September 12, 2006

Dan Dudley
Ohio EPA, Division of Surface Water
P.O. Box 1049
122 S. Front Street
Columbus, Ohio 43216-1049

Dear Mr. Dudley:

Please find enclosed a revised Level 3 Project Study Plan titled "Cuyahoga River Data Sonde Water Quality Monitoring." The changes from the original study plan dated July 12, 2006 reflect the discussion between your agency and me on September 8, 2006. Per our phone conversation earlier today, it is my understanding that the submittal of this revision will still fall under the original 60 day timeframe ending September 15, 2006. If you have any questions regarding the content of this study plan, please do not hesitate to contact me. I can be reached by email at hothems@neorsd.org or phone (216) 641-6000 ext. 2015.

Sincerely,

Seth Hothem
Investigator I
Northeast Ohio Regional Sewer District

4747 E. 49th St. | Cuyahoga Heights, OH 44125 | P: (216) 641-6000 | F: (216) 641-8118

Level 3 Project Study Plan

Cuyahoga River Data Sonde Water Quality Monitoring

(1) Objective

According to the Lower Cuyahoga River TMDL (Ohio EPA 2003), reductions in phosphorus from point and nonpoint sources in the river are needed because current levels are causing diel swings in dissolved oxygen (DO) that may be impairing the fish communities living there. However, site-specific DO data to support this hypothesis has not been collected. One of the sources of impairment given for the Cuyahoga River is the Northeast Ohio Regional Sewer District (NEORSD) Southerly Wastewater Treatment Center (WWTC). The objective of this study is to determine the impact that Southerly WWTC's effluent has on DO concentrations in the Cuyahoga River. Chemical and physical water quality monitoring in the Cuyahoga River between Lower Harvard Avenue and Riverview Road will be performed using long-term deployment water quality data sondes. The results of this study will help evaluate DO trends in the Cuyahoga River and the occurrence of diel swings. Temperature, pH, specific conductance, and turbidity will also be measured during the study. These measurements, along with DO concentrations, will be used to determine if the stream is meeting applicable Ohio EPA water quality standards and make comparisons between areas of differing use attainment status.

Reference:
Ohio EPA. 2003. Total Maximum Daily Loads for the Lower Cuyahoga River. Ohio EPA, Division of Surface. Water Standards and Technical Support Section. Online, last accessed 11/3/05.

(2) Nonpoint/Point Sources

The following are the point sources in study area: Big Creek (RM 7.20), Ohio Canal (RM 8.78), Southerly Wastewater Treatment Center (RM 10.84), West Creek (RM 11.3), Mill Creek (RM 11.40), and Combined Sewer Overflows. Upstream point sources include the Akron Wastewater Treatment Plant (RM 37.45) and numerous tributaries to the Cuyahoga River (see *Total Maximum Daily Loads for the Lower Cuyahoga River* for a complete list of tributaries and their locations).

Nonpoint sources of pollution in the study area include agriculture, urban runoff, storm sewers, and landfills.

These sources may be contributing to increased concentrations of nutrients and sediment in the river. Changes in these concentrations may lead to changes in algal and macrophyte production and, therefore, changes in DO and pH.

(3) Parameters Covered

The chemical and physical water quality parameters to be measured during the study will be dissolved oxygen, pH, temperature, specific conductance, and turbidity.

(4) Field Collection and Data Assessment Techniques

YSI 6600 EDS data sondes will be deployed at four locations in the Cuyahoga River. Each data sonde will record, in fifteen-minute increments, dissolved oxygen concentration, pH, temperature, specific conductance and turbidity from the time the data sonde is deployed until the time it is retrieved. These data sondes will be placed in the stream by inserting each one into a 4.5-inch PVC pipe with holes drilled into the sides of the lower third of the pipe to allow water to pass through it (Figure 1). The PVC pipes, which will be four feet in length, are intended to protect the data sondes from hazards floating down the stream. These pipes will then be attached, with hose clamps, to angle iron driven into the substrate. To ensure that the PVC pipe will not break loose, the data sondes will be anchored to an eyebolt attached to a large rock on the shore with a ten-foot long braided steel cable. To provide additional security, the PVC pipe will be fitted with a cap that has a hole drilled in the top and two through the sides. A steel cable will be run through a hole in the top of the cap and attached to the data sonde. A lock will be used to secure the cap to the pipe.

The information from the data sondes will be uploaded every two weeks unless conditions in the river prevent safe access. Following upload of the data, the data sondes will be calibrated according to the manufacturer's recommendations and placed back into the river.

Data assessment will include an analysis of temporal and spatial trends in the collected data. Graphs will be prepared that show DO concentrations and pH over the course of the study. These graphs will be used to determine if there are differences between areas with differing biocriteria attainment statuses as determined by Ohio EPA (2003). The collected data will also be compared to Ohio water quality standards to determine if any excursions from water quality criteria have occurred.

