

ILLINOIS POLLUTION CONTROL BOARD

In the Matter of:

PROPOSED AMENDMENTS TO
SOLID WASTE DISPOSAL: GENERAL PROVISIONS
35 Ill. Adm. Code 810; and,
STANDARDS FOR NEW SOLID WASTE LANDFILLS
LANDFILLS 35 Ill. Adm. Code 811.

R 07-008

(Rulemaking – Land)

NOTICE OF FILING

TO: See attached Service List

PLEASE TAKE NOTICE that on January 16, 2007, I caused to be filed electronically with the Office of the Clerk of the Pollution Control Board, on behalf of the National Solid Wastes Management Association the attached Pre-Filed Testimony of NSWMA Witness Thomas A. Hilbert, Pre-Filed Testimony of NSWMA Witness Terry R. Johnson, a “Supplemental Information and Errata Sheet”, and a Notice of Filing in the above matter, copies of which are hereby served upon you.

By: 
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LANDFILLS 35 Ill. Adm. Code 811.)	

PRE-FILED TESTIMONY OF NSWMA WITNESS THOMAS A. HILBERT

My name is Thomas A. Hilbert and I am the President of the Midwest Chapter of the National Solid Wastes Management Association. On behalf of the NSWMA I am pleased to present a number of proposed amendments to the Board's solid waste rules for consideration by the Board. These proposed amendments are specifically set out in the Petition filed by the NSWMA and designated by the Board as R07-008. I am also pleased to say that these amendments are supported by the Illinois Environmental Protection Agency. The NSWMA believes that the proposed amendments are a logical step in an ongoing process to update and enhance the solid waste regulations which were initially adopted by the Board in 1990 in the R88-7 rulemaking. These updates are designed to incorporate practical experience and other advances gained by the regulated community and the Illinois EPA over the last 16 years. The NSWMA believes the adoption of these proposed amendments will result in better landfill management and environmental protection.

In addition to my general duties as President of the Midwest Chapter of the NSWMA, I have been extensively involved with the development of this rulemaking going back to approximately 1999. I am presently the Vice President of Engineering for the William Charles Waste Companies, a division of William Charles, Ltd., one of the largest private employers in

northern Illinois. I have 14 years of experience in environmental management and hold a B.S. degree in geophysics from Western Washington University and a Masters degree in Science in the field of Environmental Engineering from the University of Arizona. I am a member of the American Geophysical Society, the American Society of Civil Engineers, and the National Groundwater Association. I am a licensed professional Geologist in Illinois as well as an Illinois certified landfill operator. I have attached my resume to this testimony.

The proposed amendments at issue in this hearing were developed over the preceding 7 years as a continuation of the rule changes that were envisioned 10 years ago during the development of the R97-20 rulemaking. It is our intent that the proposed amendments will provide a benefit to not only the regulated community but also those parties interested in the administration and enforcement of the rules. The NSWMA believes that the proposed amendments benefit all parties by focusing on refinements that will reduce burdensome or unnecessary requirements that provide no environmental benefit yet, add to the cost of either complying with, or administering, the existing rules.

The proposed amendments reflect input from numerous interested parties as well as the review and consideration of sources of information such as environmental monitoring databases and published literature. This included discussions with the Illinois EPA, the US EPA, environmental regulatory bodies in other states, independent experts in the field of groundwater statistics, and the experience of Illinois permitted landfill operators. These discussions resulted in a huge database of knowledge and practical experience that was used to refine the existing regulatory language. It also served to ensure that support for the proposed amendments would include the broadest possible base of interested parties. We are very appreciative that the Illinois EPA has joined with us in supporting the proposed amendments and consider its support in this

rulemaking to be a clear indication that our efforts to build a consensus around reasonable and appropriate amendments were successful.

The primary focus of the proposed amendments is to refine the groundwater monitoring requirements of the existing 810 and 811 rules. These potential changes were anticipated during the drafting of the R97-20 rules but were not included in that rulemaking so as to allow those rules to proceed since they did not have the same degree of complexity associated with assessing groundwater characteristics. Now, however, we believe that we have spent a sufficient amount of time reviewing data and assessing past experience to have developed a good foundation for proposing the amendments that we propose today.

The NSWMA believes that the proposed amendments do not degrade any of the protections to the environment or public safety inherent in the existing rules. In fact, we feel that the proposed amendments improve on those protections by removing or amending requirements that result in excessive cost or resource demands and offer no commensurate environmental benefit. The members of the NSWMA are committed to the goal of ensuring that we provide an essential public service in a manner that is protective of the environment and we are confident that these proposed amendments are consistent with that goal.

In closing, I would like to thank the representatives of the Illinois EPA that worked very hard with us on drafting these amendments, including Joyce Munie, Gwenyth Thompson, and Chris Liebman. I would also like to thank the Board for its consideration of this rulemaking and we will make every effort to respond to any questions or concerns that the Board, or any interested party, may have about the rulemaking.

Thank you.

THOMAS A. HILBERT

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PROFESSIONAL EXPERIENCE

William Charles Waste Companies- 1992-present

Vice President of Engineering for a private municipal solid waste management (MSW) company. Responsibilities include design and construction oversight for landfills during development and closure. Ensure compliance with applicable regulatory codes and operational permits for all air, land, and water permits. Assist in the planning and development of new business opportunities.

- Planning and project development for landfill gas management and energy recovery systems.
- Prepare design and bid specifications, coordinate contractors, and regulatory inspections for construction of new landfills, environmental control systems, and landfill closures.
- Plan and prepare permit applications to ensure timely, efficient, and cost effective compliance with applicable regulatory codes.
- Oversight of environmental monitoring and management systems at operating and closed facilities.
- Establish and maintain a good working relationship with regulatory agencies and state legislators.
- Past president of Illinois chapter of the National Solid Waste Management Association (NSWMA) 2000-2003
- Past president and member of the executive committee of the Illinois chapter of the Solid Waste Association of North America (SWANA) 2003-2004
- Served on a number of legislative and regulatory rulemaking committees. Current Chairman of the NSWMA technical committee.
- Financial cost review for construction projects and regulatory financial assurance requirements

University of Arizona- 1989-1992

Research assistant for National Institute of Health funded project studying bacterial transport in aquifer systems. Provided design and planning input to multi-discipline research group to establish the study goals and research methodologies.

Greiner Engineering - 1986-1989

Construction Management and Surveying for civil engineering projects. Surveying control and construction management for private client land development projects. Construction management and quality assurance oversight for state and federal agencies during construction of the Roosevelt Lake Bridge and related infrastructure.

Northern Geophysical- 1985-1986

Seismic exploration in the Basin and Range and Rocky Mountain regions with Northern Geophysical, a Canadian company, under contract for Exxon Corp.

EDUCATION:

1982-1985	Western Washington University, Bellingham, WA	Bachelor of Science Geophysics
1989-1992	University of Arizona , Tucson, AZ	Master of Science Environmental Eng.

