONOWINGO & MUDDY RUN STATIONS MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET** LOCATION: Investigator : DATE PURPOSE Weather Code m m d d ۷ 1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below) 1=Clear 2=P. Cloudy 3=Overcas 2 = Performance check (complete Sections 1, 2, 3 & 7) 4=Lt.Rain 5= H. Rain 6=Fog/Haze 3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) **1 PROJECT FLOW / RELEASE CONDITIONS:** No. of MR Units Operating Flow from Holtwood Evident: YES or NO (circle one) (0 to 8) 2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water. 20.0 °C Time 0750 CAL Temp CAL DO *a* 0 (mg/l)(prevailing, 24 hr) \* (mg/l) O に Meter Temp - ð Meter DO 0 °C Meter# 10983 Meter adj. to OK °C Meter adi to .07 (mg/l)pH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su) Meter reading @ 7.00 su Time @ 4.01 su or @ 10.00 su 7499 **3 MONITOR CALIBRATION:** Barometric pressure = **DO Calibration\*\*\*** Method Used: 3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT 4 = Other Cal Temp 20 D (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2 (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2 Cal DO ( $@ 10.00 \sqrt{p}^{j/c}$  (Record OK for buffer(s) used) pH Calibration \*\*\* @ 7.00 VOK @ 4.01 @ 718  $\mu$ S/cm \_\_\_\_/ $\nu$ /\_ @ 1413  $\mu$ S/cm VOK Conductivity Calibration\*\*\* @ 0 μS/cm @ <1 NTU √bK @ 20 NTU\_ **Turbidity Calibration\*\*\*** @ 10 NTU \_\_\_ 4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location): Time **DO / pH Meter MS5 Monitor** °C \*\* (prevailing, 24 hr) \* Temp °C Temp ma/l \*\* DO ma/l DO SU \*\* pН рH SU 5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location): Time DO / pH Meter **MS5** Monitor (prevailing, 24 hr) \* °C \*\* Temp Temp DO mg/l DO ma/l \*\* su \*\* pН SU pH 6 Air Temperature D°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.

| ENCLOSURE 1<br>CONOWINGO & MUDDY RUN STATIONS   |
|---|
| MS5 LDO MONITOR CALIBRATION & CHECK FIELD SHEET   |
| LOCATION: <u>LZ 10/5/10</u> Investigator: <u>JCA</u> EK   |
| DATE       Image: Strain display="block">O       PURPOSE       Image: Strain display="block">Weather Code       Image: Strain display="block">Strain display="block"         Image: Display="block">DATE       Image: Strain display="block">Display=       Image: Strain display="block">Weather Code       Image: Strain display="block"       Image: Strain display="block"       Image: Strain display="block">Strain display="block"       Image: Strain display="bloc |
| 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  |
| Time Meter reading @ 7.00 su @ 4.01 su or @ 10.00 su  |
| 3 MONITOR CALIBRATION: Barometric pressure = 749.55   |
| DO Calibration*** Method Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT<br>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       @ 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  |
| 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 **  |
| 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 **  |
| <br>DO mg/l **  |
| pH I su pH su **  |
| 6 Air Temperature°C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong<br>Other Sampling Notes:At Roin Million (Circle one):  |

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

| OCATION: COND PON                          | S Inves  | stigator: SWA RDK  |
|--|--|--|
|  | PURPOSE       2         1 = Calibrate & deploy monitor (complete Sec 1, 2, 4)         2 = Performance check (complete Sections 1, 2, 3 & 3)         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3 & 3) | 7) 4=Lt.Rain 5= H. Rain 6=Fog/Haze   |
| PROJECT FLOW / RELEASE C                   | ONDITIONS:   |  |
| No. of MR Units Operating                  | (0 to 8) Flow from Holtwood  | Evident: YES or NO (circle one)  |
| 2 YSI DO METER CALIBRATION:                |  |  |
| Time 0730<br>(prevailing, 24 hr) *         | CAL Temp         23.2         °C           Meter Temp         23.2         °C DK   | CAL DO <u>8.56</u> (mg/l)  |
| Meter # 10183                              | Meter adj. to $23.7$ °C  | Meter DO         8.3         (mg/l)         0           Meter adj to         8.56         (mg/l) |
|  | a one or two buffer system (7.00 and   |  |
| •  | reading @ 7.00 su @ 4.0  | •  |
|  | Barometric pressure = 74   | 14-2   |
|  |  | ver Water (bucket) vs YSI; 3 = LDO 100% SAT  |
| Cal Temp (°C                               | C from hand thermometer; YSI; c  |  |
| Cal DO                                     | <b>a/l)</b> >> DO value (from solubility table) for  | Method 1, or the YSI DO value for Method 2   |
| · •  |  | 0.00 (Record OK for buffer(s) used)  |
|  | @ 0 μS/cm√ <u>°</u> K_ @ 718   |  |
|  |  | @ 20 NTU 014   |
|  |  |  |
| PRE-RETRIEVAL "CAL END PO                  | INT" OR PERFORMANCE CHECK  | <b>VALUES (at DO monitor location):</b>  |
| Time                                       | DO / pH Meter  | MS5 Monitor  |
| (prevailing, 24 hr) *                      | Temp C Tem   | ıp °C **   |
|  | DO mg/l DO   | mg/l **  |
|  | pH su pH   | <br>SU **  |
| MONITOR REDEPLOYMENT "C                    | AL BEGIN POINT" MEASUREME  | NTS (at monitor location):   |
| Time                                       | DO / pH Meter  | MS5 Monitor  |
| (prevailing, 24 hr) *                      | Temp   | Temp °C **   |
|  | DOmg/l   | DOmg/l **  |
|  | pH su  | pH su **   |
| Air Temperature°C<br>Other Sampling Notes: | Wind Conditions (Circle one): Ca   | Im Light Moderate Gusty Strong   |
|  | ·····  |  |
|  |  |  |

\* 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.

| DATE       Imm d d y y       PURPOSE [A]       Weather Code [/]         1 = obtaine & display months (complete scalars)       1 = colore to Code y = Cod           | LOCATION: MRPSP STA004-Cylinder or STA005-1   | R Deck Investigator :  | JCA/EK  | =                      |
|--|---|--|---|------------------------|
| No. of MR Units Operating       □ 0 to 5)       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         Time       CAL Temp       2 * C         Meter #       Meter Temp       2 * C         Meter #       Meter adj. to       * C         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       D0 / pH Meter       DSSX Monitor         Mg/ pH       su pH       su **       pH         su pH       su **       pH       su         Cond  | DATE<br>m m d d y y<br>PURPOSE<br>1 = Cetibrate & deploy moni<br>2 = Performance check (cor<br>3 = Retrieve for data down   | itor (complete Sec 1, 2, 5, 6, & 7 below)<br>nplete Sections 1, 2, 3 & 7)<br>tload & maintenance (complete Sections 1, 2 | 1=Clear 2=P. Cloudy 3=Overcast<br>4=L1.Rain 5= H. Rain 6=Fog/Haze | _                      |
| 2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.         Time       CAL Temp       2 °C       CAL DO <i>J</i> · .5 ° (mg/l)         Meter #       Meter Temp       2 °C       Meter DO <i>J</i> · .5 ° (mg/l)         PM METER CALIBRATION: Use a one or two buffer system (7:00 and 4.01 or 10.00 su)       (mg/l)       (mg/l)         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):       MISS Monitor       MSS Monitor         1       Monitor, 24 hr)*       Temp       °C       Temp       °C **         1       (prevailing, 24 hr)*       Temp       °C       Temp       °C **       Temp       °C **         1       (prevailing, 24 hr)*       Temp       °C       Temp       °C **       Temp       °C **         1       (prevailing, 24 hr)*       Temp       °C       Temp       °C **       Temp       °C **         1       (prevailing, 24 hr)*       Temp       °C **       Temp       (24 hr)*       Age/cm         4       DO       mg/l       DO       mg/l **       DO       mg/l       µL */cm         4       DO walked file or Onsite)   | PROJECT FLOW / RELEASE CONDITIONS:  | Reservoir Elevation  | (F) [   | -                      |
| Time       CAL Temp       23       *C       CAL DO       \$.56'       (mg/l)         Meter #       Meter Temp       23       *C       Meter DO       \$.55'       (mg/l)         Meter #       Meter Temp       23       *C       Meter DO       \$.55'       (mg/l)         PH METER CALIBRATION: Use a one or two buffer system (7.00 and 4.01 or 10.00 su)  |   | 10 N 1   |   | -                      |
| pH METER CALLBRATION: 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       D0 / pH Meter       DS5X Monitor       MS5 Monitor         Image: D0 / pH Meter       DS5X Monitor       MS5 Monitor       ms7         D0       mg/l       D0       mg/l **       D0       mg/l         D0       generation       generation       generation       generation       generation         Batarise replaced       (forevailing, 24 hr)*       Temp       generation       generation       generation         Batarise replaced       1 = None requricit, 2 = Sensons cleaned; 3 = pH electrol  | Time     CAL Temp       (prevailing, 24 hr)*     Meter Temp   | <u>23</u> ℃ CAL DO<br>23 ℃ Meter DO  | 8.56 (mg/l)<br>8-56 (mg/l)  |                        |
| Time       DO / pH Meter       DS5X Monitor       MS5 Monitor         Image: the probability of the probability of the probability of the pH image: the pH i | pH METER CALIBRATION: Use a one or two buffer   | system (7.00 and 4.01 or 10.00 su)   |   | -                      |
| 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)       (Lab or Onsite)       Time of Download:       (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       (24 hr)*         5       MONITOR CALIBRATION:       Barometric pressure =       744'.         DO Calibration***       Method Used:       1 = A ented Water, 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT         4 = Other       2       7 H4'.       Cal Temp       23 (°C)       °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2         Cal Temp       23 (°C)       > °C from hand thermometer; YSI; or Sonde thermistor for Method 2       pH Calibration ***       @ 10.00 (Record OK tor buffer(a) used)         Conductivity Calibration***       @ 0 µS/cm       @ 718 µS/cm       @ 1413 µS/cm       20.6 -         Time that the monitor was redeployed in the Tailrace       (prevailing, 24 hr)*       Temp   | Time DO / pH Meter  | DS5X Monitor   | MS5 Monitor   |                        |
| pH       su       pH       su       su       model       su       su       model       su       su       model       mod   |   |  | i entp  |                        |
| Cond       µS/cm**       Cond       µS/cm         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 cleared; 3 = pH electrolyte replaced;       4 = Batteries replaced; 5 = Other       (24 hr)*         5       MONITOR CALIBRATION:       Berometric pressure =744'.   |   | й на — — — — — — — — — — — — — — — — — —   | <u> </u>  | _mg/i                  |
| Time retrieved (taken out of service)  |   | - · · · · · · · · · · · · · · · · · · ·  | •                           | μS/cm                  |
| DO Calibration***       Method Used: ① 1 = Aerated Water, 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT<br>4 = Other         Cal Temp       2.3       (°C)       >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2         Cal DO       ① (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       Twbid U 2         Time that the monitor was redeployed in the Tailrace       ① (prevailing, 24 hr)*       DO / pH Meter       DS5X Monitor       MS5 Monitor         Time       DO / pH Meter       DS5X Monitor       MS5 Monitor       C       Temp°C   | Time retrieved (taken out of service)       Image: Comparison of the service         Data Download Location:       (Lab or Onside the service)         Applicable Maintenance Performed:       1 = Notest of the service) | (prevailing, 24 hr) *<br><b>Site)</b> Time of Download:<br>ne required; 2 = Sensors cleaned; 3 = pt-                     | · ·   |                        |
| 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  | MONITOR CALIBRATION: Baron  | netric pressure = <u>744.</u> Z  |   | •                      |
| 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         Time that the monitor was redeployed in the Tailrace        (prevailing, 24 hr)*          MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):         DO / pH Meter       DS5X Monitor       MS5 Monitor         Time       DO / pH Meter       DS5X Monitor       Temp°C       Temp°C       Temp°C  | 27 4=0t   | her  | *)  |                        |
| Conductivity Calibration***       @ 0 μS/cm       @ 718 μS/cm       @ 1413 μS/cm       Turbidify 21         Time that the monitor was redeployed in the Tailrace       (prevailing, 24 hr)*       Turbidify 21         MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):         Time       DO / pH Meter       DS5X Monitor       MS5 Monitor         Image: Constrained and the trained at the monitor location of the trained at the monitor location of the trained at the monitor location of the trained at t  | Cal DO  | solubility table) for Method 1, or the YS  | I DO value for Method 2   |                        |
| MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):         Time       DO / pH Meter       DS5X Monitor       MS5 Monitor         (prevailing, 24 hr)*       Temp       °C       Temp       °C  |   | /  |   | ~                      |
| MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):         Time       DO / pH Meter       DS5X Monitor       MS5 Monitor         (prevailing, 24 hr)*       Temp       °C       Temp       °C  |   | F 193  | Turbid  | ity 21 - 1<br>20.6 - 0 |
| (prevailing, 24 hr) * Temp °C Temp °C ** Temp °C   | 1 (II-221-2   |  | (201)   |                        |
|  | Time DO / pH Me   | ter 👘 DS5X Monito  | MS5 Monitor   |                        |
|  | (prevailing, 24 hr) * Temp  | °C Temp °  | C ** Temp   | °C                     |
|  |   | land DO -  | ng/I ** DO  | mg/i                   |
| pH su pH su ** pH su<br>Cond μS/cm** Cond μS/cm  | 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. \*\*

