

Roeder, Eberhard

From: Roeder, Eberhard
Sent: Wednesday, December 09, 2009 12:54 PM
To: Roeder, Eberhard
Subject: Comments on technology classification, ranking and prioritization report
Attachments: 091207 Nitrogen Reduction.xls

From: Pio Lombardo [mailto:Pio@lombardoassociates.com]
Sent: Tuesday, December 08, 2009 3:41 PM
To: Roeder, Eberhard
Cc: Briggs, Gerald R; danderson@hazenandsawyer.com; Ursin, Elke; Booher, Paul W; soakley@csuchico.edu; jkreissl1@insightbb.com
Subject: RE: Next RRAC Meeting Announcement: December 16th

Eberhard

In reference to the attached Criteria 13 Stage of development, Heterotrophic Denitrification systems are permitted in the States of MA, FL, RI, MD, VA, NY, NC, CA, OR and AZ, so it should be classified as national use. Autotrophic denitrification should be classified as experimental. Again the opinions of other experts should be solicited

Also such a low, virtually meaningless weighing factor for Stage of Development should be revised upward significantly - at least by a factor of 10. It has a storing appearance that the authors are favoring ("stacking the deck") the system they originally proposed with their weighing factors

Furthermore, many of the scores for autotrophic systems are based upon extremely limited real world data vs the real world data of heterotrophic systems

Lastly, a category of environmental impact would be appropriate

Regards,

Pio

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From: Pio Lombardo

Sent: Monday, December 07, 2009 03:47

To: 'Eberhard_Roeder@doh.state.fl.us'

Cc: Gerald_Briggs@doh.state.fl.us; danderson@hazenandsawyer.com; Elke_Ursin@doh.state.fl.us; Paul_Booher@doh.state.fl.us; soakley@csuchico.edu; jkreissl1@insightbb.com

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Thank you for your astute observations Eberhard

While Florida permitting may not have been a criterion definition, it is respectfully suggested that it should be at least noted which ones are already permitted, as there is no need to hide the information. Also the information assists in evaluating which options are "ready for prime time"

In my opinion there are inherent serious difficulties-weaknesses with ranking systems that have subjective scoring and subjective weighing factors. I am not a fan of them - as it is difficult to achieve transparency and reproducibility. Also the additional "optics" challenge exists with the highest ranked system being "developed" by the evaluators and is being pursued prior to the ranking.

Perhaps the ranking effort should be supplemented with evaluations by a select group of unaffiliated experienced, well respected practioners - a number of very competent people come to mind including Professor Stewart Oakley, Professor George Tchobanoglous and retired US EPA small flows technical specialist Jim Kreissl. There may be extensive disputes on weighing factors and criteria for points. In my opinion however subjective ranking tends to get overly academic and disassociated from the real world, which is driven predominately by treatment requirements and costs.

With the weighing factors used, the stage of development have such a meaningless impact on the ranking - while in reality it is critical in terms of risk & uncertainty elimination. As I have previously commented on many of the items and issues, I will not repeat them.

In terms of screening, the overwhelming preponderance of the evidence in other parts of the US and recent legal decisions for FL is that the stringent numeric TMDL requirements and then cost effectiveness should be the screening/ranking factors. This approach is totally objective, transparent and reproducible. While draft numeric effluent requirements are to be established in FL in the next 2+/- months, it is fairly obvious what they are likely to be based upon TMDL studies in other parts of the US and an understanding of FL water resources. Whatever placeholder values are used can be refined when the rules are issued.

1. Treatment Requirements

Water quality based

In environments similar to FL, on-site systems need to achieve extremely low TN levels comparable to enhanced nutrient removal central sewer systems, typically TN < 5 mg/l based upon TMDL requirements. In many New England areas, on-site systems are dismissed if they cannot achieve this performance requirement. So the ranking criteria should have TN < 5 mg/l as one of its reference points.

Drinking water aquifers

Require TN < 10 mg/l - even though some areas rely on dilution to achieve TN < 10 mg/l many areas simply require effluent TN < 10 mg/l

2. Cost effectiveness analysis

Life cycle Cost/lb-day N removed should be the ranking criteria. This is the standard engineering approach for optimizing cost effectiveness and has been used for comparing nitrogen removal technologies - including on-site systems in other parts of the US - especially Chesapeake Bay

Then only systems capable of achieving specified TN requirements would be ranked based upon cost effectiveness and then the other "soft" factors included in the ranking report. This approach then becomes very useful for political leaders, the public and practitioners in determining which technologies are appropriate for areas with specific treatment requirements as well as where research opportunities exist - transparency and reproducibility then exists.

