Attachment E

Rebuttal Report of NENAD IRICANIN, Ph.D.

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF FLORIDA

Case No. 88-1886-Civ-Moreno

UNITED STATES OF AMERICA,

Plaintiff,

v.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT, et al.

Defendants.
_______________________________________/

REBUTTAL REPORT OF NENAD IRICANIN, Ph.D.

I, Nenad Iricanin, declare as follows:

1. I am employed by the South Florida Water Management District as a Principal Environmental Scientist. My present duties are summarized in my resume attached as Exhibit 1.

Overview to Converting Water Quality Standards into Discharge Limits

2. The conversion of water quality standards into discharge limits is the topic of several United States Environmental Protection Agency ("USEPA") statutory and regulatory provisions. *See, e.g.,* Section 301 of the Clean Water Act, 33 U.S.C. § 1311 and 40 C.F.R. Part § 122. In addition, this process is the subject of two significant written guidance documents prepared by USEPA and cited as support in USEPA's "Technical Support Document: Derivation of the Water Quality Based Effluent Limit (WQBEL) for Phosphorus in Discharges to the Everglades Protection Area (Aug. 24, 2010; Issued September 3, 2010 (Attachment G)) (hereafter "WQBEL"): (1) the 1991 "Technical Support Document for Water Quality-based Toxics Control" (EPA/505/2-90-001, Mar. 1991) ("USEPA 1991" or "1991 TSD") and (2) the "NPDES Permit Writers' Manual" (EPA-833-B-96-003, Dec. 1996)("1996 Permit Writers'

Manual" or "PMW"). The 1996 Permit Writers Manual was just updated in September 2010. EPA-833-K-10-001, Sept. 2010 ("2010 NPDES Permit Writers' Manual"). As indicated, USEPA relies upon the 1991 TSD and 1996 Permit Writers' Manual in development of its WQBEL. Scheidt at p. 15; WQBEL at p. 4 and p. 26. Other applicable regulations, preambles to regulations, guidance, statutory provisions, and prior USEPA application of these guidances to the WQBEL process are identified below.

3. The 1991 TSD "provides guidance for each step in the water quality-based toxics control process from standards development to compliance monitoring." Exec Summary at xiv. In this case, Chapter 5 is particularly relevant, specifically addressing permit requirements and discussing the requirements of establishing "effluent variability," "permit limit derivation," and "special consideration in use of statistical permit limit derivation techniques." USEPA 1991 at Chapter 5.2, 5.4, and 5.5.

4. Similarly, USEPA's 2010 NPDES Permit Writers' Manual, which, as the name implies, describes the essential components of a permit, includes chapters on developing Technology Based Effluent Limitations ("TBELs") and Water Quality Based Effluent Limitations ("WQBELs").[1] *See,* Chapters 5 and 6. The 1991 TSD is frequently cited throughout the 2010 Permit Writers' Manual. *See, e.g.,* 2010 Permit Writers' Manual at 6-11 ("The terminology used and procedures described in this manual when discussing both assessing the need for and calculating WQBELs are based on the procedures in USEPA's Technical Support Document for Water Quality-Based Toxics Control (www.epa.gov/npdes/pubs/owm0264.pdf).")

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[1] A TBEL is an effluent limit for a pollutant that is based on the capability of a treatment method to reduce the pollutant to a certain concentration or mass loading level. A TBEL represents the minimum level of effluent quality that is attainable using demonstrated technologies for reducing discharges of pollutants or pollution into the waters of the United States. CWA Section 301, 33 U.S.C. § 1311; 40 C.F.R.§ 122.44(a). PWM page 5-2 "WQBELs are designed to protect water quality by ensuring that water quality standards are met in the receiving water." PWM page 6-1.

The 2010 guidance further provides that while those procedures in the 1991 TSD were developed specifically to address toxic pollutants, they have been appropriately used to address a number of conventional and nonconventional pollutants as well." *Id.* at pp. 6-31 to 6-35.

5. Three of the essential components to deriving a WQBEL include: the effluent variability at a facility (USEPA 1991 at 5.2, p. 93), the "wasteload allocation" for the receiving water body (USEPA 1991 at 5.3, p. 96), and the statistical permit limit derivation techniques (USEPA 1991 at 5.4, p. 98). USEPA regulations also require discharge limits to be stated as maximum daily and average monthly discharge limitations "unless impracticable." 40 C.F.R. § 122.45(d)(1).

6. Effluent Variability. As explained in the 1991 TSD, an "understanding of the basic principles of effluent variability is central to water quality-based permitting." USEPA 1991 at Page 93. This is because effluent quality and quantity vary over time due to a number of factors, causing peaks in effluent concentration and volumes. USEPA 1991 at Page 93. Knowing the peaks is important because "a permit limit is to specify an upper bound of acceptable effluent quality." USEPA 1991 at p. 95.

7. Wasteload Allocation. For water quality based permits, "the limits are based on maintaining the effluent quality at a level that will comply with water quality standards. These requirements are determined by the WLA. The WLA dictates the required effluent quality which defines the desired level of treatment plant performance or target LTA [long-term average]." USEPA 1991 at p. 95. The WLA is based on ambient criteria and the exposure of the resident aquatic community or humans to pollutant loads.