|                              | TOR CALIBRATION & CHECK FIELD SHEET   |
|------------------------------|---|
| OCATION: CONSIN              | Investigator: SWA/LNT   |
| ATE 101910                   | PURPOSE 2 Weather Code 4  |
| mmdd y y                     | 1 = Calibrate & deploy monitor (complete Sec 1, 2, 5, 6, & 7 below) 1=Clear 2=P. Cloudy 3=Overcas   |
|                              | 2 = Performance check (complete Sections 1, 2, 3 & 7)       4=LLRain 5= H. Rain 6=Fog/Haz         3 = Retrieve for data download & maintenance (complete Sections 1, 2, 3, 4 & 7) |
| PROJECT FLOW / RELEASE       | CONDITIONS:   |
| No. of MR Units Operating    | (0 to 8) Flow from Holtwood Evident: YES or NO (circle one)   |
|                              | N: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.  |
| Time 0745                    | CAL Temp 20.5 °C CAL DO 9.0 (mg/l)  |
| (prevailing, 24 hr) *        | 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)   |
| •                            | se a one or two buffer system (7.00 and 4.01 or 10.00 su)<br>$\bigcirc$ 4.01 or $\bigcirc$ 4.00 su  |
| Time Met                     | er reading @ 7.00 su @ 4.01 su or @ 10.00 su  |
| MONITOR CALIBRATION:         | Barometric pressure = 746.95  |
| DO Calibration*** Met        | hod Used: 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LDO 100% SAT<br>4 = Other   |
| Cal Temp                     | °C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2   |
| Cal DO 890                   | mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2  |
| pH Calibration *** @ 7.0     | 0 / 0/2 @ 4.01 @ 10.00 / 0/2 (Record OK for buffer(s) used)   |
|                              | * @ 0 μS/cm <u>/ 0 κ</u> @ 718 μS/cm <u>/ 0 κ</u> @ 1413 μS/cm  |
| Turbidity Calibration***     |   |
| PRE-RETRIEVAL "CAL END F     | POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):  |
| Time                         | DO / pH Meter MS5 Monitor   |
| (prevailing, 24 hr) *        | Temp °C Temp °C **  |
| lauraakeuroofinaa eelaanaa f | DO mg/l **  |
|                              |   |
|                              | pH su pH su **  |
|                              | 'CAL BEGIN POINT" MEASUREMENTS (at monitor location):   |
| Time                         | DO / pH Meter MS5 Monitor   |
| (prevailing, 24 hr)          | * Temp°C **   |
|                              | DOmg/l DOmg/l **  |
|                              | pH su pH su **  |
| Air Temperature°C            | Wind Conditions (Circle one): Calm Light Moderate Gusty Strong  |

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.

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

| LOCATION: Lower River                        | Investigator :_ Ek   | K, ACS   |
|--|--|--|
| DATE 101910<br>mmddyy                        | 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, | Weather Code<br>1=Clear 2=P. Cloudy 3=Overcast<br>4=LLRain 5= H. Rain 6=Fog/Haze<br>2, 3, 4 & 7) |
| 1 PROJECT FLOW / RELEASE                     | CONDITIONS:  |  |
| No. of MR Units Operating                    | (0 to 8) Flow from Holtwood Evident: YES   |  |
|  | N: Calibrate the YSI meter with the DO probe in air satur  |  |
| Time 083<br>(prevailing, 24 hr) *            | CAL Temp 20.5 °C CAL DO  | <u>8-9</u> (mg/l)  |
| Meter # $\leq 7$                             | Meter Temp <u>20,5</u> °C Meter DO<br>Meter adj. to <u>°C</u> Meter adj to   | <u>8</u> 6 (mg/l)  |
|  | se a one or two buffer system (7.00 and 4.01 or 10.00 s  |  |
|  | er reading @ 7.00 su @ 4.01 su   | •  |
|  |  |  |
| 3 MONITOR CALIBRATION:                       | 825 hr Barometric pressure = 746.95  |  |
| DO Calibration*** Met                        | thod Used: 3 1 = Aerated Water; 2 = River Water (bucket) v   | s YSI; 3 = LDO 100% SAT  |
| Cal Temp                                     | 4 = Other<br>(°C) >> °C from hand thermometer; YSI; or Sonde thermistor  | r for Mothod 1 or 2  |
|  |  |  |
|  | (mg/l) >> DO value (from solubility table) for Method 1, or the  |  |
| pH Calibration *** @ 7.0                     |  |  |
| Conductivity Calibration**                   | * @ 0 μS/cm <u>√0 /</u> @ 718 μS/cm <u>√0 (</u>  | <u>4</u> @ 1413 μS/cm  |
| TurbIdity Calibration***                     | @ <1 NTU <u>/ 0 / </u> @ 10 NTU  | @ 20 NTU /0 K  |
| 4 PRE-RETRIEVAL "CAL END I                   | POINT" OR PERFORMANCE CHECK VALUES (at   | DO monitor location):  |
| Time   | DO / pH Meter MS5 Monit  |  |
| (prevailing, 24 hr) *                        | Temp °C Temp °   | C **   |
|  |  | ng/l **  |
|  |  | •  |
|  |  | su **  |
|  | 'CAL BEGIN POINT" MEASUREMENTS (at monit   |  |
| Time   | r  | lonitor  |
| (prevailing, 24 hr)                          | • Temp °C Temp   | °C **  |
|  | DOmg/l DO  | mg/l **  |
|  | pH   | su **  |
| 6 Air Temperature°C<br>Other Sampling Notes: | Wind Conditions (Circle one): Calm Light Mode  |  |
| · · · · · · · · · · · · · · · · · · ·        |  | <u> </u>   |
|  |  | · · · · · · · · · · · · · · · · · · ·  |

