IOWA DEPARTMENT OF AGRICULTURE AND LAND STEWARDSHIP
Bill Northey, Secretary of Agriculture

September 25, 2007

M. Granger Morgan, Ph.D., Chair
Chartered Science Advisory Board (1400F)
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: Science Advisory Panel Draft Report
Hypoxia in the Northern Gulf of Mexico

Dear Dr. Morgan:

The following comments are submitted to the Chartered Science Advisory Board concerning the draft report on hypoxia in the northern Gulf of Mexico. All are "new" comments concerning the August 30, 2007 draft and have not previously been tendered to the hypoxia science panel:

1. *Efforts in development of this report* - while the comments following are offered to improve accuracy of the report, I sincerely acknowledge and applaud the very significant work and efforts by the hypoxia science panel members in conducting this comprehensive review of many different disciplines of science, and in developing the draft report in a timeframe which was unreasonably short. This draft of the report is much improved over earlier drafts.

2. *Thorough and "stand-alone" public participation process needed for this report* – discussions between representatives of the Hypoxia Task Force members and SAB staff that preceded the decision to utilize the SAB process for this science review recognized that SAB processes were specifically designed to review and inform EPA decisions that entail future "public input through EPA rule-making", not at all the case with this report, and that "adaptation of SAB processes" would be needed to achieve both a science synthesis in this report through broad public input in the context of no other significant public input opportunities towards the content of this report. Those preliminary discussions also recognized that this report, far beyond informing future over-arching decisions of the Hypoxia Task Force in revising the Action Plan, will stand into the future as a detailed, comprehensive science overview that will be referred to by many in the future, and therefore public input processes must achieve broad reviews and input from other scientists. Yet, previous written responses from SAB staff to requests for broader participation opportunities clearly indicate "no adaptation" of SAB processes to achieve the needed public input processes for this "stand-alone" report. There are no future EPA rule-making actions and associated public input opportunities associated with the specific content of this report. Effective science reviews and comments to the previous report drafts were practically impossible, because the lengthy drafts were released just a few days prior to panel meetings, at which very short deadlines were imposed on the science

panel to produce the next draft. As example, for the July30 and August 1 meetings, the Federal Register notice required commenters to register their request by July 23, 2007 to comment about the draft report, which was not even publicly released until the following day July 24, 2007. The SAB position "comments could be submitted at any time" does not effectively engage input towards the extremely broad range of science and stakeholder interests given the content of this report. Engaging and achieving broad science reviews during the very short August 30 – September 27 public comment period has also been very difficult for a report with content this broad.

The Gulf hypoxia issue and water quality throughout the MARB requires a broad and thorough input process to achieve the best available science to inform actions towards environmental stewardship. There is no other opportunity to address the content of this report that will stand into the future as a comprehensive science review. Accordingly, 1) the public input period needs to be extended to afford broader opportunity for input, and 2) the hypoxia science panel needs to be re-convened to consider the science input received during this public comment period as well as provide more time for them to review and improve their report.

3. *Critical importance of inadequate participation on the hypoxia science panel by researchers having direct experience in the unique, extensively tile-drained landscapes of the corn belt* – the nutrient-rich and extensively tile-drained corn belt is recognized in the report as a major contributing source of nutrients to the MARB and Gulf. Lack of inclusion on the hypoxia science panel of researchers having direct experience in these unique landscapes with agricultural contaminant transport and management practices, for which many leading researchers were nominated, is noted. There was not concomitant similar exclusion of researchers with direct experience in and knowledge of the Gulf science (nor should there be), raising question of fairness and balance. Participation on the panel by corn belt scientists would have improved the accuracy and scope of the report towards these critical landscapes. Now achieving that critical input requires at minimum, enhanced opportunities for knowledgeable scientists to review and comment, and for the panel to re-consider their draft as previously noted.

4. *Review comments of the College of Agriculture and Life Sciences, Iowa State University* – in contrast to the science advisory panel, the Iowa State University review group was comprised of many leading researchers in the nation on agricultural nonpoint source contaminants and management practices in the unique landscapes of the corn belt. I concur with the comments submitted by Iowa State University College of Agriculture and Life Sciences, include them by reference in these comments, and ask that the hypoxia science panel be re-convened to review and incorporate this critical input.

