DATE: September 16, 2016 FILE REF: 4400

TO: NR 538 Technical Advisory Committee

FROM: Philip Fauble, Beneficial Use Coordinator
Waste & Materials Management Program

SUBJECT: Responses to Initial Request for Proposed Revisions to ch. NR 538 Wis. Adm. Code

During the first meeting of the NR 538 Technical Advisory Committee (TAC) for rule revisions on March 24, 2016, the Department solicited comments from the committee members for suggested revisions to the tables in Appendix I, and sections NR 538.01 to NR 538.05 of the existing administrative code requirements. Below are a summary of the comments submitted and the Department's draft responses. Both Beneficial Reuse Management and Clean Wisconsin followed up with additional responses to our draft document after the second TAC Meeting on June 1, 2016 and our responses to those comments are also included.

Additional comments on other sections of ch. NR 538 (i.e. NR 538.10 concerning acceptable uses) were received and the DNR will draft responses to those comments when the appropriate section is up for discussion. In cases where we received similar comments from different sources, we referred to our previous responses to avoid repetition.

At our June 1, 2016 meeting, the Department discussed these draft responses with the TAC members in an attempt to create a consensus on our approach. Our intent is to develop a series of memos documenting comments from the TAC members and responses where we could achieve consensus and to note areas where disagreements remained.

Clean Wisconsin's Comments on Revisions to s. NR 538, April 28, 2016

Comment: Suggested changes to NR 538:

1. Replace the water leach test in the rule with a flexible analytical framework where the type and number of tests used are scaled to the byproduct characteristics and the environmental conditions encountered in its intended use. The LEAF approach is one option, but not the only one.

2. Alternatively, if a framework approach is unworkable : 1) provide a justification as to why the current test is the most appropriate option in terms of meeting the goals of the leach-test requirement (i.e., Does it provide more protective results than other single-batch tests like TCLP or SPLP?) and 2) modify the standards to include a protective margin of safety to account for inherent uncertainty in the leach test.

Response: Clean Wisconsin presented a good deal of information questioning the appropriateness of using the ASTM Method D3989 water leach test as a means of evaluating potential beneficial uses for industrial byproducts. In response, we had their findings evaluated by Richard Mealy, a chemist with the Department's Science Services Program. His conclusion was that, for simplicity and ease of understanding for the regulated parties, the ASTM leach test is the best method to provide the information we need to make a decision. This determination was based on several factors:

- It is important to recognize that this method is intended for use as a screening tool to assign a byproduct to a category for selecting the most appropriate reuse options. The objective is to give us a reasonable idea of the leaching performance of the byproduct when exposed to moisture, not to accurately predict the leaching performance of the byproduct in any number of possible reuse scenarios. This is done in concert with a totals analysis that can reveal the upper limit of any release to the environment. This tandem approach produces a much better idea of the byproduct's performance than relying on just one test methodology.
- TCLP testing is designed to evaluate the performance of a material when exposed to conditions in a municipal solid waste landfill and, in regulatory terms, to determine whether or not a material is RCRA-defined hazardous. Since none of these byproducts are characteristically hazardous and landfilling is not a beneficial use, the TCLP test is not appropriate for these materials.
- The SPLP (Method 1312) is designed to simulate leaching of waste materials exposed to acid precipitation. To simulate this, the samples are mixed with water treated with acid to a pH of 4.2, well below the normal 5.6 pH of rainwater. It is debatable whether or not this scenario is realistic for the uses permitted under ch. NR 538 Wis. Adm. Code. Another consideration is that several byproduct types (coal fly ash, steel slag, lime kiln dust) are very alkaline and can quickly overwhelm the acidity in the solution, making the addition of acid to the solution irrelevant.
- This overwhelming of the acidity added to the solution was proven even for more neutral materials like foundry sand. In the U.S. EPA's risk assessment of spent foundry sands (EPA-530-R-14-003) study, some comparison tests using both the ASTM water leach and the SPLP were performed and the differences measured were either very small or non-existent (pages 2-26 and 4-3). The resultant pH measurements were almost identical (4.7 - 9.9) which explains the nearly identical leaching results.
- The U.S. EPA's LEAF protocols were used in the evaluation of encapsulated coal ash beneficial uses (EPA-530-R-14-001), but DNR concluded that the results would be of limited use as a screening tool in a rule such as ch. NR 538. While use of the various methods increases the accuracy of the predictive model for contaminant releases, it would be very difficult to develop a regulatory framework based on a complex set of criteria dependent on which extraction procedure was used. Many of those criteria are site-specific, which would require separate testing at each potential reuse location. There are other criteria which may not be relevant (i.e. is it reasonable to assume 100 years of leaching?) to the beneficial uses contemplated. The resulting testing and test results are too complicated to be useful as a screening tool in our existing regulatory framework.
- Unlike several other leaching methods, the ASTM Method D 3989 has the advantage of not requiring mechanical reduction of the sample. This means the results can reflect the leachability of the byproduct material at the size and surface area at which it is actually used.
- DNR has almost 20 years' worth of ASTM water leach test data in our files and databases and we have found it to be a consistent and easily reproducible testing methodology.

