

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD PANEL

Before the Licensing Board:

E. Roy Hawkens, Chair
Dr. Michael F. Kennedy
Dr. William C. Burnett

In the Matter of)
)
Florida Power & Light Company) Docket Nos. 52-040 and 52-041
)
Turkey Point,) ASLBP No. 10-903-02-COL-BD01
Units 6 and 7)
_____)

**JOINT INTERVENORS' RESPONSE TO WRITTEN STATEMENTS OF POSITION
ON NEPA CONTENTION 2.1 (INADEQUATE EVALUATION OF
GROUNDWATER IMPACTS)**

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Pursuant to 10 C.F.R § 2.1207(a)(2) and the Atomic Safety and Licensing Board's ("the Board" or "ASLB") October 5, 2016 Memorandum and Order (Prehearing Conference Call Summary, Case Management Directives, and Scheduling Order) and November 22, 2016 Order (Amending the Final Scheduling Order), Southern Alliance for Clean Energy, National Parks Conservation Association, Dan Kipnis, and Mark Oncavage (collectively "Joint Intervenors") hereby submit their written Response Statement of Position and Pre-filed Rebuttal Testimony of Mark A. Quarles Regarding Joint Intervenors' Contention 2.1 ("Quarles Rebuttal Testimony"). This Response Statement of Position answers NRC Staff Initial Statement of Position (Mar. 1, 2017) ("Staff Position Statement") and Florida Power & Light, Co.'s Initial Statement of Position in the Contested Hearing for Contention 2.1 (Mar. 1, 2017) ("FPL Position Statement").

I. INTRODUCTION

In its Final Environmental Impact Statement (“FEIS”) for the proposed Turkey Point Units 6 and 7 nuclear power plant (**Exhibit NRC-008**) the U.S. Nuclear Regulatory Commission Staff (“Staff” or “NRC”) maintained that injected wastewater is “extremely unlikely” to migrate upwards into the drinking water aquifer; and, if it does reach the drinking water aquifer, the environmental impact would be “SMALL.”¹ Joint Intervenors, in Contention 2.1, assert that the FEIS lacks a valid technical basis for these claims. Pollution of drinking water supplies in Florida by wastewater injection is a serious and urgent concern and deserves the full “hard look” required by the National Environmental Policy Act (“NEPA”).

In its Staff Position Statement and testimony, the NRC Staff now presents a new argument: that it does not matter whether municipal wastewater, used to cool the proposed Turkey Point reactors and then injected into the Boulder Zone beneath the site, will migrate vertically into the drinking water aquifer that lies above, because a new high-level disinfection process, installed at the Miami-Dade South District Wastewater Treatment Plant (“South District Plant”) in 2013, will reduce contaminants to safe levels. But the NRC Staff’s reliance on the new treatment process is misplaced. The new process was designed to remove pathogens such as *Cryptosporidium* and *Giardia*, not volatile organic compounds (“VOCs”) and semi-volatile organic compounds (“SVOCs”) like the contaminants at issue in Contention 2.1.² While measured concentrations of these compounds may have declined since the system was installed, this happenstance cannot be relied upon.³ Indeed, the U.S. Environmental Protection Agency

¹ FEIS at 5-26.

² Quarles Rebuttal Testimony, A16.

³ Quarles Rebuttal Testimony, A18.

(“EPA”) approved the use of the new process only for the specific purpose of pathogen removal – it expressly states that the treatment may not remove a “large variety of contaminants” and cannot be relied on to do so.⁴

Because the NRC Staff cannot reasonably rely on the improved wastewater treatment to argue that impacts of injecting wastewater will be small, Joint Intervenors’ concerns about the potential upward migration of the injected wastewater into a drinking water aquifer remain significant. They also remain unresolved. Both the NRC Staff and Florida Power & Light Co. (“FPL”) continue to claim, without justification, that a single exploratory well provides enough information to conclude that upward migration of wastewater is “extremely unlikely.” They offer no convincing reasons to have failed to use the highly-effective and reasonably available technology of seismic-reflection to assess the hydrogeology of the Turkey Point site. And their promise to collect more data about the hydrogeology of the site after the NRC issues a license for Turkey Point Units 6 & 7 flies in the face of NEPA’s requirement to consider environmental impacts *before* federal action is taken.⁵ The FEIS’s conclusions regarding upward migration and the connected impacts are unsupportable, and the proposal to inject wastewater into the Turkey Point site continues to be environmental folly.