This approach is identical to what is performed for centralized wastewater treatment systems in which only technologies capable of achieving required levels are examined. One does not commingle technologies that do not have required performance capabilities with those that do. For example one does not place an extended aeration activated sludge plant in the same nitrogen removal category as a membrane bioreactor or biological nutrient removal process. Comingling obfuscates the important issues that need to be addressed

Additional comments below. Thank you for the opportunity to comment

Regards,

Pio

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From: Eberhard_Roeder@doh.state.fl.us [mailto:Eberhard_Roeder@doh.state.fl.us]

Sent: Friday, December 04, 2009 04:02

To: Pio Lombardo

Cc: Gerald_Briggs@doh.state.fl.us; danderson@hazenandsawyer.com; Elke_Ursin@doh.state.fl.us; Paul_Booher@doh.state.fl.us

Subject: RE: Next RRAC Meeting Announcement: December 16th

Pio,

thank you for your comments.

It looks to me that there are two, not necessarily mutually exclusive, documents where your concerns could be discussed: The ranking report and the interim study report.

Within the ranking report, stage of technology development received a very low weighting factor, and the report's authors assigned the same score of "3" to hetero- and autotrophic denitrification 2-stage systems and the soil

infiltration with reactive barriers, and "5" to all other ranked technologies. Your argument appears to be at least in part that these scores don't reflect the differences in technology development that you see.

Absolutely, as the hetero-denitrification option is permitted in numerous states, has numerous installations that have been operating for years and has been evaluated by numerous independent parties - so it is well beyond demonstration. I know of no full scale operating systems for the autotrophic denitrification so it appears to be more experimental, as it has not been demonstrated in the real world yet. University of Massachusetts recent efforts in this regard have not proved fruitful as well as the environmental impact issue of sulfate additions with autotrophic denitrification to ground and surface waters is a serious matter taht should be an evaluation factor. Other researchers have opined to that issue being a fatal attribute of autotrophic denitrification

It is also apparent, and in agreement with the criterion definition, that Florida permitting considerations were not important in this approach.

So one question is how to bring the Florida-specific considerations into the discussion, and the other if and how broader agreement on scores can be achieved.

That seems like a good topic for the RRAC-meeting.

Damann's group may have some thoughts on that, too.

You are correct in reading that the test center experiments are anticipated to start before field testing at home sites. There could be some concurrency between the testing of home sites with ongoing test center experiments, details to be determined by the task B QAPP.

Regards,

Eberhard

From: Pio Lombardo [mailto:Pio@lombardoassociates.com]
Sent: Thursday, December 03, 2009 6:31 PM
To: Roeder, Eberhard
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Subject: RE: Next RRAC Meeting Announcement: December 16th

Hello Eberhard,

It is respectfully suggested that Table 4.7 of Technologies Recommended for Testing in Task B of the Classification, Ranking and Prioritization Of Technologies Report (copy attached) include a column that indicates if the technology is currently approved in the State of Florida and if so permit information, and technology name - for the general populace

It is expected that non wastewater management professionals and the general public would want to know that information as it is expected that few will understand the generic terminology used. Also it is expected that it would help the Department and legislature to determine the status of technology development to decide where future funds would be best served.

As you and the project team know, of the two equivalently top ranked systems:

Type 1 Two stage (segregated biomass) system: Stage 1: Biofiltration with recycle (nitrification) with Stage 2: Autotrophic denitrification with reactive media biofilter

- Top ranked system capable of meeting the lowest TN concentration standard. Suitable for new systems or retrofit

Type 2 Two stage (segregated biomass) system: Stage 1: Biofiltration with recycle (nitrification) with Stage 2: Heterotrophic denitrification with reactive media biofilter

- Top ranked system capable of meeting the lowest TN concentration standard. Suitable for new systems or retrofit

The type 2 system is our FL DoH approved Nitrex™ while, as I understand it, the Type 1 is the system developed in the earlier phases of the project and the technology has not been tested sufficiently to determine permit ability

Consequently we would naturally desire to have the Type 2 system will be field tested. As I have not been contacted in this regard and based upon my brief review of project documents, I am concerned that funds are solely being used to develop a technology, with risks, when one capable of achieving the study objectives already exists, is permitted in FL and has numerous real world installations operating for years.

Please advise. Am I misreading the documents and situation?

Sincerely,

Pio Lombardo, P.E., DEE

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