FPL

L-2011-158
10 CFR 52.3

April 25, 2011

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Re: Florida Power & Light Company
Proposed Turkey Point Units 6 and 7
Docket Nos. 52-040 and 52-041
Response to NRC Environmental Request for Additional Information Letter 1103091 (RAI 5594) Environmental Standard Review Plan
Section 5.3.4 – Non-Radiological Health

Reference:

1. NRC Letter to FPL dated March 9, 2011, Environmental Request for Additional Information Letter 1103091 Related to ESRP Section 5.3.4, Non-Radiological Health, for the Combined License Application Review for Turkey Point Units 6 and 7

Florida Power & Light Company (FPL) provides, as an attachment to this letter, its response to the Nuclear Regulatory Commission's (NRC) Environmental Request for Additional Information (RAI) 5.8.1-1, 5.8.1-2, and 5.8.1-3 provided in the referenced letter. The attachment identifies changes that will be made in a future revision of the Turkey Point Units 6 and 7 Combined License Application (if applicable).

If you have any questions, or need additional information, please contact me at 561-691-7490.

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

Executed on April 25, 2011.

Sincerely,

William Maher
Senior Licensing Director – New Nuclear Projects

WDM/RFO

D097
NRO

Attachment 1: FPL Response to NRC RAI No. 5.8.1-1 (RAI 5594)
Attachment 2: FPL Response to NRC RAI No. 5.8.1-2 (RAI 5594)
Attachment 3: FPL Response to NRC RAI No. 5.8.1-3 (RAI 5594)

cc:
PTN 6 & 7 Project Manager, AP1000 Projects Branch 1, USNRC DNRL/NRO
Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Plant 3 & 4

NRC RAI Letter No. 1103091 Dated March 9, 2011

SRP Section: EIS 05.08.01 – Etiological Agents

Question from Environmental Technical Support Branch

NRC RAI Number: EIS 05.08.01-1 (RAI 5594)

Provide the results of analyses for the presence of etiological agents in cooling water (both reclaimed and from radial collector wells, and for both proposed and alternative sites). The ESRP notes that data should be obtained on etiological agents, including the enteric pathogens *Vibrio* spp. (a concern in saline waters), *Salmonella* spp., *Shigella* spp., and *Plesiomonas shigelloides*, as well as *Pseudomonas* spp., thermophilic fungi, noroviruses, and toxin-producing algae such as *Karenia brevis*. In addition, analyses for the presence of any unusually high concentrations of the normally present *Legionella* spp. (Legionnaires' disease bacteria) and the free-living amoebae of the genera *Naegleria*, *Acanthamoeba*, and *Cryptosporidium*, should be cited. Also, historical and recent algal blooms in the vicinity of the site should be discussed. While discharge into surface waters is not planned for this site, address potential health effects caused by etiological agents from the use of reclaimed water on drift and groundwater exposure.

FPL RESPONSE:

FPL has not conducted analyses for the presence of etiological agents in the proposed cooling water sources for Turkey Point Units 6 & 7. Water quality standards required by the Florida Department of Environmental Protection for reuse water quality are dictated by Chapter 62-610 of the Florida Administrative Code (FAC). These regulations dictate that reuse water for use in cooling towers have undergone secondary treatment and basic disinfection. In addition, the Total Suspended Solids (TSS) levels must be no more than 5.0 mg/L before application of the disinfectant. The reclaimed water to be received by FPL from the Miami-Dade County's South District Wastewater Treatment Plant (SDWWTP) will have been subjected to secondary treatment followed by high-level disinfection. The filtration and disinfection conducted at the SDWWTP will include chlorination. This high-level disinfection is expected to kill or destroy algae, bacteria and viruses that may be present in the effluent. Furthermore, once the reclaimed water is received at Turkey Point, it will further be treated to remove nutrients (e.g. Nitrogen and Phosphorus) and other constituents (e.g. silica). The water will be filtered and additional chlorine will then be added to the water before it enters the Project's cooling system. (Cooling Water Supply and Disposal Conceptual Design Report, March 2009)