⁴ Quarles Rebuttal Testimony, A16 – A17.

⁵ *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349 (1989) (“NEPA ensures that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast.”).

II. LEGAL ISSUES REMAINING IN CONTROVERSY

For the same reasons discussed in Joint Intervenors' Initial Position Statement, the FEIS for the proposed Turkey Point reactors is inadequate to satisfy NEPA's "hard look" standard.⁶ In short, the NRC has failed to provide a reasonable amount of scientific support for the conclusions in the FEIS that (1) upward migration is "extremely unlikely" to occur from the underground injection of wastewater at the Turkey Point site, and that (2) the environmental impacts of the upward migration of injected wastewater containing tetrachloroethylene, ethylbenzene, heptachlor, and toluene ("constituents") will be "SMALL." The testimony submitted by FPL and the NRC Staff fails to resolve these deficiencies.

In its testimony, the NRC Staff adds a new argument not presented in the FEIS – that the recent addition of a high-level disinfection treatment of the wastewater at the South District Plant, instituted in accordance with EPA's 2005 regulation for removal of pathogens from underground injectate in Florida (the "EPA UIC Rule"),⁷ will further reduce the concentration of constituents, such that the injection of the constituents will not endanger Underground Sources of Drinking Water ("USDWs") even if upward migration occurs.⁸ But the NRC Staff's reliance on

⁶ *La. Energy Servs., L.P. (Claiborne Enrichment Center)*, CLI-98-3, 47 N.R.C. 77, 87 (1998). *See also Lands Council v. Powell*, 395 F.3d 1019, 1027 (9th Cir. 2005) ("Congress wanted each federal agency spearheading a major federal project to put on the table, for the deciding agency's and for the public's view, a sufficiently detailed statement of environmental impacts and alternatives so as to permit informed decision making. The purpose of NEPA is to require disclosure of relevant environmental considerations that were given a 'hard look' by the agency, and thereby to permit informed public comment on the proposed action and any choices or alternatives that might be pursued with less environmental harm").

⁷ Notice of Final Rule, Underground Injection Control Programs – Revision to the Federal Underground Injection Control Requirements for Class I Municipal Disposal Wells in Florida, 70 Fed. Reg. 70,513, 70,526 (Nov. 22, 2005) (**Exhibit NRC-021**) (hereinafter "UIC Rulemaking Notice").

⁸ *See Quarles Rebuttal Testimony*, A16.

the EPA UIC Rule is misplaced, because the high-level disinfection process implemented at the South District Plant in 2013 is not designed to remove any contaminants other than pathogens, such as *Cryptosporidium* and *Giardia*.⁹ As EPA acknowledged, “a large variety of contaminants, . . . that may be present in municipal wastewater, may not be removed” by this process.¹⁰

Tetrachloroethylene, heptachlor, ethylbenzene, and toluene are indicator constituents of chemicals commonly associated with industrial or agricultural wastewater streams that are discharged into the sewerage system prior to reaching the treatment plant. The mere presence of these and other similar indicator constituents in the municipal wastewater effluent reported in the FEIS after primary and secondary treatment demonstrates that the South District Plant is ineffective at removing all such constituents from the wastewater.¹¹ Thus, the high-level disinfection treatment is not a substitute for adequate analysis of the hydrogeology of Turkey Point and its potential for containing injected wastewater.

Both the NRC Staff and FPL also continue to rely on tests from a single borehole on the Turkey Point site for their assertion that injectate is “extremely unlikely” to migrate vertically into an USDW. As Mr. Quarles testifies, however, a single borehole does not provide an adequate basis to confirm or deny the presence of an adequate bedrock confining layer or layers.¹² His expert opinion is supported by the EPA’s conclusion that any confinement model for South Florida should include extensive input parameters, specifically “information on the location and extent of fissures, cracks, voids, and channels.”¹³

⁹ Quarles Rebuttal Testimony, A16.

¹⁰ UIC Rulemaking Notice, 70 Fed. Reg. at 70,525. *See also* Quarles Rebuttal Testimony, A16.

¹¹ Quarles Rebuttal Testimony, A18.

¹² *Id.*, A4.

¹³ *Id.*, A15 (citing UIC Rulemaking Notice, 70 Fed. Reg. at 70,526).