8. Statistical Parameters. Finally, USEPA guidance contemplates the use of specific probability basis when setting permit limits, the goal of which "is to allow the regulatory agency

to distinguish between adequately operated wastewater treatment plants with normal variability from poorly operated treatment plants and to protect water quality criteria." USEPA 1991 at p. 110.

9. As provided in the 1991 TSD: "Where a permitting authority does not have a specific guidance for the probability basis, USEPA recommends . . . Maximum Daily limits ("MDL")—.01 probability basis (99th percentile level) [and] Average Monthly limits ("AML")—.05 probability basis (95th percentile level)." *Id.* at p. 110. Significantly, as USEPA explains, as the probability basis for the permit limits expressed in percentiles (e.g. 95 percent and 99 percent) increases, the value of the permit limits increases (becomes less stringent). *Id.* at p. 105. The reason for this, USEPA states, is that "[t]here is a higher probability that any randomly chosen effluent sample will be in compliance with its permit limits . . . ." *Id.* at p. 106; *see also* USEPA 1992 at pp. 1–3.

USEPA's Proposed WQBEL

10. On its surface, USEPA's two part WQBEL creates the illusion of conforming with USEPA guidance. It has a short term limit (the 18 ppb annual maximum part) and a long-term limit (the one-in-three year geometric mean of 10 ppb), and its drafters examined existing STA outflow concentrations in an attempt to determine the effluent variability. As explained below, however, an analysis of USEPA's methodologies demonstrates that the illusion of compliance with USEPA guidance is just that—an illusion.

USEPA deviated from its own guidance by using a 90th percentile probability level, as opposed to the requisite 95th or 99th percentile.

11. In deriving both its short term and long term limits, USEPA used a 90th percentile probability basis, and not the 95th and 99th percentiles contemplated by USEPA guidance. Scheidt at pp. 15–17; Walker at p. 8; WQBEL at p. 6.

12. Scheidt cites to USEPA 1991 as authority for the 90th percentile. Scheidt at p. 15. A review of that document discloses no reference to the 90th percentile. The 95th and 99th percentiles, however, are discussed more than 30 times throughout the document.

13. Both Scheidt and Walker attempt to justify their departure from USEPA guidance by pointing to the use of a 90th percentile by SFWMD when drafting its BMP rules for the EAA and the C-139 basins. Neither rule, however, involved the derivation of site specific discharge limits or WQBELs. The phosphorus criterion, however, and Rule 62-302.540 and its "four part test," were derived based on a 95th percentile.

14. Scheidt and Walker also point to the prior use of a 90th percentile in discharge limits for the STAs, i.e., Nearhoof 2005; Goforth 2007. Those documents relate to the development of TBELs—technology based effluent limits—and not WQBELs. Moreover, neither of those documents refer to the USEPA 1991 guidance but, instead, refer to Walker's 1996 paper in which he converts phosphorus load reductions to phosphorus concentrations. Finally, Scheidt and Walker cite to papers prepared by FDEP staff that use a 90th percentile for the basis of a draft WQBEL. FDEP, however, never issued a permit with discharge limits based on its staff's analysis. More importantly, FDEP staff concluded that the WQBEL would be comprised solely of a 18 ppb annual maximum limit, i.e., a one step WQBEL and not the two step WQBEL that USEPA now advances (Payne et al. 2010).

15. USEPA guidance contemplating use of the 95th and 99th percentiles has been around for nearly 20 years. As noted in the 2010 Permit Writers' Manual, these percentiles have been enforced as suitable and appropriate by several courts. USEPA 2010a at 5-20 (*citing Chemical Manufacturers Association v.U.S. Environmental Protection Agency*, 870 F.2d 177, 230 (5th Cir. 1989) and *National Wildlife Federation, et al v. Environmental Protection Agency*,

286 F.3d 554 (D.C. Cir. 2002)("EPA has followed that policy in developing monthly average limitations in all effluent guidelines rulemakings since 1987."). USEPA's attempt to justify a departure from its guidance in this particular instance is improper.

16. Accepting all of USEPA's WQBEL except its 90th percentile, and changing that to a 95th percentile, results in a change of the annual maximum limit from 18 ppb to 21 ppb based on the District's attempt to apply the calculations presented by USEPA in Appendix 2 "Statistical Methodology" and the historical STA data presented in Appendix 1 of the WQBEL. The Excel spreadsheet provided by USEPA approximated this result when changing the probability level from the 90th percentile to the 95th percentile.

USEPA failed to establish a wasteload allocation.

17. USEPA guidance expressly contemplates the development of a wasteload allocation for the receiving water body into which a facility discharges. Not only is this a pre-requisite for developing discharges limits for facilities discharging into impaired waters, i.e., TMDLs, but it also applies for non-impaired waters as well.

18. The 2010 Permit Writer's Manual (p. 6-31) contains the following guidance for developing wasteload allocations (WLAs). The WLA is the loading or concentration of pollutant that the specific point source may discharge while still allowing the water quality criterion to be attained downstream of that discharge. The WLA could be allocated through an USEPA-approved TMDL, an USEPA or state watershed loading analysis, or a facility-specific water quality modeling analysis. Before calculating a WQBEL, the permit writer will first need to determine the appropriate WLAs for the point source discharge based on both the acute and chronic criteria. A WLA may be determined from a TMDL or calculated for an individual point source directly. Where no TMDL is available, a water quality model generally is used to calculate a WLA for the specific point source discharger.

