BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
PROPOSED AMENDMENTS TO:	)	R06-10
TIERED APPROACH TO CORRECTIVE	)	(Rulemaking – Land)
ACTION OBJECTIVES	)	
(35 Ill. Adm. Code 742)	)	

NOTICE OF FILING

To: Dorothy M. Gunn, Clerk
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(VIA ELECTRONIC FILING)

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(SERVICE LIST VIA FIRST CLASS MAIL)

PLEASE TAKE NOTICE that I have today filed with the Office of the Clerk of the Illinois Pollution Control Board **TESTIMONY OF JARRETT THOMAS ON BEHALF OF SUBURBAN LABORATORIES, INC.**, a copy of which is served upon you.

Respectfully Submitted,

SUBURBAN LABORATORIES, INC.,

By: /s/ Jarrett Thomas
Vice President

Dated: February 22, 2006

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CERTIFICATE OF SERVICE

I, Jarrett Thomas, the undersigned, herby certify that I have served the attached **TESTIMONY OF JARRETT THOMAS ON BEHALF OF SUBURBAN LABORATORIES, INC.** upon:

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TESTIMONY OF JARRETT THOMAS ON BEHALF OF SUBURBAN LABORATORIES, INC.

My name is Jarrett Thomas and I am the Vice President and co-owner of Suburban Laboratories, Inc., an IEPA accredited environmental testing laboratory located in Hillside, Illinois. Suburban Laboratories was established in 1936 and has performed drinking water, wastewater and soil analysis in support of environmental and public health programs for over 35 years. I am a current board member of the American Council of Independent Laboratories (ACIL) Environmental Sciences Section and President and co-founder of the Illinois Association of Environmental Laboratories, Inc. (IAETL).

This testimony was prepared with assistance for Greg Pronger, Technical Director of Suburban Laboratories. Mr. Pronger has more than 20 years experience in the environmental testing industry. Prior to joining Suburban Laboratories, in 2002 Mr. Pronger served as the Technical Director of Test America-Bartlett.

1) Background

The analytical requirements and objectives in TACO are ambiguous. The IEPA has acknowledged that there are compounds for which the routinely used methods cannot meet their respective remediation objectives established in TACO, yet the Agency does not intend to fix this problem. We seek to make the analytical requirements of TACO technically sound and achievable. This type of clarity in the regulation will greatly assist in the efficient cleanup of contaminated sites while reducing potential liability that may exist from not analytically verifying the presence or absence of pollutants at the remediation objectives.

2) Analytical Limitations Associated with ADLs, MDLs, and PQLs

In his testimony on January 31, 2006, Mr. Hornshaw of the IEPA said when the TACO rule was first created, the IEPA "looked through all the different SW-846 and drinking water methodologies to determine the lowest detection limit from any of the methodologies that pertain to a particular analyte and if the calculated risk based remediation objective was less than the lowest of the detection limits then we used the lowest detection limit, the ADL, as the remediation objective."

At the heart of the problem is the IEPA's inappropriate use of the terms Practical Quantitation Limit (PQL), Method Detection Limit (MDL) and ADL interchangeably.

USEPA SW-846 replaced the term PQL with Estimated Quantitation Limit (EQL) several years ago, presumably because regulatory officials were assigning too much weight to a value that by name is only an estimate. USEPA SW-846 defines EQL as:

> *The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine*

> *laboratory operating conditions. The EQL is generally 5 to 10 times the MDL. However, it may be nominally chosen within these guidelines to simplify data reporting. For many analytes the EQL analyte concentration is selected as the lowest non-zero standard in the calibration curve. Sample EQLs are highly matrix dependent. The EQLs in SW-846 are provided for guidance and may not always be achievable.*

The quantitation limit, however named, is meant to be a reliable analytical reporting limit. The MDL procedure is found in 40 CFR, Part 136, Appendix B, and is defined in SW-846 as,

> *The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is greater than zero and is determined from analysis of a sample in a given matrix type containing the analyte.*

The MDL is a statistical, rather than chemical, concept. It involves analyzing multiple replicates of low level spikes in the matrix of interest. Most published MDLs were generated using ultra-clean reagent grade water. Applying these MDLs to potentially contaminated groundwater and soil is ill-advised. The Wisconsin Department of Natural Resources' Analytical Detection Limit Guidance (PUBL-TS-056-96) expertly discusses the limitations of the MDL:

> *Statistically, the 99% confidence interval means that any substance detected at a concentration equal to the MDL is 99% likely to be present at a concentration greater than zero. It also means that there is a 1% chance that a substance detected at the MDL will be considered (falsely) "present" when in reality the true analyte concentration is zero. And the MDL tells us nothing about the numerical uncertainty of analytical results. It is assumed that because a substance was detected at a concentration equal to or greater than the MDL, that substance is 99% likely to be present and the quantitated value is the "best available estimate" of the true value.*
>
> *Calculating the MDL at the 99% confidence interval allows for the probability that 1% of the samples analyzed which have a true concentration at the MDL level will be false positives (type I error). Additionally, reporting data down to the MDL does nothing*