As demonstrated by the Cunningham reports, seismic reflection technology provides the most comprehensive set of data available to attempt to explain how and why wastewater has migrated through layers of bedrock that previously were thought to be “confining layers” that prevented upward migration.¹⁴ Contrary to FPL’s assertion,¹⁵ seismic reflection investigation would provide useful information regarding the hydrogeology of the Turkey Point site.¹⁶ But FPL and the NRC Staff have failed to use that technology in conjunction with borehole testing, and they have refused to justify their failure to do so.¹⁷ A seismic analysis would provide FPL and the NRC Staff with useful information about the existence of natural features that can allow upward migration of wastewater. That information could be used by FPL to pre-locate specific boring and well locations in order to confirm or deny the presence of the natural features identified by the seismic analysis. A seismic analysis would also help FPL to optimize the placement of dual-zone monitoring wells and injection wells.¹⁸

By failing to use seismic-reflection analysis and data in analyzing the likelihood of upward migration, the NRC Staff violates NEPA’s requirement to use “the best available scientific information” in its environmental analyses.¹⁹ “NEPA law requires research whenever the information is ‘significant.’ As long as the information is ‘important,’ ‘significant,’ or ‘essential,’ it must be provided when the costs are not exorbitant in light of the size of the project and/or the possible harm to the environment.”²⁰ Because Mr. Quarles has shown that seismic

¹⁴ Quarles Rebuttal Testimony, A5.

¹⁵ Maliva Testimony, ¶ 74.

¹⁶ Quarles Rebuttal Testimony, A8.

¹⁷ *Id.*, A4 and A5.

¹⁸ *Id.*, A6.

¹⁹ *Colorado Environmental Coalition v. Dombeck*, 185 F.3d 1162, 1171-72 (10th Cir. 1999).

²⁰ *Save Our Ecosystems v. Clark*, 747 F.2d 1240, 1249, 1244 n.5 (9th Cir. 1984).

reflection testing would provide the best available scientific information and is a reasonable and feasible method, the NRC cannot claim it took a “hard look” at the potential for upward migration of injectate at the Turkey Point site.

The NRC Staff effectively concedes the inadequacy of its existing analysis by relying on FPL’s plans to collect more hydrogeological data from the twelve injection wells that will be installed after the Turkey Point license is issued. According to the Staff, “data from all 12 injection wells must show that the Middle Confining Unit offers confinement of injected fluids in order to be issued a UIC program permit by the FDEP.”²¹ In making this assertion, the Staff overlooks NEPA’s cardinal requirement that environmental impacts must be considered *before* federal action is taken, not afterwards.²²

In asserting that the environmental impact would be “SMALL” if the injected wastewater were to migrate into an USDW due to the concentration of the constituents, the NRC again fails to take the “hard look” required by NEPA. Part of taking a hard look is the requirement to provide “a candid acknowledgment of the risks that . . . impacts entail.”²³ The NRC Staff and FPL have not been candid about the potentially significant risks of the constituents should they migrate into an USDW. Instead, the Staff and FPL rely on the notion that the constituents only must be below the EPA Maximum Contaminant Level (“MCL”) for their impacts to be small.²⁴ The MCL, however, is not necessarily the proper benchmark for the purposes of NEPA review.

²¹ NRC Staff Initial Position Statement at 31.

²² *Robertson*, 490 U.S. at 349 (1989).

²³ *Nat'l Audubon Soc'y v. Dep't of Navy*, 422 F.3d 174, 185 (4th Cir. 2005) (citing *Robertson*, 490 U.S. at 350 (stating that NEPA requires environmental costs to be “adequately identified and evaluated”)).

²⁴ NRC Initial Position Statement at 22.

While the MCL may be the legally enforceable drinking water limit, it is set through a process that takes into account more information than simply the impact that the level of contaminant would have on public health, and therefore the environment; in particular, it takes into account issues of cost and technical feasibility.²⁵ The concerns of NEPA are not so narrowly circumscribed, and courts have refused to conclude that NEPA's requirements are limited by the requirements of other legal standards.²⁶ Instead, NEPA requires an agency to take a "hard look" at *environmental* consequences of its actions. Because the MCL is established based on inputs other than simply the environmental impact to drinking water, using the MCL as a benchmark from which to measure environmental impacts is not congruous with NEPA's purposes.