Clean Wisconsin's Further Comments on the Draft Response, June 24, 2016

Comments on responses to initial comments on NR538.06:

Comment 1: In the final documentation for these comments, please be explicit that Clean Wisconsin's primary concern with the water leach test is that, by the test's own description, it is "not intended to provide a leachate that is representative of the actual leachate produced from a solid waste in the field." It does not make sense to us to use a test that provides very limited information about how the product will perform *in the conditions where it will be actually used.* If we want to ensure that use of these products is

not negatively affecting groundwater quality, we should be using a test that attempts to reflect actual leaching potential at the physical point of reuse.
Comment 2: We are concerned that Mr. Mealy's conclusion regarding the most appropriate test came with the caveat "*for simplicity and ease of understanding for the regulated parties.*" NR538 requires that beneficial reuse is balanced with protection of public health and the environment, but this response appears to only address one side of that balance. Would the conclusion remain the same if determining the most appropriate test for "*the protection of public health and the environment,*" and if so, what is the rationale for that conclusion?
Comment 3: The objective of the required leach test should be to provide a reasonable idea of the leaching performance of the byproduct in the environment rather than simply providing a reasonable idea of how the byproduct reacts when exposed to moisture. Has the DNR considered alternative tests that better simulate in-place conditions while still serving as an easy-to-implement screening tool?
For example:
• Column leach tests (e.g., ASTM 4874, Method 1314, NEN 7343) are considered to better reflect reality for most of the beneficial uses covered by NR538 than water leach tests.1
• In its beneficial use rule, North Dakota modified the ASTM 3987 test's liquid-to-solid ratio to better replicate conditions where byproducts are used.
Comment 4: How does information from the tandem approach to evaluating upper limit of environmental release referred to in the response2 factor into decision-making in the rule? Our understanding is that the leach test is used individually to screen for impacts on water quality while the totals analysis is used individually to screen for direct contact impacts. The rule does not appear to provide for any consideration of this tandem approach to screen out materials whose upper limit of environmental release could negatively impact water quality.
Comment 5: Clean Wisconsin continues to believe that a testing framework like LEAF that increases the accuracy of predicted releases is the most appropriate testing protocol.
Comment 6: Clean Wisconsin respectfully disagrees that past use establishing consistency and reproducibility of a test in a laboratory setting has any bearing on whether the test provides meaningful information in order to adequately screen out materials that will leach excessive amounts of pollutants when placed in the environment.

Response: We have shared your comments with our Department experts who remain of the opinion that the ASTM D3987 Water Leach Test is the most appropriate testing methodology for the purpose of screening materials for appropriate uses under the ch. NR 538 framework. This is an important distinction; we are <u>not</u> attempting to run a predictive model to ascertain the exact amounts of contaminants that may or may not leach off of the listed industrial byproducts, but attempting to screen the materials into categories for the most appropriate reuse.