PUBLICATIONS: Jewett, D.J., Hilbert, T.A., Logan, B.E., Arnold, R.G., Bales, R.C.; " Bacterial Transport In Two Porous Media Systems: Influence of Ionic Strength and pH on Collision Efficiency Estimates", Water Res., Vol. 29, No. 7, pp. 1673-1680, 1995

Logan, B.E., Hilbert, T.A, Arnold, R.G.; "Removal of Bacteria In Laboratory Filters: Models and Experiments", Water Res., Vol. 27, No. 6, pp. 955-962, 1993

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PRE-FILED TESTIMONY OF NSWMA WITNESS TERRY R. JOHNSON

My name is Terry Johnson and I am a Director – Senior Hydrogeologist with the Groundwater Protection Program of Wastes Management, Inc. I have more than 18 years of experience in the area of environmental hydrogeology and landfill technologies. I currently have responsibility for the evaluation and characterization of hydrogeologic conditions at approximately 45 solid waste facilities in the upper Midwest, including the States of Illinois, Iowa, Minnesota, North Dakota, Wisconsin, and the Canadian Provinces of Alberta and Ontario. At these facilities I have been involved in the design, implementation, and ongoing evaluation of environmental monitoring programs. I have also been involved in the development of technical standards and guidance related to environmental monitoring at solid waste facilities as well as other landfill issues such as alternate final covers and leachate recirculation and bioreactor projects. I have also developed and conducted training programs for Waste Management personnel, private consultants, and regulatory personnel related to environmental monitoring. I have a Bachelor of Science degree in geology from Bemidji State University as well as a Master of Science degree in geology from the University of North Dakota. I have attached a current

resume that identifies my education, work experience, and various papers, presentations and awards.

Perhaps more specific to today's proceedings, since approximately 1999, I have been substantially involved in discussions with the Illinois Environmental Protection Agency about the need to review and update certain aspects of Illinois' solid waste regulations. The proceeding today represents the culmination of approximately six years of regulation, review, literature review, data gathering, data analysis, and open discussions with the Illinois EPA about various regulations. In that regard, I do want to acknowledge other members of the NSWMA who also participated in this rulemaking process and brought considerable experience and knowledge to this process including Tom Hilbert, Eric Ballenger, and Bill Schubert. I also want to acknowledge the expertise, as well as investment in time, and substantial work put into this project by the Illinois EPA, including, but probably not limited to, Gwenyth Thompson, Chris Liebman, and Joyce Munie. As you know, the Illinois EPA supports and concurs with the proposed amendments, and we truly appreciate all of their work on this proposal.

The purpose of my testimony is simply to explain the rationale for the proposed amendments. Much of this testimony simply follows the rationale outlined in the written proposal. Hopefully, my written testimony is simply background which I can expand upon if the Board or any other interested party has questions in person at the scheduled hearings.

In brief, and as introduction, the proposed rules are designed primarily as an update of the Board's existing rules. These updates are designed to incorporate practical experience and other advances gained by the regulated community and the Illinois EPA over the last 16 years. The primary focus of the proposed amendments is to refine the groundwater and leachate monitoring requirements of the existing 810 and 811 rules. I believe that the proposed amendments do not

degrade any of the protections to the environment or public safety inherent in the existing rules. The proposed amendments improve on those protections by removing or amending requirements that result in excessive cost or resource demands and offer no commensurate environmental benefit.

Before I discuss the substantive proposals, I do note that a number of the proposed amendments are not substantive. These amendments merely make typographical changes or numbering changes. I will identify these amendments for the record, but I do not intend to offer any specific testimony about them. Of course, if the Board has questions, I can answer those. Using the numbering system as set out in the July 27, 2006 "Proposal to Amend Certain Pollution Control Board Regulations Related to Solid Waste Management Facilities," the non-substantive proposed amendments are: proposed amendment number 1 (810.101(a)(1)); proposed amendment number 2 (810.104(a)(1)); proposed amendment number 3 (810.104(a)(1)); proposed amendment number 11 (811.315(e)(1)(G)(ii)); proposed amendment number 13 (811.318(e)(6)(C)); proposed amendment number 14 (811.318(e)(6)(D)); proposed amendment number 15 (811.318(e)(6)(E)); proposed amendment number 17 (811.318(e)(8)); proposed amendment number 21 (811.319(a)(3)(B)); proposed amendment number 29 (811.319(b)(5)(E)); proposed amendment number 30 (811.319(b)(5)(G)); proposed amendment number 31 (811.319(d)(1)(A)); proposed amendment number 32 (811.319(d)(3)(A)); proposed amendment number 38 (811.320(d)(3)); proposed amendment number 39 (811.320(d)(4)); proposed amendment number 40 (811.320(d)(5)); and proposed amendment number 41 (811.320(d)(6)).

Substantively, the proposed amendments in 811.309(g)(1) delete the existing requirements with respect to the frequency of leachate monitoring and reference the new frequency requirements (to be found and discussed at 811.309(g)(5)) and codified list of

constituents to be sampled for (to be referenced at 811.309(g)(2)(G) and 811.309(g)(3)(D) and found at 811.Appendix C) . The proposed amendments also reference, for the first time, a default minimum number of leachate monitoring locations. Finally, the proposed amendments allows the Illinois EPA to require by permit *less* leachate sampling than might otherwise be required in the regulations as long as compliance with other regulatory provisions is ensured. This amendment is designed merely to allow the Illinois EPA flexibility to accommodate individual site conditions. The regulations currently allow the Illinois EPA the flexibility to require more leachate sampling if it believes it is necessary.

With respect to **811.309(g)(2)(G)**, we propose to amend this subsection by referencing (and requiring) a specific list of leachate monitoring parameters. This proposed list of leachate monitoring parameters consists of 202 constituents likely to be found in leachate. The list is derived by the Illinois EPA from its "Attachment 1" to Appendix C "Instructions for the Groundwater Protection Evaluation for Putrescible and Chemical Waste Landfills" of the Illinois EPA's LPC-PA2 and LPC-PA19 "Instructions for a Significant Modification Demonstrating Compliance with 35 Ill. Adm. Code, Subtitle G, Part 814, Subpart C." This list of parameters is the list currently required by permit but is not required by regulation. This amendment increases the level of environmental protection. Including the list will also ensure that it is applicable to all landfills in Illinois and not just permitted landfills.

With respect to **811.309(g)(3)(D)**, this is the same proposed amendment as identified above at 811.309(g)(2)(6).

With respect to **811.309(g)(4)**, we propose to add this new subsection to require a certain minimum number of leachate monitoring locations. Currently, the number of leachate monitoring locations is determined by the Illinois EPA on a case by case basis. Over the years, it

has developed that some landfills may have only one leachate monitoring location while others have dozens. This proposed amendment mandates a minimum number of four leachate monitoring locations and at least one for every 25 acres within a landfill units waste boundary unless the operator demonstrates, through the permitting process, that fewer leachate monitoring locations are needed. By this amendment a certain amount of uniformity will be established. Perhaps more importantly, it is recognized that leachate qualities may differ spatially and temporally within a given landfill. By requiring a certain minimum number of leachate monitoring locations, it is believed that this "spacial variability" of leachate within a landfill can be detected. The result is not only more information and improved environmental protection, but more accurate information upon which better regulatory decisions can be made.

At **811.309(g)(5)**, we propose to add this new subsection to require leachate monitoring semi-annually. Currently, once four quarters of leachate data is collected, leachate sampling is conducted on a semi-annual basis. The amount of data collected under the current regulatory scheme is extensive but has not been demonstrated to result in any greater understanding of leachate conditions at any given landfill. Under the proposed amendments, while 4 quarters of data during initial sampling is eliminated, relevant data are continued to be collected on an appropriate (semi-annual) basis as the existing rule provides. This initial quarterly data collection period occurs at generally an early stage in landfill development and yielded data not necessarily representative of long-term conditions in the landfill. Data collection on a semi-annual basis is sufficient to characterize leachate quality trends. This does serve to slightly lessen the economic cost on landfill operators, but such cost savings are not at the expense of environmental protection. In fact, considerable leachate data continues to be collected as described above.

At **811.Appendix C**, we propose to amend 811.Appendix C by referencing (and establishing) a specific list of leachate monitoring parameters. This proposed list of leachate monitoring parameters consists of 202 constituents likely to be found in leachate. The list is derived by the Illinois EPA from its "Attachment 1" to Appendix C "Instructions for the Groundwater Protection Evaluation for Putrescible and Chemical Waste Landfills" of the Illinois EPA's LPC-PA2 and LPC-PA19 "Instructions for a Significant Modification Demonstrating Compliance with 35 Ill. Adm. Code Subtitle G, Part 814, Subpart C." This list of parameters is the list currently required by permit and including it in the regulations will simply codify the list. Including the list will also increase the level of environmental protection and ensure that it is applicable to all landfills in Illinois.