A more appropriate benchmark for impact of the contaminants is EPA's maximum contaminant level goal ("MCLG"), because it only considers how high the concentration of a contaminant needs to be before that contaminant will impact a population.²⁷ EPA sets the MCLG at zero for carcinogens if there is evidence that a chemical may cause cancer or if there is no dose below which the chemical is considered safe.²⁸ Two of the constituents (heptachlor and tetrachloroethylene) have concentrations above the EPA's zero MCLG. At levels above zero, these chemical constituents pose significant health risks, particularly to sensitive individuals, including the sick, the elderly, and infants. Therefore, the NRC cannot reasonably assert that the

²⁵ Quarles Rebuttal Testimony, A20.

²⁶ *Limerick Ecology Action v. NRC*, 869 F.2d 719, 729 (3rd Cir. 1989) (finding that it was *incorrect* to claim that "NEPA could not logically require more than the safety provisions of the Atomic Energy Act.").

²⁷ Quarles Rebuttal Testimony, A20 (defining MCLG as "the level [of a contaminant] at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.").

environmental impacts of the injected wastewater entering the drinking water will be “SMALL.”

Moreover, even if the MCL (and not the MCLG) were the appropriate benchmark for determining that an environmental impact would be SMALL under NEPA, NRC still could not reasonably conclude that the impacts of the constituents are small because the FEIS reports an exceedance of the MCL. As Mr. Quarles points out, the tetrachloroethylene level reported in Table 3-5 exceeds Florida Department of Environmental Protection’s MCL.²⁹

Accordingly, the FEIS for the proposed Turkey Point 6 & 7 reactors fails to satisfy NEPA’s requirement for a “hard look” at environmental impacts, because its finding of insignificant impacts of injected wastewater at the site is not based on a sound scientific analysis of the hydrogeology of the site and because it understates the potential environmental impacts of the injected wastewater.

III. SUMMARY OF KEY POINTS TO BE MADE IN THE REBUTTAL TESTIMONY

As discussed in A3 of his rebuttal testimony, Mr. Quarles continues to hold the opinion that the NRC has failed to provide a reasonable amount of technical support for the conclusions in the FEIS that (1) upward migration is “extremely unlikely” to occur from the underground injection of wastewater at the Turkey Point site, and that (2) the environmental impacts of the upward migration of injected wastewater containing tetrachloroethylene, ethylbenzene, heptachlor, and toluene (“constituents”) will be “SMALL.” Pre-filed testimony submitted by the NRC Staff and FPL witnesses do not alter his conclusions regarding the inadequacy of the FEIS.³⁰

²⁹ Quarles Rebuttal Testimony, A20.

³⁰ The Atomic Safety and Licensing Board (“ASLB”) should summarily reject FPL’s inappropriate and misleading attempt to impugn Mr. Quarles competence and integrity by

A. Upward Migration of Wastewater Containing Contaminants

Testimony by FPL and the NRC has not resolved the four key problems raised by Mr. Quarles with the NRC's analytical approach and conclusions regarding the potential for vertical migration of injected wastewater into an USDW.³¹

First, while the FEIS claims it can draw conclusions about the Turkey Point site by comparing it to "hydrogeological conditions and parameters at the sites at which upwelling occurred,"³² the NRC did not obtain nearly enough information about the specific characteristics of the Turkey Point site to make such comparisons. The NRC Staff and FPL continue to rely on testing of a single borehole for their deep bedrock characterization of the Turkey Point site: Exploratory Well 1 ("EW-1"). They refer to no additional data about the geological characteristics of the Turkey Point site.³³

While FPL witness Dr. Maliva may be correct that a single exploratory well was the norm for investigating the geology of injection well sites in Florida in the past, Cunningham noted an "immediate need" for the additional information that would be yielded by seismic

asserting that "the accuracy of Mr. Quarles' sworn statements have been called into question in the past." FPL Position Statement at 22 n.107 (citing *Chevron Corp. v. Donziger*, 833 F.3d 74, 96 (2d Cir. 2016)). In *Chevron*, neither the appellate court nor the district court below credited accusations by Chevron against Mr. Quarles. In fact, the district court explicitly found that while Mr. Quarles was pressured to falsify an affidavit by attorney Donziger, he had done no such thing. *Chevron Corp. v. Donziger*, 974 F.Supp.2d 362, 439 (S.D.N.Y. 2014) ("Quarles was not prepared to go as far as Donziger wished, either because he knew that Donziger's assertions were false or because he knew that he lacked personal knowledge sufficient to justify him in saying what Donziger proposed."). FPL's innuendo that *Chevron* gives the ASLB some cause for mistrusting Mr. Quarles' testimony is utterly baseless.