Given this goal, we are intentionally not taking into account myriad different variables that could affect the potential for the material to impact groundwater including those that may actually reduce their potential to affect ground water quality (i.e. advection, dispersion and dilution) in exchange for a more general standard that can identify what materials are suited for reuse under given circumstances. We are also not attempting to quantify other use restrictions, such as restrictions on residential use and separation to ground water, that might also reduce the byproducts potential to adversely impact groundwater quality.

We agree that there are other leaching methodologies that might be better suited for a more detailed study of potential ground water quality impacts for specific cases, but we remain convinced that the ASTM D3987 water leach test is the best option for our beneficial use screening purposes.

Wisconsin Utility Association, NR 538 Proposed Revisions and Comments, May 5, 2016

Comment: We understand that one of DNR's objectives is to align NR 538 with EPA's CCR Rule. Consider the following:
See Preamble to CCR Rule Page 21349, column 3, regarding state regulatory programs that determine beneficial uses. Note that EPA acknowledges that state determinations provide evidence of meeting the criteria for *Beneficial Use*. Therefore NR538 should reflect and address the four conditions in EPA Section 257.53 definition of *Beneficial Use*.

Response: DNR agrees that we should try to incorporate the U.S. EPA rules and rule language to the extent that it fits within the framework of ch. NR 538. Unfortunately, we already have a definition of beneficial use in s. NR 500.03(19) Wis. Adm. Code, which we will directly reference in NR 538. The definition states "Beneficial use or beneficial reuse means the utilization of a solid waste or an industrial by-product in a productive manner". Since DNR is not changing the definition, we added a definition to clarify "productive manner" which includes the first 3 conditions defined by the U.S. EPA for beneficial use. DNR's response to the 4th condition is included in the next responses.

Comment: NR538 should provide a means for exceeding the 12,400 ton limit in condition #4 of the CCR Rule definition for Beneficial Use. One possible means is to have prior written notification and DNR concurrence for "non-roadway" geotechnical use exceeding 12,400 dry tons of CCR.

Response: While DNR does not necessarily support the rationale behind the 12,400 ton limit defined by the U.S. EPA and we do not intend to reference it in our rules, most fill projects greater than 5000 cubic yards and all unconfined fill projects already require a concurrence from the Department.

Comment: In order to clearly state how NR 538 dovetails into the CCR Rule, consider the following to address conditions #1, #2 and #4 from the CCR Rule Beneficial Use definition. Add to NR538.02 Applicability:
(3) Compliance with this chapter demonstrates that a byproduct provides a functional benefit; serves as a substitute for the use of a virgin material, conserving natural resources that would otherwise need to be obtained through practices, such as extraction; provides controls such that environmental releases to groundwater, surface water, soil and air are comparable to or lower than those from analogous products made without the byproduct, or that environmental releases to groundwater, surface water, soil and air will be at or below relevant regulatory and health-based benchmarks for human and ecological receptors during use.

Response: DNR does not believe that NR 538.02 was the best place to address this issue, but we did include the first three conditions in our definition of a productive manner of beneficial use. The 4th condition (highlighted) is problematic since our regulatory process is intended to be a screening of byproducts, not an extensive evaluation of their performance. We don't go into enough depth with our analyses to justify this statement. Our response was to add a sentence to s. NR 538.01 paraphrasing a quote from the "Scope and Purpose" section of the U.S. EPA rules (40 CFR Part 257.50(a)) which captured the intent of the EPA condition 4 (see draft language), but we received objections to this approach so the proposed language was removed and we remain open to other possibilities.

Comment: The current definition of "Flue gas desulfurization" is accurate and should not be revised.

Response: Agreed, but a definition of "flue gas desulfurization gypsum" has been added to differentiate that byproduct from other spray dryer absorber material.

Comment: Explore a broader definition of "Industrial Byproducts".

Response: Agreed, the language was broadened to include a better definition of what could be considered as an industrial byproduct (see draft language).

