

Jobos Bay (JOB) NERR WATER QUALITY METADATA  
JANUARY 1996 TO DECEMBER 1996  
Latest Update: July 16, 2002

## I. Data Set & Research Descriptors

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### 2. Entry verification:

After retrieving and carefully cleaning the dataloggers, they are examined

to detect any structural damage to the body or to the probes. The DO membrane is

checked for ruptures and then replaced if needed. The turbidity probe is

examined to assure that no obstruction affects the wiper and that the sensor is clean. Manipulation and observation are registered in the field log for each deployment respectively.

The YSI is connected to a Pentium II 400 MHz IBM compatible computer and the data are reviewed using the YSI computer program PC6000 that accompanies the YSI 6000 datalogger. The file is uploaded in two formats, one in YSI PC6000 format and the other in Comma and "" Delimited format then the file is renamed to have a ".txt" extension. The YSI Ecowatch for Windows program is used to plot the data and delete the pre- and post deployment data that are not in range of the other readings. The program is used to perform basic statistical analysis (i.e., min., max., mean, std. dev.). This information is printed out with a list of data and filed for each station.

The information obtained from this printout is used during file review to detect any gross outliers such as data taken when the datalogger was removed from the water or those caused by instrument failure. The data are imported into a Microsoft Excel file that contains the current month's cumulative recordings. When a complete month of data has been recorded the file is ready for review.

The data review includes several steps. The first step is to format the data so that the parameter columns are in the correct order. Secondly, a modified Excel 97 version of the CDMO Excel 5.0 macro is used to check and determine if there are any dates and times that were not recorded due to maintenance, battery failure, or other cause. Missing dates and times are inserted into the file and a period is inserted into the cells where data would normally be. The reason for the missing data is recorded onto the Missing data Log. The data are then formatted so that the parameter columns are in the correct size and the data have the correct number of decimal place holders as specified by the NERR CDMO. Next, the data are filtered using the CDMO Excel 97 macro to find readings outside the instrument measurement range and the "normal" range for the site in question.

Data outside the instrument range is/are removed from the file and a

period is inserted to the cell(s). An explanation for the missing dates and time are recorded onto the Missing data Log. Data that were outside the "normal" range of water quality for a particular site is investigated for validity based on field observation, QC check, PC6000 printouts, and instrument diagnostics. If the datum is/are rejected from the file a period is inserted to the cell(s) and an explanation for the missing date and time is recorded onto the Missing data Log. The information recorded on the Missing data Log is transferred to the metadata form. The metadata form is then submitted with the data to the CDMO. Data is stores in zip disks. Dr. Pedro Robles, Research Coordinator is responsible for the data management.

### 3. Research Objectives:

The four dataloggers are deployed at Mar Negro area, major component of Jobos Bay Estuarine Research Reserve, and are suspended from a pole at one foot from the bottom of the selected site. Measurements are taken at thirty (30) minute intervals for approximately two-week periods. The sites are identified as representative of areas within the reserve and comparable to the sites that may be receiving impact from human activities in the surroundings areas.

Station number six (6), is located in the proximity of Punta Colchones, close to the thermal discharge pipeline, which can be affected by high temperatures and sediment resuspension.

Station number nine (9), the impacted site, collects water quality data in a site associated with runoff from littoral and basin mangroves areas. This sampling station is closer to the Electric Power Thermoelectric Plant, which makes it subject to runoff and potential spills contamination from this industrial facility. Information compiled from historical environmental documents indicate that station nine (9) was used as a disposal site for the residues of the previously operating sugar mill operation, which might have been a high organic input to the sediments.

Station number ten (10), located in the mangrove lagoon area is the reference or unimpacted site.

Station number eleven (11) is another possible impacted site. Housing development that is not provided with sewage treatment facilities are the potential source of contaminants for this Station. Septic tanks and possible

direct disposal constitute the potential contamination sources. Runoffs from agricultural land and other contaminant transport through a drainage channel are possible hazards at station nine (9) and eleven (11).

4. Research methods:

The Estuarine Water Quality Monitoring began on December 20, 1995 at Station nine (9), February 1, 1996 at Station ten (10), March 15, 1996 at Station eleven (11), and at Station six (6) on December 06, 1996. At this time we are only performing long term water quality monitoring.