5. *Avoiding depletion of soil organic matter as indicated through unsustainable nutrient mass balances* - relationships of crop fertility, mass balance of nutrient fertility compared to removal through harvested crops, and soil organic matter sustainability need very careful consideration in this report, to avoid mining soil organic matter through efforts to reduce N transport from leaky cropped landscapes. Reducing N transport through lowering crop fertility that accelerates the mining of soil organic matter resources is a strategy to be avoided at all costs – both to avoid creating larger future environmental problems as well as depletion of our nation's food production infrastructure. To assess incorrectly has the potential to truly lead to a "point of no (or very difficult) return"

circumstance, contrasted to the use of this term in the report relative to hypoxia in the Gulf. Mass nutrient balances accounting for all N sources and removals/losses from the soil profile are a necessary surrogate measurement for annual soil organic matter declines which are below the threshold of direct SOC measurement yet over decades will cumulate to very significant losses. The report at page 189, lines 6-16 incorrectly assesses "..fertilizer effect on SOC is more likely under continuous corn than corn/soy rotation…". While corn is largely close to nutrient balance at fertility optimal for corn production, the soy phase of the CS rotation which is typically grown without additional N fertilizer and for which legume contribution is only about ½ of the N removal, is of much greater concern to SOC sustainability. This section of the report largely harkens back to the outdated nutrient management science of the 1980's, and does not reflect the rapidly emerging new science understandings of these relationships. Because of the potential huge and practically irreversible environmental impact negatively of not correctly assessing these relationships, this section of the report alone justifies further consideration by the hypoxia science panel.

6. *Elimination of fall N application to corn* – tightly-controlled research plot studies over multiple years in Iowa have not monitored increases in N transport through subsurface drainage from fall versus spring N fertilizer, when the fall N is properly applied below soil temperatures of 50 degrees (F). This is the basis for extensive educational campaigns in Iowa concerning proper fall N application. A previous Iowa science task force evaluating the environmental implications of fall N fertility, even when ignoring the Iowa plot studies and instead using the higher 15% increased N transport recorded in a Minnesota study, determined that eliminating fall N would only reduce statewide N export from Iowa to water resources by about 3-4% given that about 25% of the total N applied in Iowa occurs in the fall. Pushing changes which only offer a small incremental environmental improvement but will require very large costs and effort can actually be an "environmental opportunity loss" overall, through distraction of growers focusing instead on practices which provide much greater reductions. The report needs to at minimum avoid broad-sweeping and potentially inflammatory practice recommendations which are not optimal across the entire MARB, and defer instead to state and local strategies to determine the most effective practices tailored for specific landscapes.

7. *Environmental impact of bio-energy* – increased production of corn and soybean row crops is contra-indicated to reducing nutrient transport to water resources, in the "overall, directionally-correct" context of course. However, the report needs to be strengthened in critically evaluating the hard water quality science of the current and potential changes from bio-energy. For landscapes such as Iowa's which have long been intensively row-cropped, the likely near-term increase in N transport from larger corn acreages is estimated to be small. The approximately 15% increase in corn acreage for 2007 comes largely from shift from corn/soy rotation to continuous corn, with the CC rotation transporting about 20% more N to water resources than corn/soy, for a net statewide N transport to water resources increased for 2007 by an estimated 3%. Largely, the only new lands that remain in Iowa to be brought into corn production have previously been in pasture, hay or enrolled in the Conservation Reserve Program. Enrollment contract expiration dates control CRP lands but beyond that, little if any CRP, pasture or hay lands are tile-drained, and subsurface drained lands are estimated to source 90% of the N transport to water resources from Iowa statewide. While Iowa's situation is not replicated exactly across the MARB, it is typical of the corn belt and many of these same

principles do apply to other areas of the MARB. The report does not accurately assess these critical science relationships and assessments, and instead implies large N transport potential from conversion to row crop of lands currently enrolled in CRP, for example. The significant environmental impact of these conversions will be to P transport because of the highly-erosive nature of most CRP enrollments, not to N transport. The future potential for large environmental improvement resulting from market-based economic returns from landscape conversions to perennials driven by cellulosic ethanol is under-valued in the report. And, the report ignores the value to conservation programs and conservation practice deployment from bio-energy economic returns to landowners – in Iowa, we are rolling out a visionary public/private initiative to deploy highly effective N reduction practices, which is driven solely by the new economic returns to landowners from enhanced crop prices driven by bio-energy. Some believe it politically correct to environmentally condemn bio-energy, but I urge this report provide effect science leadership to these issues by critically evaluating the hard water quality science of these issues and avoiding generalizations which are not applicable to the entire MARB.