\* 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

| mmmddyy       1 = Calibrate & deploy monitor (complete Sections 1, 2, 5, 6, 8, 7 below)       1=Clier 2-P. Cloudy 3=Decretal<br>4=LEMin 5=rt, Rain 6=Forphace<br>3 = Review for data worksol & maintenance (complete Sections 1, 2, 3, 4, 8, 7)         1       PROJECT FLOW / RELEASE CONDITIONS:<br>No. of MR Units Operating       (0 to a)       Flow from Holtwood Evident; TSS or NO (circle one)         2       YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.<br>Time  | LOCATION: Conowings H                                     | ond   | Invo                    | estigator : <u>A</u> ( | A/1H  |
|--|---|---|-------------------------|------------------------|---|
| 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       0% [S] (regrit)         2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.       CAL Temp       22 (mg/l)         Meter #   |   | 1 = Calibrate & deploy m<br>2 = Performance check ( | complete Sections 1, 2, | 3 & 7)                 | 1=Clear 2=P. Cloudy 3=Overcast<br>4=Lt.Rain 5= H. Rain 6=Fog/Haze |
| 2 YSI DO METER CALIBRATION: Calibrate the YSI meter with the DO probe in air saturated (aerated) water.         Time       OSIS       CAL Temp       Q2_0       °C       CAL DO       S.22       (mg/l)         Meter #        Meter adj to       Q2_0       °C       Meter DO       S.22       (mg/l)         Meter #        Meter adj to       Q2_0       °C       Meter DO       S.22       (mg/l)         PH metres CaLIBRATION:       Use a one or two buffer system (7.00 and 4.01 or 10.00 su)       or @ 10.00 su  | 1 PROJECT FLOW / RELEASE                                  | CONDITIONS:   |                         |                        |   |
| Time       OSIS       CAL Temp       QQ_O       °C       CAL DO       S.Q_O       (mg/l)         Meter #   | No. of MR Units Operating                                 | (0 to 8) Flo  | w from Holtwoo          | d Evident: YES         | or NO (circle one)  |
| (prevailing, 24 hr)*       Meter Temp       22.0       °C       Meter DD       350       (ng/l)         Meter #  | 2 YSI DO METER CALIBRATIO                                 | N: Calibrate the YSI n                              | neter with the DO       | probe in air satura    | ited (aerated) water.   |
| Meter #  | Time 0815   |   | 0                       | CAL DO                 | <u>\$,72</u> (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 = 245.325         DO Calibration***       Method Used:       3 1 = Aerated Water; 2 = River Water (bucket) vs YSI; 3 = LD0 100% SAT 4 = Other         Gal Temp       (°C) >> °C from hand thermometer; YSI; or Sonde thermistor for Method 1 or 2         Cal DO       1200 (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   | (prevailing, 24 hr) *                                     | Meter Temp  | 22 <u>0</u> °C          | Meter DO               | 8,50 (mg/l)   |
| Time       Meter reading @ 7.00 su       @ 4.01 su       or @ 10.00 su         3 MONITOR CALIBRATION:       Barometric pressure = 245.325         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       100 (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 (@ 1413 µS/cm (@ 1413 µS/cm (@ 20 NTU (@ 2  |   |   |                         |                        |   |
| 3 MONITOR CALIBRATION:       Barometric pressure =45.3 ≤   | •   |   |                         |                        |   |
| DO Calibration***       Method Used: []] 1 = Aerated Water, 2 = River Water (bucket) vs YSI; 3 = LD0 100% SAT<br>4 = Other   | Time Me   | ter reading @ 7.00 s                                | su @ 4                  | .01 su 0               | or @ 10.00 su   |
| 4 = Other  | <b>3 MONITOR CALIBRATION:</b>                             | Barome  | stric pressure = 🧵      | 45.375                 |   |
| Cal DO       (mg/l) >> DO value (from solubility table) for Method 1, or the YSI DO value for Method 2         pH Callibration ***       @ 7.00       @ 4.01       @ 10.00       (Record OK for buffer(s) used)         Conductivity Callibration ***       @ 0 µS/cm       @ 718 µS/cm       @ 1413 µS/cm         Turbldity Callibration ***         @ <1 NTU   | DO Calibration*** Me                                      |   |                         |                        | : YSI; 3 = LDO 100% SAT   |
| 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         Turbldity Calibration ***         @ <1 NTU  | Cal Temp  | (°C) >> °C from han                                 | d thermometer; YS       | ; or Sonde thermisto   | r for Method 1 or 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   |   | (ma/l) >> DO value (fr                              | om solubility table)    | for Method 1 or the    | YSI DO value for Method 2   |
| Conductivity Calibration***       @ 0 μS/cm       @ 718 μS/cm       @ 1413 μS/cm         Turbldity Calibration***       @ <1 NTU   |   |   |                         |                        |   |
| Turbldity Calibration***       @ <1 NTU       @ 10 NTU       @ 20 NTU /         4 PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at D0 monitor location):       monitor         Time       DO / pH Meter       MS5 Monitor         Image: Do / pH Meter       MS5 Monitor         Image: Do / pH Meter       mg/l ±±         DO / mg/l       DO0C ±±         DO / pH Meter       MS5 Monitor         Time       DO / pH Meter       MS5 Monitor         Time       DO / pH Meter       MS5 Monitor         Image: Do / pH Meter       MS5 Monitor  |   |   |                         |                        |   |
| 4       PRE-RETRIEVAL "CAL END POINT" OR PERFORMANCE CHECK VALUES (at DO monitor location):         Time       DO / pH Meter       MS5 Monitor   |   |   |                         |                        | . /   |
| 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         image: fight (prevailing, 24 hr)*       Temp       °C       Temp       °C **         DO       mg/l       DO / pH Meter       MS5 Monitor       OC **         DO       mg/l       °C       Temp       °C **         DO       mg/l       DO       mg/l **         PH       su       pH       su **         6 Air Temperature /7.4 °C       Wind Conditions (Circle one):       Calm Light Moderate Gusty Strong   | <b>Turbidity Calibration***</b>                           | @ <1 NTU 🗍  | @ 10 N1                 | ſU                     | @ 20 NTU  |
| 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         image: fight (prevailing, 24 hr)*       Temp       °C       Temp       °C **         DO       mg/l       DO / pH Meter       MS5 Monitor       OC **         DO       mg/l       °C       Temp       °C **         DO       mg/l       DO       mg/l **         PH       su       pH       su **         6 Air Temperature /7.4 °C       Wind Conditions (Circle one):       Calm Light Moderate Gusty Strong   |   |   |                         |                        |   |
| Image: state of the state | -   |   |                         | -                      |   |
| 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         Image: Construction of the second s  |   |   |                         |                        |   |
| pH       su       pH       su **         5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):         Time       DO / pH Meter       MS5 Monitor         image: the second sec   | (prevailing, 24 hr) *                                     | Temp  | °C Te                   | emp                    | C **  |
| 5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):         Time       DO / pH Meter       MS5 Monitor         Image: Colspan="2">Image: Colspan="2" Image: Cols  |   | DO  | mg/l D                  | 0n                     | ng/l **   |
| 5 MONITOR REDEPLOYMENT "CAL BEGIN POINT" MEASUREMENTS (at monitor location):         Time       DO / pH Meter       MS5 Monitor         Image: Constraint of the second s  |   | DH  | su pł                   |                        | su **   |
| Time     DO / pH Meter     MS5 Monitor       Image: Do / pH Meter     Temp     °C       Image: Do / pH Meter     Temp     PH       Image: Do / pH Meter     pH     su       Image: Do / pH Meter     Temp     PH       Image: Do / pH Meter     Image: Do / pH Meter       Image: Do / pH Meter     Ima  | 5 MONITOR REDEPI OYMENT                                   | ·   | T" MEASUREM             | IENTS (at monit        | or location):   |
| (prevailing, 24 hr)*       Temp       °C       Temp       °C **         DO       mg/l       DO       mg/l       mg/l **         pH       su       pH       su **         6 Air Temperature       17.4 °C       Wind Conditions (Circle one):       Calm Light Moderate Gusty Strong  |   |   |                         |                        |   |
| DO mg/l DO mg/l **<br>pH su pH su **<br>6 Air Temperature 17.4 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong   |   | · · · · · · ·                                       | _                       |                        |   |
| pH     su     pH     su **       6 Air Temperature 17.4 °C     Wind Conditions (Circle one):     Calm Light Moderate Gusty Strong  | [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [                     |   |                         | remp                   |   |
| 6 Air Temperature 17.4 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong   |   |   | mg/I                    | DO                     | mg/l **   |
| 6 Air Temperature 17.4 °C Wind Conditions (Circle one): Calm Light Moderate Gusty Strong   |   | рН  | su                      | pН                     | su **   |
|  | 6 Air Temperature <u>17.4</u> °C<br>Other Sampling Notes: | Wind Condition                                      | s (Circle one): (       | Calm Light Mode        | erate Gusty Strong  |
|  | ······  |   |                         |                        |   |
|  |   |   |                         |                        |   |

\* 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.

| LOCATION: L.S.R. BE  | ON CONOWINKO   | Investigator :k  | ST, MDM  |
|--|--|--|--|
| DATE /026/0  | PURPOSE 2  |  | Weather Code 3   |
| m m d d y y  | 1 = Calibrate & deploy monitor (comp   |  | 1=Clear 2=P. Cloudy 3=Overc  |
|  | 2 = Performance check (complete Se<br>3 = Retrieve for data download & m   |  | 4=Lt.Rain 5= H. Rain 6=Fog/H<br>1, 2, 3, 4 & 7)  |
| 1 PROJECT FLOW / RELEASE   | ONDITIONS:   |  |  |
| No. of MR Units Operating  | (0 to 8) Flow from I   | Holtwood Evident: YE   | S or NO (circle one)   |
| 2 YSI DO METER CALIBRATION   |  |  |  |
| Time 0835  | CAL Temp 22.0  | -  | <u>8.7</u> (mg/l)  |
| (prevailing, 24 hr) *<br>Meter # 10984   | Meter Temp <u>Z1.8</u><br>Meter adj. to <u>ZZ.0</u>  |  | o <u>8</u> .7 (mg/l)   |
| pH METER CALIBRATION: Us   |  |  |  |
|  | r reading @ 7.00 su  |  |  |
| 3 MONITOR CALIBRATION:   | Rammatric proce  | sure = <u>745.3</u>  |  |
|  | iod Used: 3 1 = Aerated W  |  | VE VSI: 3 = 1 DO 100% SAT  |
|  | 4 = Other  |  |  |
| Cal Temp 22.8 (  | C) >> °C from hand thermon   | neter; YSI; or Sonde thermis   | tor for Method 1 or 2  |
| Cal DO 840 (   | <b>ng/l)</b> >> DO value (from solubil   | ity table) for Method 1, or th   | e YSI DO value for Method 2  |
| pH Calibration *** @ 7.0   | 0.2. @4.01 JA  | @ 10.00 0.4.   | (Record OK for buffer(s) used)   |
| Conductivity Calibration***  | @ 0 μS/cm <u>0.</u>  | @ 718 µS/cm  | <u>/</u> @ 1413 μS/cm  |
|  |  |  |  |
| Turbidity Calibration***   | @ <1 NTU <u>n.k.</u> @   | 10 NTU NA  | @ 20 NTU 0.14.   |
| Turbidity Calibration*** 4 PRE-RETRIEVAL "CAL END P  |  | 1  |  |
| and the state of the  |  | 1  | t DO monitor location):  |
| 4 PRE-RETRIEVAL "CAL END P<br>Time<br>(prevailing, 24 hr) *  | DINT" OR PERFORMANC  | E CHECK VALUES (a  | t DO monitor location):  |
| 4 PRE-RETRIEVAL "CAL END P<br>Time   | DINT" OR PERFORMANC<br>DO / pH Meter<br>Temp   | E CHECK VALUES (a<br>MS5 Mon<br>Temp   | t DO monitor location):<br>itor<br>°C **   |
| 4 PRE-RETRIEVAL "CAL END P<br>Time<br>(prevailing, 24 hr) *  | DINT" OR PERFORMANC<br>DO / pH Meter<br>Temp °C<br>DO mg/l   | E CHECK VALUES (a<br>MS5 Mon<br>Temp<br>DO   | t DO monitor location):<br>itor<br>°C **<br>mg/l **  |
| 4 PRE-RETRIEVAL "CAL END P<br>Time<br>(prevailing, 24 hr) *  | DINT" OR PERFORMANC<br>DO / pH Meter<br>Temp °C<br>DO mg/l<br>pH su  | E CHECK VALUES (a<br>MS5 Mon<br>Temp<br>DO<br>pH   | t DO monitor location):<br>itor<br>°C **<br>mg/l **<br>su **   |
| 4 PRE-RETRIEVAL "CAL END P<br>Time<br>(prevailing, 24 hr) *<br>5 MONITOR REDEPLOYMENT "  | DINT" OR PERFORMANC<br>DO / pH Meter<br>Temp °C<br>DO mg/l<br>pH su<br>CAL BEGIN POINT" MEAS   | E CHECK VALUES (a<br>MS5 Mon<br>Temp<br>DO<br>pH<br>SUREMENTS (at mon  | t DO monitor location):<br>itor<br>°C **<br>mg/l **<br>su **<br>itor location):                                |
| 4 PRE-RETRIEVAL "CAL END P<br>Time<br>(prevailing, 24 hr) *<br>5 MONITOR REDEPLOYMENT "<br>Time  | DINT" OR PERFORMANC<br>DO / pH Meter<br>Temp °C<br>DO mg/l<br>pH su<br>CAL BEGIN POINT" MEAS<br>DO / pH Meter                                | E CHECK VALUES (a<br>MS5 Mon<br>Temp<br>DO<br>pH<br>SUREMENTS (at mon<br>MS5                                     | t DO monitor location):<br>itor<br>°C **<br>mg/l **<br>su **   |
| 4 PRE-RETRIEVAL "CAL END P<br>Time<br>(prevailing, 24 hr) *<br>5 MONITOR REDEPLOYMENT "  | DINT" OR PERFORMANC<br>DO / pH Meter<br>Temp °C<br>DO mg/l<br>pH su<br>CAL BEGIN POINT" MEAS<br>DO / pH Meter<br>Temp °C                     | E CHECK VALUES (a<br>MS5 Mon<br>Temp<br>DO<br>pH<br>SUREMENTS (at mon<br>MS5<br>Temp                             | t DO monitor location):<br>itor<br>°C **<br>mg/l **<br>su **<br>itor location):<br>Monitor<br>°C **            |
| 4 PRE-RETRIEVAL "CAL END P<br>Time<br>(prevailing, 24 hr) *<br>5 MONITOR REDEPLOYMENT "<br>Time  | DINT" OR PERFORMANC<br>DO / pH Meter<br>Temp °C<br>DO mg/l<br>pH su<br>CAL BEGIN POINT" MEAS<br>DO / pH Meter<br>Temp °C<br>DO mg/l          | E CHECK VALUES (a<br>MS5 Mon<br>Temp<br>DO<br>pH<br>SUREMENTS (at mon<br>MS5<br>Temp<br>DO                       | t DO monitor location):<br>itor<br>°C **<br>mg/l **<br>su **<br>itor location):<br>Monitor<br>°C **<br>mg/l ** |
| 4 PRE-RETRIEVAL "CAL END P<br>Time<br>(prevailing, 24 hr) *<br>5 MONITOR REDEPLOYMENT "<br>Time  | DINT" OR PERFORMANC<br>DO / pH Meter<br>Temp °C<br>DO mg/l<br>pH su<br>CAL BEGIN POINT" MEAS<br>DO / pH Meter<br>Temp °C<br>DO mg/l<br>pH su | E CHECK VALUES (a<br>MS5 Mon<br>Temp<br>DO<br>pH<br>SUREMENTS (at mon<br>MS5<br>Temp<br>DO<br>DO<br>DO           | t DO monitor location):<br>itor<br>°C **<br>mg/l **<br>su **<br>itor location):<br>Monitor<br>°C **            |
| <ul> <li>4 PRE-RETRIEVAL "CAL END P<br/>Time<br/>(prevailing, 24 hr)*</li> <li>5 MONITOR REDEPLOYMENT "<br/>Time<br/>(prevailing, 24 hr)*</li> <li>6 Air Temperature <u>172</u>°C</li> </ul> | DINT" OR PERFORMANC<br>DO / pH Meter<br>Temp °C<br>DO mg/l<br>pH su<br>CAL BEGIN POINT" MEAS<br>DO / pH Meter<br>Temp °C<br>DO mg/l          | E CHECK VALUES (a<br>MS5 Mon<br>Temp<br>DO<br>pH<br>SUREMENTS (at mon<br>MS5<br>Temp<br>DO<br>u pH<br>DO<br>u pH | t DO monitor location):<br>itor<br>°C **<br>mg/l **<br>su **<br>itor location):<br>Monitor<br>°C **<br>mg/l ** |