19. This is not a case of USEPA doing an improper wasteload allocation. Rather, USEPA just didn't do one at all. USEPA compounded this error by assuming that the Everglades does not have a long-term assimilative capacity. Scheidt at 14. No *technical* basis for assuming zero assimilative capacity is presented and, given the fact that large portions of the Everglades are rainfall driven, i.e., the Refuge, there is none. This assumption is also contrary to USEPA guidance regarding TMDLs. USEPA 1991, Chapter 4.

20. USEPA argues that the notion that the Everglades might have assimilative capacity is inconsistent with the phosphorus criterion. Scheidt at 14. Not only does this argument defy science (all water bodies have some assimilative capacity—albeit some may have very little), if this were true, then there would never be a need to determine assimilative capacity for any water body. All numeric water quality criteria are based on achieving a designated use. USEPA 1991 page 1. If determining the assimilative capacity of a water body is inherent in the derivation of water quality criteria, then all of the USEPA guidance relating to establishing WQBELs and TMDLs (as well as the text of the Clean Water Act discussing assimilative capacity) is misguided.

USEPA used improper and inconsistent data screening protocols when establishing effluent variability.

21. As discussed by Scheidt, USEPA engaged in a process to determine expected year-to-year variability in phosphorus concentrations in STA discharges. Scheidt at p. 18; WQBEL at p. 7. As one would assume, that process entails the compiling of STA performance data from the six STAs. In compiling this dataset, however, USEPA employed a data screening protocol. The following was included as a part USEPA's protocol:

> The performance of some STAs has been adversely influenced by excessive phosphorus loadings, extreme droughts (2001, 2007-2008), repair of damage sustained in severe hurricanes (STA1W 2005-2007) and initial construction

> problems (STA1E 2010). Performance has also been temporarily affected by partial operation due to implementation of measures designed to optimize performance, such as internal levee construction, vegetation management, and accompanying stabilization. The above factors are likely to have increased the variability of these STA discharges relative to that expected under long-term operations, although occasional future disturbances would be expected due to maintenance and vegetation management practices. However, in order not to have extreme values in the dataset which are not representative of stable STA operation, the data used for WQBEL derivation were screened in the following manner:
>
> > (1) STA startup periods were excluded;
> >
> > (2) Data were excluded for STA1W for WY2005-2007 when performance was significantly impaired due to phosphorus overloading, hurricane damage, and construction associated with repair and optimization; and
> >
> > (3) Data were excluded for STA1E in WY2010 because of vegetation loss and deterioration in performance due to construction problems resulting in excessive water depths.
>
> Data were included from the initial phase of STA-1W (ENRP WY 1996-2000), which was operated at relatively steady flows that may not be representative of all future STAs. Data also were included for STA5 in WY2007 and STA6 in WY 2007-2008 when the coincidence of extreme drought, construction, and implementation of optimization measures contributed to elevated TP concentrations in the discharges. Retaining these data from STA1W, STA5 and STA6 in the data set used for WQBEL derivation provide a broader basis for calibration and a range of variability to account for future performance and disturbances. These retained data are indicative of conditions that USEPA reasonably expects to recur.

WQBEL at 7.

22. STAs are large biological stormwater-driven systems that are subjected to natural variations in weather and biology. STAs are not industrial wastewater facilities[2] that experience

[2] Despite repeated acknowledgements that STAs are not industrial wastewater facilities, and despite the possibility of issuing stormwater NPDES permits, USEPA and FDEP require industrial wastewater facility NPDES permits for the STAs.

"stable operations." Future performance of the STAs will be highly variable depending on start-up conditions, dryout conditions, high water conditions, high wind conditions, and the other conditions manifested in the historical STA data set[3] (with one exception – the atypical ENR operations – see below). All STAs experienced these conditions, yet USEPA excluded only certain years, which coincidently corresponded to years with very high phosphorus concentrations (e.g., STA-1E data excluded annual concentrations of 146 ppb, 71 ppb, 94 ppb, and STA-1W data excluded annual concentrations of 98 ppb, 113 ppb, 119 ppb). Therefore, excluding these years artificially reduced the overall average STA discharge concentrations, and reduced the variability in the STA discharges, resulting in an underestimate of the annual limit.

23. Including the data that USEPA excluded would increase the estimated annual limit by approximately 3 ppb, from 18 ppb to 21 ppb (all other aspects of their derivation remaining the same) based on the District's attempt to apply the calculations presented by USEPA in Appendix 2 "Statistical Methodology" and the historical STA data presented in Appendix 1 of WQBEL (SFWMD 2010, which is Exhibit 2 to this report). While the District was able to test the results of changing the probability level assigned to the upper limit (i.e. from 90th to 95th) in the USEPA Excel spreadsheet, efforts to exclude and include STA data sets where unsuccessful due to encountering numerous errors generated in the spreadsheet. Examples of the spreadsheet generated errors encountered are described further in a latter section of this report.

24. Further underscoring its flawed understanding of STA operations, the USEPA WQBEL derivation included data from the Everglades Nutrient Removal (ENR) Project, which

[3] It should be noted that the biological systems within the STAs take months to years to recover from naturally occurring extreme storm events (e.g., flood, drought and wind) and revegetation/enhancement activities; the application of the WQBEL should acknowledge this biological recovery time and allow for less than optimal performance.