At **811.315(e)(1)(G)(i)**, we propose to replace the reference to "public or food processing water supply standard at 35 Ill. Adm. Code 302" with a reference to the groundwater standards found at 35 Ill. Adm. Code 620. The reference to the public or food processing water supply standards was included in the original R88-7 Rulemaking adopted in 1990. With the adoption of the Illinois groundwater rules standards, however, the reference to the public or food processing water supply standards is no longer the most appropriate standard. Groundwater at landfills is now regulated under a more inclusive list of constituents found in the 620 regulations. Here too, as with many of these proposed amendments, technical compliance has become unreasonable with the Board's adoption of a more appropriate standard. In addition, the degree of environmental protection remains the same.

With respect to **811.318(e)(6)(B)**, we propose to delete this requirement at this location and replace it at a new Section 811.318(e)(7). As is noted below, this new proposed Section is

designed to better reflect current landfill operations and equipment advances, improve data collection and reliability, and thereby improve the existing level of environmental protection.

With respect to **811.318(e)(7)**, we propose to amend this Section by requiring well depth information to be taken on an annual basis for wells without dedicated pumps. For wells with dedicated pumps, the measurement frequency shall be 5 years (or less if the pump is serviced). Since the adoption of the current regulations, a significant amount of scientific literature has been developed that points to the superior quality of samples collected using dedicated sampling pumps used in groundwater wells. Removing these points to take well depth measurements negates these benefits and can introduce biases in the resultant data. These pumps, which over the years have become the industry standard, allow sample collection that is more representative of aquifer conditions by minimizing turbidity, and minimizing the potential for cross-contamination. The current Illinois regulations that require removal of dedicated pumps to check well depth eliminates these significant benefits. The proposed amendment is therefore justified as a means to collect more accurate data that, in turn, results in better regulatory decisions and greater protection of the environment.

Next, at **811.319(a)(2)(A)(ii)**, we propose to delete the existing provision 811.319(a)(2)(A)(ii) and replace it with a new subsection (ii) identified below. The existing provision, referencing a number of potential indicator contaminants is proposed to be replaced with a minimum list of specific constituents (see discussion below).

At **811.319(a)(2)(A)(ii)**, we propose to add a specific list of indicator contaminants in lieu of the existing standard.

Monitoring in Illinois and in accordance with the Federal regulations occurs routinely under what is known as the detection monitoring program. In this program it is desired to have a streamlined monitoring list that is tailored to indicate whether or not a potential release from the facility has occurred. Our experience (Petitioner and Illinois EPA) in monitoring landfills over the past 15 plus years has provided valuable knowledge concerning which parameters are effective in this regard. The second component of landfill monitoring is referred to as assessment monitoring which is to be initiated once the detection monitoring program indicates that a potential release from the facility has occurred. In the assessment monitoring program *more extensive monitoring is conducted.*

The proposed amendments add a specific list of indicator parameters to the detection monitoring program. This list has been selected to represent the most effective indicators of a potential leachate release plus some parameters that provide important information about conditions in the groundwater. Current Illinois practice requires quarterly monitoring for dissolved ammonia, arsenic, boron, cadmium, chloride, iron, lead, manganese, nitrate, sulfate, total dissolved solids, zinc and total cyanide and phenols.

The proposed new monitoring list includes dissolved ammonia, dissolved arsenic, dissolved boron, dissolved cadmium, dissolved chloride, dissolved chromium, total cyanide, dissolved lead, dissolved magnesium, dissolved mercury, dissolved nitrate, dissolved sulfate, total dissolved solids, and dissolved zinc. In addition, any facility accepting more than 50% by volume of non-municipal waste would also be required to monitor for additional parameters based upon their leachate and waste content. Parameters added to this quarterly sampling list include dissolved magnesium, dissolved mercury and dissolved chromium. Parameters removed from the quarterly sampling list include dissolved iron and manganese. In general terms, the

proposed list of constituents to be sampled for tend to be less subject to natural interferences, and/or exist at a better concentration contrast between leachate and background groundwater, which make them effective and reliable detection monitoring parameters.

In addition to the quarterly monitoring, current practice in Illinois has included annual monitoring for a list of total metals. Total simply means metal analyses conducted on samples of groundwater that have not been filtered to remove suspended sediments. Consequently, these sediments often compromise the sample results as the suspended sediments often contain metals, which bias the results.

Under this proposal, a number of total metals currently monitored on an annual basis will be removed from the detection monitoring program in favor of the overall changes to the detection monitoring program. The total metals to be removed are: antimony, barium, beryllium, cobalt, copper, nickel, selenium, silver, thallium, and vanadium. In general, these constituents are not effective monitoring parameters for one of more of the following reasons, 1) as discussed above they are often naturally occurring in the suspended sediment of the groundwater sample, 2) they may not be present in leachate from a facility, or if present are at an insufficient concentration contrast between background groundwater and 3) they are typically not mobile in groundwater meaning they do not migrate significantly. For the above reasons, most other state programs have eliminated the monitoring of many of these parameters. As such, the removal of these total metals from the detection monitoring program will not have a deleterious effect on groundwater monitoring programs in Illinois. In fact, it is believed that by focusing on those inorganic parameters and VOC's shown to be reliable indicators of a release (as proposed), detection monitoring will be improved. Finally, it must be noted that monitoring for these specific total metals is included in the assessment monitoring program.

By focusing on parameters most indicative of a potential landfill release, the monitoring program improves, in that it is effective and more efficient, resulting in better use of the limited resources of both facility operators and regulatory personnel. The changes in parameters noted above will improve detection monitoring and thus improve environmental protection as well.

At **811.319(a)(3)(A)(i)**, we propose to add a specific list of organic chemicals that must be monitored on a semi-annual basis. Currently, organic monitoring is performed once every year. This proposed amendment will increase that frequency to semi-annually. The list of parameters essentially incorporates the federal 40 CFR 258.Appendix I organics in addition to the 40 CFR 141.40 organics. The list includes volatile organic compounds as well as phenols and oil and grease. An exhaustive multi year examination of leachate data collected from landfills in Illinois was conducted to verify whether or not this list of organics constitutes the bulk of organic parameters in leachate. The analysis confirmed that VOCs and phenols comprise the vast majority of the mass of organic compounds in leachate. In addition to being the most prevalent organic compounds in leachate, VOC's are also the most mobile and detectable of the organic constituents. The list does eliminate certain, less mobile, semi-volatile, pesticide/herbicides, and PCBs. The elimination of these parameters from this list does not reduce the degree of environmental protection for two reasons: 1) VOC's and phenols comprise the vast majority of organic compounds present in leachate and were found to be present at higher concentrations than any other organic compound class in leachate, and 2) the organics that are eliminated from this list are included in the assessment monitoring program. Conversely, by doubling the frequency of the most commonly detected anthropogenic and mobile constituents, the level of environmental protection afforded by the ground water monitoring program is greatly improved.

We propose two changes at **811.319(a)(3)(C)**. First, the proposal revises the existing reference to Section 811.319(a)(1)(A) to a reference to the section requiring monitoring of organic parameters at 811.319(a)(3). The Petitioner and the Illinois EPA believe that this revision merely corrects a typographical error and makes the intent of the regulations clear. There is no substantive change to the regulations by this proposed amendment. This is the same proposed amendment as referenced in "Proposed Amendment 21." Second, the proposed amendment increases the frequency of the referenced sampling from annual to semi-annual. This increase in sampling frequency serves to enhance the collection of relevant data. While the cost of such sampling does increase, the degree of environmental protection is also increased.