\*\* 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.

#### **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 |
|------------|---|--------|----|---|---|---|----|---|---|-----|------|------|
| Appendix B |   |        |    |   |   |   |    |   |   |     |      |      |

| 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 | Ν              | 1          | 1       | 2    | 6    | 2      | 1     | 8.0 | 17.8               | 28.5                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 5    | 6    | 8      | 1     | 8.2 | 17.8               | 28.9                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 2    | 7    | 0      | 1     | 7.5 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 5    | 7    | 5      | 1     | 7.5 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 2    | 7    | 57     | 1     | 8.2 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 5    | 8    | 3      | 1     | 8.2 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 2    | 8    | 57     | 1     | 7.8 | 17.8               | 28.8                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 5    | 9    | 2      | 1     | 7.6 | 17.8               | 28.8                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 2    | 10   | 0      | 1     | 8.2 | 17.8               | 28.8                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 5    | 10   | 5      | 1     | 8.0 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 2    | 11   | 3      | 1     | 8.2 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 5    | 11   | 7      | 1     | 8.0 | 17.8               | 29.2                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 2    | 12   | 1      | 1     | 8.0 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 5    | 12   | 6      | 1     | 7.8 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 2    | 13   | 2      | 1     | 8.2 | 17.8               | 29.2                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 5    | 13   | 7      | 1     | 8.0 | 17.8               | 29.2                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 2    | 14   | 0      | 1     | 8.4 | 17.8               | 29.2                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 5    | 14   | 6      | 1     | 7.8 | 17.8               | 29.2                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 2    | 15   | 4      | 1     | 8.2 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 5    | 15   | 7      | 1     | 8.0 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 2    | 16   | 3      | 1     | 8.2 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 5    | 16   | 9      | 1     | 7.8 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 2    | 17   | 0      | 1     | 7.5 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10 | Ν              | 1          | 1       | 3    | 17   | 3      | 1     | 7.0 | 17.8               | 29.0                 |

| Client   | Program | Date    | Wind Direction | Wind Speed | Weather | Unit | Hour | Minute | Depth | DO  | Air Temperature °C | Water Temperature °C |
|----------|---------|---------|----------------|------------|---------|------|------|--------|-------|-----|--------------------|----------------------|
| 21342031 | 9       | 7/4/10  | Ν              | 1          | 1       | 4    | 17   | 7      | 1     | 7.0 | 17.8               | 29.2                 |
| 21342031 | 9       | 7/4/10  | Ν              | 1          | 1       | 5    | 17   | 11     | 1     | 7.5 | 17.8               | 29.2                 |
| 21342031 | 9       | 7/4/10  | Ν              | 1          | 1       | 8    | 17   | 16     | 1     | 6.0 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/4/10  | Ν              | 1          | 1       | 2    | 18   | 2      | 1     | 7.5 | 17.8               | 29.2                 |
| 21342031 | 9       | 7/4/10  | Ν              | 1          | 1       | 5    | 18   | 10     | 1     | 7.5 | 17.8               | 29.0                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 2    | 6    | 2      | 1     | 8.3 | 20.0               | 29.2                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 5    | 6    | 5      | 1     | 8.0 | 20.0               | 29.1                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 2    | 7    | 2      | 1     | 8.2 | 20.0               | 29.1                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 5    | 7    | 7      | 1     | 7.8 | 20.0               | 29.2                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 2    | 8    | 0      | 1     | 8.0 | 20.0               | 29.2                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 5    | 8    | 3      | 1     | 8.1 | 20.0               | 29.2                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 2    | 9    | 1      | 1     | 8.3 | 20.0               | 29.2                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 5    | 9    | 4      | 1     | 8.0 | 20.0               | 29.2                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 2    | 10   | 0      | 1     | 8.3 | 20.0               | 29.2                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 5    | 10   | 4      | 1     | 7.8 | 20.0               | 29.3                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 2    | 11   | 0      | 1     | 8.1 | 20.0               | 29.3                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 5    | 11   | 3      | 1     | 7.8 | 20.0               | 29.3                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 2    | 12   | 1      | 1     | 8.4 | 20.0               | 29.4                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 1       | 5    | 12   | 5      | 1     | 8.0 | 20.0               | 29.5                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 2       | 2    | 13   | 4      | 1     | 8.0 | 36.8               | 29.3                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 2       | 5    | 13   | 7      | 1     | 7.5 | 36.8               | 29.5                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 2       | 2    | 14   | 2      | 1     | 7.9 | 36.8               | 29.3                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 2       | 5    | 14   | 5      | 1     | 7.6 | 36.8               | 29.5                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 2       | 2    | 15   | 0      | 1     | 7.8 | 36.8               | 29.3                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 2       | 5    | 15   | 4      | 1     | 7.5 | 36.8               | 29.5                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 2       | 2    | 16   | 1      | 1     | 8.1 | 36.8               | 29.2                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 2       | 5    | 16   | 5      | 1     | 7.9 | 36.8               | 29.4                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 2       | 2    | 17   | 0      | 1     | 7.5 | 36.8               | 29.6                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 2       | 5    | 17   | 4      | 1     | 7.3 | 36.8               | 29.8                 |
| 21342031 | 9       | 7/5/10  | Ν              | 1          | 2       | 2    | 18   | 0      | 1     | 8.3 | 36.8               | 29.5                 |
| 21342031 | 9       | 7/5/10  | Ν              | 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                 |

| 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                 |

| 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 | Ν              | 1          | 2       | 7    | 6    | 0      | 1     | 7.9 | 21.2               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 6    | 6      | 1     | 8.4 | 21.2               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 7    | 0      | 1     | 8.0 | 21.2               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 7    | 5      | 1     | 8.5 | 21.2               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 8    | 0      | 1     | 7.8 | 21.2               | 30.2                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 8    | 5      | 1     | 8.2 | 21.2               | 30.2                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 9    | 0      | 1     | 6.8 | 21.2               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 3    | 9    | 3      | 1     | 7.1 | 21.2               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 9    | 6      | 1     | 7.2 | 21.2               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 1    | 9    | 8      | 1     | 7.0 | 21.2               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 10   | 0      | 1     | 6.7 | 21.2               | 30.2                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 3    | 10   | 4      | 1     | 7.0 | 21.2               | 30.2                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 10   | 7      | 1     | 7.6 | 21.2               | 30.2                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 1    | 10   | 10     | 1     | 7.0 | 21.2               | 30.2                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 11   | 0      | 1     | 6.9 | 30.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 3    | 11   | 5      | 1     | 7.0 | 30.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 11   | 8      | 1     | 7.5 | 30.0               | 30.0                 |

