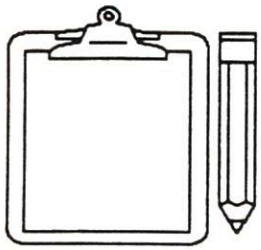
NPDES TOXICS CONTROL UPDATE

This is the first issuance of an informational memorandum entitled NPDES Toxics Control Update. It is intended to provide information on issues related to water quality-based toxics control and as a vehicle for the permit writers to learn about policies, guidance, and research pertaining to the Water Quality-based Toxics Control Program. If you would like to be on the mailing list, please complete the attached checklist or contact Sarah Wood (EPA Office of Water, Permits Division) at (202) 475-9523.

EPA's Water Quality-based Toxics Control Program was developed to implement the requirements of Sections 303, 304 and 402 of the Clean Water Act (CWA). Those sections require the attainment of designated uses through the development of water quality standards and their enforcement through NPDES permits. In March 1984, EPA's Office of Water published the Policy for the Development of Water Quality-based Permit Limitations for Toxic Pollutants (49 FR 9016). The policy outlines the goals of the program and the means by which EPA intends to accomplish those goals. As part of EPA's plan to achieve designated uses, the Third Round NPDES Permitting Strategy will focus on toxics control. Recent amendments to the Clean Water Act require States to identify stream segments not meeting designated uses and develop and implement plans for their improvement. These amendments should spur an increase in water quality-based limits in NPDES permits over the coming years.

The Water Quality-based Toxics Control Program at EPA supports the issuance of water quality-based NPDES permits through a variety of means. Under the program, EPA develops and issues policy and guidance to assist NPDES permit writers in deriving water quality-based effluent limits for industrial and municipal dischargers. In addition, EPA supports and performs research on techniques to assess effluent toxicity, identify responsible toxicants and reduce instream impacts from point source discharges. Through the use of contractors, EPA also provides assistance for writing individual discharge permits and conducts workshops for permit writers.



Status of the Program

To evaluate the impact of the water quality-based toxics control program on current NPDES permitting practices, EPA conducted a telephone survey of States and Regions. The survey, which was intended to provide a "snap shot" of permitting activity as of July 1986, indicated that approximately 40 percent (1417) of major industrial NPDES permits contain biomonitoring requirements, while only about 10 percent (385) of municipal majors have similar biomonitoring testing requirements. The survey also indicated that twenty percent of industrial permits have been issued with toxicity limits, while 7.5 percent of municipal permits have toxicity limits. There are indications that States may be changing their policies regarding biomonitoring and toxicity control through permits. These policy shifts will probably result in more permits requiring effluent biological testing, greater emphasis on chronic rather than acute bioassays, and a greater number of municipal permits containing biological testing language.

During the survey the following programmatic issues were highlighted:

- o Biological laboratory certification

  Many States expressed the need for a biological laboratory certification program, but because of resources are now incapable of implementing such a program.

- o Tropical waters testing method

  There is a belief in West Coast States, and in the Pacific Islands, that current bioassay methodologies may be inappropriate for tropical and West Coast waters.

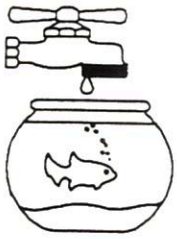
- o Managing municipality toxicity testing

  Several States asked for information regarding the management of municipality toxicity testing implemented by other States.

- o Evaluating human health concerns

  Most States now manage human health concerns through chemical specific effluent analyses; some States are experimenting with the Ames test; many States employ ambient water fish flesh analyses for constituents of concern, and some coastal States have mussel watch programs.

A summary of NPDES permit-required testing by State as well as other bioassay work conducted by States in their individual programs is presented in Table 1.



EPA Complex Effluent Toxicity Testing Program

Since 1983, EPA has conducted eight studies under the Complex Effluent Toxicity Testing Program (CETTP). The purpose of these studies was to evaluate the use of effluent and ambient toxicity tests in predicting the effects of toxicity on receiving waters.

For each of the studies, EPA performed ambient toxicity tests and instream biological surveys above and below point source dischargers. Effluent toxicity tests were performed on most of the point source dischargers to quantify acute, chronic, and subchronic effects. The hydrological mixing characteristics of the discharges were also examined during the studies.