An algal bloom in southern Biscayne Bay, south of Turkey Point, occurred from November 2005 for a period of approximately two years. The algal bloom began in Manatee Bay and Barnes Sound after Hurricane Katrina and spread north to Turkey Point by the summer of 2006. The algae consisted of marine blue-green algae, primarily genus *Synechocystis* and *Synechococcus,* and were not toxic. The algal bloom occurred from multiple causes including highway construction, hurricane activities, and an extremely high Total Phosphorus load

discharged from the C-111 Canal into the Bay. (Report on Algae Blooms in Eastern Florida Bay and Southern Biscayne Bay, July 28, 2006)

Due to the use of high-level disinfection and chlorination prior to being utilized for cooling, adverse health effects resulting from the use of reclaimed water for cooling is not expected. FPL will adhere to Florida Department of Environmental Protection requirements (Chapter 62-610.668, FAC) for the use of reclaimed water in cooling towers.

REFERENCES:

HDR, Inc. March 2009. Cooling Water Supply and Disposal Conceptual Design Report. Available at http://publicfiles.dep.state.fl.us/Siting/Outgoing/FPL_Turkey_Point/Units_6_7/Completeness/Plant_Associated_Facilities/2nd_round_Completeness/FPL_Response_Part_A_Information/Attached%20Reports/HDR%20Reports/Conceptual%20Design%20Report%20-%20March,%202009/HDR_6-~2.PDF, accessed April 21, 2011.

Rudnick, David, C. Madden, S. Kelly, R. Bennett, and K. Cunniff. July 28, 2006. Report on Algae Blooms in Eastern Florida Bay and Southern Biscayne Bay. Coastal Ecosystems Division, South Florida Water Management District.

ASSOCIATED COLA REVISIONS:

No COLA changes have been identified as a result of this response.

ASSOCIATED ENCLOSURES:

None

NRC RAI Letter No. 1103091 Dated March 9, 2011

SRP Section: EIS 05.08.01 – Etiological Agents

Question from Environmental Technical Support Branch

NRC RAI Number: EIS 05.08.01-2 (RAI 5594)

Provide a list of the outbreaks of waterborne diseases during the previous 10 years in the vicinity of the proposed and alternative sites.

FPL RESPONSE:

The Florida Department of Health's Food and Waterborne Disease Program is responsible for the surveillance, investigation, reporting, and prevention of food and waterborne diseases within the state. Each year, the program publishes an annual report that summarizes food and waterborne disease outbreaks (WBDOs) in the state. Annual reports dating back to 1997 are available on line at http://www.doh.state.fl.us/Environment/medicine/foodsurveillance/AnnualReports.htm.

Table 5.8-1 shows total number of WBDOs by organism and location (county) over the 2002-2009 period. Two organisms were implicated in 61.7 percent of the cases reported – the Norovirus (a virus that causes acute gastroenteritis) and Cryptosporidium (a parasitic protozoan). Giardia (a parasitic protozoan) was blamed for 55 cases (10.4 percent). *Legionella* (a gram-negative bacterial pathogen) was the cause of 33 cases (6.2 percent). An outbreak of "sea bather's eruption," dermatitis caused by exposure to *Linuche unguiculata* (larval thimble jellyfish), occurred in 2005, with 24 cases (4.5 percent) reported. Six cases (1.1 percent) were associated with Naegleria fowleri (a free-living amoebic parasite) and two cases (0.3 percent) were associated with Shigella. In 83 cases (15.7 percent), the cause of the outbreak was listed as "unknown." The vast majority of cases were associated with inadequate treatment, improper treatment, or temporary interruption of treatment of drinking water or recreational water (pools, recreational water slides, whirlpools). In some instances, swimmers were infected by pathogenic micro-organisms in freshwater lakes, presumably from human or animal waste contamination.