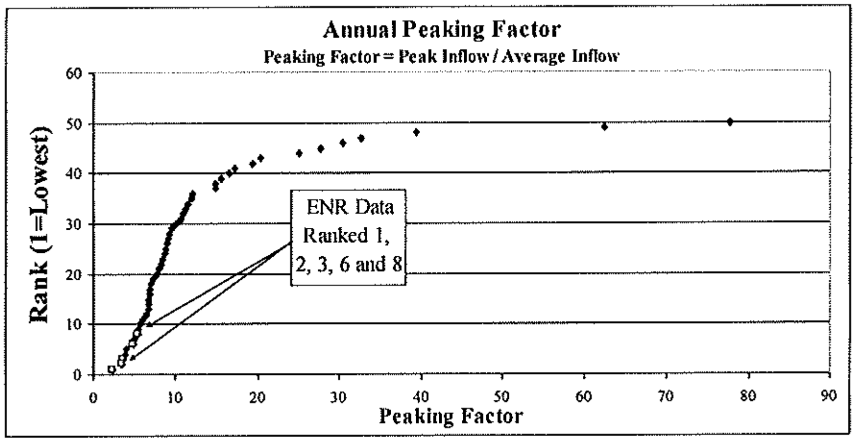
is not representative of future STA conditions[4], resulting in a lower estimate of variability and leading to an underestimate of the annual limit. The ENR Project did not receive the full range of pulsed stormwater inflows as are experienced by the full-scale STAs. To illustrate this fact, an appropriate metric for characterizing the peak hydraulic loading rate to a stormwater treatment area is the *instantaneous loading rate* (Kadlec and Wallace 2009). In the ENR, the instantaneous loading rate was limited to 9.5 cm/day, less than one-third the average instantaneous loading rate of the full-scale STAs (33.9 cm/day) (Table 1). Another appropriate metric is the *peaking factor*, defined as the ratio of the maximum flow to the average flow in a water system (Zhang et al. 2005). Figure 1 presents the anomalously low peaking factors for the ENR project in comparison to the STAs; for all but one year the ENR data fell at or below the lowest 10% of annual values. These data clearly indicate that the ENR Project did not receive the peak hydraulic loading rates that full-scale STAs experience, and hence, the entire ENR data set should be excluded from use in the derivation of the WQBEL.

Table 1. Summary of Instantaneous Loading Rates for the Treatment Areas (WY1996-2009).

Treatment Area	Area acres	Peak Inflow Rate cfs	Instantaneous Loading Rate cm/day
ENR	3,815	600	9.5
STA-1E	5,132	5,593	65.9
STA-1W	6,670	3,250	29.5
STA-2	6,430	3,369	31.7
STA-3/4	16,543	6,475	23.7
STA-5	4,100	1,200	17.7
STA-6	870	500	34.7
Average STA Rate			***33.9***

[4] USEPA acknowledges this fact, yet included the data anyway: "Data were included from the initial phase of STA-1W (ENRP WY 1996-2000), which was operated at relatively steady flows that may not be representative of all future STAs."

Figure 1. Annual Peaking Factors (WY1996-2009).



25. In addition, USEPA did not make any adjustments for the atypical hydraulic characteristic of the ENR Project, such as factoring in stormwater flows bypassed around the ENR Project during its years of operation. The variance in the ENR outflow TP concentrations (8 ppb^2) was more than an order of magnitude lower than the variance of the STAs including all water years (1682 ppb^2, with a range of 22-2792 ppb^2). Under ideal conditions, the operation of a very large flow equalization basin upstream of each STA might serve to reduce the hydraulic peaks to the STAs, however, countering this is the fact that available water is limited during dry weather, and that treatment cells in expanded STAs will likely experience an increase in zero flow days as water managers prioritize cells to receive the limited available water, thus resulting in an increase in hydraulic loading variability.

26. In summary, the ENR data are not representative of the operation of a full-scale STA. Excluding these data would increase the estimated annual limit by approximately 1 ppb, from 18 ppb to 19 ppb (all other aspects of their derivation remaining the same). Excluding the ENR data and including the data from the full-scale STAs that USEPA excluded (see above discussion) would increase the estimated annual limit by approximately 4 ppb, from 18 ppb to 22

ppb (all other aspects of their derivation remaining the same). Due to the errors encountered in the USEPA Excel spreadsheet, these estimates (SFWMD 2010) are based on the District's attempt to apply the calculations presented by USEPA in Appendix 2 "Statistical Methodology" and the historical STA data presented in Appendix 1 of the WQBEL.

USEPA Guidance does not contemplate the "rescaling" of effluent data when determining effluent variability.

27. As discussed on page 12 of the WQBEL, USEPA used a statistical method known as "rescaling" to transform the historical STA discharge concentration data downward to result in a long-term average annual geometric mean concentration for each STA of 10 ppb, even though no STA has ever achieved an annual outflow of 10 ppb, even under low phosphorus loading rates (i.e., below 1 gram per meter squared per year).

28. USEPA's guidance contains a lengthy discussion of how to determine effluent variability. USEPA 1991 at Chapter 5.2. Rescaling or similar data manipulation is not discussed. USEPA's rescaling resulted in annual FWM concentrations as low as 6 ppb. Annual FWM concentrations this low have never been achieved in an STA (and is comparable to rainfall concentrations in pristine areas) and bias the data extremely low. In addition to yielding unjustifiably low GM and FWM concentrations, rescaling also reduced the variance of the FWM concentrations that USEPA then used to calculate the upper 90% confidence limit to derive 18 ppb (see Figure 2).