Before each YSI 6000 datalogger is deployed, calibration and maintenance is performed following the manufacturer's instruction (YSI Manual addendum 7/94, sections 3,4 and 7). Calibration standards are only required for pH, salinity, and turbidity, all other parameters are done as described in the manual. Buffer solutions for two-point calibration (pH 7 and pH 10) are purchased from a scientific supply house. Salinity is calibrated via a specific conductance standard 1000  $\mu\text{S}/\text{cm}$  and are purchased from a scientific supply house. This solution is also prepared in the laboratory of Department of Natural and Environmental Resources (DNER) utilizing KCl following specification of EPA methods.

The two-point turbidity calibration (as of January 01, 1997) was performed using a 0 NTU standard using lab grade DI water made at the DNER laboratory and 40 NTU standard purchased from a scientific supply house. We are now using (since Jan 01, 1997) a 200 NTU standard purchased from a scientific company. The dissolved oxygen membranes are replaced before deployment and are allowed to sit at least 24 hours prior to deployment.

The weather conditions and tide stage during deployment are recorded in the field observation log. Measurements of DO, pH, salinity, specific conductance, temperature, turbidity (secchi) are taken with other calibrated field instruments to check the accuracy of the instrumentation.

Each YSI datalogger is tied with steel cable to a wrought iron galvanized pole, which is plunged into the sediments of each sampling area. Dataloggers are deployed at a depth of 0.3 m. Every 30 minutes during the sampling period measurements are taken for date, time, temperature, specific conductance,

salinity, dissolved oxygen saturation, dissolved oxygen concentration, depth, pH, and turbidity. Every two weeks the dataloggers are retrieved, uploaded, cleaned, inspected, and calibrated as noted previously. The datalogger is then ready to be deployed.

##### 5. Site location and character:

The Jobos Bay National Estuarine Research Reserve (JOBNERR) is located on the southern coastal plain of the island of Puerto Rico, a reserve within the West Indies geographical area. JOBNERR is composed of two major areas: (1) Mar Negro, located on the western margin of the Bay, and (2) Cayos Caribe, a chain of 15 tear-shaped islets located to the southeast. The Mar Negro area comprises the bulk of the Reserve, and consists of mangrove forests and a complex system of lagoons and channels interspersed with salt and mud flats. Coral reefs and seagrass beds, with small beach deposits and upland areas fringe Cayos Caribe mangrove islands.

Station 6 is located in the bay close to the peninsular drape area in Mar Negro known as Punta Colchones. The datalogger is deployed at about five meters from the emergence of the fallout pipe cooling water from the Thermoelectric Power Plant. This station is subject to high temperatures and sediment resuspension. The tidal range varies from 12 in. to 14 in. in the vicinity of the monitoring station. No fresh water input in the vicinity of the station is probable. The salinity at the vicinity of the monitoring station varies from 34.0 ppt to 35.7 ppt. The station pole is located at 17° 56' 6.5"N and 66° 13' 43.6"W.

Station 9 is an impacted site and is located at the northeastern part of the Mar Negro unit. The sampling station is associated with the mangrove lagoon area and received the Thermoelectric Power Plant runoff through mudflats and areas adjacent. The tidal range varies from 12 in. to 14 in. in the vicinity of the monitoring station. No fresh water input in the vicinity of the station is probable. The salinity at the vicinity of the monitoring station varies from 0.0

ppt to 41.1 ppt. The station pole is located at 17° 56' 36.8" N and 66° 14' 18.5" W.

Station 10 is located in a mangrove lagoon not impacted from upland or marine activities. It provided a reference for comparison of the data obtained in other stations, especially to the stations in Mar Negro lagoon environment. The tidal range varies from 12 in. to 14 in. in the vicinity of the monitoring station. No fresh water input in the vicinity of the station is probable. The salinity at the vicinity of the monitoring station varies from 0.0 ppt to 41.7 ppt. The pole is located at 17° 56' 20.3" N and 66° 45' 26.7" W.