EPA evaluated the data to determine if statistically significant correlations existed between projected instream waste concentrations of the tested effluents, results of the ambient toxicity tests, and observed impacts on the biota. In general, the studies found that the impacts measured during the biological survey were predicted correctly by ambient toxicity tests 60 to 100 percent of the time, depending on the degrees of impairment measured. In some cases, the correlations between ambient toxicity test results and impacts on zoo plankton, macroinvertebrate and fish species were statistically significant. In other cases, the correlations were statistically significant but impacts on macroinvertebrates were underestimated by ambient toxicity tests. Where effluent toxicity tests were performed, they were found to be reasonably good indicators of ambient toxicity. The results of these studies support the contention that effluent and ambient toxicity tests can be used to predict instream effects, but that differences in species sensitivity and rates of pollutant biodegradability may reduce the accuracy with which predictions can be made. Consequently, effluent testing using a combination of species (from different trophic levels) is recommended by EPA.

(From: The Program Survey - Biological Toxicity Testing in the NPDES Permits Program, July 1986)

STATES	NPDES PERMITS								STATE PROGRAMS	
	Major Industrial	Industrial with Biossays 1 With Toxicity Limits		Major Municipal	Municipal with Bioassays 1 With Toxicity Limits		Biotic Assessments Required	Static Bioassays	Flow-through/ Chronic Bioassays	Biotic Assessment Locations
Alabama	82	25	25	85	0	0	0	FEW	10	7
Alaska	308	2	0	19	0	0	0	0	0	0
Arizona*	23	0	0	19	0	0	0	0	0	0
Arkansas	56	34	0	59	0	0	0	12	0	40
California	98	440	440	148	110	110	0	SOME	SOME	0
Colorado	70	0	0	70	8	0	0	2	2	3
Connecticut	130	1	1	68	0	0	0	100	10	6
Delaware	21	5	0	15	1	0	0	0	0	2
D. C.	0	0	0	1	1	0	0	0	0	0
Florida	122	35	35	125	10	10	0	0	0	0
Georgia	60	25	0	120	1	0	0	MANY	12	20
Hawaii	19	2	0	11	1	0	3	0	0	0
Idaho	42	3	0	28	2	0	0	0	0	0
Illinois	104	4	0	175	1	1	0	25	10	30
Indiana	88	6	0	94	0	0	0	15	0	5
Iowa*	34	0	0	62	0	0	0	0	0	2
Kansas*	14	0	0	32	0	0	0	FEW	0	4
Kentucky	205	17	1	56	3	2	0	50	0	12
Louisiana	145	100	0	75	0	0	6	0	0	0
Maine	56	10	8	68	8	5	0	0	0	0
Maryland	52	13	0	35	20	0	0	FEW	FEW	0
Massachusetts	57	10	8	68	8	5	0	0	0	0
Michigan *	122	3	0	95	2	0	0	30	5	50
Minnesota	28	2	0	50	0	0	0	75	2	0
Mississippi	39	20	4	45	0	0	0	15	0	1
Missouri*	70	0	0	70	0	0	2	0	16	200
Montana*	6	2	0	17	0	0	0	10	2	8
Nebraska*	26	0	0	44	0	0	0	0	0	6
Nevada	3	0	0	10	1	1	1	0	0	0
New Hampshire	57	10	8	69	9	5	0	0	0	0
New Jersey	200	118	118	160	111	111	0	5	5	FEW
New Mexico	16	5	0	21	0	0	0	0	0	8
New York	166	10	0	266	10	0	0	0	10	5
North Carolina	94	30	30	121	24	24	0	150	12	50
North Dakota*	7	0	0	15	0	0	0	0	0	0
Ohio*	150	1	0	155	0	0	0	75	10	20
Oklahoma	36	22	0	59	0	0	0	0	0	0
Oregon	23	15	2	36	0	0	1	4	30	15
Pennsylvania*	171	0	0	225	0	0	0	0	0	35
Rhode Island	16	12	0	19	12	0	0	0	0	0
South Carolina	80	55	5	115	5	0	40	100	10	15
South Dakota	4	0	0	29	1	0	0	0	0	16
Tennessee	86	12	5	75	2	0	0	MANY	12	12
Texas	234	133	0	241	0	0	0	0	0	0
Utah	19	0	0	39	14	0	0	0	0	0
Vermont*	8	0	0	31	0	0	0	0	0	0
Virginia	100	120	0	25	25	0	20	36	2	FEW
Washington	45	40	30	45	3	0	0	0	6	0
West Virginia	75	39	39	34	0	0	0	100	0	60
Wisconsin	62	36	0	88	0	0	0	0	0	450
Wyoming	30	0	0	20	2	0	0	0	0	0
TOTALS	3759	1417	759	3652	385	274	73			
No. of STATES								23	20	29

* States with a principally pollutant specific approach for toxics.