³¹ Quarles Testimony, A4 and A11-A13.

³² FEIS 5-21.

³³ Quarles Rebuttal Testimony, A4.

reflection studies, for the very reason that long-accepted methods had not proven to be reliable.³⁴ Cunningham's reports show that seismic reflection technology is useful for sites like Turkey Point – and that the methods used in the past are outdated and perhaps not cost-effective.³⁵ A single borehole does not provide an adequate basis to confirm or deny the presence of an adequate bedrock confining layer or layers, or provide enough information to adequately characterize the entire Turkey Point site.³⁶

FPL asserts it will do further investigations of the site hydrogeology at Turkey Point when it drills its injection wells. However, a promise to gather data in the future is no substitute for having adequate data when it is needed, *i.e.*, for the environmental analysis in the FEIS.³⁷ Additionally, boreholes by themselves provide inadequate geologic information. As FPL witness Dr. Maliva concluded in his testimony, even 100 exploratory wells would be incapable of locating discrete natural pathways such as faults.³⁸

Instead of relying solely on boreholes, FPL should have used the reasonable and feasible technique of seismic stratigraphy (*i.e.*, seismic-reflection investigations) to investigate the potential for vertical flow through geologic pathways on the Turkey Point site.³⁹ Cunningham's use of seismic technologies, coupled with traditional down-hole drilling and sampling methods (e.g. drill cutting, core samples, porosity tests, and packer tests), provides the most comprehensive data set available to attempt to explain how and why wastewater has migrated

³⁴ Quarles Rebuttal Testimony, A5.

³⁵ *Id.*, A6.

³⁶ *Id.*, A4.

³⁷ *Id.*, A10.

³⁸ *Id.*, A9 (citing Maliva Testimony, ¶20).

³⁹ *Id.*, A4.

through layers of bedrock that previously were thought to be “confining layers” that prevented upward migration.⁴⁰ Contrary to FPL’s assertion, other studies have not ruled out geologic pathways such as faults and karst collapse.⁴¹

The Cunningham reports show that seismic-reflection reports are useful in determining site conditions that might explain leakage of wastewater into USDWs and can be used to evaluate whether leakage could occur at specific sites like Turkey Point.⁴² His work certainly supports the usefulness of performing such a detailed investigation at the Miami-Dade South District and North District Wastewater Treatment Plants. And, by the same token, it supports the usefulness of seismic technologies at Turkey Point.⁴³

Second, the broad generalizations in the FEIS regarding the “low-permeability” of the “confining unit” in South Florida are contradicted by numerous instances of vertical intrusions of contaminated wastewater.⁴⁴ Time and again, unexpected vertical intrusions of contaminated water into the drinking water supply in South Florida have proved the FEIS’s generalization to be dead wrong.⁴⁵ A 2007 report authored by FPL witness Dr. Maliva himself demonstrated that bedrock and aquifer data beneath deep well injection sites may not be determinative on the questions of whether a confining layer actually exists and, if leakage does occur, how quickly that leakage can migrate.⁴⁶ Additionally, the EPA has recognized that bedrock conditions in

⁴⁰ *Id.*, A5.

⁴¹ *Id.*, A7.

⁴² *Id.*

⁴³ *Id.*, A6.

⁴⁴ *Id.*, A11.

⁴⁵ *Id.*

⁴⁶ *Id.* (citing Robert G. Maliva *et al.*, *Vertical Migration of Municipal Wastewater in Deep Injection Well Systems, South Florida, USA*, at 2 (2007) (hereinafter “Maliva 2007”) (**Exhibit INT-014**)).

South Florida have allowed unintended vertical migration of wastewater.⁴⁷ In fact, the EPA decided that in South Florida, a UIC permit can no longer be completely justified based on the rationale that injected wastewater will not migrate from its intended geologic formation, *i.e.*, the “no fluid-movement” rationale.⁴⁸

Third, the FEIS incorrectly minimizes the significance of known instances of upward migration of contaminated wastewater in the area of the Turkey Point site. Both the EPA and NRC have acknowledged instances of unintended upward migration of injected wastewater into USDWs.⁴⁹ An USDW must be protected under the Safe Drinking Water Act as a potential future potable water supply.⁵⁰