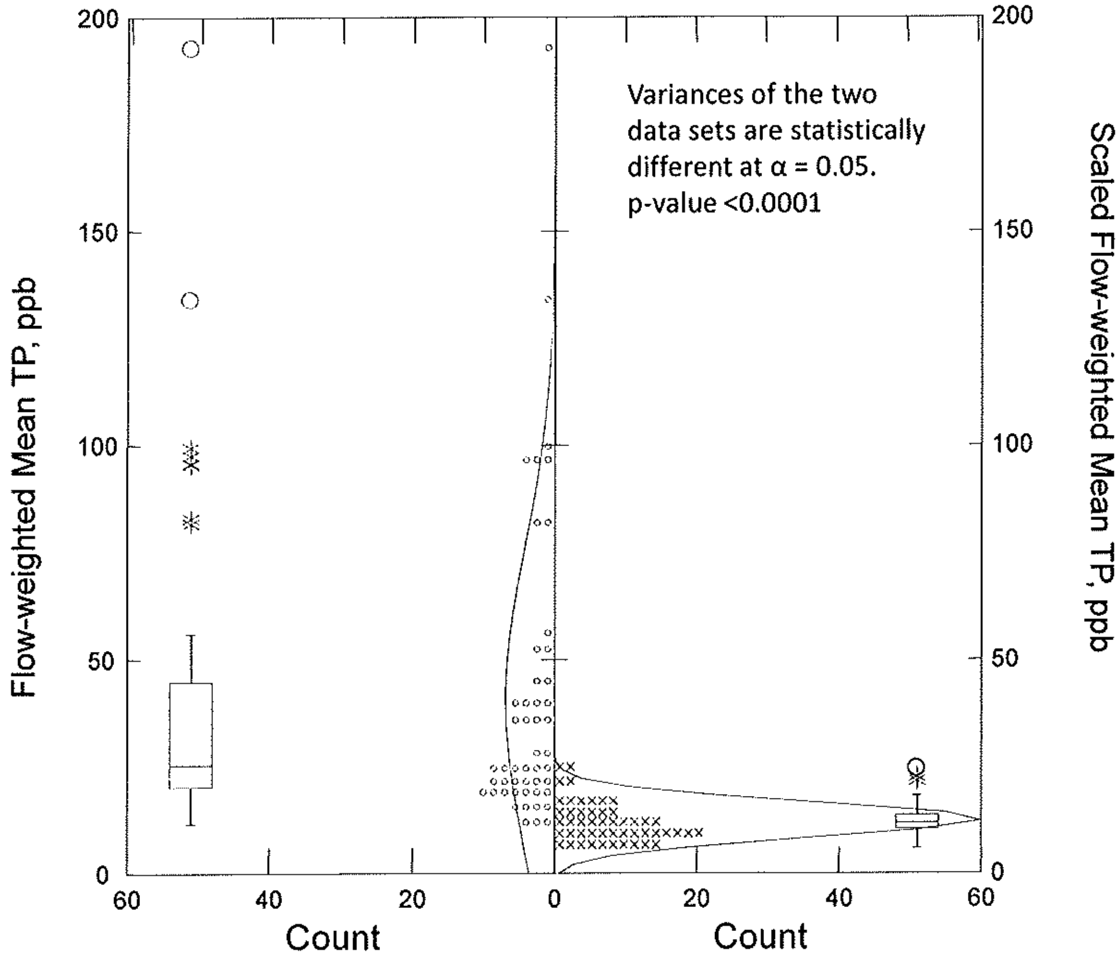


Figure 2. Reduction in variance due to rescaling.

The USEPA Proposal Fails To Maintain Consistency Between The Application Of The WQBEL And Its Derivation.

29. The proposed protocol for assessing achievement of the WQBEL is not consistent with the derivation of the WQBEL. As discussed above, in the derivation of the annual limit USEPA excluded some, but not all, STA data for years they considered "startup," "when performance was significantly impaired due to phosphorus overloading, hurricane damage, and construction associated with repair and optimization," and "because of vegetation loss and

deterioration in performance due to construction problems resulting in excessive water depths." In applying the WQBEL, no consideration is given to extreme hydrologic events (e.g., high water levels, droughts, high winds), water supply releases, and other operational conditions present in the historical STA data that were excluded by USEPA in the derivation of the WQBEL.

30. If a goal of rescaling is to replicate a range of variability in phosphorus discharges based on the expected performance capabilities of future STAs when they are built and performing as designed, then a better approach, and one that would not involve speculation as to future operations, would be to look at the current best performing STAs that have all experienced the range of extreme events as other STAs in the data screening protocol (i.e., STA-2, STA-3/4 and STA-6).

31. Additional consideration in the data screening protocol should give weight to the fact that if USEPA excludes data based on such factors as hurricanes, phosphorus overloading, etc., then it needs to exclude similar data from compliance assessment.

USEPA did not express the discharge limits in daily or monthly concentrations.

32. As discussed above, USEPA was required to express its WQBEL limits in terms of a maximum daily and average monthly discharge limits "unless impracticable." 40 C.F.R. 122.45 (d). The WQBEL does not comply with this requirement and USEPA provides no explanation for its decision other than point to a 2004 USEPA memorandum relating to a Chesapeake Bay TMLD and that use of monthly and daily limits "are not appropriate." WQBEL at p. 5

Use of the three year, "long-term" geometric mean is contrary to the language in the criterion.