| Client   | Program | Date    | Wind Direction | Wind Speed | Weather | Unit | Hour | Minute | Depth | DO  | Air Temperature °C | Water Temperature °C |
|----------|---------|---------|----------------|------------|---------|------|------|--------|-------|-----|--------------------|----------------------|
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 1    | 11   | 10     | 1     | 7.1 | 30.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 12   | 0      | 1     | 6.9 | 30.0               | 29.5                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 3    | 12   | 4      | 1     | 7.0 | 30.0               | 29.5                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 12   | 6      | 1     | 7.6 | 30.0               | 29.8                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 1    | 12   | 8      | 1     | 7.1 | 30.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 11   | 13   | 0      | 1     | 5.2 | 30.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 9    | 13   | 3      | 1     | 5.5 | 30.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 8    | 13   | 6      | 1     | 6.5 | 30.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 13   | 9      | 1     | 6.9 | 30.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 3    | 13   | 12     | 1     | 7.2 | 30.0               | 30.2                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 13   | 15     | 1     | 7.4 | 30.0               | 30.5                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 1    | 13   | 18     | 1     | 7.2 | 30.0               | 30.2                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 11   | 14   | 0      | 1     | 4.7 | 30.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 9    | 14   | 4      | 1     | 5.0 | 30.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 8    | 14   | 8      | 1     | 5.6 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 14   | 11     | 1     | 6.7 | 34.0               | 30.2                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 3    | 14   | 14     | 1     | 7.0 | 34.0               | 30.5                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 14   | 17     | 1     | 7.4 | 34.0               | 30.5                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 1    | 14   | 19     | 1     | 7.3 | 34.0               | 30.5                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 11   | 15   | 1      | 1     | 4.4 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 9    | 15   | 5      | 1     | 4.7 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 8    | 15   | 8      | 1     | 5.5 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 15   | 11     | 1     | 6.5 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 3    | 15   | 15     | 1     | 7.1 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 15   | 17     | 1     | 7.5 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 1    | 15   | 19     | 1     | 7.4 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 11   | 16   | 0      | 1     | 4.6 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 9    | 16   | 5      | 1     | 5.0 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 8    | 16   | 8      | 1     | 6.0 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 16   | 11     | 1     | 6.8 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 3    | 16   | 14     | 1     | 7.4 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 16   | 16     | 1     | 7.8 | 34.0               | 30.2                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 1    | 16   | 19     | 1     | 7.4 | 34.0               | 30.2                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 11   | 17   | 0      | 1     | 4.8 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 9    | 17   | 3      | 1     | 5.0 | 34.0               | 29.5                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 8    | 17   | 5      | 1     | 6.0 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 17   | 7      | 1     | 6.7 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 3    | 17   | 11     | 1     | 7.5 | 34.0               | 30.0                 |

| Client   | Program | Date    | Wind Direction | Wind Speed | Weather | Unit | Hour | Minute | Depth | DO  | Air Temperature °C | Water Temperature °C |
|----------|---------|---------|----------------|------------|---------|------|------|--------|-------|-----|--------------------|----------------------|
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 17   | 13     | 1     | 7.8 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 1    | 17   | 16     | 1     | 7.5 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 11   | 18   | 0      | 1     | 5.2 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 9    | 18   | 4      | 1     | 5.2 | 34.0               | 29.8                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 8    | 18   | 7      | 1     | 5.9 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 7    | 18   | 9      | 1     | 6.7 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 3    | 18   | 12     | 1     | 7.3 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 2    | 18   | 14     | 1     | 7.7 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/15/10 | Ν              | 1          | 2       | 1    | 18   | 15     | 1     | 7.5 | 34.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 6    | 1      | 1     | 8.5 | 31.0               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 6    | 9      | 1     | 8.0 | 31.0               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 7    | 2      | 1     | 8.5 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 7    | 10     | 1     | 8.0 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 8    | 9      | 1     | 8.0 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 8    | 16     | 1     | 7.8 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 9    | 1      | 1     | 8.2 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 9    | 6      | 1     | 7.5 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 10   | 5      | 1     | 8.0 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 10   | 9      | 1     | 7.4 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 11   | 3      | 1     | 8.2 | 34.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 11   | 7      | 1     | 7.2 | 34.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 12   | 6      | 1     | 7.6 | 34.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 3    | 12   | 9      | 1     | 7.0 | 34.5               | 30.2                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 6    | 12   | 14     | 1     | 6.5 | 34.5               | 30.2                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 12   | 19     | 1     | 6.7 | 34.5               | 30.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 8    | 12   | 22     | 1     | 6.5 | 34.5               | 30.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 1    | 13   | 11     | 1     | 7.2 | 34.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 13   | 7      | 1     | 7.6 | 34.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 3    | 13   | 13     | 1     | 7.4 | 34.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 4    | 13   | 15     | 1     | 7.1 | 30.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 6    | 13   | 18     | 1     | 6.8 | 30.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 13   | 21     | 1     | 6.7 | 30.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 8    | 13   | 23     | 1     | 6.1 | 30.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 9    | 13   | 27     | 1     | 5.7 | 30.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 1    | 14   | 1      | 1     | 7.2 | 30.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 14   | 6      | 1     | 7.8 | 30.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 3    | 14   | 11     | 1     | 7.3 | 30.5               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 4    | 14   | 14     | 1     | 7.2 | 30.5               | 30.2                 |

| Client   | Program | Date    | Wind Direction | Wind Speed | Weather | Unit | Hour | Minute | Depth | DO  | Air Temperature °C | Water Temperature °C |
|----------|---------|---------|----------------|------------|---------|------|------|--------|-------|-----|--------------------|----------------------|
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 6    | 14   | 19     | 1     | 6.8 | 30.5               | 30.2                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 14   | 22     | 1     | 6.8 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 8    | 14   | 26     | 1     | 6.2 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 9    | 14   | 30     | 1     | 5.9 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 1    | 15   | 6      | 1     | 7.0 | 31.0               | 30.0                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 15   | 9      | 1     | 7.2 | 31.0               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 3    | 15   | 12     | 1     | 7.0 | 31.0               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 4    | 15   | 15     | 1     | 7.0 | 31.0               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 6    | 15   | 18     | 1     | 6.5 | 31.0               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 15   | 20     | 1     | 6.8 | 31.0               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 8    | 15   | 23     | 1     | 6.1 | 31.0               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 9    | 15   | 26     | 1     | 5.9 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 1    | 16   | 1      | 1     | 7.2 | 32.5               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 16   | 4      | 1     | 7.8 | 32.5               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 3    | 16   | 8      | 1     | 7.4 | 32.5               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 4    | 16   | 11     | 1     | 7.2 | 32.5               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 6    | 16   | 16     | 1     | 6.6 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 16   | 20     | 1     | 6.8 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 8    | 16   | 23     | 1     | 6.2 | 32.5               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 9    | 16   | 26     | 1     | 5.9 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 1    | 17   | 9      | 1     | 7.6 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 17   | 14     | 1     | 8.1 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 3    | 17   | 19     | 1     | 7.9 | 32.5               | 29.8                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 4    | 17   | 22     | 1     | 7.5 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 6    | 17   | 26     | 1     | 6.9 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 17   | 30     | 1     | 6.8 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 8    | 17   | 33     | 1     | 6.2 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 9    | 17   | 37     | 1     | 5.8 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 2    | 18   | 6      | 1     | 7.8 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/16/10 | Ν              | 1          | 1       | 7    | 18   | 11     | 1     | 6.8 | 32.5               | 29.5                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 2    | 6    | 4      | 1     | 7.6 | 23.0               | 29.0                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 6    | 6    | 8      | 1     | 5.8 | 23.0               | 29.0                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 2    | 7    | 1      | 1     | 8.0 | 23.0               | 28.9                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 6    | 7    | 5      | 1     | 5.9 | 23.0               | 28.9                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 2    | 8    | 0      | 1     | 8.2 | 23.0               | 29.0                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 6    | 8    | 4      | 1     | 5.7 | 23.0               | 29.0                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 2    | 9    | 0      | 1     | 8.0 | 23.0               | 29.0                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 6    | 9    | 3      | 1     | 6.2 | 23.0               | 29.0                 |

| Client   | Program | Date    | Wind Direction | Wind Speed | Weather | Unit | Hour | Minute | Depth | DO  | Air Temperature °C | Water Temperature °C |
|----------|---------|---------|----------------|------------|---------|------|------|--------|-------|-----|--------------------|----------------------|
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 2    | 10   | 0      | 1     | 8.2 | 23.0               | 29.0                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 6    | 10   | 4      | 1     | 6.4 | 23.0               | 29.0                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 2    | 11   | 1      | 1     | 8.4 | 23.0               | 29.1                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 6    | 11   | 5      | 1     | 6.0 | 23.0               | 29.1                 |
| 21342031 | 9       | 7/17/10 | Ν              | 1          | 1       | 2    | 12   | 0      | 1     | 8.2 | 23.0               | 29.3                 |
| 21342031 | 9       | 7/17/10 | Ν              | 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 | Ν              | 1          | 1       | 5    | 6    | 0      | 1     | 7.2 | 18.8               | 31.0                 |
| 21342031 | 9       | 7/30/10 | Ν              | 1          | 1       | 5    | 7    | 0      | 1     | 7.2 | 18.8               | 30.8                 |
| 21342031 | 9       | 7/30/10 | Ν              | 1          | 1       | 5    | 8    | 0      | 1     | 7.2 | 18.8               | 31.0                 |
| 21342031 | 9       | 7/30/10 | Ν              | 1          | 1       | 5    | 9    | 0      | 1     | 7.0 | 18.8               | 31.0                 |
| 21342031 | 9       | 7/30/10 | Ν              | 1          | 1       | 5    | 10   | 0      | 1     | 7.2 | 18.8               | 31.2                 |
| 21342031 | 9       | 7/30/10 | Ν              | 1          | 1       | 5    | 11   | 4      | 1     | 7.5 | 18.8               | 31.5                 |
| 21342031 | 9       | 7/30/10 | Ν              | 1          | 1       | 5    | 12   | 1      | 1     | 7.2 | 18.8               | 31.8                 |
| 21342031 | 9       | 7/30/10 | Ν              | 1          | 1       | 5    | 13   | 1      | 1     | 7.2 | 18.8               | 31.5                 |

| Client   | Program | Date    | Wind Direction | Wind Speed | Weather | Unit | Hour | Minute | Depth | DO  | Air Temperature °C | Water Temperature °C |
|----------|---------|---------|----------------|------------|---------|------|------|--------|-------|-----|--------------------|----------------------|
| 21342031 | 9       | 7/30/10 | Ν              | 1          | 1       | 9    | 13   | 6      | 1     | 5.7 | 18.8               | 31.5                 |
| 21342031 | 9       | 7/30/10 | Ν              | 1          | 1       | 7    | 13   | 10     | 1     | 6.6 | 18.8               | 32.0                 |
| 21342031 | 9       | 7/30/10 | Ν              | 2          | 1       | 4    | 13   | 15     | 1     | 6.9 | 27.5               | 32.0                 |
| 21342031 | 9       | 7/30/10 | Ν              | 2          | 1       | 3    | 13   | 19     | 1     | 6.7 | 27.5               | 32.0                 |
| 21342031 | 9       | 7/30/10 | Ν              | 2          | 1       | 3    | 14   | 1      | 1     | 6.9 | 27.5               | 31.5                 |
| 21342031 | 9       | 7/30/10 | Ν              | 2          | 1       | 4    | 14   | 5      | 1     | 6.9 | 27.5               | 31.5                 |
| 21342031 | 9       | 7/30/10 | Ν              | 2          | 1       | 5    | 14   | 12     | 1     | 7.4 | 27.5               | 31.5                 |
| 21342031 | 9       | 7/30/10 | Ν              | 2          | 1       | 7    | 14   | 16     | 1     | 6.8 | 27.5               | 31.5                 |
| 21342031 | 9       | 7/30/10 | Ν              | 2          | 1       | 9    | 14   | 19     | 1     | 6.1 | 27.5               | 31.2                 |
| 21342031 | 9       | 7/30/10 | Ν              | 2          | 1       | 5    | 15   | 4      | 1     | 7.3 | 27.5               | 31.5                 |
| 21342031 | 9       | 7/30/10 | Ν              | 2          | 1       | 5    | 16   | 1      | 1     | 7.3 | 27.5               | 31.5                 |
| 21342031 | 9       | 7/30/10 | Ν              | 2          | 1       | 5    | 17   | 6      | 1     | 7.5 | 27.5               | 31.8                 |
| 21342031 | 9       | 7/30/10 | Ν              | 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                 |