> *to control the possibility for false negatives (type II error). Since replicate analyses of environmental samples tend to follow a Gaussian distribution around a mean, it is logical to assume that for a sample spiked at the MDL concentration, 50% of the values would fall above the MDL (detected) and 50% would fall below (not detected). False negatives are much less of an issue for the regulated community because in general "not detected" does not result in future site remediation or permit limits. The slim possibility of false positives and the high probability of false negatives are inherent drawbacks of using a method detection limit.*

The EPA's MDL procedure has been widely criticized in the literature and by regulated facilities for a variety of reasons. In fact, USEPA is currently under court order to change its MDL procedure (68 FR 11770 March 12, 2003). A Federal Advisory Committee on Detection and Quantitation Approaches was formed in 2005 to address the MDL issue.

IEPA defines their Practical Quantitation Limit (PQL) in Section 742.200 as:

> *"PQL" means practical quantitation limit or estimated quantitation limit, which is the lowest concentration that can be reliably measured within specified limits of precision and accuracy for a specific laboratory analytical method during routine laboratory operating conditions in accordance with "Test Methods for Evaluating Solid Wastes, Physical Chemical Methods", EPA Publication No. SW-846, incorporated by reference in Section 742.210.* ***When applied to filtered water samples, PQL includes the method detection limit or estimated detection limit in accordance with the applicable method revision in: "Methods for the Determination of Organic Compounds in Drinking Water", Supplement II", EPA Publication No. EPA/600/4-88/039; "Methods for the Determination of Organic Compounds in Drinking Water, Supplement III", EPA Publication No. EPA/600/R-95/131, all of which are incorporated by reference in Section 742.210.***

There are two problems with the bolded portion of IEPA's definition. First, water samples submitted under TACO are not filtered. Second, for reasons stated earlier, the PQL/EQL should not be equated to MDL. The USEPA has acknowledged that MDLs

and EQLs are highly matrix dependent and are not always achievable, however IEPA has not addressed this limitation in TACO. The Section 742.200 definition of PQL be changed to:

> *"PQL" means practical quantitation limit or estimated quantitation limit, and is the lowest concentration that can be reliably measured within specified limits of precision and accuracy for a specific laboratory analytical method during routine laboratory operating conditions. Published PQLs found in USEPA method are highly matrix dependent and not always achievable.*

Finally, for soil samples, the TACO risk based remediation objectives and ADLs as well as all the USEPA method MDLs, PQLs/EQLs are on a wet weight basis. Section 742.225 (f) requires samples be reported on a dry weight basis. Converting a sample to a dry weight basis can raise its reporting limit. IEPA must consider this when establishing ADLs and determining compliance with remediation objectives. We recommend that a statement similar to the following be added to address this:

> *The remediation objectives and ADLs listed are on a wet weight basis. Actual laboratory results are required to be reported on a dry weight basis. Non-detect analytes that have an elevated reporting limit above the remediation objective or ADL due to the dry weight multiplier shall be considered to meet the remediation objective.*

3) Methods of Analysis

Drinking water method manuals are incorporated by reference in TACO and other IEPA programs like SRP and LUST, although there is no citation back to these manuals in the substantive portion of the regulations. SW-846 is also referenced and in the case of the SRP, the specific method numbers are listed for each analyte. For example, Section 740 Appendix A Table B lists the method for N-Nitrosodi-n-propylamine as 8270C, however 8270C is incapable of achieving the soil and groundwater remediation

objectives for this analyte. The Agency should evaluate the compounds in TACO to determine the quantitation limits and cite the specific methods of analysis used to generate the ADLs.

The Agency should be taking a Performance Based Measurements Systems (PBMS) approach to the analytical requirements of TACO. USEPA defines PBMS as

> *"A set of processes wherein the data needs, mandates, or limitations of a program or project are specified, and serve as criteria for selecting appropriate methods to meet those needs in a cost-effective manner. The criteria may be published in regulations, technical guidance documents, permits, work plans, or enforcement orders. Under a performance-based approach, EPA would specify:*
>
> - *Questions to be answered by monitoring.*
> - *Decisions to be supported by the data.*
> - *Level of uncertainty acceptable for making decisions.*
> - *Documentation to be generated to support this approach in the RCRA monitoring program.*
>
> *For more information, read the Federal Register Notice - October 6, 1997.*

The referenced method of analysis is an important consideration especially since LUST and SRP require that all analyses be completed by an IEPA accredited laboratory and analyses not utilizing an accredited lab are deemed invalid. For many of the drinking water methods and non-standard SW-846 methods there are no IEPA accredited laboratories in the State of Illinois. To facilitate a PBMS approach, TACO should include language that allows flexibility of method selection:

> *Laboratories may use any USEPA method or Performance Based method in accordance with 35 Ill. Adm. Code 186. If the analyte cannot be determined or the remediation objective or ADL cannot be achieved using a method included in the Illinois EPA's 35 Ill. Adm. Code 186 scope of accreditation, the laboratory may utilize any non-standard method so long as the method is validated in accordance with the requirements in 35 Ill. Adm. Code 186.*

4. Specific Problem Compounds

For purposes of identifying problem compounds, we have limited this review to the SRP and LUST Target Compounds. TACO contains dozens of compounds not included in SRP and LUST Target Compound Lists and we encourage IEPA to reevaluate all TACO compounds to determine the analytical limitations. The following is a list of compounds with ADLs or remediation objectives that are difficult to achieve using common methods of analysis like those specified in SRP Section 740 Appendix A Table A through C.