33. The state's phosphorus rule, 62-302.540, includes a four-part test in which two parts of the test contemplate a five-year period to assess compliance. The three-year compliance testing period expressed in the USEPA WQBEL is inconsistent with the phosphorus rule.

The limited information provided to the District on October 12, 2010, by itself, is insufficient to evaluate USEPA's WQBEL and, therefore, its results cannot be replicated or verified.

34. The Excel file provided by the USEPA containing equations and data used in the derivation of the WQBEL is complex and cumbersome. There are 15 worksheets in the Excel file with data from several worksheets being cross references. For instance, the main calculation worksheet ("FinalCalcs") references portion of itself as well as data located on three (3) other worksheets ("GM_Calcs"; "SFWMD_STA_POR"; and "STA Operations." In turn, the "GM_Calcs" data is calculated from the worksheet "Data" using a pivot table to select grab sample data from "Data" based on conditions limiting the data set to data coded with the "Keep" attribute being "True." An example of the types of linkages between cells is provided in Figure 3.

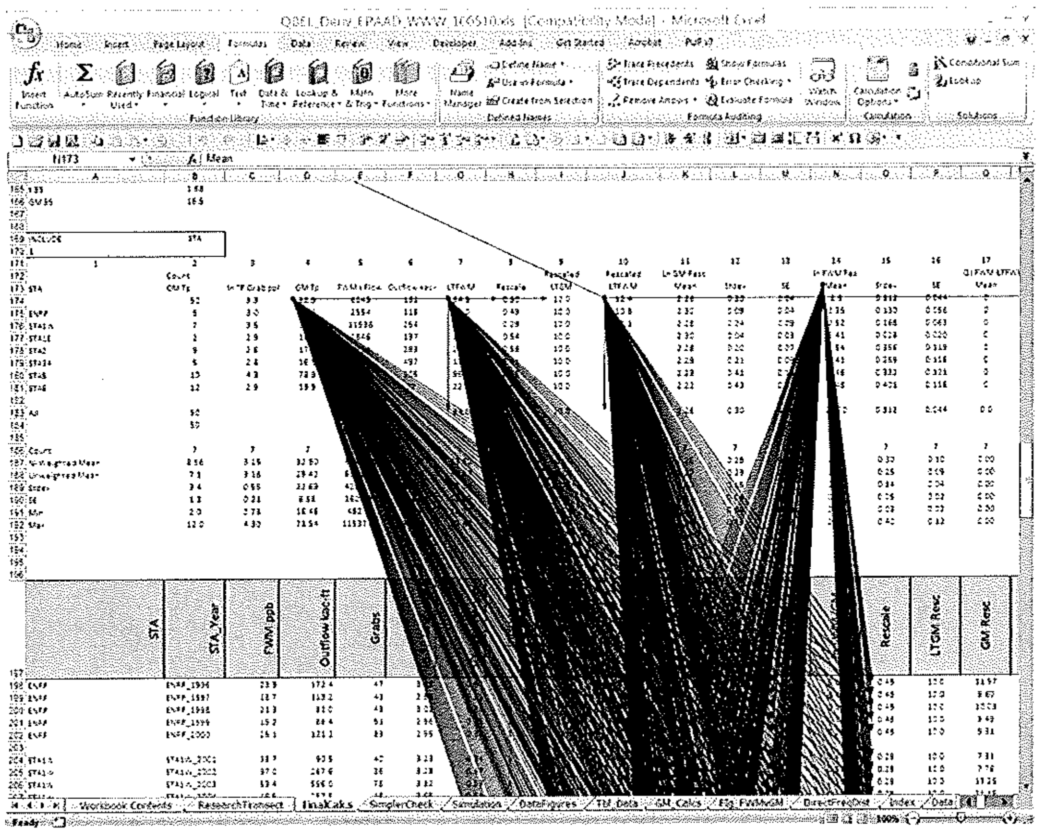


Figure 3. Screen shot worksheet "FinalCalcs" in the USEPA Excel file (QBEL_Deriv_EPAAD_WWW_100510.xls) showing the inter-relationship of various cells

35. As stated above, the "FinalCalcs" worksheet is the main portion of the file where the WQBEL is derived. The statistical terms used from Appendix 2 in the derivation of the WQBEL, however, are not specified, nor readily identifiable in the spreadsheet. As a result, we had to make assumptions of how Appendix 2 terms are used in the worksheet, and in the derivation of the WQBEL itself. In many instances, spreadsheets are summarized based on the use of Excel functions, i.e., named lists and conditional statements, that are difficult to follow from cell to cell, thus making the verification of Appendix 2 equations equally difficult.

36. Cells in the "FinalCalcs" worksheet are difficult to decipher because the formulas used to calculate values do not follow a logical sequence. For instance, Column G, rows 174-181 contain the values for LTFWM. The information is not calculated in this column, but is referenced to Column AB (same rows) where this term is calculated using the average sum product of the of Column X, Rows 198 – 257 by the information provided in Column A, Rows 198-257 divided by the average STA flow (Column F, Rows 174-181). It should be noted that Columns B-AF, Rows 174–181 contain a formula "{TABLE(,B170)}" in many of the cells that appears to be associated with Excel's built in "What-If Analyses" using Data Tables. Because the actual formulas appear to be located in Row 174 of this sheet, it appears that the cells containing the TABLE reference are being calculated in the same way.