Station 11 datalogger is tied to a small pier stand in the westernmost lagoon in the Mar Negro unit. Although a chain from a small pier suspends this datalogger, and it has been deployed at the same depth of the other dataloggers. Non point sources of contaminants from residences and boating activities in the vicinity are probable. The lagoon is characterized by dark bottom, tidal range from 12 in. to 14 in., allegedly related to long term deposition of organic wastes from the sugar mill operation when the mill was operating. No fresh water input in the vicinity of the station is probable. The salinity at the vicinity of the monitoring station varies from 0.0 ppt to 36.7 ppt. The datalogger is suspended by a chain and localized at 17° 56' 41.8" N and 66° 15' 46.0" W.

All monitoring is considered long term.

#### 6. Data collection period:

Station nine (9) sampling with the YSI began on December 20, 1995.  
Station ten (10) sampling with the YSI began on February 1, 1996.  
Station eleven (11) sampling with the YSI began on March 15, 1996.  
Station six (6) sampling with the YSI began on December 06, 1996.

#### 7. Associated researchers and projects:

A water quality and plankton monitoring scheme was initiated in 1995, to monitor 12 stations in the Jobos Bay system. This effort, conducted by the Department of Natural and Environmental Resources Laboratory began in March 1995, using a Hydrolab Data sonde 3 with a Surveyor 3 readout system, monitoring

the water column on a bimonthly time basis for abiotic parameter similar to the YSI. Monthly samples for nutrients, plankton and chlorophyll were conducted from March to October (Water Quality Monitoring-Spatial and temporal variations of main abiotic and plankton components in JOBNERR, 1996). Samplings were resumed in January 1996 and will be conducted until March 1997).

8. Variable sequence, range of measurements, units, resolution and accuracy:

| Variable                                  | Range of Measurements (units) | Resolution         |     |
|-------------------------------------------|-------------------------------|--------------------|-----|
| Accuracy                                  |                               |                    |     |
| Date                                      | 1-12,1-31,00-99 (Mo,Day,Yr)   | 1 mo, 1 day, 1 yr  | NA  |
| Time                                      | 0-24,0-60,0-60 (Hr,Min,Sec)   | 1 hr, 1 min, 1 sec | NA  |
| Temp                                      | -5.0 to 45.0 (C)              | 0.01 C             | +/- |
| 0.15 C                                    |                               |                    |     |
| SpCond                                    | 0-100 (mS/cm)                 | 0.01 mS/cm         | +/- |
| 0.5%                                      |                               |                    |     |
| reading + 0.001 mS/cm                     |                               |                    |     |
| Salinity                                  | 0-70 Parts per thousand (ppt) | 0.01 ppt           | +/- |
| 1.0%                                      |                               |                    |     |
| reading or 0.1ppt, (whichever is greater) |                               |                    |     |
| DO                                        | 0-200 (% air saturation)      | 0.1% @ air sat     | +/- |
| 2.0% @                                    |                               |                    |     |
| air sat                                   |                               |                    |     |
| DO                                        | 200-500 (% air saturation)    | 0.1% @ air sat     | +/- |
| 6.0% @                                    |                               |                    |     |
| air sat                                   |                               |                    |     |
| DO                                        | 0-20 (mg/L)                   | 0.01 mg/L          | +/- |
| 0.2 mg/L                                  |                               |                    |     |
| DO                                        | 20-50 (mg/L)                  | 0.01 mg/L          | +/- |
| 0.6 mg/L                                  |                               |                    |     |
| Depth                                     | 0-9.1 (m)                     | 0.001 m            | +/- |
| 0.018 m                                   |                               |                    |     |
| PH                                        | 2-14 units                    | 0.01 units         | +/- |
| 0.2 units                                 |                               |                    |     |
| Turbidity                                 | 0-1000 NTU                    | 0.1 NTU            | +/- |
| 5% of                                     |                               |                    |     |
| reading or 2 NTU (whichever is greater)   |                               |                    |     |

9. Coded variable indicator and variable code definitions:

Site definitions: S9 = Station 9

Site definitions: S10 = Station 10

Site definitions: S11 = Station 11

Site definitions: S6 = Station 6

File definitions: site/month/year (ex: XXaug95 = Station data from August of 1995).