| 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 | Е              | 2          | 2       | 5    | 15   | 10     | 1     | 7.1 | 28.5               | 31.2                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 1    | 16   | 4      | 1     | 6.6 | 28.5               | 31.1                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 2    | 16   | 7      | 1     | 7.4 | 28.5               | 31.1                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 3    | 16   | 11     | 1     | 6.4 | 28.5               | 31.2                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 5    | 16   | 15     | 1     | 7.0 | 28.5               | 31.1                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 8    | 16   | 22     | 1     | 6.0 | 28.5               | 31.1                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 1    | 17   | 0      | 1     | 6.7 | 28.5               | 31.1                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 2    | 17   | 3      | 1     | 7.1 | 28.5               | 31.2                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 3    | 17   | 6      | 1     | 6.4 | 28.5               | 31.2                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 5    | 17   | 10     | 1     | 6.6 | 28.5               | 31.2                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 8    | 17   | 15     | 1     | 5.0 | 28.5               | 31.6                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 1    | 18   | 0      | 1     | 6.5 | 28.5               | 31.2                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 2    | 18   | 4      | 1     | 7.0 | 28.5               | 31.2                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 3    | 18   | 7      | 1     | 6.2 | 28.5               | 31.2                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 5    | 18   | 11     | 1     | 6.7 | 28.5               | 31.2                 |
| 21342031 | 9       | 8/1/10 | Е              | 2          | 2       | 8    | 18   | 16     | 1     | 5.2 | 28.5               | 31.2                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 2    | 6    | 5      | 1     | 8.2 | 23.5               | 31.0                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 5    | 6    | 11     | 1     | 7.7 | 23.5               | 30.8                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 2    | 7    | 1      | 1     | 8.2 | 23.5               | 30.8                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 5    | 7    | 6      | 1     | 7.9 | 23.5               | 31.0                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 2    | 8    | 4      | 1     | 8.3 | 23.5               | 30.8                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 5    | 8    | 10     | 1     | 8.0 | 23.5               | 31.0                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 2    | 9    | 0      | 1     | 8.2 | 23.5               | 31.0                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 5    | 9    | 3      | 1     | 7.9 | 23.5               | 31.0                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 2    | 9    | 53     | 1     | 8.5 | 23.5               | 31.0                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 5    | 10   | 0      | 1     | 8.0 | 23.5               | 31.0                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 2    | 11   | 4      | 1     | 8.4 | 24.0               | 30.8                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 5    | 11   | 10     | 1     | 7.8 | 24.0               | 30.8                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 2    | 12   | 1      | 1     | 8.0 | 24.0               | 31.0                 |
| 21342031 | 9       | 8/2/10 | Ν              | 1          | 1       | 5    | 12   | 8      | 1     | 7.8 | 24.0               | 31.0                 |

| Client   | Program | Date    | Wind Direction | Wind Speed | Weather | Unit | Hour | Minute | Depth | DO  | Air Temperature °C | Water Temperature °C |
|----------|---------|---------|----------------|------------|---------|------|------|--------|-------|-----|--------------------|----------------------|
| 21342031 | 9       | 8/2/10  | Ν              | 1          | 1       | 2    | 13   | 0      | 1     | 8.3 | 24.0               | 31.2                 |
| 21342031 | 9       | 8/2/10  | Ν              | 1          | 1       | 5    | 13   | 4      | 1     | 7.9 | 24.0               | 31.0                 |
| 21342031 | 9       | 8/2/10  | Ν              | 1          | 1       | 2    | 14   | 2      | 1     | 8.3 | 24.0               | 30.8                 |
| 21342031 | 9       | 8/2/10  | Ν              | 1          | 1       | 5    | 14   | 7      | 1     | 7.9 | 24.0               | 30.8                 |
| 21342031 | 9       | 8/2/10  | Ν              | 1          | 1       | 2    | 15   | 4      | 1     | 8.1 | 24.0               | 31.0                 |
| 21342031 | 9       | 8/2/10  | Ν              | 1          | 1       | 5    | 15   | 9      | 1     | 7.8 | 24.0               | 31.0                 |
| 21342031 | 9       | 8/2/10  | Ν              | 1          | 1       | 2    | 16   | 18     | 1     | 7.6 | 24.0               | 31.0                 |
| 21342031 | 9       | 8/2/10  | Ν              | 1          | 1       | 5    | 16   | 21     | 1     | 7.4 | 24.0               | 31.0                 |
| 21342031 | 9       | 8/2/10  | Ν              | 1          | 1       | 5    | 17   | 10     | 1     | 7.3 | 24.0               | 31.0                 |
| 21342031 | 9       | 8/2/10  | Ν              | 1          | 1       | 5    | 18   | 0      | 1     | 7.5 | 24.0               | 31.2                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 4       | 2    | 6    | 0      | 1     | 7.4 | 22.0               | 29.5                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 4       | 2    | 7    | 0      | 1     | 7.6 | 22.0               | 30.0                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 4       | 2    | 8    | 0      | 1     | 7.5 | 22.0               | 30.2                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 4       | 2    | 9    | 0      | 1     | 7.5 | 22.0               | 30.2                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 4       | 2    | 10   | 0      | 1     | 7.7 | 22.0               | 30.2                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 4       | 2    | 11   | 0      | 1     | 7.6 | 22.0               | 30.2                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 4       | 2    | 12   | 0      | 1     | 7.4 | 22.0               | 30.2                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 4       | 2    | 13   | 0      | 1     | 7.6 | 22.0               | 29.5                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 4       | 2    | 14   | 2      | 1     | 7.6 | 22.0               | 29.5                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 4       | 2    | 15   | 2      | 1     | 7.6 | 22.0               | 29.5                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 3       | 2    | 16   | 0      | 1     | 7.5 | 22.5               | 29.5                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 3       | 2    | 17   | 0      | 1     | 7.3 | 22.5               | 30.0                 |
| 21342031 | 9       | 8/13/10 | Е              | 1          | 3       | 2    | 18   | 0      | 1     | 7.3 | 22.5               | 29.8                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 6    | 5      | 1     | 6.9 | 18.9               | 31.0                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 7    | 1      | 1     | 7.1 | 18.9               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 8    | 3      | 1     | 7.2 | 18.9               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 9    | 0      | 1     | 7.2 | 18.9               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 10   | 0      | 1     | 7.3 | 18.9               | 31.2                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 11   | 0      | 1     | 7.2 | 18.9               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 12   | 2      | 1     | 7.2 | 18.9               | 31.0                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 13   | 0      | 1     | 7.3 | 18.9               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 14   | 2      | 1     | 7.2 | 18.9               | 31.2                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 15   | 1      | 1     | 7.2 | 18.9               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 1    | 16   | 5      | 1     | 6.8 | 25.0               | 31.2                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 16   | 7      | 1     | 7.2 | 25.0               | 31.2                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 3    | 16   | 8      | 1     | 6.2 | 25.0               | 31.2                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 4    | 16   | 12     | 1     | 5.9 | 25.0               | 31.2                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 8    | 16   | 17     | 1     | 4.8 | 25.0               | 31.2                 |

| Client   | Program | Date    | Wind Direction | Wind Speed | Weather | Unit | Hour | Minute | Depth | DO  | Air Temperature °C | Water Temperature °C |
|----------|---------|---------|----------------|------------|---------|------|------|--------|-------|-----|--------------------|----------------------|
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 9    | 16   | 19     | 1     | 5.0 | 25.0               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 11   | 16   | 22     | 1     | 3.9 | 25.0               | 31.2                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 1    | 17   | 2      | 1     | 6.0 | 25.0               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 2    | 17   | 5      | 1     | 6.8 | 25.0               | 31.2                 |
| 21342031 | 9       | 8/14/10 | Е              | 1          | 2       | 3    | 17   | 8      | 1     | 7.9 | 25.0               | 31.2                 |
| 21342031 | 9       | 8/14/10 | Е              | 2          | 2       | 1    | 18   | 3      | 1     | 6.0 | 25.0               | 31.0                 |
| 21342031 | 9       | 8/14/10 | Е              | 2          | 2       | 2    | 18   | 6      | 1     | 6.7 | 25.0               | 31.0                 |
| 21342031 | 9       | 8/14/10 | Е              | 2          | 2       | 3    | 18   | 9      | 1     | 6.5 | 25.0               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 2          | 2       | 4    | 18   | 12     | 1     | 6.4 | 25.0               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 2          | 2       | 5    | 18   | 16     | 1     | 6.6 | 25.0               | 30.9                 |
| 21342031 | 9       | 8/14/10 | Е              | 2          | 2       | 6    | 18   | 19     | 1     | 5.7 | 25.0               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 2          | 2       | 7    | 18   | 22     | 1     | 6.6 | 25.0               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 2          | 2       | 8    | 18   | 26     | 1     | 5.3 | 25.0               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 2          | 2       | 9    | 18   | 29     | 1     | 5.6 | 25.0               | 31.1                 |
| 21342031 | 9       | 8/14/10 | Е              | 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                 |

| 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 | Ν              | 1          | 3       | 5    | 6    | 20     | 1     | 7.7 | 19.8               | 28.8                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 3       | 5    | 7    | 21     | 1     | 7.7 | 19.8               | 28.8                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 3       | 5    | 8    | 1      | 1     | 7.6 | 19.8               | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 3       | 5    | 9    | 1      | 1     | 7.7 | 19.8               | 28.8                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 3       | 5    | 10   | 1      | 1     | 7.6 | 19.8               | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 3       | 5    | 11   | 1      | 1     | 7.6 | 19.8               | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 3       | 1    | 12   | 3      | 1     | 6.9 | 19.8               | 28.8                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 3       | 2    | 12   | 6      | 1     | 7.5 | 19.8               | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 3       | 3    | 12   | 10     | 1     | 6.7 | 19.8               | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 3       | 5    | 12   | 17     | 1     | 7.4 | 19.8               | 29.0                 |

