The Fertilizer Institute

Nourish, Replenish, Grow

William C. Herz
Director of Scientific Programs

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VIA ELECTRONIC DELIVERY

U.S. Environmental Protection Agency
Office of Water/Office of Science and Technology
Health and Ecological Criteria Division (MC 4304 T)
Response to Region 4 White Paper
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

Re: Region 4 Hypoxia Report

Dear Sir/Madam:

The Fertilizer Institute (TFI) has a substantive interest in general scientific issues regarding hypoxia, particularly with respect to the hypoxic zone in the Gulf of Mexico. As such, TFI wishes to highlight specific matters concerning the review of the Environmental Protection Agency (EPA) Region 4 report on hypoxia.

TFI represents the nation's fertilizer industry. Producers, manufacturers, retailers, trading firms and equipment manufacturers which comprise its membership are served by a full-time Washington, D.C., staff engaged in various legislative, educational, technical and public relations programs. Many TFI member companies manufacture both nitrogenous and phosphatic fertilizers and thus have an interest in the hypoxia issue.

TFI has been involved in the gulf hypoxia issue since the Committee on Environment and Natural Resources (CENR) created an interagency task force devoted to hypoxia. To assist the committee, TFI previously submitted detailed comments and commissioned a now highly-regarded report by the University of Alabama entitled "*The Role of the Mississippi River in Gulf of Mexico Hypoxia*." The report identifies additional variables that play a significant role in the creation of the Gulf of Mexico hypoxic zone, including anthropogenic changes to shipping channels and river flow, loss of natural filtration mechanisms such as wetlands, organic carbon influence, and fresh water discharge and stratification.

TFI supports comments already submitted by Cliff Snyder, PhD, on behalf of the Potash and Phosphate Institute (PPI). Additionally, there are several issues that TFI strenuously believes are central to our scientific understanding of the gulf hypoxia issue, which the task force must focus on as it moves forward. These issues include:

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- Utilize multiple regression techniques to determine strength of relationship between known contributing variables and hypoxia. Unfounded statements by task force members regarding the relationship between commercial fertilizers and hypoxia have clouded the debate despite the fact that no clear statistically significant relationship has been found between nitrogen fertilizer use in the Mississippi basin and hypoxia development.

- Evaluate the protocols utilized in the original CENR reports surrounding the Redfield ratio. Recent research seems to indicate that the Redfield N:P ratio of 16 is not universal, but instead represents an optimum range (Klausmeir, 2004).

- Fill in the gaps in regard to monitoring data in certain regions within the gulf as well as data that is current up to the 2005 time frame.

- Better quantify phosphorus inputs to the gulf system. The United States Geological Survey (USGS) has a Spatially Referenced Regressions on Watershed Attributes (SPARROW) model for nitrogen but not phosphorus, leading in part to an overemphasis on the role of nitrogen in the watershed. There is significant uncertainty surrounding phosphorus inputs, and the role of both coastline deterioration and nutrient upwelling from deep water sources may be important but as yet remains unquantified.

- Integrate the most recent data surrounding nutrient use efficiency for both nitrogen and phosphorus. For example, phosphorus fertilizer consumption in the 20 major states of the Mississippi-Atchafalaya River Basin (MARB) has **declined 23%** since 1980. During that same period, crop yields and the associated phosphorus removal from soils in the basin increased substantially. Average phosphorus removal in harvested crops from 1998 to 2000 was 1.7 million short tons, exceeding the amount of phosphorus fertilizer applied in the 20 basin states by 42 percent and the sum of phosphorus fertilizer and recoverable phosphorus manure applied by 8 percent.

- Account for increases in nutrient use efficiency in modeling fertilizer inputs. Since 1985, there has been a 39 percent increase in nitrogen use efficiency, demonstrated by a 40 percent increase in corn yields made possible by only a 12 percent increase in nitrogen use. Excess agricultural nitrogen has declined or remained stable in all regions except the Lower Mississippi. Here, the excess almost tripled between 1949 and 1978 but has subsequently declined so that in 1997 it was only 50 percent larger than the excess in 1949. Excess nitrogen in the Upper Mississippi region declined 20 percent largely between 1978 and 1997.

- Examine corollaries in other estuarine systems that demonstrate a lack of sensitivity regarding riverine nitrogen and chlorophyll concentration. As detailed in the PPI comments, the Neuse River Estuary is one such system.

Any attempt to establish relationships between fertilizer sales or use and the size of the hypoxic zone in the Gulf of Mexico fails to account for the tremendous increase in nutrient use efficiency realized over the last 25 years. Researchers should recognize that fertilizer use has been flat or

has in fact decreased from 1980 to the present, resulting in significantly less nitrogen and phosphorus fertilizers being delivered to the gulf.

TFI is pleased to be able to comment on the future direction of the task force and support the PPI comments on this important issue. If you have any questions about this letter, please contact me at (202) 515-2706 or wcherz@tif.org.

Sincerely,

William C. Herz
Director of Scientific Programs