Comment: Explore adding a mechanism or framework within NR 538 for WDNR to approve other uses that are not listed in 538.10. It would be helpful to have an additional option to work with WDNR under NR 538 for creative or not-yet-conceived uses, as opposed to having to go down the Low Hazard Exemption path.

Response: This option already exists under s. NR 538.08(7) for case-specific approvals which are approved under 289.43(7) Stats. (Recycling of High-Volume Industrial Waste) authority, not 289.43(8) (Low Hazard Exemption) authority.

Comment: Create beneficial use NR 538.10(14) for agricultural land application.
NR 538.10(14) Land applications of flue gas desulfurization materials from coal combustion or biomass combustion applied at agronomic rates and in conformance with NR518.

Response: DNR intends to do so when we discuss the s. NR 538.10 section of the rule revisions. Note that the draft has added a definition of "soil or plant additive" to the definitions in anticipation of an addition of such a beneficial use option. DNR intends to reference the standards in USDA Code 333 for testing and application rates for FGD gypsum.

Comment: End users and lenders have expressed concerns that the use of a byproduct may be considered a release even when complying with NR 538. This concern can be expressed during real estate transactions and the purchasers due diligence. The use of byproduct per NR 538 should not constitute a "release". Revise section NR 538.05(1):
NR 538.05 **Solid waste rules Rules** exemption. (1) GENERAL.
Persons who generate, use, transport or store industrial byproducts that are characterized and beneficially used in compliance with this chapter are exempt from licensing under s.289.31, Stats., and the regulatory requirements in chs. NR 500 to 538 **and chs NR 700 to 754.**

Response: While it may be desirable, we do not believe we have the legal authority to exempt byproduct material from the ch. NR 700 rules.

Comment: Revise definition of unconfined geotechnical fill. Allow alternative cover materials other than native materials such as gravel or crushed stone. Revise definition 538.03(10)
"Unconfined Geotechnical fill" means a fill that is covered by native soils, **crushed stone or gravel**.

Response: Agreed, as long as the addition of a gravel surface is compatible with the defined end use.

Comment: The TAC should have a discussion regarding the possibility of creating a definition for "encapsulated uses" and the potential use of this term in section 538.10(1) and 538(5)(i). The definition will help to clarify ambiguities in the CCR Rule in regards to the use of this term. See CCR Rule Preamble page 21349.

Response: Agreed. DNR proposes discussing this issue in the context of redefining s. NR 538.10(1) as "encapsulated uses" instead of "raw material" but keeping most of the existing language. We feel that should cover the definition without having to add anything to s. NR 538.03.

Comment: DNR expressed an intention to update Appendix 1 standard threshold values. The establishment of the appropriate threshold values can be complex therefore DNR should give the TAC ample time to respond to the proposed revisions.

Response: Agreed.

Wisconsin Cast Metals Association, NR 538 TAC – Suggestions/Revisions, 4/18/16

Comment: Add a Section NR 538.03 definition for Foundry Sand. The definition may follow the suggestion below or something similar:

"Foundry sand" means molding sand and core sand used in the metalcasting process. Foundry sand includes baghouse fines from sand handling systems if made up of only fine foundry sand particles.

Response: Agreed, although DNR added a bit to the definition. We would also like to discuss the appropriateness of including of the term "spent" in the definition as well as the status of phenolic resin bonded sands.

Comment: In any consideration of an update to the Appendix I category threshold tables, WCMA requests that the Department recognize that some current values do not account for the native background levels of typical Wisconsin soils.

Additionally, WCMA requests that the Department leverage the published results of the USDA/USEPA "Risk Assessment of Spent Foundry Sands In Soil-Related Applications" published October 2014 while reviewing the Appendix I tables. This study applied a rigorous investigative methodology to a potential use which may have posed, if applicable, an increased human health and the environment exposure to beneficial use (soil amendments, manufactured soils, soil-less potting media). The study's outcome supports such uses, and by default, many other uses currently allowed by NR 538 which represent lesser degrees of potential exposure.

The types of foundry sands covered within the study are well represented in the State of Wisconsin, with a number of WCMA members having participated as subject facilities within the research effort.

