

Summary of Department of Natural Resources (DNR) Responses to Public Comments on RR Program Guidance, RR-991, now retitled to “Compliance Averaging of Soil Contaminant Concentration Data Under Ch. NR 720, Wis. Adm. Code”

The comments were received during the 21-day public comment period that ended March 9, 2015.

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Thank you to the individuals that provided feedback. You helped to improve the document. The follow-up items in this summary are now part of the current guidance available at: <http://dnr.wi.gov/files/PDF/pubs/rr/RR991.pdf>

Public Comments / DNR Responses on RR-991 [Retitled Compliance Averaging of Soil Contaminant Concentration Data Under Ch. NR 720, Wis. Admin. Code]

#	Public Comment / Question	Commenter	DNR Response	DNR Follow-Up
1	"...do most DNR project managers have a 'good working knowledge of statistics' in order to assess if the RP evaluated the environmental data correctly...?"	Maria Powell (MEJO), 2/25/2015 email	2/25/2015 email response: "Yes, most do ... Default procedure in NR 720 doesn't involve statistic, (but) point-to-point comparison to RCLs."	None.
2	"The title of the document ... is inaccurate. It should be retitled "Using Statistical Analysis for Evaluating Soil Concentration Data under Ch. NR 220, Wis. Admin. Code."	Lanette Altenbach (AECOM), 3/9/2015 email	We will retitle to emphasize the guidance objective of compliance under NR 720.	New Title: "Compliance Averaging of Soil Contaminant Concentration Data Under... NR 720..."
3	"95% of UCL - Upper Confidence Limit is not an average and should not be defined as such. An average is the sum of the concentrations divided by the number of concentrations..."	"	"Average" could refer to several statistics. The comment described the most common average - the arithmetic mean. But average may also refer to the median (or midpoint), the mode (or most-frequent), <u>or</u> any other central or typical value.	Revise RR-991 to provide for a better definition of the UCL for the mean as the appropriate measure for RCL comparison.
4	"What happens when the UCL is above RCL? Will the DNR require cleanup of outliers and sample results that contribute to a higher UCL?"	"	When UCL > RCL, or when outliers > RCL, then there is exceedance of RCL. After an SI, when there is an RCL exceedance, further work will be necessary. Further work may involve additional sampling, cleanup at particular areas where RCL is exceeded and/or construction of cap to address the direct-contact pathway.	

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5	While determining whether there has been a potential release may be possible via the direct comparison of individual sample result against criterion, this comparison says nothing about the exposure risks or significance. In reality, one small area above the RCL may actually pose less of an exposure risk than a large area with concentrations slightly less than the RCL.	"	We agree that a larger area may generally pose a higher exposure risk. An implicit direct-contact RCL assumption is that it applies to an area no larger than 0.5 acre. A larger site may need to be divided into smaller exposure subareas, and each subarea may require its own assessment. The algorithm that determines direct-contact RCLs assumes certain "fixed" exposure parameters. The algorithm and the exposure assumptions are not covered by this guidance, as they are the subject in another RCL guidance (RR-890).	
6	While the simple average may not be appropriate, the use of a UCL may be appropriate to demonstrate the risk of a limited number of values above the RCL is negligible. Therefore, there should be a methodology or process whereby the use of the UCL can be applied without prior approval. This process would require appreciable thought/design, especially regarding the collection of samples. Perhaps the department should just recommend that RPs use the EPA ProUCL tool to develop an approach and then request their DNR project manager approve the approach. This fact could be a line item ... and is not needed as a guidance document.	"	Under NR 720.07(2)b, <u>any</u> alternative (to point-to-point comparison to an RCL) for determining numerical standard exceedances needs to be approved by the department. Comment regarding appreciable thought/design is welcomed, and if the alternative analysis proposed proves to be sound, then it should be approvable. The examples in RR-991 aim to present sound statistical techniques that, when applied, should lead both the RP's consultant and DNR PM to the same conclusion regarding exceedances or not. But it does not mean that other sound alternatives would not be approvable.	
7	And as we have seen from the statistical analysis of the background concentration of arsenic for Wisconsin, the 8 mg/kg value is at the lower end of the 1 to 50 mg/kg typical range for arsenic in soils (USEPA, OSWER, 1983). In addition, the 8 mg/kg value was not a 95%UCL concentration.	"	Comment is correct that the 8 mg/kg soil-As is a background threshold value (BTV), and not a UCL. It, however, is not at the low end. In fact, 8 mg/kg is the maximum of the 650+ outlier-free statewide background samples (http://dnr.wi.gov/files/PDF/pubs/rr/RR940.pdf). BTV and UCL are different statistics. Their difference, as well as how they need to be interpreted (BTV is strictly for point-to-point comparison), is explained in the paragraphs (p. 17) preceding the conclusion section of RR-991.	

