

BEFORE THE COUNCIL FOR THE CITY OF NEW ORLEANS

**APPLICATION OF ENTERGY NEW)
ORLEANS, INC. FOR APPROVAL TO)
CONSTRUCT NEW ORLEANS POWER)
STATION AND REQUEST FOR)
COST RECOVERY AND TIMELY RELIEF)**

DOCKET NO. UD-16-02

PRE-FILED SUPPLEMENTAL TESTIMONY

OF

DR. ALEXANDER S. KOLKER, PhD

ON BEHALF OF

ALLIANCE FOR AFFORDABLE ENERGY,

DEEP SOUTH FOR ENVIRONMENTAL JUSTICE, 350 LOUISIANA – NEW ORLEANS

AND SIERRA CLUB

October 13, 2017

1 **Q1. Please state your name.**

2 A. I am Dr. Alexander S. Kolker

3 **Q2. Have you previously testified in this proceeding?**

4 A. Yes. I submitted pre-filed Direct Testimony in this proceeding on behalf of the Alliance
5 for Affordable Energy, the Deep South Center for Environment Justice and Sierra Club on
6 January 6, 2017. As I stated in my Direct Testimony, I currently work at the Louisiana
7 Universities Marine Consortium and I teach at Tulane University. However, I prepared my
8 Direct and Supplemental testimony on my own time, at the request of the Alliance for Affordable
9 Energy. The information I present here are my opinions, based on my years of experience. They
10 are not necessarily those of any other organization.

11 **Q3. Please provide a brief summary of your January 6, 2017 Direct Testimony.**

12 A. In my earlier testimony I pointed out that several studies had noticed that groundwater
13 withdrawal associated with the previous Entergy New Orleans plant had contributed to a
14 potentiometric cone of depression (similar to a lowering of the water table) and subsidence in the
15 area. This subsidence was particularly alarming because it appears very close to the newly
16 strengthened post-Katrina levee system that protects the lower 9th ward and nearby communities.
17 I also noted that Entergy New Orleans' study of the area was inadequate as it pertains to
18 subsidence in the area, and I strongly encouraged an outside expert to provide a more thorough
19 engineering report.

20 **Q4. What is the purpose of your Supplemental Testimony?**

21 A. I respond to the Supplemental and Amending Direct Testimony of Dr. George Losonsky
22 filed on behalf of Entergy New Orleans, Inc.

23 **Q5. Has your opinion changed since you submitted your previous testimony?**

1 A. No. My recommendations are very similar to the recommendations I made before.
2 I do note that Entergy New Orleans hired an outside engineer, George Losonsky, to examine the
3 subsidence issue in this area. Dr. Losonsky took his job seriously, and I praise him for his efforts.
4 However, my concerns remain. I have technical concerns with his report and the testimony, and
5 I will outline these concerns below.

6 More broadly, I want to stress how important it is that the city, “get this one right.” Water
7 and subsidence management issues are some of the most important this city faces. Quite frankly,
8 these issues are challenging to get right even under the best of circumstances given the multiple
9 flood threats the area faces (rainfall, storm surge, river floods) and the notoriously poor quality of
10 many of the soils the city is built on.

11 Thus, I remain convinced that the City of New Orleans should hire an independent
12 expert, beholden only to the city and its residents, to fully and comprehensively examine how
13 any water withdrawals caused by the ENO plant could impact the area, including homes and
14 businesses near the facility, as well as all of the flood control structures that could be impacted
15 by this plant. I also believe that all of the levee board and the Army Corps of Engineers should
16 very closely examine any potential for subsidence caused by the plant to impact any of the
17 structures associated with the Hurricane and Storm Surge Risk Reduction System (HSDRRS)-
18 which is the upgraded levee protection system.

19 **Q6. In Dr. Losonsky’s testimony, he states that, “His (Kolker) testimony contains incorrect**
20 **statements about technical concepts related to potential impacts of the proposed operation**
21 **of NOPS. His testimony contains statements on a variety of topics that are correct in**
22 **general, but do not have the direct bearing on NOPS or New Orleans East communities**
23 **that his testimony implies. His testimony also includes statements that misrepresent**

1 **technical content of the C-K Technical Report to the Council.” Do you have any comments**
2 **about this remark?**

3 A. I wish that Dr. Losonsky was specific about where my comments were wrong. Without
4 knowing the specific criticisms, it is hard to rebut them. That said, I stand by my original
5 testimony.