Response: Agreed. The most obvious parameter affected by high background levels in Wisconsin is arsenic. DNR did incorporate the average background threshold value (8 ppm) of arsenic into the tables. We also acknowledged the U.S. EPA study by only choosing parameters identified in the study as potential Phase II constituents of concern (both for groundwater and ecological).

Comment: Consider removing Appendix I testing parameters which have a history of insignificant or non-detection in foundry by-products. One example candidate may be the Polyaromatic Hydrocarbon family of compounds.

Response: DNR agrees and have done so for coal ash, but do not feel it is appropriate for foundry sand. The U.S EPA study confirms detectable levels of PAHs in almost all of the spent sand samples and, in some cases especially with regards to naphthalene, at levels well above our health standards. We need to be able to differentiate between "green" sands that contain only bentonite or other clays and molding process sands that may use a variety of phenolic or other chemical binding compounds.

Comment: Add a new NR 538.10 beneficial use for foundry sand as a soil amendment as demonstrated by the USDA/USEPA "*Risk Assessment of Spent Foundry Sands In Soil-Related Applications*" published October 2014.

Response: There is a new definition for "soil or plant additive" in the draft language, but it applies only to FGD gypsum or similar byproducts. The difference between foundry sand and FGD gypsum is that the FGD gypsum replaces an existing mined product that adds essential soil nutrients to certain soils that need it (especially soils that are sulfur deficient). What the USDA/EPA study showed was not that foundry sands necessarily added any essential nutrients, but that they did not cause any adverse impacts. There is another administrative code, s. NR 518 Wis. Adm. Code, that contains requirements for the landspreading of byproducts that would not be regulated by DATCP as a soil additive or fertilizer, but could be considered for use if the practice does not result in cumulative harmful effects. This would likely require calculating appropriate soil loading and application rates for specific foundry byproducts.

Comment: Whether by guidance or NR 538 rule update, recognize the limitations of the ASTM D3987 method in testing foundry sands (variability yielded by the ASTM neutral leach procedure when testing high clay materials such as foundry sands).

Response: DNR is looking into this issue. We intend to update the testing methodology from ASTM D3987-85 to D3987-12, which may help.

Comment: Clarify the Section NR 538.03 definition for Unconfined Geotechnical Fill. The definition may follow the suggestion below or something similar:

"Unconfined Geotechnical Fill" means a fill that is covered by native soils **or gravel**.

Response: Agreed.

Wisconsin Manufacturers and Commerce – Initial Comments, April 29, 2016

Specific feedback issues raised by WMC included:

Comment: As noted above, the definition, applicability and performance standards may be sections that we would want to revisit depending on changes made to other sections of NR 538.

Response: DNR agrees and will revisit previous sections as needed during the review process.

Comment: We would encourage DNR add a definition of "foundry sand" to NR 538.03.

Response: DNR has included draft language to better define "foundry sand" as it pertains to the rule.

Comment: We would also encourage a revision to "unconfined geotechnical fill" to recognize that such fill may be covered by something over than native soils (such as "or other cover"). This definition change makes sense given that NR 538.10(8) allows "other cover approved by the department"

Response: DNR agrees and has included some draft language to that effect.

Comment: Appendix I Feedback
NR 538 should recognize or account for background levels typical of Wisconsin soils.
We would also note that a study completed by the USDA and the US EPA entitled "Risk Assessment of Spent Foundry Sands in Soil-Related Applications," should be thoroughly reviewed by the Department as NR 538 and the Appendix I tables are updated. Several Wisconsin companies participated in this study, and it provides a great deal of information that would be beneficial for the TAC to consider regarding this rewrite of NR 538.

Response: DNR agrees and has included some draft language (see previous responses). We acknowledge the EPA study and have referenced it especially in regards to selecting appropriate parameters for testing in Appendix I.