None of the cases was attributed to a heated (thermal effluent) or unheated (sanitary waste) discharge from a steam electric plant. Only one outbreak (10 Legionella cases in Dade County in 2009) occurred in one of the counties (i.e., Dade, Glades, Kissimmee, Martin, Okeechobee, and St. Lucie) within which the proposed and alternative sites would lie.

The Food and Waterborne Disease Program's annual reports prior to 2002 contained less specific information, such as not providing locations (counties) of outbreaks/cases. Therefore, this data has not been presented.

Table 5.8-1: Waterborne Disease Outbreaks in Florida, 2002-2009

Year	Total No. of Outbreaks in Florida and (No. of Associated Cases)[1]	Organism/ Vector	Location	No of Cases	Exposure Source	Notes
2002	11 (43)	Unknown	Hillsborough	43	Not described	
2003	3 (88)	Norovirus	Orange County	56	Public drinking water	
		Norovirus	Polk County	10	Freshwater lake	
		Norovirus	Polk County	22	Freshwater lake	
2004	1 (42)	Norovirus	Duval	42	Recreational water slide	
2005	3 (73)	Cryptosporidium	Duval	47	Recreational water	protozoan
		Legionella	Broward	2	Unknown	bacteria
		Linuche unguiculata (thimble jellyfish)	Nassau	24	Atlantic Ocean	Sea bather's eruption is dermatitis caused by hypersensitivity to larval jellyfish
2006	4 (119)	Cryptosporidium	Orange	3	Hotel swimming pool	protozoan
		Giardia	Orange	55	Swimming pool/waterfall	protozoan
		Legionella	Volusia	11	Whirlpool/ spa	bacteria
		Norovirus	Santa Rosa	50	Recreational swimming lake	
2007	9 (98)	Cryptosporidium	Collier	8	Condo swimming pool	protozoan
		Cryptosporidium	Indian River	38	"Interactive water fountain"	protozoan
		Cryptosporidium	Marion	3	Swimming pool	protozoan
		Cryptosporidium	Palm Beach	6	"water"	protozoan
		Naegleria fowleri	Orange	1	Lake water	
		Naegleria fowleri	Orange	1	Fresh water	

Year	Total No. of Outbreaks in Florida and (No. of Associated Cases)[1]	Organism/ Vector	Location	No of Cases	Exposure Source	Notes
		Naegleria fowleri	Osceola	1	Lake water exposure	
		Unknown	Palm Beach	38	Public drinking water	
		Unknown	Pasco	2	Recreational water exposure	
2008	4 (23)	Cryptosporidium	Sarasota	13	Pool	protozoan
		Legionella	Orange	5	Hot tub	bacteria
		Legionella	Orange	3	Hot tub	bacteria
		Shigella	Hillsborough	2	Freshwater	
2009	10 (44)	Cryptosporidium	Orange	8	Swimming pool	protozoan
		Cryptosporidium	Orange	6	Swimming pool	protozoan
		Cryptosporidium	Orange	5	"Multiple pools"	protozoan
		Cryptosporidium	Palm Beach	6	Recreational water, untreated	protozoan
		Cryptosporidium	Santa Rosa	4	Swimming pool	protozoan
		Legionella	Dade	10	Private water system	
		Legionella	Seminole	2	Shower heads	
		Naegleria fowleri	Nassau	1	Freshwater lake	
		Naegleria fowleri	Polk	1	Lake	
		Naegleria fowleri	Orange	1	Lake	

[1]Cases associated with waterborne chemicals/chemical contamination were not included.
Source(s): FlaDOH 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010.

This response is PLANT SPECIFIC.

REFERENCES:

FlaDOH (Florida Department of Health) 2003. Food and Waterborne Illness Surveillance and Investigation: Annual Report, Florida 2002. Division of Environmental Health, Bureau of Community Environmental Health, Tallahassee, FL.

FlaDOH (Florida Department of Health) 2004. Food and Waterborne Illness Surveillance and Investigation: Annual Report, Florida 2003. Division of Environmental Health, Bureau of Community Environmental Health, Tallahassee, FL.