Section 742 APPENDIX B Table A and Table B Soil Remediation Objectives

Analyte	Minimum TACO Objective or ADL (mg/kg)
N-Nitrosodi-n-propylamine	0.0018*
Pentachlorophenol	0.03

*The soil ADL for N-Nitrosodi-n-propylamine listed in TACO appears to be an error as it is the same value as for groundwater.

Section 742 APPENDIX B Table E Class I Groundwater Remediation Objectives

Analyte	Class I (mg/L)
Bromodichloromethane	0.0002
Bromoform	0.001
Chloroform	0.0002
cis-1,3-Dichloropropene	0.001
trans-1,3-Dichloropropene	0.001
Vinyl chloride	0.002
2,4-Dinitrotoluene	0.00002
2,6-Dinitrotoluene	0.00031
Hexachlorobenzene	0.00006
N-Nitrosodiphenylamine	0.0032
N-Nitrosodi-n-propylamine	0.0018
Pentachlorophenol	0.001

Analyte	Class I (mg/L)
Toxaphene	0.003
PCBs	0.0005

The Class I groundwater remediation objectives are also listed in Section 742 APPENDIX B Table H Chemicals Whose Tier 1 Class I Groundwater Remediation Objective Exceeds the 1 in 1,000,000 Cancer Risk Concentration, however, Table H includes ADLs that are lower than the groundwater remediation objectives for some compounds.

5) Fraction Organic Carbon (FOC)

The IEPA has proposed changes that have helped clarify the FOC requirement. The addition of the specific temperature method and the factor required to calculate FOC should be added to provide consistent reporting.

Section 742 Table F: Methods for Determining Physical Soil Parameters; F_{oc}

> ASTM D2974-00 ~~87~~ **(Method C @ 440°C)** ~~Reapproved 1995~~
> Moisture, Ash and Organic Matter[b] appropriately adjusted to
> estimate the fraction of organic carbon **using a factor of 0.5-0.58**
> as stated in Nelson and Sommers (1982)

6) TCLP Inorganic Non-Metals

The procedure for preparing soil samples for analysis of inorganic non-metals such as chloride, nitrate and sulfate is specified in footnotes “m” and “q” of Section 742 Appendix B Table A and B. The referenced TCLP/SPLP procedures were not designed for these analytes and utilizing these procedures can lead to invalid results. The footnotes “m” and “q” should be consolidated and changed to the following:

Extraction must be performed using either 1) USEPA Method 1312 SPLP extraction fluid 3/reagent water or ASTM method D3987-85 Standard Test Method for Shake Extraction of Solid Waste with Water.

The Class I and Class II Soil Component of the Groundwater Ingestion Exposure Route Values for metals were deleted from Section 742 Appendix B Table B. This appears to be in error as the values still exist in Table A.

7) Summary of Recommendations and Conclusion

a) The analytical limitations and methods of analysis associated with determining the risk based remediation objectives should be evaluated by IEPA. The evaluation should take into account matrix specific methods and applicable quantitation limits.

b) TACO should identify the methods used to create the ADLs and develop a procedure specifying the analytical requirements when the ADL is unachievable.

c) ADLs should be added where necessary and the ADLs should not be lower than the Class I Groundwater Remediation Objectives.

d) If IEPA requires reporting down to the MDL, the reporting procedure should be well-defined.

e) The effect of dry weight conversion should be addressed.

f) IEPA should adopt the PBMS approach.

g) The requirement to use an accredited lab when a non-standard method is referenced should be addressed.

h) Correct the N-Nitrosodi-n-propylamine soil ADL error.

i) Better define the FOC temperature requirement and factor.

j) Change the inorganic non-metal leacheate procedure footnotes.

k) Identify/correct problem with deleted metals from Section 742 Appendix B Table B.

TACO identifies several key requirements for laboratory analysis and reporting, however these requirements are ambiguous and in some cases, inconsistent with other IEPA programs. The Agency has allowed hundreds of sites to be closed based on theoretical data in lieu of analytical testing to verify a site is clean. There could be significant liability associated with that type of policy. The Agency should either remove the analytical requirements from TACO and move them to the appropriate program or reevaluate the requirements to make them technically sound and achievable. Analytical requirements that prove a site is clean is the best and most efficient way to ensure the Agency is complying with their mission to “safeguard environmental quality”.