1. Numbers may represent major and minor permits.

POTOMAC STRIPED BASS THREATENED BY METALS
(Reprinted from Associated Press Article in the Washington Post, November 9, 1986)

Colonial Beach, Va.--The presence of toxic metals in the Potomac River off Stafford and Prince William counties is part of the reason the striped bass population in the river has declined, scientists say.

High levels of aluminum, copper and chromium were evident at the three test stations set up by Johns Hopkins University scientists, according to Lenwood W. Hall Jr., one of the scientists.

Another factor appears to be that the acid levels of river waters in that area sometimes rise suddenly to concentrations that can kill striped bass larvae, said Hall. The scientists detected the increases after weekends, which is when sewage treatment plants generally have their highest flow volumes. Heavy metals are commonly found in the effluent from sewage treatment plants, according to Hall.

Hall gave the report Thursday at a meeting of the bistate Potomac River Fisheries Commission. He recommended that the commission have state agencies investigate because the pollution is playing a role in the decline of striped bass and "we need to do something about it."

Lee A. Zeni, a commission member who heads the tidal waters division of the Maryland Department of Natural Resources, said that his agency also has found a link between striped bass mortality and the presence of heavy metals in such rivers as the Nanticoke.

But, he said, people should not get the idea that such pollution is the only cause for the decline of striped bass. It is increasingly obvious, he said, that a combination of factors has led to a drastic decline of the species, which has played a primary role in commercial and sport fishing in the Chesapeake Bay region and along the Atlantic Coast. Hall said overfishing undoubtedly has been a factor in the decimation of the striped bass population.

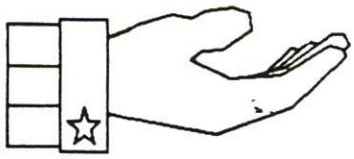
The Johns Hopkins study was conducted at three places along an approximately seven-mile section of the river from Widewater in Stafford to Cherry Hill in southern Prince William. That stretch of river was studied because striped bass return there in the spring to spawn.

Water Quality Data Bases

During the 1986 fiscal year, EPA's Office of Water developed a program to link several data bases within EPA which are water quality-related. This network, known as the PCS/STORET interface, is intended to allow State and Regional water quality analysts and permit writers to use the PCS and STORET files interactively. The program that links these data bases provides environmental data in the vicinity of the NPDES discharge through the use of a menu of eleven reports. Available reports include a basic report from PCS, Reach and IFD;

a summary of DMR data; a list of indirect facilities discharging to POTWs; effluent toxicity data from the Complex Effluent Testing Information System (CETIS); stream flows and dilution ratios for direct dischargers; locations of drinking water intakes; direct discharger locations and their SIC codes; and ambient stream monitoring data.

For example, reports on effluent toxicity can be generated from CETIS, a data management component of STORET that has operated for almost three years. It contains information on facilities that have self-monitoring requirements for effluent toxicity or have been monitored by regulatory agencies for toxicity. It does not contain information on which facilities have been permitted with toxicity limits. The purpose of CETIS is to provide permit writers with toxicity information on the effluents of facilities similar to those that they regulate, thereby allowing permit writers to make more informed decisions on which permits could include toxicity requirements and the form of these requirements. The PCS/STORET interface is in pilot form at present and does not cover all States or Regions. Further information can be obtained from Phil Taylor, Office of Water Regulations and Standards, (202) 382-7046.

