

In the Matter of	)	
	)	Docket Nos. 52-040-COL
Florida Power & Light Co.	)	52-041-COL
Turkey Point Units 6 & 7	)	
	)	
Combined Construction and License	)	
Application	)	
_____	)	

**AFFIDAVIT OF DR. JEAN-PIERRE BARDET**

I, Dr. Jean-Pierre Bardet, being duly sworn, state the following:

1. I am over the age of 18 and have personal knowledge of the facts and statements herein.

**EDUCATION, QUALIFICATIONS, AND EXPERIENCE**

2. I am the Dean of the College of Engineering at the University of Miami. My address is McArthur Building, 1251 Memorial Drive, Room 255, Coral Gables, Florida 33146. I have prepared the following affidavit on behalf of the City of Miami.
3. I hold M.S. and Ph.D. degrees in Civil Engineering from the California Institute of Technology. My professional career has spanned over 30 years.
4. Prior to serving as Dean of the College of Engineering at the University of Miami, I was the Dean of the College of Engineering at the University of Texas at Arlington ("UTA"), where I founded and directed the Urban Water Institute. Prior to my tenure at UTA, I was a professor in and the chair of the Sonny Astani Department of Civil Engineering at the University of Southern California ("USC"). While at USC, I also founded and directed the USC Center on Megacities.
5. I have also been widely published in scientific journals and am the author of the textbook *Experimental Soil Mechanics*. I am also the recipient of awards from numerous scientific

organizations, including the Texas Academy of Medicine, Engineering Science and Technology, the National Academy of Engineering, and the National Science Foundation.

### STATEMENT

6. My affidavit in this proceeding is in support of the City of Miami's Initial Statement of Position and Direct Testimony for the Evidentiary Hearing in the Contested Portion of FPL's COLA for Turkey Point Units 6 and 7. My statement is based on my review of the Final Environmental Impact Statement ("FEIS"), relevant portions of FPL's Environmental Report in its COLA, and additional publicly available documents.
7. The sole contention pending before the Atomic Safety and Licensing Board ("ASLB") focuses on the risks that the injected wastewater into the Boulder Zone have the potential of leaking. Specifically, that the environmental impacts of injecting wastewater into the Boulder Zone using deep well injection would be small. Additionally, there is disagreement between parties that there will be vertical or horizontal migration of injected wastewater.
8. An issue that has not been discussed is the potential risk of induced seismicity that could result from the injected wastewater. According to the United States Geological Survey ("USGS"), between 1973 through 2008 there was an average of twenty-one (21) earthquakes of magnitude three (3) or greater in the central and eastern United States ("U.S."). From 2009 through 2013 there were over ninety-nine (99) earthquakes of magnitude three (3) or greater and the rate continues to rise. USGS has found that in 2014, alone, there were six hundred fifty-nine (659) earthquakes of magnitude three (3) or greater.

9. Great attention has recently been focused on the induced earthquakes in the central U.S., specifically in Oklahoma due to fracking. However, the majority of fluid induced earthquakes in Oklahoma is due to the deep injection of wastewater. Injecting large volumes of water into the deep sedimentary formations raises the pore pressure over large areas that can induce earthquakes.
  
10. USGS has identified that wastewater injection well disposal is the primary cause of the recent increase in earthquakes in the central U.S. since they operate for long periods of time and increase pressure levels.
  
11. Although not all wastewater injection wells induce earthquakes, it is still a possibility that wastewater injection wells, including the deep injection wells contemplated by FPL, may induce earthquakes. Several factors that need to be considered to determine the probability and potential of wastewater wells inducing earthquakes, such as the injection rate and total volume injected; the presence of faults that are large enough to produce felt earthquakes; stresses that are large enough to produce earthquakes; and the presence of pathways for the fluid pressure to travel from the injection point to faults.
  
12. Induced earthquakes are generally smaller than tectonic earthquakes. However, induced earthquakes may have enough force to potentially destabilize soft sediments in coastal margins and generate landslide tsunamis.

13. While submarine and costal landslides triggered by seismicity induced by fluid injections have a low probability, the risks associated with the occurrence of such events can be very high on nuclear facilities.
14. Much research and analysis has been conducted on whether the radioactive wastewater will leak from the deep injection wells and the horizontal and vertical migration of the water. However, there is very little research or analysis of induced seismicity caused from the wastewater deep injected into the wells that can lead to destabilizing soft submarine and coastal sediment, causing local tidal waves impacting nuclear facilities.
15. Additional research and studies should be conducted to identify the risks associated fluid induced seismicity in the anticipated deep injection wells contemplated for this project and once identified, it is my belief that engineering solutions can be devised to mitigate the risks.

FURTHER AFFIANT SAYETH NAUGHT.

  
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Dr. Jean-Pierre Bardet

STATE OF FLORIDA  
COUNTY OF DADE

Sworn to (or affirmed) and subscribed before me this 28<sup>th</sup> day of February, 2017, by

DR. JEAN-PIERRE BARDET, Dean of the University of Miami's College of Engineering.

(NOTARY SEAL)

(Signature of Notary Public-State of FLORIDA)



**ODALIS AGUEDA RUIZ**  
**MY COMMISSION # FF 975085**  
**EXPIRES: June 19, 2020**  
**Bonded Thru Budget Notary Services**

ODALIS AGUEDA RUIZ  
(Name of Notary Typed, Printed, or Stamped)

Personally Known  OR Produced Identification

Type of Identification Produced \_\_\_\_\_