

## TurkeyPointCEm Resource

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**From:** Stoddard, Philip K. [PStoddard@southmiamifl.gov]  
**Sent:** Wednesday, May 20, 2015 3:14 PM  
**To:** TurkeyPointCOLEIS Resource  
**Cc:** Menendez, Maria M.; Steven J. Alexander  
**Subject:** City of South Miami's comments on draft EIS  
**Attachments:** South Miami comments on DEIS v4.pdf

Dear Ms. Bladey:

Below please find the City of South Miami's comments on U.S.NRC Environmental Impact Statement for Combined Licenses (COLs) for Turkey Point Nuclear Plant Units 6 and 7. NUREG-2176.

Sincerely,

Dr. Philip K. Stoddard  
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20 May, 2015

Re: NUREG-2176  
Cindy Bladey  
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TurkeyPoint.COLEIS@nrc.gov

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Sincerely,

Philip K. Stoddard, Ph.D.



**Summary –**

The Turkey Point 6 & 7 Draft EIS [DEIS] has serious omissions in analysis that make it impossible to determine the likely effects of plant operation on the environment. Most of the problems and uncertainties identified concern cooling water operations. In addition we find likely adverse consequences for the Miami-Dade County economy as a whole that are overlooked in the DEIS. Ten points of concern are enumerated below.

**Comment 1. The DEIS is incomplete in that it makes no analysis of the effects of entrainment of the hypersaline plume, and the likely resulting consequences for demand on water from other sources, i.e., fresh water from the Coastal Everglades or bay water from Biscayne National Park, if the RCW system is tainted by the hypersaline plume –**

Radial collector wells (RCWs) under the site will draw water from beneath the plant when water is unavailable from the wastewater treatment plant. The DEIS attempts to model how water will flow underground into the RCWs, yet the DEIS admits that the models used to project underground flow of ground water were insufficient to determine how water of different density (i.e., from salinity differences) will move through the ground:

*“The steady-state nature of the FPL model and the assumption of constant density fluids make the model inadequate for modeling this potential scenario.”*  
[DEIS p. G-29]

How water of differing densities moves is critically important because of the hypersaline plume underneath the existing cooling canals (the so-called “Industrial Waste Facility” or IWF). According to the DEIS [p. 3-30], the cooling system cannot operate if the cooling water becomes more than 1.5x the saline concentration of bay water. However, the hypersaline plume is already approximately twice the salinity of water in Biscayne Bay prior to entering the cooling system, and it could get worse: continued operation of TPN 3 & 4 has the capacity to further expand or relocate the hypersaline plume, either by continued concentration of water through heating and evaporation, or by displacement with water pumped in. Entrainment of the underground hypersaline plume into the RCWs could halt operation of the plant. Specifically, if the water entering the RCWs included 70% or more of water with the salinity of the hypersaline plume, the plant could not operate. Failure of the RCWs to provide water of sufficiently low salinity would place the cooling demand squarely on aboveground sources, either the L31E canal or Biscayne Bay itself.

***The final EIS must consider possible loss of usable cooling water caused by RCW entrainment of hypersaline plume under the IWF.***

**Comment 2. The DEIS is incomplete because it does not evaluate possible harm to the ecosystem of Biscayne Bay if the hypersaline plume under the cooling canals is forced into the bay by pumping from the radial collector wells –**

The DEIS indicates that intermittent pumping, as proposed in the DEIS, could displace the hypersaline plume into the path of fresh water flowing eastward:

*“Intermittent operation could result in an increase of hypersaline flow into the aquifer beneath the bay that could migrate into the bay when the RCW is not operating.” [DEIS p. G-29]*

Emergence of hypersaline water into Biscayne Bay could result in localized hypersalinity that would kill sea grass beds in Biscayne National Park, as happened during periods of hypersalinity in Florida Bay in the early 1990s (e.g., Zieman et al. 1999); those areas of Everglades National Park have not fully recovered.

***The final EIS must note possible harm to Biscayne National Park ecosystem if hypersaline plume is relocated into Biscayne Bay.***

**Comment 3. The DEIS fails to take NOAA’s guidance of planning for the highest estimates of SLR, and likely underestimates SLR by using consensus global projections for future SLR that are below the ongoing local rates of SLR measured by regional experts at the University of Miami’s Rosenstiel School of Marine and Atmospheric Science –**

Appendix I of the DEIS addresses climate change and sea level rise:

*“Sea level is projected to rise 1 to 4 ft globally by 2100.” [DEIS, p. I-3]*

While several reports list project such global figures, scientists at the University of Miami’s Rosenstiel School of Marine and Atmospheric Science (RSMAS) have actually measured SLR in the Miami region that indicates higher SLR rates are already happening locally:

*“...over the past 15 years, the average annual increase [in sea level] is roughly 0.27"/year, but over just the past 5 years, it's about 0.97"/year.” [McNoldy 2014]*

Existing SLR rates measured locally yield a range of 2 to 6.5 feet of rise over the life of the plant stated in DEIS Appendix I, but scientists agree the rate of rise is going to accelerate exponentially. The NOAA states:

*“The Highest Scenario [for SLR] should be considered in situations where there is little tolerance for risk (e.g. new infrastructure with a long anticipated life cycle such as a power plant).” [NOAA 2012]*

***The final EIS must better estimate effects of sea level rise (SLR) by considering how measured local rates of SLR differ from projected global rates, and the effect of uncertainty in SLR on viability of the project.***

**Comment 4. The DEIS is incomplete in failing to consider loss of the main cooling water supply through reduction of the wastewater stream resulting from reduced residential demand caused by forced water conservation –**

Sea level rise (SLR) will limit cooling water availability in ways that were not considered in the DEIS. One foot of sea level rise will overwhelm the saltwater exclusion dams in

Miami-Dade County, and produce significant saltwater intrusion upon the wellfields. The freshwater supply will be supplemented, at considerable expense, with desalinated water from the Upper Floridan Aquifer, a process that has already begun in parts of Miami-Dade County. Since saltwater intrusion from SLR will impose staunch water conservation measures, either by regulation or by economics, the amount of water available from the Southern Waste Water Treatment Facility will undoubtedly decline over time. Thus the amount of water available today from the Southern Waste Water Treatment Facility will not be available for use as cooling water over the projected operational life of TPN 6&7.

***The final EIS must consider loss of wastewater as cooling water source because of reduced residential demand from water conservation measures addressing SLR induced saltwater intrusion on freshwater supply.***

**Comment 5. The DEIS is incomplete in failing to consider reduction of the wastewater stream from reduced number of residences and businesses producing wastewater –**

The Miami-Dade Water Sewer Dept. has noted that the residential service area of the Southern Waste Water Treatment Facility is low in elevation, and will likely depopulate in the face of SLR. The DEIS likewise notes:

*“Climate change could lead to changes in the distribution of land use in Miami-Dade County and sea-level rise could lead to the loss of some inhabitable land in the county.”* [DEIS I.3.1.1 Land-Use Summary, p. I-4.]

Reduction in the number of customers in the southeast coastal regions of Miami-Dade County will reduce the amount of wastewater sent to the Southern Waste Water Treatment Facility, and thus the amount of treated wastewater water available for cooling TPN 6&7.

***The final EIS must consider eventual loss of wastewater as a cooling water source because of regional depopulation due to SLR.***

**Comment 6. The DEIS is incomplete in failing to consider access restriction and ocean vulnerability caused by SLR that could eliminate treated wastewater as a source of cooling water for TPN 6&7 –**

SLR will complicate road access to the Southern Waste Water Treatment Facility, making plant operation difficult. Although a causeway could be built to keep the plant operational, the price could make operation uneconomical. Further, Elliot Key, which currently shields the region from open ocean effects, will be underwater. Ocean swell, east winds, storms, and tides will have greater effects on plant accessibility and operations. If Miami-Dade County finds operation of the plant has become uneconomical because of SRL, then TPN 6&7 could lose its primary source of cooling water.

***The final EIS must consider possible loss of treated wastewater as a cooling water source because SLR will impair site access and operability of the Southern Waste Water Treatment Facility.***

**Comment 7. The DEIS is incomplete in failing to consider a third source of cooling water if the primary and secondary sources are compromised by SLR, or to consider the consequences of that outcome for residents and businesses of Miami-Dade County –**

The DEIS does not consider the possibility of losing both sources of cooling water, or the consequences. As detailed above, the treated wastewater eventually will be lost because of water conservation or regional depopulation, both caused by sea level rise. While the timeframe of SLR is uncertain at this date, the first loss scenario is almost certain to happen before the TPN 6&7 would be ready for decommissioning, and the second one could occur within that time frame as well. The proposed backup source of cooling water, the radial collector wells (RCWs) could become compromised by entrainment of hypersaline water from under the cooling canals (IWF). So what happens if the reactors at TPN 6&7 lose both sources of cooling water? The plant would be forced to compete directly with residential and businesses for the remaining sources of fresh water. Ironically the DEIS notes a projected increase in residential demand for freshwater over the same time period.

***The final EIS must consider the possibility and the consequence of losing both proposed cooling water sources.***

**Comment 8. The DEIS is incomplete because it gives no context for evaluating the safety of the chemicals projected to be released. Nor does it show quantitative mapping of aerosol accumulation, though the data are probably available. Specifically, the DEIS does not list safe accumulation levels for the list of chemicals that will be released as aerosols, nor does it compare the projected levels to the safe accumulation levels –**

Cooling water will be evaporated in cooling towers with blowdown preventing escape of most aerosols. Nonetheless, some aerosols will escape the towers and blow out across Biscayne National Park and the coastal Everglades on the prevailing winds:

*“Small droplets of water (drift) and salt particles would be emitted from the cooling towers during operation. For the Turkey Point Units 6 and 7 combined drift rate from the circulating-water system and service-water system towers the expected maximum drift rate would be approximately 8 gpm (Table 3-6).”*

[DEIS p. 5-9]

The DEIS projects 4,207,680 gal/year aerosol drift, and a 4 year accumulation cycle. Dispersion models predict a non-uniform distribution of aerosols across the region, with greater accumulation near the plant. Thus, use of reclaimed wastewater will introduce myriad waste chemicals into the nearby reaches of Biscayne Bay and the Southeast Coastal Everglades. The DEIS gives no context for evaluating safety of the chemicals to be released. It lists projected amounts, but does not provide other key information. Absent are diagrams showing how fallout varies over the area. Likewise absent are safety data to evaluate the possible effects of chemicals that accumulate. What are the safe accumulation levels? While soluble chemicals like chloride might reach saturation after 4 years time, the same is not true for hydrocarbons and metals that bioaccumulate.