FlaDOH (Florida Department of Health) 2005. Food and Waterborne Illness Surveillance and Investigation: Annual Report, Florida 2004. Division of Environmental Health, Bureau of Community Environmental Health, Tallahassee, FL.

FlaDOH (Florida Department of Health) 2006. Food and Waterborne Illness Surveillance and Investigation: Annual Report, Florida 2005. Division of Environmental Health, Bureau of Community Environmental Health, Tallahassee, FL.

FlaDOH (Florida Department of Health) 2007. Food and Waterborne Illness Surveillance and Investigation: Annual Report, Florida 2006. Division of Environmental Health, Bureau of Community Environmental Health, Tallahassee, FL.

FlaDOH (Florida Department of Health) 2008. Food and Waterborne Illness Surveillance and Investigation: Annual Report, Florida 2007. Division of Environmental Health, Bureau of Environmental Public Health Medicine, Tallahassee, FL.

FlaDOH (Florida Department of Health) 2009. Food and Waterborne Illness Surveillance and Investigation: Annual Report, Florida 2008. Division of Environmental Health, Bureau of Environmental Public Health Medicine, Tallahassee, FL.

FlaDOH (Florida Department of Health) 2010. Food and Waterborne Illness Surveillance and Investigation: Annual Report, Florida 2009. Division of Environmental Health, Bureau of Environmental Public Health Medicine, Tallahassee, FL.

ASSOCIATED COLA REVISIONS:

No COLA changes have been identified as a result of this response.

ASSOCIATED ENCLOSURES:

None

NRC RAI Letter No. 1103091 Dated March 9, 2011

SRP Section: EIS 05.08.01 – Etiological Agents

Question from Environmental Technical Support Branch

NRC RAI Number: EIS 05.08.01-3 (RAI 5594)

Given the presence of etiologic and chemical agents, including "emerging pollutants of concern" (EPOCs; also referred to as "emerging substances of concern" (ESOCs), "contaminants of emerging concern" (CECs), and "microconstituents"), in reclaimed water to be used in the cooling system, explain whether human health impacts may be anticipated from the use of the reclaimed water (e.g., from exposures such as inhalation of drift and ingestion of contaminated groundwater). This discussion may include an explanation of the extent to which such substances are (or are not) addressed under Florida's reclaimed water regulations (Florida Administrative Code 62-610, Part IV).

The Staff's environmental review evaluates human health impacts associated with the plant's cooling system. The proposed use of reclaimed water for cooling is noted in the ER as being in compliance with Florida Administrative Code 62-610, Part IV, but some FPL, state, and other documents highlight potential impacts due to EPOCs and other constituents – see:

- Work Order #1 – Task 1.4, Analysis of Baseline Water Source Tech Review Report for Property 6 & 7 (HDR for FPL, December 2007);
- Request for Additional Information, Project No. 0250003-0 13-AC (PSD-FL-409), Florida Power and Light, Turkey Point Plant, Cooling Tower Project to Support Proposed Units 6 and 7 (from Jeffery F. Koerner, Florida Department of Environmental Protection, to Randall R. LaBauve, FPL, July 20, 2009);
- Guidelines for Water Reuse, EPA/625/R-04/108 (U.S. EPA, September 2004).

Furthermore, ER Sec. 5.3.1 refers to criteria that would be used to determine when reclaimed water would not be of sufficient quality for use in the cooling system; please identify these criteria or provide a reference to where they are identified. The December 15, 2010 FPL letter, Part 2 of 2, states that a *Reclaimed Water Reliability Study* will be available for inspection in the Reading Room when completed; please indicate whether this study will address human health and/or ecological risk-based criteria.