10. Data anomalies:

January 1996:

S9: Problem with Specific Conductance Standard. Error in Calibration for S9  
from 01/31/96 15:30:00 through 01/31/96 23:30:00

February 1996:

S9: Problem with Specific Conductance Standard. Error in Calibration for S9  
from 02/01/96 00:00:00 through 02/16/96 09:00:00

March 1996:

S10: High DO spikes for S10 on 3/16 10:30:00 through 13:30 and 3/17 15:00:00  
should be considered anomalous

April 1996:

S9: Very low DO (zeroes) on 4/3 15:00:00 - 4/8 15:30:00 for S9  
S10: low DO values on 4/6 05:00:00 and 4/26 06:30:00 for S10

May 1996: none to report

June 1996:

S9: Very low DO (zeroes) on 6/10 05:00:00 - 6/14 08:30:00 for S9.  
Data for Specific Conductance and Salinity on 6/24/96 9:30:00 to 6/24/96 10:00:00 for S9 are out range and were deleted.

July 1996:

S9: DO data deleted from 7/24/96 20:00 through 7/31/96 08:30 due to suspected DO membrane puncture. DO values jump from 100% to 280% in 15 minute time period.  
S10: 7/31/96 1500 through 9/1/96 1600 depth is very low, probably due to clogged probes and should be considered suspect.  
S11: No data due to reparation of datalogger at 07/12/96 10:00:00 through 07/31/96 14:30:00 for S11.

August, 1996:

S9: DO data suspect and deleted from 8/16/96 16:00 through 8/24/96 19:00.  
There was only one day where DO values were > 0 %.  
No data due to "Internal Error" on 08/24/96 19:30:00 through 08/31/96 23:30:00 for S9.  
S10: 7/31/96 1500 through 9/1/96 1600 depth is very low, probably due to clogged probes and should be considered suspect.

September, 1996:

S9: No data due to "Internal Error" on 09/16/96 12:30:00 through



09/30/96 23:30:00 for S9.

S10: 7/31/96 1500 through 9/1/96 1600 depth is very low, probably due to

clogged probes and should be considered suspect.

pH spike from 9/15/96 1400 through 2030 should be considered suspect

due to instrument malfunction.

S11: Very erratic DO values from 9/13 10:00:00 - 9/22 07:30:00 for S11.

Negative DO % Values for Station 11 deleted:

09/14/96 18:30:00 through 09/14/96 19:30:00

09/15/96 10:00:00 through 09/15/96 12:00:00

09/15/96 14:00:00 through 09/15/96 16:00:00

09/16/96 10:00:00 through 09/16/96 14:00:00

09/16/96 15:00:00

Negative DO mg Values for Station 11 deleted:

09/14/96 18:30:00 through 09/14/96 19:30:00

09/15/96 10:00:00 through 09/15/96 12:00:00

09/15/96 14:00:00 through 09/15/96 16:00:00

09/16/96 10:00:00 through 09/16/96 14:00:00

09/16/96 15:00:00

October, 1996:

S9: First four DO values were deleted because they were >200% from 10/3/96

12:00 through 13:30. Appears as if the membrane was not settled yet.

DO data deleted from 10/16/96 12:00 through 10/30/96 13:30.

All values

except last day are >100% indicating calibration problems.

First four DO values of deployment were deleted from 10/31/96 18:00 through

19:30 because membrane was not settled yet.

S10: No data due to "Internal Error" on 10/15/96 08:00:00 through 10/31/96 23:30:00 for S10; intermittent zero DO values for S10.

November, 1996:

S9 : No data DO % and DO mg/L from 11/18/96 12:00:00 through 11/30/96 23:30:00.

YSI datalogger or sensor for DO are damaged.

S10: DO values deleted from 11/07/96 16:00 through 11/14/96 10:30 due to

suspected DO membrane puncture.

High DO value on 11/18 12:00:00 was deleted because membrane was not settled yet

S11: Very erratic DO values from 11/6 09:00:00 - 11/14 12:30:00 for S11

Negative DO mg Values for Station 11 deleted:

