



To: Mr. Edward delaParte **Date:** October 5, 2007

From: Gary Wantland, P.E. **Reference:**

Subject: Review of Proposed Design Standards for Clay Settling Areas within the Peace River and Myakka River Basin

In accordance with your request we have completed our review of the proposed design standards presented by Mosaic fertilizer LLC (Mosaic) as part of discussions regarding a potential settlement between the affected parties. Our scope for this assignment included a preliminary evaluation of the minimum design standards established by the Florida Department of Environmental Protection in rule 62-672 FAC, the requirements set forth in the Design Criteria Memorandums (DCM) generated for the South Florida Water Management District Comprehensive Environmental Restoration Program Acceler8 projects and the criteria proposed by Mosaic. Specifically the DCM guidance documents reviewed were:

- DCM 1 – Hazard Potential Classification
- DCM 2 – Wind and Precipitation
- DCM 3 – Spillway and Drawdown Requirements
- DCM 4 – Minimum Embankment Dimensions

The criteria presented by Mosaic were combined into the categories of Minimum embankment geometry and Factors of safety.

Minimum Embankment Geometry

Criteria presented for this category included minimum freeboard, wave size and run-up design, side slope criteria as well as crest and toe road widths. In general the criteria proposed by Mosaic meet or exceed the current standards established in 62-672 FAC. The proposed criterion for freeboard is 5 feet. This requirement does not agree with the criteria established by the Acceler8 DCMs.

The Acceler8 DCM criteria establish freeboard requirements for embankments and dams based on a combination of several factors including surcharge pool level, wind set up, wave height and wave run up. DCM 2 – Wind and Precipitation indicates freeboard determination should be based on site –specific conditions that can be reasonably expected to occur simultaneously. DCM 2 has established wind conditions for evaluation of worse case freeboard criteria that range from the 100 ear wind to a site specific storm event.

The components of wind setup and wave height / wave run up are a function of the wind speed. Wind speed varies in Florida based on location with respect to the coast (near the coast or inland). Establishing design criteria that address these factors should include evaluation of a range of potential events. In our opinion establishing a single freeboard value does not allow for the designer to address potential events that reasonable may be expected to occur. Based on the criteria established by the Acceler8 program modified to account for the location of the potential clay settling areas and the shorter design life of these structures we recommend freeboard requirements for these structures be established based on the following criteria:

- 100 year wind (100 mph) combined with a PMP storm event (39 inches in 24 hours)
- 100 year storm (12 inches in 24 hours) combined with a 90 mile per hour wind event.

At a minimum the design freeboard should be no less than 5 feet as currently required by 62-672 FAC.

Factors of Safety

Analysis of Factors of Safety for design for an embankment typically includes evaluation of each stage of the structures “life”. These typically include end of construction conditions, operating conditions and drawdown. In addition to meeting the requirements of 62-672 FAC for these analyses, we recommend the design of these clay settling areas should demonstrate that the structure meets the following minimum factors of safety:

End of Construction	1.3
Operations	1.5
Drawdown	1.1

Operation conditions shall consider the stability of the embankment under a full pool with at least 20 feet of clear water. The factor of safety for drawdown should be the evaluation of drawdown from the maximum surcharge pool levels.

Table 1 (attached) summarizes these recommendations. If you have any questions or require further clarification of any or the above please call.

**PEACE RIVER AND MYAKKA RIVER BASIN
DAM DESIGN CRITERIA
MOSAIC FERTILIZER LLC**

MINIMUM DAM GEOMETRY	FDEP	PROPOSED CRITERIA	RECOMMENDED CRITERIA
Minimum Freeboard	5 ft	5 ft	See Text
Wave Size and Run-up Design	N/S	90 mph	See Text
Side Slopes (upstream)	2H : 1V	2.5H : 1V	2.5H : 1V
Side Slopes (downstream)	2H : 1V	3.0H : 1V	3.0H : 1V
Crest Road Width	N/S	30	30
Toe Road Width	N/S	20	20
FACTOR OF SAFETY			
Bearing Capacity	1.5	10 +	10
Horizontal Shear at Base	1.75	4.2	3
Horizontal Shear Due to Seepage	1.5	1.5	1.5
Shear Failure of Circular Arc	1.5	1.5	1.5
Evaluation of Stability During Selected Stages of Structures Life	Not Given	Not Given	Evaluate stability at end of construction, operating conditions and drawdown