Finally, the FEIS incorrectly attributes the known instances of vertical migration of contaminated wastewater to faulty wells, rather than geologic conduits such as faults and collapsed karst structures. FPL witness Dr. Maliva also claims that the “prevailing opinion” about the cause of upward movement of wastewater at the South District Plant is that it was due to the use of obsolete procedures for well construction.⁵¹ But Dr. Maliva provides no proof for his assertion that the “upwards movement of wastewater that has occurred at the South District Plant is likely not due to migration through the confining unit” but instead “likely due to well construction issues rather than hydrogeological issues (e.g. breaches in the confining layer).”⁵² Dr. Maliva’s assertion is also contradicted by his own research, in which he observed that “well

⁴⁷ *Id.*

⁴⁸ *Id.* (citing UIC Rulemaking Notice, 70 Fed. Reg. at 70,515).

⁴⁹ *Id.*, A12.

⁵⁰ *Id.*

⁵¹ *Id.*, A13 (quoting Maliva Testimony, ¶¶ 57-58).

⁵² *Id.*, A13 (quoting Maliva Testimony, ¶ 57).

construction problems as a cause for vertical fluid migration *have not yet been conclusively confirmed at any injection well site.*⁵³ Dr. Maliva has not identified any subsequent research results conclusively tying upward migration to well construction problems.⁵⁴

B. Adverse Impacts to Drinking Water Supply

In his initial testimony, Mr. Quarles also challenged the FEIS' failure to support its assertion that if injectate migrates into the drinking water supply, its environmental impacts will be "SMALL."⁵⁵

NRC Staff witnesses now assert that the recent addition of high-level disinfection in the treatment of the wastewater at the South District Plant, in compliance with state and federal UIC requirements, would "provide an effluent quality that would not endanger Underground Sources of Drinking Water."⁵⁶ However, the high-level disinfection process is not designed to remove contaminants such as VOCs and SVOCs (*i.e.*, the Contention 2.1 constituents), but only designed to remove pathogens.⁵⁷ When promulgating the high-level disinfection rule, EPA recognized that other contaminants may be present in wastewater, but did not vouch for the high-level disinfection process for any purpose other than removal of pathogens.⁵⁸ While the NRC Staff witnesses point out that measurements of the constituents, taken since the high-level disinfection equipment was installed at the South District Plant, are now below detection limits, the fact that the high-level disinfection process may work by happenstance on occasion to remove VOCs and

⁵³ *Id.* (citing Maliva 2007 at 9).

⁵⁴ *Id.*, A13.

⁵⁵ Quarles Testimony, A19-32.

⁵⁶ NRC Staff Testimony, A20 (quoting UIC Rulemaking Notice, 70 Fed. Reg. at 70,523).

⁵⁷ Quarles Rebuttal Testimony, A16 - A18.

⁵⁸ *Id.*, A16 and A17.

SVOCs does not establish its consistent effectiveness.⁵⁹

Instead of relying on high-level disinfection, EPA relies on other, existing mechanisms for the removal of these contaminants.⁶⁰ The presence of VOCs and SVOCs in the South District Plant's wastewater discharge in the past shows that these traditional wastewater treatment processes and industrial pre-treatment programs are not always effective in eliminating such contaminants from the treated wastewater effluent that would be discharged to Turkey Point.⁶¹

The purpose of designating aquifers as USDWs is to ensure that they are protected for both present *and* future uses.⁶² FPL's and NRC Staff's witness statements related to drinking water wells being too far away to be affected or too saline to be used for drinking water without treatment therefore are short sighted and inconsistent with the federal Safe Drinking Water Act. As defined in federal Safe Drinking Water Act regulations, an USDW includes not just current sources of drinking water, but aquifers containing "a sufficient quantity of ground water to supply a public water system," if they contain fewer than 10,000 mg/L total dissolved solids.⁶³ Given the high and expanding population of Florida, and given the limited supply of fresh water (and particularly the shallowness of the Biscayne Aquifer used in Southeast Florida), any aquifer with the potential to provide drinking water should be protected.⁶⁴

Mr. Quarles agrees with the NRC Staff that the Maximum Contaminant Level (MCL) is a good benchmark, as the NRC Staff testifies.⁶⁵ In that context, it is important to note that the

⁵⁹ *Id.*, A18.

⁶⁰ *Id.*, A17 and A18.

⁶¹ *Id.*, A17.

⁶² *Id.*, A19.

⁶³ 40 C.F.R. § 144.3(a)(2)(ii).