11/08/96 00:00:00 11/08/96 12:30:00

11/08/96 13:30:00

11/08/96 14:30:00 11/08/96 16:00:00

11/08/96 18:00:00  
 11/12/96 19:30:00 11/12/96 20:30:00  
 11/12/96 04:30:00  
 11/18/96 12:00:00 through 11/24/96 10:00:00  
 11/24/96 13:00:00 through 11/24/96 15:30:00  
 11/25/96 04:30:00  
 11/25/96 05:30:00 through 11/25/96 07:30:00  
 11/28/96 03:30:00 through 11/28/96 07:00:00  
 11/30/96 07:00:00  
 Negative DO % Values for Station 11 deleted:  
 11/08/96 00:00:00 11/08/96 12:30:00  
 11/08/96 13:30:00  
 11/08/96 14:30:00 11/08/96 16:00:00  
 11/08/96 18:00:00  
 11/12/96 19:30:00 11/12/96 20:30:00  
 11/12/96 04:30:00  
 11/18/96 12:00:00 through 11/24/96 10:00:00  
 11/24/96 13:00:00 through 11/24/96 15:30:00  
 11/25/96 04:30:00  
 11/25/96 05:30:00 through 11/25/96 07:30:00  
 11/28/96 03:30:0 through 11/28/96 07:00:00  
 11/30/96 07:00:00  
 Negative Depth values for station 11:  
 11/14/96 11:00:00 through 11/14/96 12:30:00

December, 1996 :

S9: Sensor problem for DO on 12/01/96 00:00:00 through 12/31/96  
 23:30:00 for S9. DO % and DO mg/L data were deleted.  
 S11: Sensor problem for DO on 12/06/96 12:00:00 through 12/31/96  
 23:30:00 for S11. DO % and DO mg/L data were deleted.  
 S6: No data due to "Internal Error" on 12/07/96 05:00:00,  
 12/07/96 08:00:00, 12/24/96 05:30:00, 12/24/96 11:30:00, 12/24/96  
 13:00:00 and 12/25/96 08:00:00 through 12/31/96 10:30:00 for S6.

11. Missing data:

Note: There were no turbidity probes available on our instruments until January 1997

January, 1996 :

S9: No data from 01/31/96 10:00:00 through 01/31/96 15:00:00 for  
 servicing.  
 No data for Specific Conductance and Salinity from 01/31/96  
 15:30:00 through 01/31/96 23:30:00 due to calibration error

February, 1996 :

S9 : No data for Specific Conductance and Salinity from 02/01/96  
 00:00:00 through 02/16/96 09:00:00 for calibration error.  
 No data from 02/16/96 09:30:00 through 02/16/96 14:00:00 for  
 servicing.  
 S10 : The YSI 6000 data logger were not deployed until February 1,

1996. at 00:00:00. No data from 02/16/96 10:00:00 through  
02/16/96 14:00:00 for servicing.

March, 1996 :

S9 ; No data from 03/01/96 09:30:00 through 03/01/96 14:00:00 for servicing.

No data from 03/15/96 11:00:00 through 03/15/96 16:00:00 for servicing.

No data from 03/31/96 16:30:00 through 03/31/96 23:30:00 for servicing.

S10 : No data from 03/01/96 10:00:00 through 03/01/96 14:00:00 for servicing.

No data from 03/15/96 11:30:00 through 03/15/96 16:00:00 for servicing.

No data from 03/31/96 16:30:00 through 03/31/96 23:30:00 for servicing.

S11 : The YSI 6000 data logger were not deployed until March 15,  
1996

16:30:00, the following data missing :

No data from 03/01/96 00:00:00 through 03/15/96 16:00:00

No data from 03/31/96 17:00:00 through 03/31/96 23:30:00 for servicing.

April, 1996 :

S9 : No data from 04/01/96 00:00:00 through 04/01/96 14:30:00 for servicing.

No data from 04/17/96 11:00:00 through 04/17/96 16:00:00 for servicing.

S10 : No data from 04/01/96 00:00:00 through 04/01/96 15:00:00 for servicing.

No data from 04/17/96 11:00:00 through 04/17/96 16:00:00 for servicing.

S11 : No data from 04/01/96 00:00:00 through 04/01/96 15:00:00 for servicing.

No data from 04/17/96 11:30:00 through 04/17/96 16:30:00 for servicing.

May, 1996 :

S9 : No data from 05/02/96 16:30:00 through 05/03/96 17:30:00 for servicing.

No data from 05/17/96 09:30:00 through 05/17/96 16:00:00

internal

error

No data from 05/31/96 09:30:00 through 05/31/96 14:30:00

internal

error

S10 : No data from 05/03/96 11:30:00 through 05/03/96 18:00:00 for servicing.