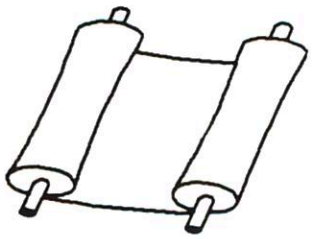


Assistance is Available on Water Quality-Based Permits

The use of water quality-based limitations for toxics in NPDES permits is "new ground" for many EPA and State personnel. The need for technical and legal guidance is great, as with any emerging program. To provide this program guidance, the Technical Support Branch in the Permits Division had, and will continue to give both direct and contractor assistance to NPDES personnel to promote the goals of the Office of Water toxics policy and the upcoming Third Round Permits Strategy. Assistance projects such as work in Region V to support the Great Lakes National Program and permit development for the State of Ohio are underway. Many additional projects will be starting soon, in answer to contractor assistance request from the Regions received at the start of FY 87. We hope to report on their progress and distribute some of the "products" of this work over the coming months.

A critical part of our assistance strategy is the defense of permits

that are challenged because they contain water quality-based toxics requirements. Clearly our program cannot allow these challenges to go unanswered. We can and will provide expert assistance to Regions that are faced with evidentiary hearings which deal with toxics/toxicity issues. Within the limits of our resources we will support NPDES States as well. We will also keep you informed of important legal and technical issues that result from these permit challenges. Please keep in touch with the Permits Division, and let us know where you need assistance, as well as, what "tools" would make your job easier or more productive.

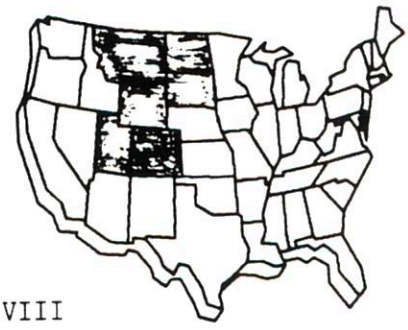


Upcoming Guidance

EPA has completed the Permit Writer's Guide to Water Quality-Based Permitting for Toxic Pollutants. This document is intended to complement the Technical Support Document for Water Quality-Based Toxics Control, issued in 1985. The Permit Writer's Guide introduces NPDES permit writers to fundamental concepts of water quality-bases permitting, presents step-by-step procedures for deriving permit limits, including case examples, and discusses Toxicity Reduction Evaluations (TREs) in much greater detail than the Technical Support Document. Copies will be sent to the EPA Regional offices in the near future.

Workshops

One component of EPA's effort to implement the Policy on Water Quality-Based Toxics Control is the sponsoring of workshops. Workshops are held periodically around the country to disseminate information on water quality issues, such as biomonitoring techniques and methods for deriving water quality-based NPDES permit limits. The following summarizes recent and planned workshops held by EPA.



Region VIII

On December 9 and 10, 1986, EPA Region VIII hosted a biomonitoring workshop to review whole effluent

toxicity testing methods and biomonitoring requirements that will be included in NPDES permits. Among those who attended the workshop were State NPDES and Water Quality Personnel, Major NPDES permittees, local laboratory personnel, and local pretreatment coordinators from Region VIII. A variety of topics were discussed, including, the National Policy, Region VIII's draft Toxic Control Program, and use of biomonitoring in the pretreatment program. For further information, please contact Mr. Marshall Fischer, Region VIII, at (303) 293-1592.

Marine Toxicity

On April 14 and 15, 1987, EPA sponsored a workshop on effluent toxicity into marine/estuarine waters. The purpose of the workshop, which was held on Solomon Island, Maryland, was to present techniques for toxicity testing using four marine species (Arbacia puntulata, Champia parvula, Mysidopsis bahia, and Cyprinodon varieqatus). The workshop focused on relatively inexpensive, short term methods for determining chronic toxicity endpoints (i.e., based on growth or reproductive effects). The methods are intended to be used by regulatory agencies for evaluating the toxicity of effluents in marine and estuarine waters. For further information, please contact Sarah Wood at (202) 475-9523.

Complex Effluents

A workshop will be held in early September in Santa Cruz, California on the use of toxicity testing to evaluate complex effluents. The workshop is intended to provide a basic understanding of the need for, and use of, toxicity tests to assess the hazards of complex effluents. Emphasis will be given to chronic tests, environmental persistence, and instream toxicity. Test protocols for Mysidopsis, Champia, and Cyprinodon are to be presented, as well as information on culturing techniques, nutrition, handling the animals, counting individuals, and calculating results.