⁶⁴ Quarles Rebuttal Testimony, A19.

⁶⁵ *Id.*, A20.

tetrachloroethylene level reported in Table 3-5 of the FEIS (0.00359 mg/L) exceeds the Florida Department of Environmental Protection's (FDEP's) MCL of 0.003 mg/L.⁶⁶ Although Dr. Teaf states that the measured value of 0.00359 mg/L is "well below the federal safe drinking water standard" and "only a few ten thousandths of a mg/L above the state drinking water concentration,"⁶⁷ this exceedance of the Florida MCL indicates potentially significant impacts, because it exceeds the FDEP drinking water standard.⁶⁸

In any event, the MCL is not the only standard that should be used, because it is not based purely on public health.⁶⁹ As EPA explains, MCLs are derived from Maximum Contaminant Level Goals (MCLGs), "the level at which no known or anticipated adverse effect on the health of persons occur and which allow an adequate margin of safety."⁷⁰ MCLs, in contrast, are "enforceable standard which the [Safe Drinking Water] Act directs EPA to set as close to the MCLGs as feasible."⁷¹ The EPA explains that the term "feasible" means: "feasible with the use of the best technology, treatment techniques, or other means which the Administrator finds available (taking costs into consideration) after examination for efficacy under field conditions and not solely under laboratory conditions."⁷²

Mr. Quarles disputes FPL's assertion that upward migration of injected fluids will be

⁶⁶ *Id.* (citing Teaf Testimony, ¶ 29).

⁶⁷ *Id.*

⁶⁸ *Id.*

⁶⁹ *Id.*

⁷⁰ *Id.* (citing Notice of Final Rule, National Primary Drinking Water Regulations; Synthetic Organic Chemicals; Monitoring for Unregulated Contaminants, 52 Fed. Reg. 25,690-91 (July 8, 1987). (A copy is attached to Mr. Quarles' testimony as **Exhibit INT-021.**)

⁷¹ *Id.*

⁷² *Id.*

detected before drinking water is impacted, in two key respects.⁷³ First, FPL does not identify, nor is he aware of, any provision in FPL's groundwater monitoring program or the State's UIC program for testing of FPL's wastewater discharge for the four VOC and SVOC constituents of concern in Contention 2.1. The NPDES Permit for the South District Plant contains no monitoring requirements for ethylbenzene, heptachlor, tetrachloroethylene, and toluene. Nor does FPL represent that these constituents will be tested for under the UIC permit prior to injection at Turkey Point. FPL does not go further than to generally say that leaks of the injectate will be monitored for and detected.⁷⁴

Second, FPL's own groundwater monitoring system is likely unable to detect upward migration in time because (1) sampling will not be frequent enough due to the possibility of a rapid rate of migration and (2) the constituents may migrate horizontally before they migrate upward.⁷⁵ Upward migration of wastewater along vertical pathways can occur in a matter of days, much more quickly than could be detected by FPL's sampling frequencies. Discrete vertical migration of wastewater can also bypass shallower monitoring wells through discrete vertical fractures in the upper-lying bedrock.

Mr. Quarles' opinion is supported by the EPA, which stated in the EPA UIC Rule that "existing monitoring programs are not sufficient to protect against movement of contaminants into USDWs, nor do they provide sufficient early warning of contamination."⁷⁶ As EPA further explained:

[G]roundwater monitoring wells at most deep well facilities in Florida are only intended

⁷³ *Id.*, A22.

⁷⁴ *Id.* (citing McNabb Testimony, ¶¶ 44-47).

⁷⁵ *Id.*

⁷⁶ *Id.* (citing UIC Rulemaking Notice, 70 Fed. Reg. at 70,526).

to provide some initial indication of fluid movement and are not capable of characterizing the full areal extent of fluid movement, especially where natural conduits for flow are present. Moreover, once any contamination is detected, it may be too late to prevent endangerment.⁷⁷

Thus, FPL has no basis for asserting that the environmental impacts of heptachlor, ethylbenzene, toluene, or tetrachloroethylene will be insignificant because they will be detected and mitigated in a timely and effective way.

IV. CONCLUSION

For the foregoing reasons, the ASLB should find that the FEIS for the Turkey Point COL is inadequate to comply with NEPA or to justify the licensing of Turkey Point Units 6 and 7.

Respectfully submitted this 23rd day of March, 2017.

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⁷⁷ *Id.*