With respect to **811.319(a)(4)(A)(i)**, we propose two changes to this subsection. Currently, the subsection requires that confirmation monitoring shall be instituted where any constituent monitored shows a progressive increase over four monitoring events. The proposed amendments provide that confirmation monitoring shall be instituted only where any inorganic constituent monitored shows a progressive increase over eight, rather than four, consecutive monitoring events. These proposed amendments are designed to provide greater assurance based upon statistical reliability that any identified progressive increases are due to an actual change in groundwater concentrations rather than by chance alone. Under the current four consecutive event rule, frequent false positives (i.e., indication that a given parameter is outside of its normal range when in fact it is not) are identified. Eight consecutive monitoring events reduce the chance of false positives to approximately 5% consistent with current US EPA guidance. This results in improved assessment of the data, which ultimately results in better regulatory and operational decisions. It should be noted that in addition to this test a facility is still required to perform the requisite statistical tests on these same data. Thus, the false positive

rate of this test is additive to the overall facility false positive rate. The degree of environmental protection remains at its high level and is not affected by this proposed amendment.

With respect to **811.319(a)(4)(B)(i)**, the proposed amendment allows adequate time to verify observed constituent concentration increases and to clarify the start time for that verification. Currently, the subsection provides that an operator shall verify observed increases within 45 days of the initial observation of an increase. This 45 day window in which to sample and verify an increase is difficult to satisfy while following all the requisite data quality assurance and quality control procedures consistent with US EPA guidance and best practices. Allowing a 90 day verification process allows adequate time for an operator to sample, analyze and complete the requisite data quality assurance and quality control procedures. The 90 day verification process also allows verification sampling to potentially be conducted during the next routine quarterly sampling event, thus maximizing the efficiency of the detection monitoring program. Amending the initiation of the verification process from the currently required "initial observation" to the proposed "initial sampling event" is designed merely to clarify the starting point for the 90 day verification process. Neither of these proposed amendments alters the purpose, effect, or degree of environmental protection reflected in the rule. In fact, completion of important quality control functions insures more reliable data are collected at the site and used to populate statistical control programs and data management programs which results in improved environmental protection and a better basis for regulatory decisions.

At **811.319(a)(4)(B)(iii)**, we propose to amend this subsection by requiring an operator that has confirmed an increase in the concentration of a constituent to submit its determination as to the source of the increase within 180 days of the original sampling event. In addition, this submittal must be in the form of a "significant permit modification." This proposed amendment

establishes a much more rigorous procedure than is now in place and is therefore more protective of the environment. Current practice is for an operator to submit a letter to the Illinois EPA discussing the confirmed increase and the operator's determination as to the source of the increase. Under the proposed amendment, the 180 day time frame from the original sampling event accounts for the 90 day resample date and allows the operator sufficient time to adequately investigate the cause of the increase. In addition, the requirement that the notification be submitted as a significant modification permit submittal provides the Illinois EPA with an appropriate procedural mechanism to review, comment, and ultimately approve (or disapprove) the submittal thereby ensuring a quality review and administrative finality.

With respect to **811.319(b)(2)**, we propose to amend this subsection by requiring an operator that is required to submit an assessment monitoring program plan to submit such plans within 180 days of the original sampling event. The proposed amendment also requires implementation of the assessment monitoring program within that same 180 days from the original sampling event for unpermitted facilities and 45 days after Illinois EPA approval of the program for permitted facilities. This proposed amendment establishes a much more specific timeline for action. Currently, no specific time frame is required for submittal of the assessment monitoring program plans for either permitted or unpermitted facilities. Rather, the only time frame in the current rule is that the assessment monitoring program must be implemented within 90 days of monitored increase confirmation at unpermitted facilities and within 90 days of Illinois EPA approval of the significant permit modification submittal at permitted facilities. By amending the rule as proposed (tied to the original sampling event) a much more definite implementation time is established for unpermitted facilities to implement the assessment monitoring program. Likewise, the proposed amendment establishes a faster implementation

time for permitted facilities as well reducing the time for implementation of the assessment monitoring program from 90 to 45 days. Both proposed amendments result in more expeditious response to confirmed monitored increases which in turn enhances environmental protection.

At **811.319(b)(5)(A)**, we propose to amend this subsection by making certain minor clarifications. First, a reference to subsection (b)(1)(A) is amended by deleting the reference to “(A)”. This amendment, retaining the reference to (b)(1) simply corrects a typographical error and broadens the reference to include (b)(1)(A), (B), and (C). Second, the word “shall” has been replaced with “must.” Third, the subsection is amended to include a reference to additional constituents (in addition to those constituents currently referenced at 40 CFR 258.Appendix II) that must be tested for by referencing 35 Ill.Adm. Code 620.410. These additional constituents serve to increase environmental protection.

At **811.319(b)(5)(D)**, we propose to amend this subsection by clarifying that the expanded list of constituents to be monitored for must be monitored on an annual basis, and that any constituents detected under the expanded monitoring list must be monitored on a semi-annual basis. The first proposed amendment simply changes the term “shall” to “must.” This amendment is being proposed at the suggestion of the Illinois EPA to reflect the Pollution Control Board’s current usage. The second amendment provides that any constituents on the expanded monitoring list (40 CFR 258.Appendix II and 35 Ill.Adm. Code 620.410) that are detected in the initial sampling must be monitored for on a semi-annual basis. The third amendment proposes that the expanded monitoring list be monitored on an annual basis. These changes are designed to generate more accurate information. The degree of environmental protection is increased in light of the expanded mandatory list of constituents to be monitored

for, while focusing on those constituents of concern that have been identified. The proposed amendment retains testing on a comprehensive basis annually.

With respect to **811.320(a)(3)(B)**, we propose to replace the reference to “public or food processing water supply standard at 35 Ill.Adm. Code 302” with a reference to the groundwater standards found at 35 Ill.Adm. Code 620. The reference to the public or food processing water supply standards was included in the original R88-7 Rulemaking adopted in 1990. Subsequently, with the adoption of the Illinois groundwater rules, the 620 standard with respect to groundwater has been adopted. The reference to the public or food processing standard is no longer *practically or legally the most appropriate standard*. Legally it appears that the public or food processing water supply standards is inapplicable to groundwater. See 35 Ill.Adm. Code 620.130. Practically, as well, groundwater at landfills is regulated under a more inclusive list of constituents found in the 620 regulations. This proposed amendment mirrors the proposed amendment at 811.315(e)(1)(G)(i).

With respect to **811.320(b)(2)**, we propose to replace the reference to 35 Ill.Adm. Code 302.301, 304 and 305 (which are “public or food processing water supply standards) with the newer groundwater quality standards at 620.410, 420, 430 and 440. This proposed amendment is designed merely to update the regulations and bring them more in line with current practice. Referencing the groundwater standards appears to be consistent with the exemptions of 35 Ill.Adm. Code 620.130 limiting the applicability of public or food processing water supply standards to groundwater. Referencing the groundwater quality standards is also more inclusive than the public or food processing water supply standards and thus these proposed amendments are more protective of the environment.

Next, at **811.320(b)(4)**, we propose to replace the reference to 35 Ill. Adm. Code 302.301, 304 and 305 (which are “public or food processing water supply standards) with the newer groundwater quality standards at 620.410, 420, 430 and 440. This proposed amendment is designed merely to update the regulations and bring them more in line with current practice. Referencing the groundwater standards appears to be consistent with the exemptions of 35 Ill. Adm. Code 620.130 limiting the applicability of public or food processing water supply standards to groundwater. Referencing the groundwater quality standards is also more inclusive than the public or food processing water supply standards and thus these proposed amendments are more protective of the environment.