Toxicity Reduction Evaluations (TREs)

On April 7 and 8, 1987, a workshop was held in Columbus, Ohio to discuss toxicity reduction evaluation research. Case studies of municipal and industrial TREs and toxicity identification evaluations (TIEs) was presented to assess the state-of-the-art and elicit suggestions for improvements and refinements. A full report on the workshop will appear in the next issue of the Update.

Literature on Water Quality Based Permitting

The following is a list of documents available to help the permit writers with the concept and methodology for water quality based permitting. Many of these documents are available from: ORD Publications Office, Center for Environmental Research Information, 26 St. Clair Street, Cincinnati, Ohio 45268 (513) 569-7562, FTS 684-7562.

EPA's Policy for Water Quality Based Permitting

Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants (49 Federal Register 9016, March 9, 1984).

Toxicity Testing Methodology and Data Bases

Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, EPA/600/4-85/014, December 1985. Available from ORD Cincinnati.

Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, EPA600/4-85/013, March 1985. Available from ORD Cincinnati.

CETIS: Complex Effluent Toxicity Information System Retrieval User's Manual, EPA-600/8-84-030, November 1984. Available from Ann Pilli, CETIS Coordinator, EPA Environmental Research Laboratory, 6201 Congdon Blvd., Duluth, MN 55804, (218) 720-5714, FTS 780-5714.

Whole Effluent and Chemical Specific Bioaccumulation Tests

Interim Procedures for Conducting the Salmonella/Microsomal Mutagenicity Assay (Ames Test), EPA-600/4-82-068, March 1983. Available from Dr. Lewell Williams, Environmental Monitoring Systems Laboratory, P.O. Box 15027, Las Vegas, NV 89114, (702) 798-2100, FTS 545-2100.

Implementing the Water Quality Based Permit Policy

Technical Support Document for Water Quality-based Toxic Control, EPA-440/4-85-032, September 1985.

Available from CENTEC in Reston, Virginia. For copies, call Jeff Overton or Fred Heitman at (703) 471-6300.

A Permit Writer's Guide to Water Quality-Based permitting for Toxic Pollutants (1987). Available at EPA Regional Offices, starting in May.

Chemical-Specific Toxicity Data Bases

AQUIRE: Aquatic Information Retrieval Toxicity Data Base Project Description, Guidelines and Procedures, EPA-6008-84-021, June 1984. Chemical Information Systems, Inc. (CIS) supplies a streamlined user's manual when the user signs an agreement for access to the chemical information. For the CIS manual and user's contract, contact Ms. Laurie Donaldson, CIS Inc., 7215 York Road, Baltimore, MD 21212, (301) 247-8737, FTS 247-8737.

Quantitative Structural Activity Relationship (QSAR) System

Draft User Manual for QSAR System, Center for Data Systems and Analysis, Montana State University, November 1985. Available from Ms. Lee Faulkner, Director, Center for Data Systems and Analysis, Montana State University, Bozeman, Montana 59717, (406) 994-4481, FTS 994-4481.

Chemical-Specific Bioacummulation Tests

Standard Practice for Conducting Bioconcentration Tests with Fishes and Saltwater Bivalve Molluscs, Designation E 1022-84, 1985 Annual Book of ASTM Standards, vol. 11.04, Publication Code Number (PCN): 01-110485-48, April 1985. Available from ASTM, 1916 Race Street, Philadelphia, PA 19103, (215) 299-5400, FTS 299-5400.

Mixing Zone Analyses

Measurement of Mixing Characteristics of the Missouri River Between Sioux City, Iowa and Plattsmount, Nebraska. U.S. Geological Survey Water-Supply Paper 1899-G, 1970. Available from U.S. Geological Survey, Books and Open File Reports. Federal Center, Building 41, Box 24525, Denver, Colorado 80225, (303) 236-7476, FTS 776-7476.

Methods for Predicting Dispersion Coefficients in Natural Streams, with Application to Lower Reaches of the Green and Duwarmish Rivers, Washington. U.S. Geological Survey Professional Paper 582-A, 1968. Available from U.S.G.S. (above).

"A Study of Tidal Dispersion in the Potomac River." Water Resources Research, Vol. 2 1966. Available in Libraries.