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8	Use of spatial weighing for averaging such as inverse distance weighing, Kriging, Thiessen polygons, or other spatial representation techniques can lead to a better understanding of the existence of hotspots and/or whether site should be subdivided into different exposure areas.	Stuart Messur / Kimberly Powell (Anchor QEA, LLC), 3/9/2015 email	Spatial techniques that lead to maps showing isoconcentration contours or Thiessen polygons are part of an NR 716 site investigation. "Averaging" may be an unnecessary exercise when that is the case because the spatial distribution is known, especially identifying the areas where there is RCL exceedance. A Thiessen polygon is an area having the whole area assume the point concentration in the center. So if that point concentration > RCL, then the whole polygonal area represents an exceedance. A prudent use of Thiessen polygons - in determining contaminant mass - is shown in another RR guidance (see RR-614's Appendix A).	Add in the reference the EPA publication that covers spatial data plot, including symbol plotting and contour plotting.
9	Timing for application of guidance: pre- ("baseline") or post-remediation. Recommend that the guidance be applicable post-remediation that include "expected" backfill concentrations.	"	Guidance applicability is to both pre- and post-remediation. Adding "expected" backfill concentration(s) into a previous set of post-remediation concentrations may require additional DNR review. The practice may introduce a potential bias in the analysis.	
10	Multiple properties: How guidance is applied to site that extends over multiple properties. Recommend greater discussion as to where and when averaging can be used and for what purpose.	"	RR-991 is not intended to cover all situations. Certainly, site-specific review by DNR PM is not precluded by the guidance. With multiple properties, several property owners may be involved in the discussion, and agreements among them may be necessary before implementing any approach (or approaches) related to remediation.	
11	In order to be transparent in the approach and reduce confusion it is important that this definition be omitted from the text. "Average" is not a generic word, it is a mathematical concept that represents central tendency, definitely not outer confidence limits. Throughout the text the 95UCL should be referred to as the 95UCL not the "average"	Julie A. Zimdars (NRT, Inc.), 3/9/2015 email	See Response to Comment #3 above.	Revise RR-991 to make it clear the guidance is about compliance averaging involving the use of the UCL statistic.
12	If the 95UCL of a single population without outliers exceeds the RCL, can the responsible party address the samples at the highest end of the range to reduce the 95UCL of the full area? Or are other approaches limited once the statistical definitions of single population and outlier are met?	"	Yes, concentrations at the high end (that exceed the DC-RCL) will need to be addressed. If the UCL > RCL, DNR's expectation is that the point concentrations above RCL will need to be addressed.	

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13	The guidance document focuses solely on a few statistical tests, and is silent on other topics that are equally important, including site history and spatial and temporal considerations.	Bradley S. Nave (DuPont), 3/9/2015 email	The application of NR 720 is assumed to follow an NR 716 site investigation where site history and temporal considerations should be included. Yes, there are only a few statistical tests in the guidance, but those few there are also the most useful.	Revise guidance to reference EPA publication with many more statistical techniques,
14	While the proposed guidance document repeatedly discusses averaging, it does not mention estimating variability. An UCL cannot be estimated without both an estimate of the average and standard deviation ...	"	This may be unclear, but the guidance has Example 1 where true mean and true standard deviation are tabulated together with sample mean and sample standard deviation.	See DNR Follow-up #3
15	Furthermore, the risk assessment concepts of acute and chronic exposure are not addressed in this discussion ...	"	Correct. The guidance falls under NR 720, Wis. Adm. Code. Risk assessment falls under another code, NR 722. If risk assessment is proposed at a site, it may involve a very site-specific review from the DNR.	
16	The concept of "population" is inappropriately applied in the proposed guidance... Factor in multiple constituents and you could potentially end up with a mass of confusion. For example, ... there could be 3 populations for constituent A and 5 for constituent B (or even a multitude of permutations). This approach would lead to inability to efficiently remediate sites ... The proposed guidance is essentially saying that one can use statistical analysis, but only when the data look a certain way. A much better thing to say would be ... "inspect the data and use knowledge of the site to determine if something unusual is going on which would require further investigation."	"	The guidance does not aim to hamper site remediation. If truly confusion results from the statistical analysis, then the point-to-point comparison to RCLs may become the basis for remediation decision.	Revise guidance so that exploratory data analysis (EDA) is emphasized early, with the aim of gaining insight into the data set collected for the best possible interpretation of the data. EDA may point to the fact that additional investigation may be what's necessary.
17	In the guidance discussion and examples provided ... it can be inferred that the only reason data would ever not follow a normal distribution would be due to multiple populations hidden within the data... All the examples ... were based on comparisons to the normal distribution... an attempt to determine the underlying mechanism that created the two populations should be made.	"	At a remediation site, it is more prudent to assume in the analysis that the overall data reflect different degrees of contamination at the site. One statistical test that is easy to pass is the test to show lognormality. In fact, even many a given data set that is clearly with a normal distribution will pass the lognormality test. What may even be worse is that a mixture dataset from 2 normal populations may be masked as if they are from 1 lognormal population. A mechanism that created 2 populations is actually in Example 1, where it mentioned " <i>contamination</i> is small volumetrically and areally ... relative to the <i>uncontaminated</i> area of the site."	

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18	The apparent idea that fewer than 10 observations cannot be averaged is fundamentally flawed... the issue is whether a representative sample from a population of interest is indicated, but the proposed guidance does not mention this basic tenet.	"	Representative sampling falls under NR 716 where the issue - whether a site investigation is complete or not - is addressed. NR 720 assumes a completed SI. And if there are very few data points, point-to-point comparison to the RCL may be a more efficient to determine compliance, and the need for remediation or not.	
19	A fundamental concept missing ... is a central tenet of Statistics known as the Central Limit Theorem. It states that when there is a non-normal population and a sample is taken from that population the distribution of the means tend toward a normal population.	"	We will revise guidance to include CLT.	Revise guidance so as to include CLT in defining the UCL statistic.
20	...the proposed guidance defines UCL as "the average." ... The average is the average of the data. The 95% UCL is something else ...	"	See Response to Comment #3 above.	See DNR Follow-up #3
21	Attachment 2 presents a list of USEPA guidance documents... in addition, a variety of states have similar guidance documents.	"	Thank you for these references.	Add the other State guidance documents in the references.