At **811.320(d)(1)**, we propose to revise existing section 311.320(d) related to the establishment of background concentrations into 3 separate subsections. The substantive revisions contained in proposed subsections (d)(1) and (d)(2) are designed to allow more appropriate and accurate characterization of site background conditions consistent with US EPA guidance and current practice. This is accomplished by allowing the Illinois EPA to review more than one year's worth of quarterly sampling data and, given the potential for a greater number of sampling events, by allowing non-consecutive data in certain circumstances. Allowing, but not requiring, more than one year of quarterly sampling is justified by the simple principle that more data provides an improved statistical basis for comparisons. The statistical limits generated by the additional data will, in the long run, reduce the frequency of both false positive and false negative decisions. In addition, the proposed amendment will allow the Illinois EPA to consider non-consecutive data as long as only one quarterly sampling is absent and that the remaining data is nevertheless representative of consecutive data. In providing the opportunity to undertake more accurate statistical comparisons (i.e. a resultant improvement in both the false positive and

false negative rate), the ability of the program to detect real groundwater changes is improved. Thus, the amendment provides a higher level of environmental protection. In addition, these proposed amendments reflect current US EPA guidance as well as current literature and industry practice.

At **811.320(d)(2)**, we propose to amend the existing rule by clarifying when adjustments to background concentrations can be made. The existing rule provides that adjustments to background concentrations can be made if changes in the background concentrations are “statistically significant.” The proposed amendments simply clarifies that in addition to being “statistically significant,” the changes must be due to either a natural temporal or spatial variability or otherwise due to an off-site source not associated with the landfill or landfill activities. This ensures that no adjustments are made that might be related to landfill operations, thus improving environmental protection. The proposal also provides that such changes may only be made once every two years. The proposed amendment also references the availability of using non-consecutive data to adjust background concentrations as long as the Illinois EPA approves. Finally, the proposed revision prohibits any adjustment under this subsection until two years after this amendment becomes final unless specifically required by the Illinois EPA.

At **811.320(e)(1)**, we propose to delete existing references to specific “normal theory statistical tests” and “nonparametric statistical tests” set out in the regulations. This proposed amendment is designed to eliminate references to inappropriate tests while allowing the use of more appropriate tests consistent with US EPA guidance and practice. The proposed amendment will not alter the regulatory scheme or impact protection to human health and the environment.

At **811.320(e)(3)**, we propose to amend this subsection to recognize that the practical quantification limit (“PQL”) is the appropriate “level of detection” when reporting monitoring

data. References to the “method detection limit” are proposed to be replaced with the use of the “practical quantification limit” (“PQL”) as the recognized “level of detection.” This codifies the present monitoring approach of reporting data to the PQL. The PQL is recognized as the lowest limit at which the analytical result can be quantified. The U.S. EPA recognizes the limits of using the method detection limit and has provided that PQL’s are much more appropriate. It also provides consistency with existing regulation 811.319(a)(4)(A). This proposed amendment is therefore designed to reflect the state of current thought and sound and practical practice in analyzing groundwater monitoring data. To ensure that the use of PQL’s remain protective of human health and the environment, the proposed amendment also provides that any established PQL shall not in any case be higher than any level established by the Board as a groundwater quality standard under the Illinois Groundwater Protection Act.

At **811.320(e)(3)(A)**, we propose to amend this subsection to reflect the changes proposed above in Section 811.320(e)(3) by deleting the reference to MDL’s and substituting the PQL. The proposed amendment also deletes a reference to the use of certain statistical tests identified at section 811.320(e)(4). As noted below, the reference to the specific statistical tests identified at section 811.320(e)(4) are proposed to be deleted and replaced by allowing additional types of statistical tests that can be demonstrated to meet current regulatory requirements and which are approved by the Illinois EPA. This proposed amendment is designed to allow more a wider range of statistical tests that may be more suitable for individual site conditions while still achieving the same, if not enhanced, data for operator and regulatory review.

With respect to **811.320(e)(3)(B)**, we propose to amend this subsection by deleting the reference to “data transformations,” thus making this subsection consistent with its companion section 811.320(e)(3)(A) and the usage of particular tests. The proposed amendment also allows

the use of "Atchison's adjustment" as well as the existing Cohen's adjustment in analyzing groundwater data. This amendment merely adds an additional adjustment method (Atchison's) that has become a standard in the industry. It is currently widely accepted. Finally, the reference to the specific statistical tests identified at section 811.320(e)(4) are proposed to be deleted allowing additional types of statistical tests that can be demonstrated to meet current regulatory requirements and which are approved by the Illinois EPA. This proposed amendment is designed to allow a wider range of statistical tests that result in more accurate statistical comparisons for individual site conditions, thus improving the ability of the program to protect human health and the environment.

With respect to **811.320(e)(3)(C)**, we propose to amend this subsection by deleting the reference to the "test of proportions." As noted above, the specific statistical tests currently referenced are to be deleted, thus allowing additional types of statistical tests that can be demonstrated to meet or exceed current regulatory requirements and which are approved by the Illinois EPA. This proposed amendment is designed to allow more a wider range of statistical tests that may be more suitable for individual site conditions while still achieving the same, if not enhanced, data for operator and regulatory review.

With respect to **811.320(e)(4)**, we propose to delete the majority of existing section 811.320(e)(4) which identifies specific normal theory statistical tests. Revised subsection 811.320 (e)(1) and 811.320 (e)(3) provide adequate direction to statistical procedures for normal or transformed data sets without specifying, what in some cases are, inappropriate test methods. This proposed amendment is designed simply to allow the use of more appropriate tests. The proposed amendment will not alter the regulatory scheme or impact protection to human health and the environment.

At **811.320(e)(5)**, we propose to delete portions of the section that referenced specific statistical methods and reference the use of any such tests that meet the requirements of 35 Ill. Adm. Code 724.197(i). This subsection is renumbered as 811.320(e)(4). The use of statistical tests meeting the requirements of 35 Ill. Adm. Code 724.197(i) is currently allowed. This proposed amendment is designed simply to clarify that the use of non-specified statistical tests may be allowed by the Illinois EPA where appropriate. The proposed amendment will not alter the regulatory scheme or impact protection to human health and the environment.

At **811.320(e)(6)**, we propose to delete existing subsection 811.320(e)(6) which allows the use of statistical tests that meet the requirements of 35 Ill. Adm. Code 724.197(i). Reference to the use of tests meeting 35 Ill. Adm. Code 724.197(i) has been incorporated into new subsection 811.320(e)(4). The proposed amendment will not alter the regulatory scheme or impact protection to human health and the environment.

In closing, I would again like to thank the Illinois EPA for working with the NSWMA on these proposed amendments. I would also like to thank the Board for its consideration of this rulemaking and urge the Board to adopt these reasonable and appropriate amendments.

Thank you.



TERRY R. JOHNSON, PG, CPG
Director/Senior Hydrogeologist

Education

Master of Science, Geology, University of North Dakota, Grand Forks, North Dakota, 1990.

Bachelor of Science, Geology, Bemidji State University – Bemidji, Minnesota, 1987.

Professional Registrations

Professional Geologist, Wisconsin # 892
Professional Geologist, Minnesota # 30582
Certified Professional Geologist # 9855
Professional Geologist, Ontario # 0965

Professional Summary

Mr. Johnson, has 18 years of experience in the area of environmental hydrogeology and landfill technologies. He has experience in the design, set-up, performance and management of environmental monitoring programs for over 40 solid waste facilities in the Midwest and Canada. In addition, he is a member of WMI's Bioreactor Program and a Co-leader of WMI's Alternate Final Cover Initiative. Mr. Johnson has worked on the design, operation and monitoring of multiple leachate recirculation/bioreactor projects in the Midwest. In his capacity as a Leader of WMI's Alternate Final Cover Program, Mr. Johnson is responsible for company policy, regulatory interaction, applied research as well as project implementation and management.