6 **Q7. In Dr. Losonsky’s testimony he writes, “As noted in the C-K Technical Report, the**
7 **specific capacity of the wells located at the proposed NOPS site range from 36.4 to 49.7**
8 **gallons per minute (“gpm”)/ft. Wells of this capacity range would cause only a minimal**
9 **drawdown of the water levels in the Gonzales-New Orleans aquifer, which drawdown**
10 **would be within the range of what one might expect as part of natural variation due to**
11 **changes in rainfall or river water levels. This minimal drawdown level, coupled with the**
12 **overall trend of rising water levels in the Gonzales-New Orleans aquifer, which were**
13 **depicted in Figure 5 in the C-K Technical Report, led me to conclude that the operation of**
14 **the proposed CT Unit at NOPS (with an anticipated groundwater withdrawal rate of 96**
15 **gpm) will not exacerbate subsidence in New Orleans East or cause damage to**
16 **infrastructure in the area.” What do you think of this statement? Should we be concerned**
17 **if changes caused by this plant are similar to what is found in nature?**

18 A. The ground in New Orleans is naturally prone to subsidence, any human driven action
19 that causes subsidence will intensify something that we already know to be problematic.
20 Furthermore, I note that while natural processes fluctuate wetting and drying throughout the year,
21 this plant could be operational up to 365 days per year, meaning that it could reduce natural
22 recharge, and intensify natural subsidence.

1 It is also worth noting the total magnitude of water removed from the system. A
2 withdrawal rate of 96 gallons per minute would result in 504,907,538 gallons in a 10-year period
3 and 2,524,538,880 over a 50-year period. This is the equivalent of over 760 Olympic-sized
4 swimming pools over a 10-year period and over 3,820 Olympic-sized swimming pools of water
5 over a 50-year period. The question of what happens to the void space left behind after this water
6 is withdrawn remains unanswered.

7 **Q8. In Dr. Lososky's testimony he state's, "Based on (i) observations made during visits**
8 **to the NOPS/Michoud site and surrounding areas, (ii) data relating to operation and testing**
9 **of groundwater wells at the Michoud facility, (iii) area-wide water level and groundwater**
10 **production data, and (iv) discussions with Company personnel about historical operation**
11 **and maintenance at the site, I noted the absence of any such signs of differential settlement**
12 **at the Michoud site." Do you agree with that statement?**

13 **A.** No. From a technical perspective, change must be determined by measuring a process at
14 two points in time. Since Dr. Lososky in this report, and the earlier C-K only examined one
15 point in time, it is impossible to know if a change in elevation had occurred. This is why I
16 pointed to the Jones et al study (aka the LSU/Caltech study). That study explicitly measured
17 change in elevation at two points in time using radar interferometry, one of the most accurate
18 ways to measure changes in land surface movements. That study indicated that subsidence at the
19 Entergy facility ranged from 25-35 mm per year (about 1" to 1 3/8" per year), and noted that this
20 subsidence occurred in the direct vicinity of water wells that withdrew from the Gonzales-New
21 Orleans aquifer. That study used satellite data collected in 2009 and 2012, and thus indicates that
22 subsidence has recently occurred in this area.

1 **Q9. Dr. Losonsky writes, “Dr. Kolker, as well as individuals who have studied subsidence**
2 **in the New Orleans area, agree that multiple processes cause subsidence. In fact, Ms.**
3 **Cathleen Jones – the lead author of the 2016 study Dr. Kolker discusses, has stated that**
4 **‘additional research is needed to directly link groundwater pumping to the subsidence**
5 **rates,’ and that, with regard to the Michoud area, it is ‘unclear whether the subsidence**
6 **there results from groundwater withdrawal, compaction of soft soils and other soil**
7 **processes, or because of geologic processes, such as a nearby “Michoud fault.”” What is**
8 **your opinion on this statement?**

9 **A.** I agree that subsidence in this area is complex, and that there may be multiple factors at
10 play. This is why I think it is so important that the City Council get an independent expert to
11 examine the issue, and for the Army Corps of Engineers and the levee board to look very closely
12 at whether the proposed ENO plant could possibly impact the nearby HSDRRS. Understanding
13 subsidence and water flow in the New Orleans area is tough, and when mistakes are made, the
14 results can be disastrous. That is why I urge a serious, independent study of the issue and an
15 abundance of caution.