"Fluorescent-Tracer Studies of an Estuary." Journal of the Water Pollution Control Federation, Vol. 38, 1966. Available in Libraries.

Computer Models for Freshwater, Marine and Estuaring Discharges

Initial Mixing Characteristics for Municipal Ocean Discharges. Volumes I and II. EPA.600/3-85-073a and b, November 1985.

State and Regional EPA Staff can obtain copies of the reference manual and most of EPA's Mixing Zone Models (except PDS and PDSM) from Byron Coleman at EPA's Marine Science Center in Newport, Oregon [(503) 867-4035], FTS 867-4035. Request for models must be accompanied by an IBM-PC compatible diskette which will be returned with the model source codes copied onto the disc. State and Regional EPA staff who would like to obtain the PDS and PDSM models should send and

IBM-PC compatible diskette to David Eng of EPA's Permits Division in Washington D.C. [(202) 475-9522], FTS 475-9522.

Representatives of nongovernmental organizations seeking the referenced manual and models must purchase them from the National Technical Information Service, 5285 Port Toyal Road, Springfield, VA 22161 [(703) 487-4650]. The NTIS Publication Numbers for the manuals and PC programs are: Volume I (PB86-137478); Volume II (PB86-137460); and IBM-PC compatible diskette (PB86-137486).

EPA Complex Effluent Toxicity Testing Program

Eight sites were studied to investigate the validity of predicting biological impacts from effluent and ambient toxicity tests. The results of these studies is presented in the following documents:

Validity of Effluent and Ambient Toxicity Tests for Predicting Biological Impact, Scippo Creek, Circleville, Ohio. US EPA, EPA/600/3-85/044. Available from ORD Cincinnati.

Validity of Effluent and Ambient Toxicity Tests for Predicting Biological Impact, Ottawa River, Lima, Ohio. US EPA, EPA/600/3-84/080. Available from ORD Cincinnati.

Validity of Effluent and Ambient Toxicity Tests for Predicting Biological Impact, Five Mile Creek, Birmingham, Alabama. US EPA, EPA/600/8-85/015. Available from ORD Cincinnati.

Validity of Effluent and Ambient Toxicity Tests for Predicting Biological Impact, Skeleton Creek, Enid, Oklahoma. US EPA, EPA/600/8-86/002. Available from ORD Cincinnati.

Validity of Effluent and Ambient Toxicity Tests for Predicting Biological Impact, Naugatuck River, Waterbury, Connecticut. US EPA, EPA/600/8.86/005. Available from ORD Cincinnati.

Validity of Effluent and Ambient Toxicity Tests for Predicting Biological Impact, Back River, Baltimore Harbor, Maryland. US EPA, EPA/600/8-86/001. Available from ORD Cincinnati.

Validity of Effluent and Ambient Toxicity Tests for Predicting Biological Impact, Ohio River, Near Wheeling, West Virginia. US EPA, EPA/600/3-85/071. Available from ORD Cincinnati.

Validity of Effluent and Ambient Toxicity Tests for Predicting Biological Impact, Kanawha River, Charleston, West Virginia. US EPA, EPA/600/3-86/006. Available from ORD Cincinnati.

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UPDATE RESPONSE CHECKLIST

Do you wish to receive any of the following:

[] Techincal Support Document for Water Quality-Based Toxic Controls (EPA Office of Water; September 1985)

[] Permit Writer's Guide to Water Quality-Based Toxic Pollutants (EPA Office of Water Enforcement and Permits) Availability: August, 1987)

[] Aquatic Toxicity Testing - Seminar Manual (EPA Office of Water Enforcement and Permits and Office of Research and Development) Availability: October, 1987

[] Program Survey - Biological Toxicity Testing in the NPDES Permits Program (EPA Office of Water Enforcement and Permits; July 1986

[] Please add my name to the mailing list for the next NPDES Toxics Control Update memo.

Please Print
Name & Title:_____

Organization:_____

_____

Address:_____

City, State:_____ Zip:_____

Phone:(___)_____ Ext._____

[] Comments/Topics for the Update/Suggestions/Other:

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Please forward to: Mr. John Whitescarver, WESTEC Services, Inc.
11260 Roger Bacon Dr. Ste. 500
Reston, VA 22090
Attn: NPDES Toxics Control Update