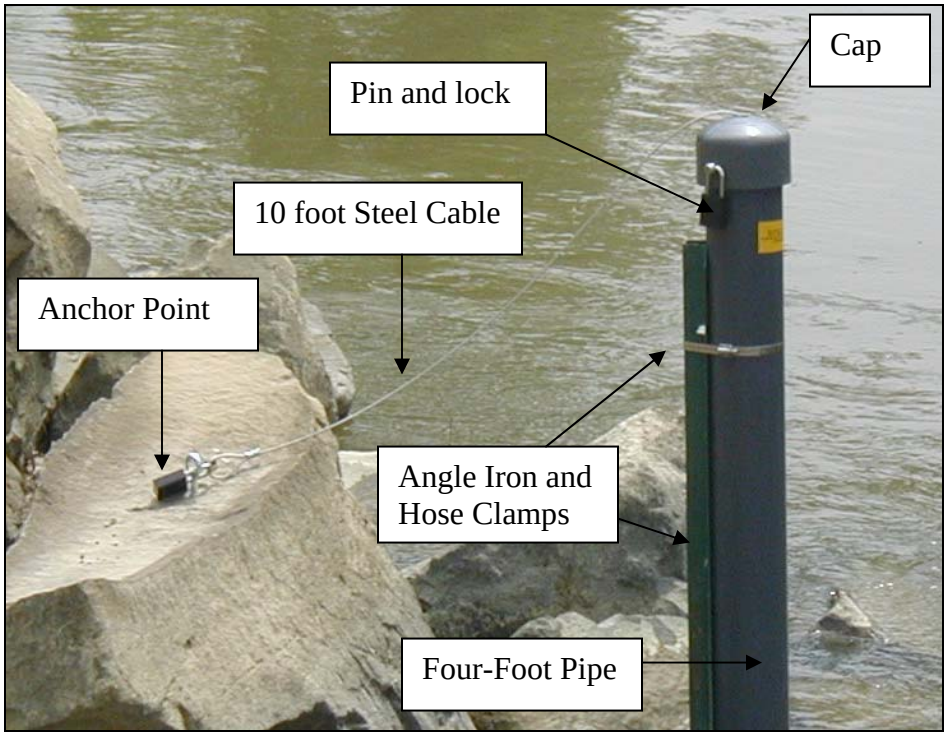

Figure 1. Data sonde installed in the Cuyahoga River

(5) Sampling Locations

The following locations will be sampled in the Cuyahoga River for the duration of the study. The most upstream site will be at the old Riverview Road bridge ("CRDS04 Riverview Road"), approximately 0.2 miles downstream of the confluence with Tinkers Creek. This site was chosen because it is upstream of Southerly WWTC and was in full attainment of biological criteria according to sampling completed by Ohio EPA in 2000 (Ohio EPA 2003). The next site downstream will be in an area of non-attainment approximately 0.5 miles upstream of Southerly WWTC ("CRDS03 Chlorine Access Bridge"). Permit-required water quality samples are also collected at this site and chemical and physical data are readily available. The third site will be located on the river approximately 1.1 miles downstream of the Southerly WWTC discharge ("CRDS02 Interceptors"). This site is outside of the mixing zone and is an additional location where permit-required water quality samples are collected. The most downstream site will be at Lower Harvard Avenue, which crosses the Cuyahoga River 0.1 miles downstream of the confluence with Big Creek ("CRDS01 Lower Harvard Avenue").

Reference:
Ohio EPA. 2003. Total Maximum Daily Loads for the Lower Cuyahoga River. Ohio EPA, Division of Surface. Water Standards and Technical Support Section. Online, last accessed 11/3/05.

Location	Latitude	Longitude	River Mile	Description	Quadrangle	Purpose
CRDS04 Riverview Road	41º 21.943' N	81º 36.769' W	16.8	Approximately 0.2 miles downstream of the confluence of Tinkers Creek at the old Riverview Road Bridge	Northfield	In full attainment of biological criteria, reference site
CRDS03 Chlorine Access Bridge	41º 25.139' N	81º 38.895' W	11.3	Approximately 50 feet downstream of the chlorine access bridge near the Southerly ash lagoons	Cleveland South	Non-attainment of biological criteria, upstream of Southerly WWTC
CRDS02 Interceptors	41º 25.631' N	81º 39.945' W	9.7	Between the Big Creek and Southwest Interceptors downstream of Southerly WWTC	Cleveland South	Partial attainment of biological criteria, downstream of Southerly WWTC
CRDS01 Lower Harvard Avenue	41º 26.835' N	81º 41.053' W	7.1	Near the northeast side of the Lower Harvard Avenue Bridge	Cleveland South	Partial attainment of biological criteria, downstream of Southerly WWTC

(6) Schedule

Data sondes will be installed at all of the sampling locations on April 10, 2006 and will remain in the river until sufficient data has been collected to establish DO trends under a variety of flow conditions. The information from the data sondes

will be downloaded and the sondes calibrated once every two weeks unless conditions in the river prevent safe access. Maintenance on the data sondes and probes will be completed as needed.