FPL RESPONSE:

The "emerging substances of concern (ESOCs)" are chemicals such as pharmaceuticals, components of personal care products, some per- and poly-fluorinated compounds, and nanoparticles among other classes of chemicals. Concentrations of these microconstituents in sewage effluents are generally small. During treatment these small concentrations are further decreased during aerobic and anaerobic treatment by microbial degradation and oxidation by the disinfection. Most of the residuals of these compounds and their degradation products will be adsorbed into biosolids that are removed in sludge. Concentrations of these

microconstituents in the reclaimed water from Miami-Dade County WWTP are expected to be orders of magnitude less than concentrations that are needed for a therapeutic or pharmaceutical dose and, therefore, are not anticipated to be associated with any human health issues. (FDEP, December 2008)The concentrations of these constituents in effluents are normally much less than the thresholds for any adverse effects from oral, dermal and inhalation pathways. For instance, concentrations of pharmaceuticals are much less than therapeutic doses. Since people will not be drinking the effluent directly, the primary vector of exposure would be through dermal and inhalation. Most of the ESOCs that have been identified are water soluble so they would not be absorbed through dermal contact. The concentrations to which people could be exposed through inhalation would be much smaller than those that would be accumulated orally and thus even less of a concern than the oral exposure route.

While concentrations of these ESOCs are small in effluents, their concentrations will be further reduced by dissipation once they are released into the environment. They will be greatly diluted by receiving waters into which they could be deposited. Furthermore, many of these compounds can be further degraded in the environment by biotic and abiotic mechanisms. For instance, some of the compounds will be hydrolyzed while others will be microbially degraded and also subjected to photolysis due to exposure to solar radiation. The fact is that the concentrations, while low in the effluent received from Miami-Dade County WWTP, will be further decreased once in the environment and also diluted to concentrations that would pose no risk to human health. Finally, the water used in the cooling towers will be subjected to additional secondary treatment in the FPL reclaimed water treatment facility prior to being used as cooling water which will reduce the concentrations of microconstituents to concentrations that will further decrease the potential for adverse effects. These processes will remove more of the small amount of residual contaminants that would be present in the treated effluent received from the Miami-Dade County WWTP.

Reclaimed water of the type proposed to be used in the cooling system will be of quality similar to, or better than, reclaimed water already used for many purposes. For instance water of this quality has been used to water lawns and golf courses with no reported adverse effects from human contact with irrigated turf or from inhalation of vapor mists from sprinkler systems. FPL's reclaimed water treatment facility will provide an additional level of treatment beyond what is required by Florida Administrative Code 62-610, Part III for use in the irrigation of areas that are intended to be accessible to the public.

Based on the predicted small concentrations of ESOCs in the reclaimed water received from the Miami-Dade County WWTP, and even smaller amounts to which humans and wildlife may be exposed due to additional secondary treatment and degradation in the environment, the risk to human health as well as wildlife will be negligible.

The reclaimed water to be received by FPL from the Miami-Dade County's South District Wastewater Treatment Plant (SDWWTP) will have been subjected to secondary treatment

followed by high-level disinfection, as stipulated in Chapter 62-600.420 and -440 of the Florida Administrative Code (FAC). The filtration and disinfection conducted at the SDWWTP will include chlorination. This high-level disinfection is expected to kill or destroy algae, bacteria and viruses that may be present in the effluent. Furthermore, once the reclaimed water is received at Turkey Point, it will further be treated to remove nutrients (e.g. Nitrogen and Phosphorus) and other constituents (e.g. silica). The water will be filtered and additional chlorine will then be added to the water before it enters the circulating water system.

In the event the SDWWTP is unable to provide reclaimed water that is of sufficient quality for use, that is the water does not meet the appropriate regulatory criteria for secondary treatment and disinfection, an alternate source (radial collector wells) would be utilized.

The *Reclaimed Water Reliability Study* will not address human health and/or ecological risk based criteria.

REFERENCES:

Florida Department of Environmental Protection (FDEP) December 2008. Emerging Substances of Concern, Division of Environmental Assessment and Restoration, Tallahassee, Florida.

ASSOCIATED COLA REVISIONS:

No COLA changes have been identified as a result of this response.

ASSOCIATED ENCLOSURES:

None