| Client   | Program | Date    | Wind Direction | Wind Speed | Weather | Unit | Hour | Minute | Depth | DO  | Air Temperature °C | Water Temperature °C |
|----------|---------|---------|----------------|------------|---------|------|------|--------|-------|-----|--------------------|----------------------|
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 1    | 13   | 3      | 1     | 6.7 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 2    | 13   | 7      | 1     | 7.3 |                    | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 3    | 13   | 10     | 1     | 6.5 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 5    | 13   | 14     | 1     | 7.1 |                    | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 8    | 13   | 19     | 1     | 5.7 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 9    | 13   | 22     | 1     | 5.5 |                    | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 1    | 14   | 1      | 1     | 7.0 |                    | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 2    | 14   | 6      | 1     | 7.4 |                    | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 3    | 14   | 10     | 1     | 6.7 |                    | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 5    | 14   | 14     | 1     | 7.1 |                    | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 8    | 14   | 20     | 1     | 5.6 |                    | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 9    | 14   | 25     | 1     | 5.4 |                    | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 1    | 15   | 4      | 1     | 7.0 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 2    | 15   | 7      | 1     | 7.6 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 3    | 15   | 11     | 1     | 7.2 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 5    | 15   | 13     | 1     | 7.4 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 8    | 15   | 18     | 1     | 5.9 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 9    | 15   | 21     | 1     | 5.6 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 1    | 16   | 2      | 1     | 7.2 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 2    | 16   | 7      | 1     | 7.6 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 3    | 16   | 10     | 1     | 6.5 | 23.0               | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 5    | 16   | 15     | 1     | 7.3 | 23.0               | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 8    | 16   | 20     | 1     | 5.9 | 23.0               | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 9    | 16   | 24     | 1     | 5.5 | 23.0               | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 1    | 17   | 1      | 1     | 7.1 | 23.0               | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 2    | 17   | 5      | 1     | 7.3 | 23.0               | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 3    | 17   | 8      | 1     | 6.7 | 23.0               | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 5    | 17   | 10     | 1     | 7.2 | 23.0               | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 8    | 17   | 14     | 1     | 5.9 | 23.0               | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 9    | 17   | 19     | 1     | 5.9 | 23.0               | 29.2                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 1    | 18   | 1      | 1     | 7.2 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 2    | 18   | 5      | 1     | 7.4 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 3    | 18   | 11     | 1     | 6.8 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 5    | 18   | 17     | 1     | 7.3 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 1          | 2       | 8    | 18   | 25     | 1     | 5.9 |                    | 29.0                 |
| 21342031 | 9       | 8/25/10 | Ν              | 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                 |

| 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                 |

| 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                 |

|               |    |      |    |      |     |      |     |      | 195 | 56-2009 | ) (Histo | oric) |    |      |    |      |    |      |      |      |
|---------------|----|------|----|------|-----|------|-----|------|-----|---------|----------|-------|----|------|----|------|----|------|------|------|
| Ī             | 32 | -35  | 36 | -40  | 41  | -45  | 46  | -50  | 51  | -55     | 56       | -60   | 61 | -65  | 66 | -70  | 71 | -75  | TO   | ГAL  |
|               | Ν  | %    | Ν  | %    | Ν   | %    | Ν   | %    | Ν   | %       | Ν        | %     | Ν  | %    | Ν  | %    | Ν  | %    | Ν    | %    |
| 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  |
|               |    |      |    |      |     |      |     |      |     | 20      | 10       |       |    |      |    |      |    |      |      |      |
|               | 32 | -35  | 36 | -40  | 41  | -45  | 46  | -50  | 51  | -55     | 56       | -60   | 61 | -65  | 66 | -70  | 71 | -75  | TO   | ГAL  |
|               | Ν  | %    | Ν  | %    | Ν   | %    | Ν   | %    | Ν   | %       | Ν        | %     | Ν  | %    | Ν  | %    | Ν  | %    | Ν    | %    |
| 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 April, 1956 - 2009 (historic) and 2010.

|               |    |      |    |     |    |      |     |       | 195 | 56-2009 | (Histo | oric) |     |       |    |      |   |      |      |       |
|---------------|----|------|----|-----|----|------|-----|-------|-----|---------|--------|-------|-----|-------|----|------|---|------|------|-------|
|               | 36 | -40  | 46 | -50 | 51 | -55  | 56  | -60   | 61  | -65     | 66     | -70   | 71  | -75   | 76 | -80  | > | 80   | TO   | TAL   |
|               | Ν  | %    | Ν  | %   | Ν  | %    | Ν   | %     | Ν   | %       | Ν      | %     | Ν   | %     | Ν  | %    | Ν | %    | Ν    | %     |
| 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   |
|               |    |      |    |     |    |      |     |       |     | 20      | 10     |       |     |       |    |      |   |      |      |       |
|               | 36 | -40  | 46 | -50 | 51 | -55  | 56  | -60   | 61  | -65     | 66     | -70   | 71  | -75   | 76 | -80  | > | 80   | TO   | TAL   |
|               | Ν  | %    | Ν  | %   | Ν  | %    | Ν   | %     | Ν   | %       | Ν      | %     | Ν   | %     | Ν  | %    | Ν | %    | Ν    | %     |
| 15,000-19,999 |    |      |    |     |    |      |     |       |     |         |        | 1     |     |       | 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    |        | 1     |     |       |    |      |   |      | 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 May, 1956 - 2009 (historic) and 2010.

|               |    |      |    |      |    |      | 195 | 6 - 2009 | ) (Histo | oric) |     |       |     |       |      |       |
|---------------|----|------|----|------|----|------|-----|----------|----------|-------|-----|-------|-----|-------|------|-------|
|               | 41 | -45  | 56 | -60  | 61 | -65  | 66  | -70      | 71       | -75   | 76  | -80   | >   | 80    | TO   | TAL   |
|               | Ν  | %    | Ν  | %    | Ν  | %    | Ν   | %        | Ν        | %     | Ν   | %     | Ν   | %     | Ν    | %     |
| 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   |
|               |    |      |    |      |    |      |     | 20       | 10       |       |     |       |     |       |      |       |
| ſ             | 41 | -45  | 56 | -60  | 61 | -65  | 66  | -70      | 71       | -75   | 76  | -80   | >   | 80    | TO   | TAL   |
| ſ             | Ν  | %    | Ν  | %    | Ν  | %    | Ν   | %        | Ν        | %     | Ν   | %     | Ν   | %     | Ν    | %     |
| 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 June, 1956 - 2009 (historic) and 2010.

|               |    |      |    |      | 19  | 56 - 200 | 9 (histo | oric) |     |       |      |       |
|---------------|----|------|----|------|-----|----------|----------|-------|-----|-------|------|-------|
|               | 61 | -65  | 66 | -70  | 71  | -75      | 76       | -80   | >   | 80    | TO   | ΓAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %        | Ν        | %     | Ν   | %     | Ν    | %     |
| 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   |
|               |    |      |    |      |     | 20       | 10       |       |     |       |      |       |
|               | 61 | -65  | 66 | -70  | 71  | -75      | 76       | -80   | >   | 80    | TO   | ΓAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %        | Ν        | %     | Ν   | %     | Ν    | %     |
| 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 July, 1956 - 2009 (historic) and 2010.

|               | 2  |      |    |      | 19  | 56 - 200 | 9 (histo | ric)  |     |       |      |       |
|---------------|----|------|----|------|-----|----------|----------|-------|-----|-------|------|-------|
|               | 46 | -50  | 66 | -70  |     | -75      |          | -80   | >   | 80    | TO   | TAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %        | Ν        | %     | Ν   | %     | Ν    | %     |
| 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   |
|               |    |      |    |      |     | 20       | 10       |       |     |       |      |       |
|               | 46 | -50  | 66 | -70  | 71  | -75      | 76       | -80   | >   | 80    | TO   | ГAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %        | Ν        | %     | Ν   | %     | Ν    | %     |
| 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 August, 1956 - 2009 (historic) and 2010.

|               |    |      |    |      |     | 1956  | 5 - 200 | 9 (Hist | oric) |       |     |       |      |       |
|---------------|----|------|----|------|-----|-------|---------|---------|-------|-------|-----|-------|------|-------|
|               | 56 | -60  | 61 | -65  | 66  | -70   | 71      | -75     | 76    | -80   | >   | 80    | TO   | TAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %     | Ν       | %       | Ν     | %     | Ν   | %     | Ν    | %     |
| 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   |
|               |    |      |    |      |     |       | 20      | 10      |       |       |     |       |      |       |
|               | 56 | -60  | 61 | -65  | 66  | -70   | 71      | -75     | 76    | -80   | >   | 80    | TO   | TAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %     | Ν       | %       | Ν     | %     | N   | %     | Ν    | %     |
| 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 September, 1956 - 2009 (historic) and 2010.

|               |    |      |    |      |     |       |     | 1     | 956-20 | 09 (His | toric) a | and 201 | 0   |      |    |      |   |      |      |       |
|---------------|----|------|----|------|-----|-------|-----|-------|--------|---------|----------|---------|-----|------|----|------|---|------|------|-------|
|               | 41 | -45  | 46 | -50  | 51  | -55   | 56  | -60   | 61     | -65     | 66       | -70     | 71  | -75  | 76 | -80  | > | 80   | ΤΟ   | TAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %     | Ν   | %     | Ν      | %       | Ν        | %       | Ν   | %    | Ν  | %    | Ν | %    | Ν    | %     |
| 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   |
|               |    |      |    |      |     |       |     |       |        | 20      | 10       |         |     |      |    |      |   |      |      |       |
|               | 41 | -45  | 46 | -50  | 51  | -55   | 56  | -60   | 61     | -65     | 66       | -70     | 71  | -75  | 76 | -80  | > | 80   | TO   | TAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %     | Ν   | %     | Ν      | %       | Ν        | %       | Ν   | %    | Ν  | %    | Ν | %    | Ν    | %     |
| 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 October, 1956 - 2009 (historic) and 2010.

|               | 32 | -35  | 36 | 5-40 | 41  | -45   | 46            | -50   | 51      | -55   | 56  | -60         | 61  | -65  | 66 | 5-70 | 71 | -75  | TO   | TAL   |
|---------------|----|------|----|------|-----|-------|---------------|-------|---------|-------|-----|-------------|-----|------|----|------|----|------|------|-------|
|               | Ν  | %    | Ν  | %    | Ν   | %     | Ν             | %     | Ν       | %     | Ν   | %           | Ν   | %    | Ν  | %    | Ν  | %    | Ν    | %     |
| 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 |    |      |    |      |     |       | $\frac{2}{2}$ | 0.12  | 4<br>15 | 0.24  | 27  | 0.3<br>1.64 | 16  | 0.18 | 4  | 0.00 | 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 April, 1956 - 2010.