No data from 05/17/96 10:00:00 through 05/17/96 16:30:00 for

S10

No data from 05/31/96 10:00:00 through 05/31/96 14:30:00 for

S10

S11 : No data from 05/03/96 12:00:00 through 05/03/96 18:00:00 for

servicing.  
No data from 05/17/96 10:00:00 through 05/17/96 16:30:00  
internal  
error  
No data from 05/31/96 10:30:00 through 05/31/96 15:00:00  
internal  
error

June, 1996 :  
S9 : No data from 06/14/96 09:00:00 through 06/17/96 14:30:00 for servicing.  
Data for Specific Conductance and Salinity are out range:  
from 06/24/96 09:30:00 through 06/24/96 10:00:00  
S10 : No data from 06/14/96 09:00:00 through 06/17/96 15:00:00 for servicing.  
S11 : No data from 06/14/96 09:30:00 through 06/17/96 15:00:00 for servicing.

July, 1996 :  
S9 : No data from 07/01/96 10:00:00 through 07/01/96 14:30:00 for servicing.  
No data from 07/12/96 10:00:00 through 07/12/96 15:30:00 for servicing.  
DO data deleted from 7/24/96 20:00 through 7/31/96 08:30 due to  
suspected DO membrane puncture. DO values jump from 100% to  
280% in  
15 minute time period.  
No data from 07/31/96 09:00:00 through 07/31/96 14:30:00 for servicing.  
S10 : No data from 07/01/96 10:00:00 through 07/01/96 14:30:00 for servicing.  
No data from 07/12/96 10:00:00 through 07/12/96 15:30:00 for servicing.  
No data from 07/31/96 09:00:00 through 07/31/96 14:30:00 for servicing.  
S11 : No data from 07/01/96 10:00:00 through 07/01/96 14:30:00 for servicing.  
No data from 07/12/96 10:00:00 through 07/31/96 14:30:00. YSI datalogger or sensor for DO are damages.

August, 1996 :  
S9 : No data from 08/16/96 10:30:00 through 08/16/96 15:30:00 for servicing.  
DO data suspect and deleted from 8/16/96 16:00 through  
8/24/96 19:00.  
There was only one day where DO values were > 0 %.

All data missing due to "Internal Error" from 08/24/96  
19:30:00  
through 08/31/96 23:30:00.  
S10 : No data from 08/14/96 01:30:00 through 08/16/96 15:30:00 for servicing.  
S11 : No data from 08/16/96 11:00:00 through 08/16/96 15:30:00 for

servicing.

September, 1996 :

S9 : No data from 09/01/96 00:00:00 through 09/16/96 12:00:00 for servicing.

All data missing due to "Internal Error" from 09/16/96

12:30:00

through 09/30/96 23:30:00.

S10 : No data from 09/01/96 16:30:00 through 09/13/96 09:30:00 for servicing.

No data from 09/29/96 10:30:00 through 09/30/96 23:30:00 for servicing.

S11 : No data from 09/01/96 16:30:00 through 09/13/96 09:30:00 for servicing.

No data from 09/29/96 10:30:00 through 09/30/96 23:30:00 for servicing.

Negative DO % Values for Station 11 deleted:

09/14/96 18:30:00 through 09/14/96 19:30:00

09/15/96 10:00:00 through 09/15/96 12:00:00

09/15/96 14:00:00 through 09/15/96 16:00:00

09/16/96 10:00:00 through 09/16/96 14:00:00

09/16/96 15:00:00

Negative DO mg Values for Station 11 deleted:

09/14/96 18:30:00 through 09/14/96 19:30:00

09/15/96 10:00:00 through 09/15/96 12:00:00

09/15/96 14:00:00 through 09/15/96 16:00:00

09/16/96 10:00:00 through 09/16/96 14:00:00

09/16/96 15:00:00

October, 1996 :

S9 : No data from 10/01/96 00:00:00 through 10/03/96 11:30:00 for servicing.

First four DO values were deleted because they were >200% from 10/3/96

12:00 through 13:30. Appears as if the membrane was not settled yet.

No data from 10/15/96 08:00:00 through 10/16/96 11:30:00 for servicing.