Wisconsin Department of Transportation – Notes, April 20, 2016

The notes submitted by WDOT were fairly wide-ranging and mostly general in that they did not suggest many specific changes in wording. However two suggestions were put forward related to this section of the Code revisions:

Comment: DNR is discussing acceptable contaminant levels with dept. of health (especially for cat. 1 materials). ASK: Are the levels: measurable; achievable; and at the naturally occurring background levels for the state (not below).

Response: DNR is working with the Department of Health to develop appropriate health-based screening numbers to assign byproducts to beneficial use categories. It is our goal to make sure they are measurable and achievable and we are taking background levels into consideration.

Comment: ADD to the rule – if you want to propose material for use by DOT test the following parameters: Chlorides, sulfides, resistivity, and the physical properties for use on roadway. (Add basic engineering property/geotechnical parameters for use in DOT fill).

Response: DNR cannot add parameters to enforce DOT standards, however we will reference DOT standards whenever possible. If a byproduct cannot meet an applicable specification, then it is not a legitimate reuse option. We would appreciate any input from DOT regarding the most appropriate standards to include in the revised rule (FHA, DOT or ASTM).

Beneficial Reuse Management-Suggestions/Revisions, April 18, 2016

Comment: NR 538.03 Definitions: BRM proposes the following definitions or changes be made to the code. Specific changes or comments are in bold type.

"Industrial Byproduct" means the papermill sludge, ash from energy recovery including coal ash and slag, material captured in flue gas desulfurization systems, ***aluminum,*** ferrous and steel foundry excess system sand and slag, lime kiln dust or non-hazardous solid waste with similar characteristics as determined by the department.

Response: Agreed (see draft language).

Comment: "Foundry excess system sand" ***includes the raw core and core sand, core butts, foundry baghouse dry and wet collector sand fines.***

Response: Included the WCMA foundry sand definition in this section.

Comment: "Flue gas desulfurization systems" ***includes wet or dry material including Spray Dryer Ash or Spray Dryer Ash/Fly Ash Mixtures.***

Response: DNR did not change the definition as requested by the WUA, but did include a definition of FGD gypsum.

Comment: "Confined geotechnical fill" means a fill that is covered by an impervious surface such as concrete of asphalt **or other surface that the department considers equivalent.**

Response: DNR provided a definition of "impervious surface" to better define what would constitute an impervious surface.

Comment: "Unconfined geotechnical fill" means a fill that is covered by native soils **or gravel.**

Response: Changed as documented in earlier comment responses.

Comment: NR 538.04 (2) **For the purposes of clarification the WDNR should formally address the issue of compliance with this requirement for project sites that have been substantially altered previously by human activity. The best place for this clarification however maybe in WDNR's guideline document for implementation.**

Response: It isn't entirely clear what specific changes are being requested, but we are required, by Statute, to assess every site for potential impacts to threatened and endangered species through a review of our databases for known occurrences, regardless of human disturbances.

Comment: NR 538.05 Solid waste rules exemption

This section of the code exempts byproduct materials from the regulatory requirements in chs. NR 500 to 536. The WDNR needs to address this section of the code related to:

a. current and proposed changes by the WDNR concerning review fees for projects covered under Chapter NR 538 that are found in Chapter NR 520 Table 2 and what is allowed under ss. 289.43 (7). **The WDNR needs to clarify what authority it has in charging fees for projects under NR 538.**

Response: The DNR will provide an analysis of our legal authority when we discuss this issue with the TAC.

Comment: **b.** and the requirement in Chapter NR 507 that the WDNR has interpreted to require that industrial byproduct samples be analyzed by a state certified lab. In the case of FGD gypsum, BRM has not located any commercial certified state lab to analyze the material correctly either for environmental or agricultural chemical parameters. **The requirement to use a state certified lab seems to be in conflict with NR 538.05.**

Response: After consultation with our Laboratory Certification staff, DNR determined that most WI-certified labs could run a metal analysis on FGD gypsum material. We also noted that WE Energies regularly submits laboratory data for their FGD gypsum byproduct from a WI-certified laboratory. We will need further information on what is limiting the ability of the labs to run the analyses before we could determine the cause of this issue.