|               | 36 | -40  | 46 | 5-50 | 51 | -55  | 56  | 5-60  | 61  | -65   | 66  | -70   | 71  | -75   | 76 | 5-80 | > | -80  | TO   | TAL   |
|---------------|----|------|----|------|----|------|-----|-------|-----|-------|-----|-------|-----|-------|----|------|---|------|------|-------|
|               | Ν  | %    | Ν  | %    | Ν  | %    | Ν   | %     | Ν   | %     | Ν   | %     | Ν   | %     | Ν  | %    | Ν | %    | Ν    | %     |
|               |    |      |    |      |    |      |     |       |     |       |     |       |     |       |    |      |   |      |      |       |
| 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 May, 1956 - 2010.

|               | 41 | -45  | 56 | 5-60 | 61 | -65  | 66  | -70   | 71  | -75  | 76  | <b>i-</b> 80 | >   | 80   | ТО   | TAL   |
|---------------|----|------|----|------|----|------|-----|-------|-----|------|-----|--------------|-----|------|------|-------|
|               | Ν  | %    | Ν  | %    | Ν  | %    | Ν   | %     | Ν   | %    | Ν   | %            |     |      | Ν    | %     |
| 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 June, 1956 - 2010.

|               | 61 | -65  | 66 | 5-70 | 71  | -75  | 76  | -80   | >80 |       | TO   | TAL   |
|---------------|----|------|----|------|-----|------|-----|-------|-----|-------|------|-------|
|               | Ν  | %    | Ν  | %    | Ν   | %    | Ν   | %     |     |       | Ν    | %     |
| 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 July, 1956 - 2010.

|               | 46 | 5-50 | 66 | 5-70 | 71  | -75  | 76  | 6-80  | >   | 80    | TO   | TAL   |
|---------------|----|------|----|------|-----|------|-----|-------|-----|-------|------|-------|
|               | Ν  | %    | Ν  | %    | Ν   | %    | Ν   | %     | Ν   | %     | Ν    | %     |
| 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 August, 1956 - 2010.

|               | 56 | -60  | 61 | -65  | 66  | -70   | 71  | -75   | 76  | 5-80  | >   | 80    | TO   | TAL   |
|---------------|----|------|----|------|-----|-------|-----|-------|-----|-------|-----|-------|------|-------|
|               | Ν  | %    | Ν  | %    | Ν   | %     | Ν   | %     | Ν   | %     | Ν   | %     | Ν    | %     |
| 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 September, 1956 - 2010.

|               | 41 | -45  | 46 | 5-50 | 51  | -55   | 56  | 5-60  | 61  | -65   | 66  | -70   | 71  | -75  | 76 | 5-80 | > | ·80  | TO   | TAL   |
|---------------|----|------|----|------|-----|-------|-----|-------|-----|-------|-----|-------|-----|------|----|------|---|------|------|-------|
|               | Ν  | %    | Ν  | %    | Ν   | %     | Ν   | %     | Ν   | %     | Ν   | %     | Ν   | %    | Ν  | %    | Ν | %    | Ν    | %     |
| 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   |

Joint occurrence of daily Holtwood river flows and temperatures October, 1956 - 2010.

|               | 32-35 |      | 36-40 |       | 41-45 |       | 46-50 |       | 51-55 |       | 56-60 |      | 61-65 |      | 66-70 |      | TOTAL |       |
|---------------|-------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-------|------|-------|------|-------|-------|
|               | Ν     | %    | Ν     | %     | Ν     | %     | Ν     | %     | Ν     | %     | Ν     | %    | Ν     | %    | Ν     | %    | Ν     | %     |
| 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   |

Joint occurrence of daily Holtwood river flows and temperatures November, 1956 - 2009.

|               | 1956-2009 (Historic) |      |    |      |     |       |     |       |     |       |     |       |    |      |    |      |    |      |      |       |
|---------------|----------------------|------|----|------|-----|-------|-----|-------|-----|-------|-----|-------|----|------|----|------|----|------|------|-------|
|               | 32                   | -35  | 36 | -40  | 41  | -45   | 46  | -50   | 51  | -55   | 56  | -60   | 61 | -65  | 66 | -70  | 71 | -75  | TO   | TAL   |
|               | Ν                    | %    | Ν  | %    | Ν   | %     | Ν   | %     | Ν   | %     | Ν   | %     | Ν  | %    | Ν  | %    | Ν  | %    | Ν    | %     |
| 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  | TO   | TAL   |
|               | Ν                    | %    | Ν  | %    | Ν   | %     | Ν   | %     | Ν   | %     | Ν   | %     | Ν  | %    | Ν  | %    | Ν  | %    | Ν    | %     |
| 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: RIVER FLOW AND WATER TEMPERATURE JOINT PROBABILITY OCCURRENCES FOR EACH MONTH (APRIL-OCTOBER).

|               |    |      |    |     |    |      |     |       | 195 | 6-2009 | ) (Histo | oric) |     |      |    |      |   |      |      |       |
|---------------|----|------|----|-----|----|------|-----|-------|-----|--------|----------|-------|-----|------|----|------|---|------|------|-------|
|               | 36 | -40  | 46 | -50 | 51 | -55  | 56  | -60   | 61  | -65    | 66       | -70   | 71  | -75  | 76 | -80  | > | 80   | TO   | TAL   |
|               | Ν  | %    | Ν  | %   | Ν  | %    | Ν   | %     | Ν   | %      | Ν        | %     | Ν   | %    | Ν  | %    | Ν | %    | Ν    | %     |
| 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   |
|               |    |      |    |     |    |      |     |       |     | 20     | 10       |       |     |      |    |      |   |      |      |       |
|               | 36 | -40  | 46 | -50 | 51 | -55  | 56  | -60   | 61  | -65    | 66       | -70   | 71  | -75  | 76 | -80  | > | 80   | TO   | TAL   |
|               | Ν  | %    | Ν  | %   | Ν  | %    | Ν   | %     | Ν   | %      | Ν        | %     | Ν   | %    | Ν  | %    | Ν | %    | Ν    | %     |
| 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 MAY, 1956-2009 (HISTORIC) AND 2010.

# APPENDIX B-2: JOINT OCCURRENCE OF DAILY HOLTWOOD RIVER FLOWS AND TEMPERATURES JUNE, 1956-2009 (HISTORIC) AND 2010.

|               |    |      |    |      |    |      | 195 | 6 - 200 | 9 (Hist | oric) |       |       |     |      |      |       |
|---------------|----|------|----|------|----|------|-----|---------|---------|-------|-------|-------|-----|------|------|-------|
|               | 41 | -45  | 56 | -60  | 61 | -65  | 66  | -70     | 71      | -75   | 76    | -80   | >   | 80   | TO   | TAL   |
|               | Ν  | %    | Ν  | %    | Ν  | %    | Ν   | %       | Ν       | %     | Ν     | %     | Ν   | %    | Ν    | %     |
| 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   |
|               |    |      |    |      |    |      |     | 20      | 10      |       |       |       |     |      |      |       |
|               | 41 | -45  | 56 | -60  | 61 | -65  | 66  | -70     | 71-75   |       | 76-80 |       | >80 |      | TO   | TAL   |
|               | N  | %    | Ν  | %    | Ν  | %    | Ν   | %       | Ν       | %     | Ν     | %     | Ν   | %    | Ν    | %     |
| 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.

|               |    |      |    |      | 195 | 6 - 200 | 9 (Hist | oric) |     |       |      |       |
|---------------|----|------|----|------|-----|---------|---------|-------|-----|-------|------|-------|
|               | 61 | -65  | 66 | -70  | 71  | -75     | 76      | -80   | >{  | 30    | TO   | ΓAL   |
|               | N  | %    | Ν  | %    | Ν   | %       | Ν       | %     | 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   |
|               |    |      |    |      |     | 20      | 10      |       |     |       |      |       |
|               | 61 | -65  | 66 | -70  | 71  | -75     | 76      | -80   | >{  | 30    | TO   | ΓAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %       | Ν       | %     | Ν   | %     | Ν    | %     |
| 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.

|               |    |      |    |      | 195 | 6 - 200 | 9 (Histo | oric) |     |       |       |       |
|---------------|----|------|----|------|-----|---------|----------|-------|-----|-------|-------|-------|
|               | 46 | -50  | 66 | -70  | 71  | -75     | 76       | -80   | >   | 80    | TOTAL |       |
|               | N  | %    | Ν  | %    | Ν   | %       | Ν        | %     | Ν   | %     | Ν     | %     |
| 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   |
|               |    |      |    |      |     | 20      | 10       |       |     |       |       |       |
|               | 46 | -50  | 66 | -70  | 71  | -75     | 76       | -80   | >   | 80    | TO    | ГAL   |
|               | N  | %    | Ν  | %    | Ν   | %       | Ν        | %     | Ν   | %     | Ν     | %     |
| 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 | 5 - 200 | 9 (Hist | oric) |       |     |      |      |       |
|---------------|----|------|----|------|-----|------|---------|---------|-------|-------|-----|------|------|-------|
|               | 56 | -60  | 61 | -65  | 66  | -70  | 71      | -75     | 76    | -80   | >   | 80   | TO   | ГAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %    | Ν       | %       | Ν     | %     | Ν   | %    | Ν    | %     |
| 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   |
|               |    |      |    |      |     |      | 20      | 10      |       |       |     |      |      |       |
|               | 56 | -60  | 61 | -65  | 66  | -70  | 71      | -75     | 76    | -80   | >   | 80   | TO   | ГAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %    | Ν       | %       | Ν     | %     | Ν   | %    | Ν    | %     |
| 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   |

|               |    |      |    |      |     |      |     | 19    | 956-20 | 09 (His | toric) | and 201 | 10  |      |    |      |   |      |      |       |
|---------------|----|------|----|------|-----|------|-----|-------|--------|---------|--------|---------|-----|------|----|------|---|------|------|-------|
|               | 41 | -45  | 46 | -50  | 51  | -55  | 56  | -60   | 61     | -65     | 66     | -70     | 71  | -75  | 76 | -80  | > | 80   | TO   | TAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %    | Ν   | %     | Ν      | %       | Ν      | %       | Ν   | %    | Ν  | %    | Ν | %    | Ν    | %     |
| 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   |
|               |    |      |    |      |     |      |     |       |        | 20      | 10     |         |     |      |    |      |   |      |      |       |
|               | 41 | -45  | 46 | -50  | 51  | -55  | 56  | -60   | 61     | -65     | 66     | -70     | 71  | -75  | 76 | -80  | > | 80   | TO   | TAL   |
|               | Ν  | %    | Ν  | %    | Ν   | %    | Ν   | %     | Ν      | %       | Ν      | %       | Ν   | %    | Ν  | %    | Ν | %    | Ν    | %     |
| 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    |     |      | 1   | 3.23  |        |         |        |         |     |      |    |      |   |      | 1    | 3.23  |
| 50,000 PLUS   |    |      |    | 1    |     |      | 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 B-2: JOINT OCCURRENCE OF DAILY HOLTWOOD RIVER FLOWS AND TEMPERATURES OCTOBER, 1956-2009 (HISTORIC) AND 2010.

APPENDIX C: CONOWINGO POND DO AND WATER TEMPERATURE PROFILE PLOTS (ALL 8 TRANSECTS)