8. *Gulf response models* – the Gulf model used to establish the 45% N loading reduction target appears to be the same as used previously to establish the previous 30% N reduction target. Modeling to establish the 45% P loading reduction target appears to not be adequately detailed in the report. Additional textual support in the report is needed to convey greater confidence in these models and resulting predictions of the hypoxia science panel, if we are to expect the people communities of the MARB to undertake the drastic and costly changes needed to achieve these reductions.

9. *"Action lag"* – the text at page 1, line 42-43 "..scientific understanding of the causes of hypoxia has grown while actions to control hypoxia have lagged…" and at page 8, line 30 "..action component lags behind the growing body of science…" (and others) is inflammatory given the recognition at page 127, lines 16-30 "..during the last five years of record…a total N reduction of about 21% (Table 9)…recent reductions in net N inputs…". The report does not adequately recognize that the new science understandings detailed by this report of now 1) increasing the N reduction target by an additional 50% over the previous 30% N reduction target, 2) focusing towards spring N load reduction, and 3) a needed 45% P reduction target, are very substantial changes and in the case of P, a diametric change for hypoxia response from agricultural nonpoint source landscapes. Targeted ag NPS landscapes for N reduction of the tile-drained regions and associated N reduction practices are diametrically different than the targeted landscapes for P reduction and associated reduction practices. References to "action lags" in the context of the report which states that actions to meet the targets will "take decades" also seems incongruous.

10. *Costs, feasibility and policy options* – the report fails to characterize the costs, feasibility, and social welfare of the recommended actions, as specifically requested in the charge. Instead, the report uses the cost, feasibility and social welfare questions of the charge as justification (noted in lines 40-43 of the draft transmittal letter to the EPA administrator) to wander outside of science issues into policy matters which were clearly and purposefully excluded from the charge. The cost and feasibility questions of the charge are clearly science and technical assessments of critical importance that should be addressed in this science report. Policy options and matters need to be left to the policy-making bodies and frameworks, and should be excluded from the science report.

11. *Adaptive management* – much is made of this term by references throughout the text. However the report does not address the challenges of truly applying adaptive management at macro ecosystem scale such as nutrient loading to the Gulf of Mexico from one of the larger rivers in the world, when nutrient reduction actions are applied at very distributed and micro-scale watersheds and year to year hydrologic dominance of nutrient transport due to weather completely overwhelms the remediation actions. The report needs to characterize the intensity and spatial distribution of water quality monitoring at large and small watershed scale that would be truly be needed to effectively employ adaptive management. For example, the 5-year N load reductions to the Gulf identified in the report as "..about 21% (Table 9)…" reduction were earlier calculated from USGS data as a 32% reduction, based upon the same USGS monitoring data at the mouth of the river regressed using a different approach. In this example, the change in load reduction to the Gulf varied by 11% or 1/3 of the previous 30% N reduction target, just with differing regression approaches of the same water quality data. Further discussion in the report is needed of specifically how the panel envisions and recommends adaptive management be effectively employed in working with practical limitations at the scale of macro ecosystem goals (45% N and P reduction at the mouth of the river) and with downstream water quality monitoring which will never be enough.

12. *Landscape design graphic and principles* – the text at pages 141-144 may have academic value to some, but offers little in useful science understanding or program guidance towards reducing nutrients to water resources in the MARB and Gulf hypoxia. Figure 40 at page 122 also contributes little of value yet is inflammatory to some by unreasonably emphasizing farm and agricultural contributions compared to industrial/municipal point sources, and should be deleted. Nutrients in the MARB and Gulf hypoxia are best addressed through efforts by all residents of watersheds working together, rather than dividing and pointing fingers, which some interpret this figure to do.

13. *Inconsistencies, math errors, erroneous table/figure references* – there are numerous inconsistencies and mistakes in the current draft, too numerous to detail here. These are understandable given the hypoxia science panel was starved for adequate time to review and improve their composite report, but need correction before the report is finalized.

Again, I urge the comment period be extended and the hypoxia science panel be re-convened to consider these and other comments. Thank you for the opportunity to comment.

Sincerely,

Dean W. Lemke, P.E. Chief
Water Resource Bureau

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