Comment: Numeric changes to the NR 538 Appendix I Tables 1-4 and added or removed required testing parameters from the Appendix I tables.

BRM is very concerned that updating the current NR 538 Tables, which categorize industrial byproducts, utilizing the same assumptions used to create these tables in 1998, will not take into account information on these materials obtained in both the public and private sector over the last 18 years since the code was adopted. **The WDNR should consider the following information in its proposal to update these tables.**

a. The majority of the green foundry sands, when compacted properly, have hydraulic conductivity equivalent or superior to landfill clay that prevent water penetration into geotechnical fills (both confined and unconfined) and therefore do not leach metals as one would anticipate if only the results of the ASTM leach were considered in its characterization.

Response: This comment is not clear in what changes are being requested. Should we only conduct tests on foundry sand after it has been compacted? Can we be assured that the material was uniformly compacted or that every use involved compaction? The Code requires testing of the material by the generator prior to use, not after placement and compaction, if that is necessary for the given application.

Comment: b. The WDNR should consider recent studies on the chemical concentration of background soils as a replacement, or at a minimum, be considered to alter the base concentration of the Tables in Appendix I. For example the Table 1 A concentration for arsenic is 0.042 mg/kg set by NR 720

is substantially lower than what the USGS, in cooperation with the WDNR, determined are in background soils in Wisconsin. In the 2012 USGS report, "Distribution and Variation of Arsenic in Wisconsin Surface Soils, With Data on Other Trace Elements" the mean concentration of arsenic in soils was 2.3 mg/kg. While no leach test results are readily available for soils the implication of this result and for other chemical parameters is that natural soils have higher concentrations, in some cases, than do industrial byproducts, and that these soils, when subjected to the NR 538 leach procedure may exceed the groundwater PALs in NR 140. **The WDNR must consider this issue in its update of the NR 538 Appendix I tables.**

Response: DNR will take background levels into consideration, especially for arsenic as you have noted. However, the total amounts do not reflect the amount of arsenic that may leach out of the soil since it is often complexed with iron oxy-hydroxides and we have no data on the leachability of arsenic in native WI soils. If you have such information, we would be glad to review it.

Comment: c. The beneficial uses allowed in NR 538.10 are tied to the Category a byproduct is assigned based on the results of leach and totals testing required in Appendix I. As the Category of an industrial byproduct increases from 1 to 5 the environmental and technical specifications for its use increase so as to provide more environmental protection. When NR538 was adopted in code in 1998 no provisions were provided in code to provide separation from the byproduct to groundwater or any separation distance to a public or private well for certain non-roadway projects that typically require large fills. The revisions adopted in 2006 added a groundwater and a well separation distance, including an increase in the separation distance to human residences. **These additions to the code provided additional protections to the environment and the WDNR should consider these additions in evaluating whether the "old" 10 times multiplier that was used in 1998 to set concentration limits for categories is too restrictive.**

Response: It was not necessary to adjust the multiplier in 2006 when these protections were added and we concur with the earlier assessment that these changes were not, in themselves, significant enough to justify modifying the screening levels. The multipliers seem to have worked well since the inception of the rule to screen for byproducts that need additional restrictions on their use.

Comment: d. **Aluminum and steel foundries should be added to the current "ferrous foundry excess system sand and slag" columns in all of Appendix I Tables.** Data from totals and leach testing of these byproducts indicate that the chemical parameters from these foundries is similar to those in ferrous foundries and do not require additional testing required in the "Other" column.

Response: Agreed.

Comment: e. **Table 1 and 2 parameters that are currently required to be tested should exclude those parameters which historically have resulted in no detects for certain foundry sands and coal ash. A list of these parameters include: polyaromatic hydrocarbons (PAH's), phenols and sulfate (coal ash excluded). A suggestion for the WDNR to consider would be to add a Note to the table specifying when these parameters do not need to be tested based on the material in question.**

Response: As noted in earlier responses, DNR has adjusted the tables to reflect our historic data and newer evaluations of the byproduct material by the U.S. EPA. As long as foundry wastes that contain chemical binders are allowed in the program, we have to maintain PAH testing to differentiate them from the "greensand" foundry sands that do not contain core binders. We have numerous examples of foundry sands that are well above calculated health limits, especially with regards to naphthalene which is listed as a human carcinogen.