Mr. Johnson is experienced in the development of technical standards and guidance related to environmental monitoring, bioreactor landfills and alternate final cover systems.

Mr. Johnson has worked with regulatory leaders on the development of new regulations and guidance governing solid waste environmental monitoring, alternate final covers and bioreactors in over 8 states and Canadian Provinces.

He has experience designing and implementing environmental remediation systems for groundwater and other media. He has also performed numerous landfill gas/groundwater investigations. Mr. Johnson's other experience includes landfill emissions/methane oxidation, landfill hydraulics and unsaturated flow dynamics in landfill cover systems.

Professional Experience

Director/Senior Hydrogeologist, Groundwater Protection Program (1996 to Present), Waste Management Inc., Minneapolis, Minnesota.

Mr. Johnson is responsible for the evaluation and characterization of hydrogeologic conditions at various solid waste facilities within his geographic area of responsibility. He is also involved in the design, implementation and on-going evaluation of environmental monitoring programs at these facilities. Mr. Johnson's current geographic area of coverage includes approximately 45 landfills located in the upper mid-west (Illinois, Iowa, Minnesota, North Dakota and Wisconsin) and two Canadian provinces (Alberta and Ontario). He has developed and conducted training programs regarding various aspects of environmental monitoring for WMI staff, environmental consultants and regulatory personnel. Mr. Johnson also provides technical oversight and assistance to staff within Waste Management and various outside consultants.

In addition, Mr. Johnson also works with regulatory officials regarding the revision of existing regulations or development of new regulations and guidance pertaining to environmental monitoring at solid waste facilities. He has worked in this capacity with the states of Illinois, Minnesota, and the Canadian Province of Alberta.

Project Manager/Hydrogeologist (1990 to 1996), B. A., Liesch Associates, Inc., Minneapolis, Minnesota.

Project Manager/Hydrogeologist on environmental projects ranging from underground storage tank sites to landfill and industrial sites with a project base comprised primarily of landfill projects. Responsibilities as a Project Manager include regulatory interaction, project QA/QC, staffing, project administration and cost control in addition to technical duties. Other duties involved developing work plans and performing data analysis, data interpretation and report preparation as well as oversight of these functions.

Involved in a broad array of environmental projects as a project hydrogeologist. These projects include remedial investigation/feasibility studies, hydrogeologic evaluations, site investigations, remediation projects and water supply projects. Responsible for performing major aspects of hydrogeologic evaluation, ranging from site characterization to corrective action studies. Duties also included performing groundwater flow and contaminant modeling in varying hydrogeologic settings to develop and assess groundwater remediation systems. Responsible for remedial alternative selection and conceptual design.

Other general responsibilities include Environmental Assessment Worksheet (EAW)/Environmental Impact Statement (EIS) preparation, litigation support services and serving as technical advisor on projects. Performed peer/regulatory

review of EAW/EIS process and/or RI/FS programs at solid waste facilities and other project sites. Additional responsibilities included marketing environmental services.

Project Manager (1988 to 1990), North Dakota Mining and Mineral Resources Research Institute, University of North Dakota, Grand Forks, North Dakota.

Managed an environmental research project into the hydrogeologic effects of fly ash utilization in concrete. Responsible for performing all duties associated with this project including equipment and contractor procurement, investigation design and implementation. Designed and installed comprehensive monitoring networks in the saturated and unsaturated zones for monitoring fly ash utilization materials. Performed data acquisition, management and analysis. Responsible for data interpretation and report preparation.

Project Hydrogeologist (1989 to 1990), Energy and Environmental Research Center, Grand Forks, North Dakota.

Provided contract hydrogeologic consulting services regarding coal ash disposal in mine spoil settings.

Professional Affiliations

Minnesota Ground Water Association
Association of Ground Water Scientists and Engineers
National Solid Waste Management Association
Sigma Gamma Epsilon, National Honorary Society in the Earth Sciences

Papers/Presentations/Awards:

Spruce Ridge Leachate Recirculation Pilot Project Design and Operational Summary – Terry R. Johnson P.G., Presentation at RAM/SWANA Fall Conference Minneapolis Minnesota, September 27, 2006.

An Evapotranspiration Final Cover Case Study, Humid Climate Location, Central Disposal Landfill, Lake Mills, Iowa, Presented at 8th Intercontinental Landfill Research Symposium, Gallivare, Sweden, June 2006.

Alternate Final Cover Opportunities – Technical and Regulatory Considerations, Terry R. Johnson, P.G., Presentation and Proceedings at the 17th Annual Engineering Society of Detroit/Michigan Waste Industry Association Emerging Technologies in Solid Waste Conference, East Lansing, Michigan, April 4, 2006.

Landfill Operations in the Public & Private Sectors: A Marketing and Operations Perspective. Guest Speaker and Panelist - Iowa Recycling Association and Iowa Society of Solid Waste Operations, 2005 Fall Conference, October 19, 2005.

Spruce Ridge Resource Management Facility, Leachate Recirculation Pilot Project Overview and Bioreactor Application Summary, Presentor and Panelist at Minnesota Pollution Control Agency, St. Paul Minnesota, August 3, 2005.

Case Histories from Waste Management's Alternative Final Cover Program, Terry R. Johnson, P.G., and Leonard Butler, P.E., Paper and Presentation at the 10th Annual SWANA Landfill Symposium, Boulder Colorado, June 2005.

Landfill Leachate Quality Trends and Comparisons: Implications for Solid Waste Planning, Terry Johnson, P.G., James Cetrullo and Jim Aitken, P.G., Presented at the Minnesota Air, Water and Waste Conference, Minneapolis, Minnesota, February 2005.

Landfill Liner Performance: Lessons Learned from Leak Detection Lysimeters, Presented at the Minnesota Pollution Control Agency's – 2004 Air, Water and Waste Conference, Bloomington, Minnesota. February 26, 2001.

Stairway to Water Quality: Innovations in Groundwater Collection and Treatment, Co-authored with John Rice, Dan Erni and Joel Schittone, Presented with John Rice at National Solid Waste Management Association – WasteTech Annual Conference, Coral Springs, Florida, February 25, 2002.

The Selection of Effective Groundwater Monitoring Parameters, Presented at the Minnesota Pollution Control Agency – 2001 Waste Conference, Minneapolis, Minnesota. February 21, 2001.

Effective Groundwater Monitoring in Clay Tills - An Oxymoron, presented at the Midwest Groundwater Conference, Sioux Falls, South Dakota, October 1992.

High-Volume Fly Ash Utilization and the Hydrogeological Effects at a North Dakota Power Generating Facility, 1991. Energy and Environmental Research Center, Grand Forks, North Dakota.

The Environmental Effects of Fly Ash Utilization in Concrete at Coal Creek Station, Underwood, North Dakota, presented at the North Dakota Environmental Health Conference, November 1989.

Envirofil Groundwater Treatment System, Macomb, Illinois, Recipient of The Achievement Award from the Wisconsin Association of Consulting Engineers, 2000 Engineering Excellence Awards Competition .

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD**In the Matter of:**

)	
)	
PROPOSED AMENDMENTS TO)	
SOLID WASTE DISPOSAL: GENERAL PROVISIONS)	R 07 - 008
35 Ill. Adm. Code 810; and,)	
)	(Rulemaking – Land)
STANDARDS FOR NEW SOLID WASTE LANDFILLS)	
LANDFILLS 35 Ill. Adm. Code 811.)	