37. Prior to receiving the USEPA Excel file, the District developed its own Excel file to calculate the WQBEL based on the information provided in Appendix 1, 2 and 3 of the WQBEL. The Excel file allowed the District to perform sensitivity checks with regards to the derivation of the limit based on the number of STAs used and water years included or excluded. Due to the complexity of the USEPA Excel file, the sensitivity analyses could not be readily performed in that spreadsheet as evidenced by the numerous instances where the equations generated "error" results, noted by a"#DIV/0!" code, on the "FinalCalcs" worksheet. In turn, these errors were further propagated to the "Simulation" worksheet, which is used to simulate 50,000 water years to determine the excursion frequency for each STA in failing the 2-Part test of the USEPA WQBEL (see Figures 4 and 5).

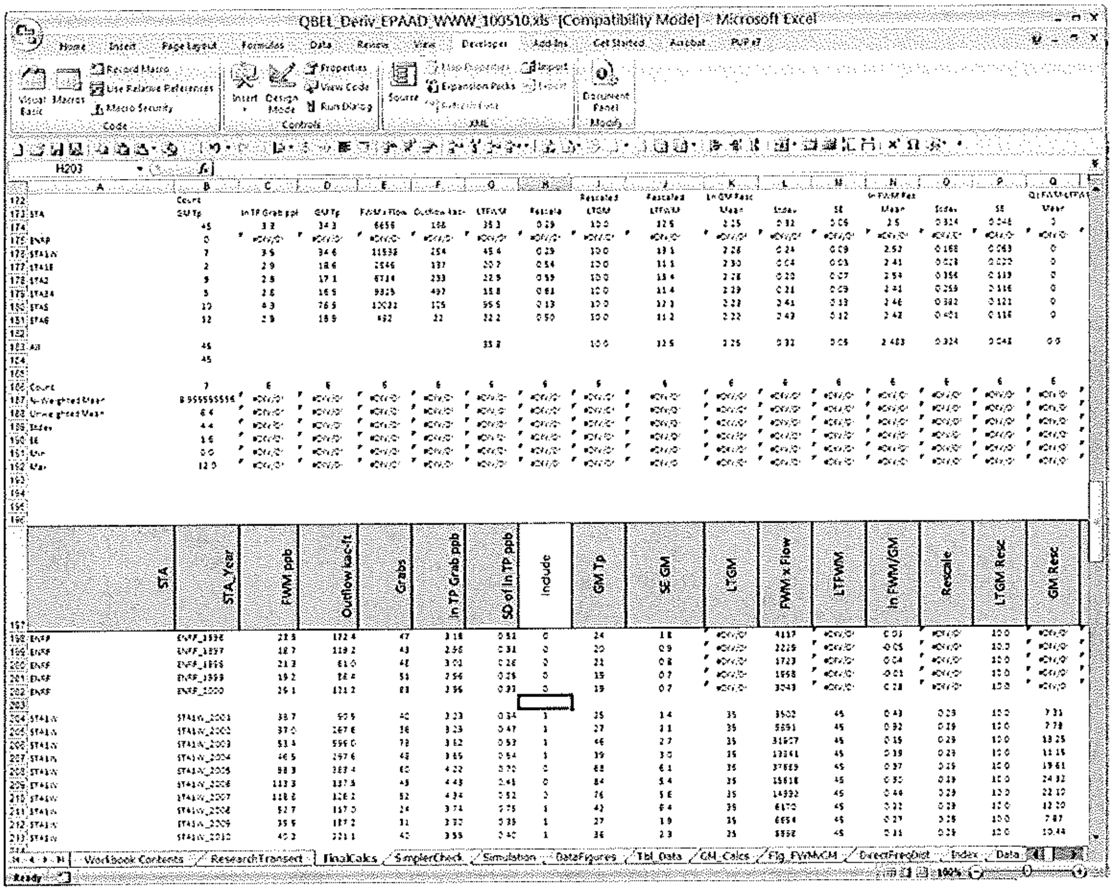


Figure 4. Screen shot worksheet "FinalCalcs" in the USEPA Excel file (QBEL_Deriv_EPAAD_WWW_100510.xls) showing "#DIV/0!" error when the ENRP is excluded from the derivation