Comment: Table 2B has very limited application in the categorical determination of industrial byproducts based upon data gathered over the years particularly for foundry sand and coal ash. Its application is limited to non-green foundry sand where molding or core sands have resin binders. In addition BRM is not aware of any chemical regulatory standard that combines the results of individual chemical parameters such as PAHs or any other parameter. **BRM proposes either the elimination of the total PAHs standard and have the categorization based upon the analytical results being less than each parameter's threshold standard or re-design a new Table that would be designed to more scientifically categorize a byproduct material as Category 3.**

Response: DNR is working on options for making the tables more reflective of our current knowledge of the byproducts and health standards. Again, as long as the chemically bonded sands are allowed, we are obligated to test for PAHs to ensure public health and safety. Category 3 was actually developed specifically to address the issue of four types of applications (bonded and non-bonded surface course, decorative stone, and cold weather abrasive) that use coal bottom ash and slag almost exclusively (foundry sand typically cannot meet the DOT specs). Since that is the case, there may be a rationale for removing PAHs from the Category 3 testing.

Beneficial Reuse Management's Further Comments on the Draft Response, June 8, 2016

Comment: As we have stated in the June 1, 2016 meeting we prefer the current version of the format for the Appendix I tables because it outlines all the regulatory standards in a simple format where each of the byproducts are listed side-by-side. Although the DNR stated that many people have stated that the tables are confusing, we believe that confusion may not be rooted in the Tables themselves but in the written code as to what to sample (individual waste streams), the language as to what category a byproduct would fall to, etc.

Response: We agree that some of the Code language can be confusing, but we also maintain that the table themselves can also contribute to the confusion when interpreting the Code requirements. For instance, there is no separate table for Category 3 which forces the user to reference the code language. Or the equally confusing Appendix I table that references both Category 2 and 3 requirements without differentiating between the two. This confusion is not limited to byproduct generators but also extends to DNR staff trying to determine compliance.

Given the time and effort required to revise a rule, we feel it is appropriate to attempt to simplify the rule requirements to the extent possible to make it easier for byproduct generators to comply with the rule and make it easier for DNR staff to determine who is in compliance with the rule requirements.

Comment: We appreciate WDNR's proposal that FGD gypsum be included in the list of beneficial uses. As we commented on June 1, 2016 we would like to ask the WDNR revise its regulatory standards by eliminating the leach standards and focusing on standards that are based on the results of total elemental analysis as is in place in most land application programs for both organic and inorganic byproducts.

Response: We agree for some uses. We propose a separate table for the use of FGD gypsum as a soil or plant additive that is based on the standards for such use in the NRCS Conservation Practice Standard Code 333, and those only require totals. We preserved the water leach testing for other uses of FGD gypsum that do not involve use as a soil or plant additive.

Comment: Based on the discussions in the June 1, 2016 it is vital that some initial consensus be achieved on the proposed regulatory standards in Appendix I before the TAC moves forward. From leach and total elemental testing results from 8 foundries, BRM has determined that some of the foundry byproducts it uses would now be classified as a Category 4 or a new category 3 proposed by the WDNR if the proposed standards would be in place. This change would unnecessarily and significantly decrease the amount of byproduct reused. This would also potentially eliminate smaller foundries from the NR 538 program due to the change in Category and the extra costs required to beneficially to reuse the material.

Response: As mentioned several times during the June 1, 2016 meeting, the numbers presented in the draft tables were our first draft and were meant merely to convey the need to revise the standards presented in the tables. We have conducted a far more thorough evaluation of the most appropriate standards for the NR 538 tables in conjunction with the WI Department of Health Services and will be presenting them at the September 13, 2016 meeting. We are committed to having a thorough discussion of these proposed standards and welcome any input regarding their potential impact to the program.