They may continue to concentrate in the ecosystem for longer, reaching greater concentrations over periods longer than four years.

***The final EIS must better estimate accumulation levels and better detail spatial distribution of listed wastewater chemicals released as aerosols and compare those levels to levels shown safe for aquatic organisms.***

**Comment 9. The DEIS is incomplete (a) in failing to consider a complete list of bioactive chemicals found in the wastewater stream, (b) in failing to identify the bioactivity class of all chemicals listed, and (c) in failing to address additive and synergistic effects of those chemicals on aquatic organisms in the adjacent Biscayne National Park –**

Ecotoxicology studies show that some pollutants act in tandem to produce greater effects than any single chemical does at its particular concentration. Compound action can be additive or synergistic (Crews et al. 2000). Chemicals in the same class of bioactivity often act in an additive manner, with effects proportional to the sum of the concentrations of multiple chemicals (Kortenkamp 2007). For other bioactive waste products, especially chemicals acting on different endocrine or biochemical pathways, the combined activity of multiple chemicals can be synergistic, with actions greater than the sum of the constituents (e.g., Vonier et al. 1996; Arukwe et al. 2001). Because of additive and synergistic effects, environmental consequences of exposure can only be estimated by knowing the entire constituency of chemicals released in treated wastewater, upon what body systems they act, and how they interact in the organism. The DEIS does not consider or present an exhaustive list of bioactive chemicals in the local wastewater stream, only those quantified by one prior study (Lietz and Meyer 2006). One example of a chemical missing from the DEIS is triclocarban (TCC), a chemical common to personal hygiene products, and likewise common in municipal wastewater (Lozano et al. 2013). While TCC has no endocrine action on its own, it acts synergistically to enhance action of androgens (Chen et al. 2008). Projected levels of TCC are not stated in DEIS. Triclosan is listed in the DEIS, but methyltriclosan, also common in wastewater, is omitted. Since triclosan and methyltriclosan will have additive effects, the omission of one of these necessarily results in underestimation of the likely effects of that chemical class on aquatic organisms. Lietz and Meyer (2006) did not pretend to be exhaustive in their analysis of wastewater chemicals, however the EIS must be exhaustive in order to give us an accurate picture of the possible hazards to the sensitive ecosystem surrounding the nuclear plant.

***The final EIS must consider additive and synergistic bioactivity of toxins and endocrine disrupters released as aerosols.***

**Comment 10. The DEIS is incomplete in that its analysis of alternate sites did not consider the economic impacts of transmission infrastructure necessitated by a new nuclear plant and it did not consider the disparate economic impact of that infrastructure on a county with a disproportionately minority and low income population –**

Miami-Dade County has a predominantly minority population and a higher number of people living in poverty (25.6%) than the statewide average (20.8%) (U.S. Census & American Community Survey). Economic effects of the entire TPN 6&7 project include

not just the plant itself, but also the attendant infrastructure, including new transmission lines. All components that can affect the County's tax base must be taken into economic consideration within the DEIS because they will affect the ability of the County to provide needed services countywide. The DEIS does consider the economic benefits to the County during construction, but not the countywide costs caused by infrastructure necessitated by the plant. Most of the economic benefits reported in the DEIS will accrue only during construction, but the economic costs will be permanent and recurring. Economic analysis by Dr. Richard Weisskoff, Chairman of the Economics Dept. at the University of Miami (2011) has projected that the transmission line infrastructure will cost the county's tax base by \$35 million annually (adjusted for change in real estate values since the study was done in 2010). FPL's analysis shows approximately 6500 temporary jobs will be added countywide during construction. However, Dr. Weisskoff's analysis, not mentioned in the DEIS, shows that 4000-8000 permanent jobs will be lost by routing supporting infrastructure (transmission lines) through areas of high economic activity. It should be noted that FPL engaged the property appraiser from Leon County, Florida to critique Dr. Weisskoff's analysis. That individual concluded that Dr. Weisskoff's valuation data were erroneous, however it appears the property appraiser did not understand that the Miami-Dade County Property Appraiser's valuation listings treat condominiums differently than other property types, combining values of land and structure in a single column of numbers rather than breaking them out separately. Thus the valuation discrepancy reported by the Leon County property appraiser appears to stem from his own misunderstanding of local property appraiser listings and not from any error in Dr. Weisskoff's data collection or analysis.

***The final EIS must evaluate disparate countywide impacts of site selection and attendant infrastructure on minorities and low-income residents of Miami-Dade County.***

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