SUPPLEMENTAL INFORMATION AND ERRATA SHEET

NOW COMES Proponent, the National Solid Wastes Management Association – Midwest Region (“NSWMA”) by and through its attorneys, SNHCC, CJN, of counsel, and pursuant to, in part, the Illinois Pollution Control Board’s August 17, 2006 Order, hereby provides certain requested supplemental information as well as an Errata Sheet with respect to a portion of the proposed rule amendments.

1. On July 27, 2006, the NSWMA filed its “Proposal to Amend Certain Pollution Control Board Regulations Related to Solid Waste Management Facilities.” These proposed amendments related to certain requirements at 35 Ill. Adm. Code 810 and 811. On August 17, 2006, the Board accepted the Proposal for hearing but identified two informational deficiencies with the Proposal. The first deficiency related to providing a more detailed outline of anticipated testimony from the NSWMA. The second deficiency related to the identification of any published studies or research reports intended to be relied upon by the NSWMA.

2. With respect to anticipated testimony, the NSWMA intends to present two witnesses at the first public hearing. The first witness will be Mr. Thomas Hilbert who is the President of the NSWMA-Midwest Region. Mr. Hilbert has previously participated in Board rulemakings concerning solid waste issues and has been actively involved in the current

proposal. Mr. Hilbert has been in the solid waste industry for many years in Illinois. His testimony will relate to the regulatory context of the proposed amendments and their development. He will also be available to answer questions from the Board and other interested parties on these subjects as well as the substance of the proposed amendments.

The NSWMA will also present the testimony of Terry Johnson. Mr. Johnson has more than 18 years of experience with solid waste facilities, particularly in the areas of environmental hydrogeology and landfill technologies. Mr. Johnson was substantially involved in the development of the proposed amendments. His testimony will relate primarily to the scope, purpose, and effect of proposed amendments themselves. He will also be available to answer questions from the Board and other interested parties on these subjects.

Depending on the nature of any questions or concerns of the Board, additional witness may be called upon to present testimony at the second public hearing to be held in Springfield. If such witnesses are necessary, it is the intent of the NSWMA to pre-file testimony as may be necessary.

3. With respect to the identification of any published study or report used in the development of the rule, a number of articles and studies were reviewed. Copies can be obtained from the original source, any number of reference libraries, or the NSWMA can provide copies on request. Articles used include:

Aitchison, J. 1955, On the distribution of a positive random variable having a discrete probability mass at the origin: *Journal of American Statistical Association*, v. 50, pp. 901-908.

Christensen, T.H., Kjeldsen, P., Albrechtsen, H.J., Heron, Gorm, Nielsen, P.H., Bjerg, P.L., and Holm, P.E., 1994, Attenuation of Landfill Leachate Pollutants in Aquifers, *Critical Reviews in Environmental Science and Technology*, 24(2):119-202.

Clark, T.P., and Piskin R., 1977, Chemical Quality and Indicator Parameters for Monitoring Landfill Leachate in Illinois, *Environmental Geology* v. 1 pp. 329-339.

Cravy, T.D., McIsaac, P., and Gibbons, R.D., 1990, Evaluation of organic indicator parameters using an Appendix VII/IX Database: presented at Waste Tech '90, Landfill Technology: Back to Basics. San Francisco, CA.

Gibbons, R., 1994, *Statistical Methods for Groundwater Monitoring*. New York: John Wiley and Sons.

Gibbons, R. et al., 1999, Statistical Comparison of Leachate from hazardous, Codisposal, and Municipal Solid Waste Landfills, *Groundwater Monitoring and Remediation*, Fall 1999, pp. 57-72.

Heidlauf, D.T. and Bartlett, T.R., 1993, Effects of monitoring well purge and sample techniques on the concentration of metal analytes in unfiltered groundwater samples: Proceedings of the NGWA Outdoor Action Conference, Las Vegas, NV, May 1993, pp. 437-450.

USEPA, 1977, *Solid Waste Monitoring Guidance*. To be completed

USEPA, 1988, *Summary of Data on Municipal Solid Waste Landfill Leachate Characteristics*. To be completed

USEPA, Federal Register, 1991, Code of Federal Regulations (CFR) Parts 257 and 258: *Solid Waste Disposal Facility Criteria; Final Rule*.

USEPA, 1992, Addendum to interim final guidance document – Statistical analysis of ground-water monitoring data at RCRA facilities.

USEPA, 1998, *Characterization of municipal solid waste in the United States: 1997 Update*, Report No. EPA 530-R-98-007. Washington, D.C.: U.S. EPA, Office of Solid Waste.

USEPA, 2000, Geosynthetic Research Institute, University of Illinois and Geosyntec Consultants, *Assessment and Recommendations for Optimal Performance of Waste Containment Systems*, Grant number CR-821448-01-0.

Pastor, E. F. and Frick, D. R., 1992 "Considerations in Selecting Indicator Parameters for the Statistical Evaluation of Ground-Water Quality," Current Practices in Ground Water and Vadose Zone Investigations, ASTM STP 1118, David M. Nielsen and Martin N. Sara, Eds., American Society for Testing and Materials, Philadelphia.

Plumb, R.H., 1991 The Occurrence of Appendix IX Organic Constituents in Disposal Site Ground Water, Groundwater Monitoring Review, Spring 1991, pp. 157-164.

Plumb, R.H., 1987, A comparison of groundwater monitoring data from CERCLA and RCRA sites. Groundwater Monitoring Review, v. 8 pp. 94-100.

Puls, R.W., Clark, D.A., Bledsoe, B., Powell, R.M., and Paul, C.J., 1992 Metals in groundwater: Sampling Artifacts and Reproducibility, Hazardous Waster and Hazardous Materials, v. 9, No. 2, pp. 149-162.

Puls, R.W., and Powell, R.M., 1992, Acquisition of Representative Groundwater Quality Samples for Metals, Groundwater Monitoring Review Summer 92, pp. 167-176.

Allen, H.E., Perdue, E.M., and Brown, D., 1993. Metals in Groundwater. Boca Raton, Florida: Lewis Publishers.

Baker, J.A. "Leachate Characteristics of Leachate Recirculation and Bioreactor Landfills", Presentation at USEPA's 2nd Annual Bioreactor Workshop, Feb. 2003.

Bagchi, A., 1987. Natural attenuation mechanisms of landfill leachate and effects of various factors on the mechanisms. Waste Management & Research 5, 453-464.

Barlaz, M.A., et al, "A Critical Evaluation of Factors Required to Terminate Post-Closure Monitoring and Performance of Solid Waste Landfills", Environmental Science and Technology, 2002, 36, 3457.

Bubb, J.M., and Lester, J.N., 1991. The impact of heavy metals on lowland rivers and the implications for man and the environment. The Science of the Total Environment 100, 207-233.

Cartwright, K. and Griffin, R.A., Gilkeson, R.H. 1987. Migration of landfill leachate through glacial tills. Ground Water 25, 294-305.

Christensen, T. H., et al. 2001, Biogeochemistry of Landfill Leachate Plumes. Applied Geochemistry, Vol. 16, No. 7, pp. 659-718(60) Elsevier Science, Pub.

Davis, J.A., et al. 1993. Influence of Redox Environment and Aqueous Speciation on Metal Transport in Groundwater: Preliminary Results of Trace Injection Studies, in: Metals in Groundwater, Allen, H.E., et al. editors. Lewis Publishers.

Dragun, J., 1988. The Soil Chemistry of Hazardous Materials. Hazardous materials Control research institute, Silver Springs, Maryland.

Gibbons, R.D., and Sara M., 1994. Statistical comparison of Metal Concentrations in Filtered and unfiltered Ground-water Samples. In: Ground Water Sampling—A Workshop Summary. EPA/600/R-94/205

Ham, R.K. & Booker, T.J. (1982) "Decomposition of solid Waste in Test Lysimeters. Journal of Environmental Engineering, 108, pp. 1147-1170.