(7) QA/QC

The data sondes will be calibrated when the data is collected every two weeks according to the YSI Environmental Operations Manual. The specific conductance will be calibrated first using a 111.9 mS/cm standard. Second, the pH will be calibrated using two different buffers (7 and 10 s.u.). The DO membrane will be replaced every other time the sondes are calibrated. Once the membrane is replaced, the DO will be calibrated. The acceptable error in calibration will be 0.1 mg/L.

Each data sonde will have a separate calibration and maintenance logbook. As the appropriate calibration procedures are completed, the results will be recorded in the logbook along with the name of the person performing the calibration and the date. If difficulty is encountered in calibrating an instrument, or if the instrument will not hold calibration, this information will also be recorded.

Malfunctioning equipment will not be used to collect data. Proper steps will be taken to correct the problem as soon as possible, whether by repairing the sonde in the field or at the Environmental & Maintenance Services Center or by sending it to the supplier or an appropriate service company. All equipment maintenance will be recorded in the logbook.

Reference: Ohio EPA. 2003. Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices. Divisions of Surface Water and Environmental Services.

(8) Work Products

Following the completion of the project, a spreadsheet that presents data collected during the study and highlights any excursions from water quality criteria will be prepared. Reports summarizing, interpreting, graphically presenting, and discussing the data will also be prepared.

(9) Qualified Data Collectors

The following Level 3 Qualified Data Collectors will be involved with this study:

Name	Address	Email Address	Phone Number
Kathryn Crestani (QDC number 011)	4747 E. 49th St., Cuyahoga Heights, OH 44125	crestanik@neorsd.org	216-641-6000
Seth Hothem* (QDC number 010)	4747 E. 49th St., Cuyahoga Heights, OH 44125	hothems@neorsd.org	216-641-6000
John Rhoades (QDC number 008)	4747 E. 49th St., Cuyahoga Heights, OH 44125	rhoadesj@neorsd.org	216-641-6000
Cathy Zamborsky (QDC number 009)	4747 E. 49th St., Cuyahoga Heights, OH 44125	zamborskyc@neorsd.org	216-641-6000

* Indicates lead project manager

The following is a list of persons not qualified as level 3 data collectors who will also be involved in the project. The lead project manager will conduct training on the proper methods for installing and retrieving the sondes, data uploading, and calibration with these and any other individuals who may be involved in the collection of field data prior to their involvement. The lead project manager will also be responsible for reviewing all reports and data analysis prepared by these individuals prior to completion.

Name	Address	Email Address	Phone Number
Frank Foley	4747 E. 49th St., Cuyahoga Heights, OH 44125	foleyf@neorsd.org	216-641-6000
Eric Hinton	4747 E. 49th St., Cuyahoga Heights, OH 44125	hintone@neorsd.org	216-641-6000
Keith Linn	4747 E. 49th St., Cuyahoga Heights, OH 44125	linnk@neorsd.org	216-641-6000
Tiffany Moore	4747 E. 49th St., Cuyahoga Heights, OH 44125	mooret@neorsd.org	216-641-6000
Elizabeth Toot-Levy	4747 E. 49th St., Cuyahoga Heights, OH 44125	toot-levye@neorsd.org	216-641-6000
Tom Zablotny	4747 E. 49th St., Cuyahoga Heights, OH 44125	zablotnyt@neorsd.org	216-641-6000

(10) Documentation of approval of project manager as level 3 qualified data collector

See attached (Appendix A).

(11) Contract laboratory contact information

Not applicable.

(12) Copy of ODNR collector's permit

Not applicable.

(13) Catalog Statement

A digital photo catalog of all sampling locations will be maintained for 10 years and will include photos of the specific sampling location(s), the riparian zone adjacent to the sampling location(s) and the general land use in the immediate vicinity of the sampling location(s).

Signature:_____ Date:_____

(14) Voucher Specimen Statement

Not applicable.

(15) Trespassing Statement

I, _____, have not been convicted or pleaded guilty to a Violation of section 2911.21 of the Revised Code (criminal trespass) or a substantially similar municipal ordinance within the previous five years.

Signature:_____ Date:_____

I, _____, have not been convicted or pleaded guilty to a Violation of section 2911.21 of the Revised Code (criminal trespass) or a substantially similar municipal ordinance within the previous five years.

Signature:_____ Date:_____

I, _____, have not been convicted or pleaded guilty to a Violation of section 2911.21 of the Revised Code (criminal trespass) or a substantially similar municipal ordinance within the previous five years.

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Signature:_____ Date:_____