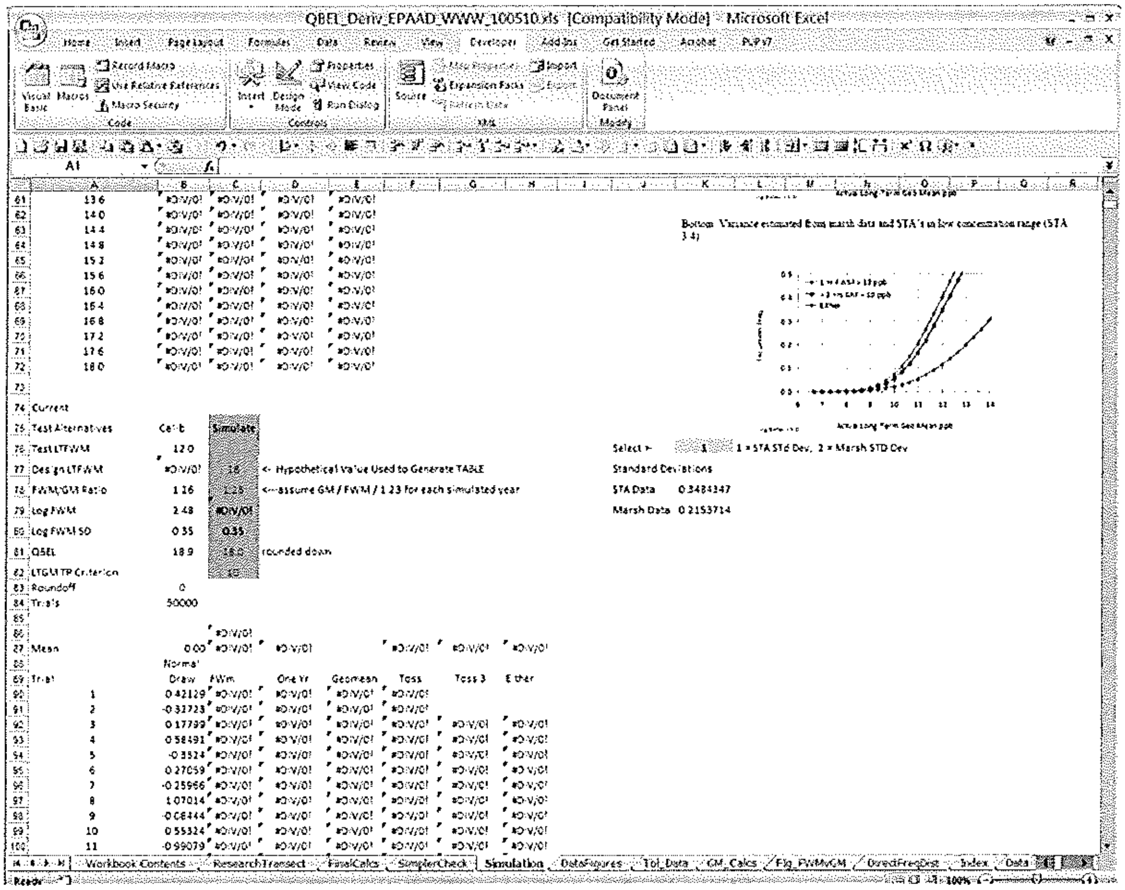


Figure 5. Screen shot worksheet "Simulation" in the USEPA Excel file (QBEL_Deriv_EPAAD_WWW_100510.xls) showing "#DIV/0!" error when the ENRP is excluded from the derivation on the FinalCalcs worksheet and its effects on the Simulation worksheet

38. While reviewing the USEPA Excel file, it became apparent as well, that Visual Basic code in the file is linked with an externally referenced Excel file, PERSONALx.xls. Typically these files are used to store macros that are available to other Excel files. Since this file was not provided with the USEPA excel file, it is impossible to conclude if this file was used in any portion of the WQBEL derivation and its related impact.

I declare, under penalty of perjury, that the foregoing is true and correct.

By: ___________________________
Nenad Iricanin, Ph.D.

Executed: October 20, 2010

References:

Goforth, Gary, Nenad Iricanin, Steve Hill, Shi Kui Xue, Tracey Piccone, Frank Nearhoof, and Ken Weaver. 2007. Technical support document for the STA-1W TBEL. October 12, 2007.

Kadlec, R. and S. Wallace. 2009. Treatment Wetlands Second Edition. CRC Press.

Nearhoof, F., K. Weaver, G. Goforth, and S. Xue. May 2005. Test for Determining Achievement of the Initial 50 ppb TBEL for Everglades Stormwater Treatment Areas. Florida Department of Environmental Protection.

Payne, G., K. Weaver, F. Nearhoof and K. Hallas. 2010. Derivation of the Water Quality Based Effluent Limit for Total Phosphorus in Discharges to the Everglades Protection Area. Florida Department of Environmental Protection. May 2010.

SFWMD. 2010. Excel Spreadsheet.

USEPA. 1990. NPDES Permit Writer's Guide to Data Quality Objectives. USEPA, Nov. 1990.

USEPA. 1991. Technical support document for water quality-based toxics control. March 1991. Second printing. EPA/505/2-90-001. Office of Water. Washington, D. C.

USEPA. 1992. Supplemental Guidance to RAGS: Calculation the Concentration Term. May 1992.

USEPA. 1996a. NPDES Permit Writers' Manual. EPA-833-B-96-003, Dec. 1996.

USEPA. 1996b. EPA Guidance on Application of State Mixing Zone Policies in EPA-Issued NPDES Permits. USEPA Aug. 6, 1996.

USEPA. 2010a. Technical Support Document: Derivation of the Water Quality Based Effluent Limit (WQBEL) for Phosphorus in Discharges to the Everglades Protection Area. Aug. 24, 2010; Issued September 3, 2010.

USEPA. 2010b. 2010 NPDES Permit Writers' Manual. EPA-833-K-10-001, Sept. 2010.

Walker, William. 2003. Consideration of Variability and Uncertainty in Phosphorus Total Maximum Daily Loads for Lakes. *ASCE Journal of Water Resources Planning and Management* 129(4).

Zhang, Xiaoyi, Steven Buchburger, and Jakobus E. van Zyl. 2005. A Theoretical Explanation for Peaking Factors. Impacts of Global Climate Change World Water and Environmental Resources Congress 2005. Anchorage, Alaska, USA.