16 **Q10. In Dr. Losonsky’s testimony he writes, “ The site-specific calculations (Hantush-Jacob**
17 **solution) predict a maximum drawdown over a 10-year period of about one foot near the**
18 **NOPS pumping well, diminishing to half a foot or less at a distance of several thousand feet**
19 **away, and one quarter foot or less at a distance of two miles from the well.” What is your**
20 **opinion on this?**

21 **A.** I am concerned that the modeling was conducted only for a 10-year period. The modeling
22 should be conducted for the entire expected lifetime of the plant, plus an additional factor of
23 safety time frame, since infrastructure sometimes is used beyond its original life expectancy.

1 **Q11. In Dr. Losonsky’s testimony, he writes, “The calculated total possible consolidation**
2 **settlement for the CT unit is in the range of 0.7 to 4.7 millimeters (0.027 to 0.18 inch) for a**
3 **flow rate of 96 gpm. (The low end of this range is more likely considering the geological**
4 **characteristics of the New Orleans- Gonzalez aquifer.) Since a higher flow rate has already**
5 **been applied to the New Orleans- Gonzalez aquifer in the past, this settlement has already**
6 **occurred, and continued pumping at the level proposed for operation at the CT unit will**
7 **not cause additional settlement.” What is your opinion on this statement? If the future rate**
8 **of withdrawal is less than earlier rates of withdrawal, does this mean no additional**
9 **settlement will occur?**

10 **A.** Not necessarily. While the reduced rate of withdrawal may mean that future subsidence
11 will be less than past subsidence, it does not by any means mean that there will be no subsidence.
12 Given that subsidence rates in and around New Orleans are often high, caution is urged.

13 **Q12. In Dr. Losonsky’s report, he presents data from groundwater wells monitored by the**
14 **US Geological Survey. These data suggest that reductions in groundwater usage are causing**
15 **the water table to rebound over a period of several decades. Does this mean that**
16 **groundwater withdrawal is no longer causing subsidence?**

17 **A.** No. While I applaud Dr. Losonsky for looking up the old reports, a reduction in
18 groundwater usage and an increase in the water table does not necessarily mean that subsidence
19 has stopped. Indeed, we know from the Jones et al., (2016) study, that modern subsidence is a
20 problem in the Michoud area. That study showed rates of subsidence that ranged from about 25-
21 35 mm/yr (about 1” to 1 3/8”) during the period 2009-2012 in the direct vicinity of the Entergy
22 Power Plant, and that there were active wells here that withdrew water from the Gonzales-New
23 Orleans aquifer. It is possible that subsidence rates have slowed as the water table has rebounded,

1 but that subsidence is still occurring. One way to think of this is to image that you are driving a
2 car at 60 miles per hour, and you ease up on the accelerator; the car is now going at 40 miles per
3 hour. Should an accident occur, the 40 mph car would do less damage than the 60 mph car,
4 however an accident involving a 40 mph car could still occur. To bring this back to our situation
5 here, a new power plant that withdraws less water than the old plant could still cause problems,
6 even if those problems might be less than those caused by a previous plant. Given that the
7 proposed ENO plant is so close to flood control structures that are critical to New Orleans, a very
8 high degree of caution is urged.

9 **Q13. What are your recommendations at this time?**

10 A. I recommend an abundance of caution. As we all know, issues of water management and
11 subsidence are of great importance here in New Orleans, and when problems arise the results can
12 be troublesome to say the least. Water management and subsidence are particularly important in
13 the area near the proposed ENO plant, as the plant is very near critical parts of the upgraded
14 Hurricane and Storm Surge Risk Reduction System (HSDRRS), including the Lake Borgne
15 Surge Barrier that helps defend the lower 9th Ward. That is why I urge the council, the Army
16 Corps, and the levee board to conduct their own independent investigations to understand
17 whether this plant will cause any subsidence.

18 **Q14. Does this conclude your testimony?**

19 A. Yes.

AFFIDAVIT

STATE OF Louisiana)
)
PARISH OF Orleans)

I, Alexander S Kolker do hereby swear under the penalty of perjury the following:

That I am the person identified in the attached prepared testimony and that such testimony was prepared by me under my direct supervision; that the answers and information set forth therein are true and accurate to the best of my personal knowledge and belief; and that if asked the questions set forth herein, my answers thereto would, under oath, remain the same.



Alexander S. Kolker, PhD

SWORN TO AND SUBSCRIBED BEFORE ME THIS 15th DAY OF October,
2017



NOTARY PUBLIC

My commission expires: At Death