DO data deleted from 10/16/96 12:00 through 10/30/96 13:30.

All values

except last day are >100% indicating calibration problems.

No data from 10/30/96 14:00:00 through 10/31/96 17:30:00 for servicing.

DO data deleted from 10/31/96 18:00 through 10/31/96 19:30.

DO membrane

not settled yet.

S10 : No data from 10/01/96 00:00:00 through 10/03/96 11:30:00 for servicing.

All data missing due to "Internal Error" from 10/15/96

08:00:00

through 10/31/96 23:30:00.

S11 : No data from 10/01/96 00:00:00 through 10/03/96 12:00:00 for

servicing.

No data from 10/15/96 08:00:00 through 10/16/96 12:00:00 for servicing.

No data from 10/30/96 14:00:00 through 10/31/96 17:30:00 for servicing.

November, 1996 :

S9 : No data from 11/14/96 10:30:00 through 11/18/96 11:30:00 for servicing.

11/30/96 No data DO % and DO mg/L from 11/18/96 12:00:00 through

23:30:00. YSI datalogger or sensor for DO are damaged.

S10 : No data from 11/01/96 00:00:00 through 11/07/96 15:30:00 for servicing.

due to DO values deleted from 11/07/96 16:00 through 11/14/96 10:30

suspected DO membrane puncture.

No data from 11/14/96 11:00:00 through 11/18/96 11:30:00 for servicing.

High DO value on 11/18 12:00:00 was deleted because membrane was not settled yet

S11 : Negative DO mg Values for Station 11 deleted:

11/08/96 00:00:00 - 11/08/96 12:30:00

11/08/96 13:30:00

11/08/96 14:30:00 - 11/08/96 16:00:00

11/08/96 18:00:00

11/12/96 19:30:00 - 11/12/96 20:30:00

11/13/96 04:30:00

11/18/96 12:00:00 through 11/24/96 10:00:00

11/24/96 13:00:00 through 11/24/96 15:30:00

11/25/96 04:30:00

11/25/96 05:30:00 through 11/25/96 07:30:00

11/28/96 03:30:00 through 11/28/96 07:00:00

11/30/96 07:00:00

Negative DO % Values for Station 11 deleted:

11/08/96 00:00:00 11/08/96 12:30:00

11/08/96 13:30:00

11/08/96 14:30:00 11/08/96 16:00:00

11/08/96 18:00:00

11/12/96 19:30:00 11/12/96 20:30:00

11/13/96 04:30:00

11/18/96 12:00:00 through 11/24/96 10:00:00

11/24/96 13:00:00 through 11/24/96 15:30:00

11/25/96 04:30:00

11/25/96 05:30:00 through 11/25/96 07:30:00

11/28/96 03:30:00 through 11/28/96 07:00:00

11/30/96 07:00:00

Negative Depth values for station 11:

11/14/96 11:00:00 through 11/14/96 12:30:00

No data from 11/14/96 13:00:00 through 11/18/96 11:30:00 for servicing.

December, 1996 :

S6 : The YSI 6000 data logger were not deployed until December 6, 1996 at 12:00:00. No data for 12/01/96 00:00:0 through 12/06/96 11:30:00.

All

data missing due to "Internal Error" on 12/07/96 05:00:00  
All data missing due to "Internal Error" on 12/07/96 08:00:00  
All data missing due to "Internal Error" on 12/24/96 05:30:00  
All data missing due to "Internal Error" on 12/24/96 11:30:00  
All data missing due to "Internal Error" on 12/24/96 13:00:00  
All data missing due to "Internal Error" from 12/25/96

08:00:00

through 12/31/96 10:30:00.

S9 : No DO% and DO mg/L data from 12/01/96 00:00:00 through 12/31/96 23:30:00.

YSI datalogger or sensor for DO are damages.

No data from 12/04/96 10:30:00 through 12/06/96 12:30:00 for servicing.

S10 : No data from 12/04/96 10:00:00 through 12/06/96 12:00:00 for servicing.

S11 : No data from 12/04/96 10:00:00 through 12/06/96 11:30:00 for servicing.

No DO% and DO mg/L data from 12/06/96 12:00:00 through 12/31/96 23:30:00.

YSI datalogger or sensors for DO are damaged.

12. Other remarks