Hounslow, A.W., 1995. Water Quality Data, Analysis and Interpretation. Lewis Publishers.

Kjeldsen, P., Barlaz, M.A., Rooker, A.P., Baun, A. Ledin, A. Chistensen, T.H., 2002, "Present and Long-Term Composition of MSW Landfill Leachate: A Review, Environmental Science and Technology, 32(4), 297-336.

McLean, J.E. and Bledsoe, B.E., 1992. Behavior of metals in soils. Ground Water Issues, USEPA, EPA/540/S-92/018.

Puls, R.W. and Barcelona, M.J., 1989. Filtration of Ground Water Samples for Metals Analysis. Hazardous Waste & Hazardous Materials, Vol 6, No. 4, 385-393.

RUST E&I, 1995. Leachate Characterization Study.

Suthersan, S.S., 1997. Remediation Engineering. Boca Raton, Florida: Lewis Publishers.

4. Subsequent to the filing of the Proposal, the Illinois Environmental Protection Agency identified what it believed was an error in the list of leachate monitoring parameters set out in new "811.Appendix C" According to the Illinois EPA, certain monitoring parameters were inadvertently left off the list. Those parameters included: Arsenic (total); Barium (total); Cadmium (total) mg/l; Iron (total); Ammonia Nitrogen – N; Bacteria (fecal coliform); Biochemical Oxygen Demand (BOD); 4-Nitrophenol; Acenaphthene; Acetone; Alachlor; Aldicarb; Aldrin; Alpha-BHC; Aluminum; Anthracene; Antimony; Atrazine; Benzene; Benzo(a)Anthracene; Benzo(a)Pyrene; Benzo(b)Fluoranthene; Benzo(ghi)Perylene; Benzo(k)Fluoranthene; Beryllium (total); Beta-BHC; Bicarbonate; Bis (2-Chloro-1-Methylethyl) Ether; Bis (2-Chloroethoxy) Methane; Bis (2-Chloroethyl) Ether; Bis (2-Ethylhexyl) Ether; Bis

(2-Ethylhexyl) Phthalate; Bis (Chloromethyl) Ether; Boron; Bromochloromethane; Bromodichloromethane; Bromoform; Bromomethane; Bromoform; Bromomethane; Butanol; Butyl Benzyl Phthalate; Calcium mg/l; and Carbofuran. The NSWMA supports the inclusion of these additional parameters and therefore proposes that the Board consider the list of leachate monitoring parameters as corrected as if originally included in the initial Proposal. The revised list of leachate monitoring parameters is attached to this filing as an Errata Sheet (See Exhibit 1).

Respectfully submitted,

NATIONAL SOLID WASTES MANAGEMENT
ASSOCIATION

By: 

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EXHIBIT 1

ERRATA SHEET

Section 811.Appendix C

pH
Elevation Leachate Surface
Bottom of Well Elevation
Leachate Level from Measuring Point
Arsenic (total)
Barium (total)
Cadmium (total) mg/l
Iron (total)
Ammonia Nitrogen - N
Bacteria (Fecal Coliform)
Biochemical Oxygen Demand(BOD₅)
1,1,1,2-Tetrachloroethane
1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethane
1,1-Dichloroethylene
1,1-Dichloropropene
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,2-Dibromo-3-Chloropropane
1,2-Dichloroethane
1,2-Dichloropropane
1,3,5-Trimethylbenzene
1,3-Dichloropropane
1,3-Dichloropropene
1,4-Dichloro-2-Butene
1-Propanol
2,2-Dichloropropane
2,4,5-tp (Silvex)
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dichlorophenoxyacetic Acid (2,4-D)
2,4-Dimethylphenol
2,4-Dinitrotoluene

2,4-Dinitrophenol
2,6-Dinitrotoluene
2-Chloroethyl Vinyl Ether
2-Chloronaphthalene
2-Chlorophenol
2-Hexanone
2-Propanol (Isopropyl Alcohol)
3,3-Dichlorobenzidine
4,4-DDD
4,4-DDE
4,4-DDT
4,6-Dinitro-O-Cresol
4-Bromophenyl Phenyl Ether
4-Chlorophenyl Phenyl Ether
4-Methyl-2-Pentanone
4-Nitrophenol
Acenaphthene
Acetone
Alachlor
Aldicarb
Aldrin
Alpha - BHC
Aluminum
Anthracene
Antimony
Atrazine
Benzene
Benzo (a) Anthracene
Benzo (a) Pyrene
Benzo (b) Fluoranthene
Benzo (ghi) Perylene
Benzo (k) Fluoranthene
Beryllium (total)
Beta - BHC
Bicarbonate
Bis (2-Chloro-1-Methylethyl) Ether
Bis (2-Chloroethoxy) Methane
Bis (2-Chloroethyl) Ether
Bis (2-Ethylhexyl) Phthalate
Bis(Chloromethyl)Ether
Boron
Bromobenzene
Bromochloromethane
Bromodichloromethane
Bromoform
Bromomethane

Butanol
Butyl Benzyl Phthalate
Calcium mg/l
Carbofuran
Carbon Disulfide
Carbon Tetrachloride
Chemical Oxygen Demand (COD)
Chlordane
Chloride mg/l
Chlorobenzene
Chloroethane
Chloroform
Chloromethane
Chromium (hexavalent)
Chromium (total)
Chrysene
Cis-1,2-Dichloroethylene
Cobalt (total)
Copper (total)
Cyanide
DDT
Delta - BHC
Di-N-Butyl Phthalate
Di-N-Octyl Phthalate
Dibenzo (a,h) Anthracene
Dibromochloromethane
Dibromomethane
Dichlorodifluormethane
Dieldrin
Diethyl Phthalate
Dimethyl Phthalate
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin
Endrin Aldehyde
Ethyl Acetate
Ethylbenzene
Ethylene Dibromide (EDB)
Fluoranthene
Fluorene
Fluoride
Heptachlor Epoxide
Heptachlor
Hexachlorobenzene
Hexachlorobutadiene

Hexachlorocyclopentadiene
Hexachloroethane
Ideno (1,2,3-cd) Pyrene
Iodomethane
Isopropylbenzene
Lead (total)
Lindane
Magnesium (total)
Manganese (total)
Mercury (total)
Methoxychlor
Methyl Chloride
Methyl Ethyl Ketone
Methylene Bromide
Methylene Chloride
Naphthalene
Nickel (total)
Nitrate-Nitrogen
Nitrobenzene
Oil, Hexane Soluble (or Equivalent)
Parathion
Pentachlorophenol
Phenanthrene
Phenols
Phosphorous
Polychlorinated Biphenyls
Potassium
Pyrene
Selenium
Silver (total)
Specific Conductance
Sodium
Styrene
Sulfate
Temperature of Leachate Sample (°F)
Tert-Butylbenzene
Tetrachlorodibenzo-p-Dioxins
Tetrachloroethylene
Tetrahydrofuran
Thallium
Tin
Toluene
Total Organic Carbon (TOC)
Total Suspended Solids (TDS) mg/l
Toxaphene
Trans-1,2-Dichloroethylene

Trans-1,3-Dichlorpropene
Trichloroethylene
Trichlorofluoromethane
Vinyl Acetate
Vinyl Chloride
Xylene
Zinc (total)
m-Dichlorobenzene
m-Xylene
n-Butylbenzene
n-Nitrosodimethylamine
n-Nitrosodiphenylamine
n-Nitrosodipropylamine
n-Propylbenzene
o-Chlorotoluene
o-Dichlorobenzene
o-Nitrophenol
o-Xylene
p-Chlorotoluene
p-Cresol
p-Dichlorobenzene
p-Isopropyltoluene
p-Nitrophenol
p-Xylene
sec-Butylbenzene

Note: All parameters shall be determined from unfiltered samples.

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