EARTHJUSTICE

December 12, 2017

Ms. Lora W. Johnson, CMC
Clerk of Council
City Hall - Room 1E09
1300 Perdido Street
New Orleans, LA 70112

Re: ***Application of Entergy New Orleans, Inc. for Approval to Construct New Orleans Power Station and Request for Cost Recovery and Timely Relief - CNO Docket No. UD-16-02***

Dear Ms. Johnson

Please find enclosed an original and two copies of the Alliance for Affordable Energy, Deep South Center for Environmental Justice, 350-New Orleans and Sierra Club's **Motion to Strike the Supplemental Direct Testimony of Jonathan E, Long and Memorandum in Support thereof** for filing in the docket noted above. Please file the attached in the record of the proceeding in accordance with your normal procedures.

Should you have any questions regarding the above matter, please do not hesitate to contact me.

Thank you for your attention to this matter.

Sincerely,

Susan Stevens Miller

Susan Stevens Miller
Earthjustice
1625 Massachusetts Ave., NW, Ste. 702
Washington, DC 20036
(202) 797-5246
smiller@earthjustice.org

Enclosures
cc: Official Service List

BEFORE THE

COUNCIL OF THE CITY OF NEW ORLEANS

APPLICATION OF ENTERGY NEW ORLEANS, INC. FOR APPROVAL TO CONSTRUCT NEW ORLEANS POWER STATEION AND REQUEST FOR COST RECOVERY AND TIMELY RELIEF	)))))	**DOCKET NO. UD-16-02**

ALLIANCE FOR AFFORDABLE ENERGY, DEEP SOUTH CENTER FOR ENVIRONMENTAL JUSTICE, 350-NEW ORLEANSAND SIERRA CLUB MOTION TO STRIKE THE SUPPLEMENTAL DIRECT TESTIMONY OF JONATHAN E. LONG

Pursuant to New Orleans City Code Section 158-478, the Alliance for Affordable Energy, Deep South Center for Environmental Justice, 350-New Orleans and Sierra Club ("Public Interest Intervenors") respectfully move to strike the Supplemental Testimony of Jonathan E. Long filed in the above- captioned docket on November 18, 2016.[1] Public Interest Intervenors also request that those portions of the Rebuttal Testimonies of Mr. Charles W. Long, Dr. George Losonsky, and Dr. Bliss Higgins which refer to Mr. Jonathan E. Long's Supplemental Testimony also be stricken. These portions are:

1) Rebuttal Testimony of Mr. Charles W. Long, p. 30, lines 2-12.[2]

2) Rebuttal Testimony of Dr. George Losonsky, p. 17, fn 9.[3]

3) Rebuttal Testimony of Ms. Bliss M. Higgins, p. 12, lines 8–13 and p.13 lines 7-12.[4]

---

[1] See Appendix A for a copy of Mr. Long's Supplemental Testimony.
[2] See Appendix B for excerpt of Mr. Charles Long's Testimony with portions to be stricken underlined
[3] See Appendix C for excerpt of Dr. Losonsky's Testimony with portions to be stricken underlined.
[4] See Appendix D for excerpts of Ms. Higgins Testimony with portions to be stricken underlined.

For reasons explained in the memorandum in support of this motion, which is made a part hereof, the Supplemental Testimony of Jonathan E. Long is inadmissible and otherwise improper and therefore should be stricken from the record, as should those portions of the above listed Rebuttal Testimonies which refer to Mr. Long's Supplemental Testimony.

WHEREFORE, the Public Interest Intervenors pray that their motion to strike be granted and that the Supplemental Testimony of Jonathan E. Long be stricken from the record.

Respectfully submitted,

Susan Stevens Miller
Earthjustice
1625 Massachusetts Ave., NW, Ste. 702
Washington, DC 20036
(202) 797-5246
smiller@earthjustice.org

Counsel for Alliance for Affordable Energy and 350-New Orleans

/s/ Michael L. Brown
Robert Wiygul, La. Bar No. 17411
Michael Brown, La. Bar No. 35444
Waltzer Wiygul & Garside LLC
1000 Behrman Highway
Gretna, LA 70056

Joshua Smith
Staff Attorney
Sierra Club Environmental Law Program
2101 Webster Street, Suite 1300
Oakland, CA 94612

Counsel for Sierra Club

/s/ Monique Harden
Monique Harden, La. Bar No. 24118
Deep South Center for Environmental Justice
3157 Gentilly Blvd., #145
New Orleans, LA 70122

Counsel for Deep South Center for Environmental Justice

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing pleading has been served upon "The Official Service List" via electronic mail and/or U.S. Mail, postage properly affixed this 12th day of December, 2017.

Susan Stevens Miller.

BEFORE THE

COUNCIL OF THE CITY OF NEW ORLEANS

APPLICATION OF ENTERGY NEW ORLEANS, INC. FOR APPROVAL TO CONSTRUCT NEW ORLEANS POWER STATEION AND REQUEST FOR COST RECOVERY AND TIMELY RELIEF	)))))	**DOCKET NO. UD-16-02**

MEMORANDUM IN SUPPORT OF THE ALLIANCE FOR AFFORDABLE ENERGY, DEEP SOUTH CENTER FOR ENVIRONMENTAL JUSTICE, 350-NEW ORLEANS AND SIERRA CLUB MOTION TO STRIKE THE SUPPLEMENTAL DIRECT TESTIMONY OF JONATHAN E. LONG

INTRODUCTION

Public Interest Intervenors, the Alliance for Affordable Energy, Deep South Center for Environmental Justice, 350-New Orleans, and Sierra Club, move to strike Jonathan E. Long's supplemental testimony filed on November 18, 2016, which purports to render expert opinions on the air quality health impacts, groundwater subsidence impacts and flooding issues concerning the proposed New Orleans Power Station ("NOPS").[5] Mr. Long, an electrical engineer, admitted in his deposition, taken on December 8, 2017, that he had no specialized knowledge or expertise on these issues. Instead, Mr. Long's November 2016 testimony essentially quotes or paraphrases third-party reports that he attached. Because Mr. Long admitted that he is not an expert about—and indeed has no independent knowledge of—air quality issues, the health impacts of air pollution, groundwater subsidence impacts, or flooding

[5] This motion would not disturb Mr. Long's other testimonies, filed in June 2016 and July 2017, which principally concern engineering, procurement, and cost issues of the proposed combustion turbine ("CT") and reciprocating internal combustion engine ("RICE") units proposed by ENO.

issues related to the proposed NOPS, his opinions about those matters are inadmissible and must be stricken.

BACKGROUND

On November 3, 2016, the City Council of New Orleans ("Council") issued Resolution R-16-506, which required Entergy New Orleans ("ENO" or "Company") to make a supplemental filing, **including supporting testimony**, related to several issues.[6] These issues included, among other things, "groundwater withdrawal and subsidence at [ENO's] Michoud site and surrounding area(s), [and] air quality effects of the proposed [New Orleans Power Station] NOPS."[7]

Rather than file direct testimonies from experts on air quality, flooding and subsidence, ENO submitted Mr. Long's Supplemental Testimony which presents his lay opinions on a range of scientific and technical experts' findings. According to Mr. Long, his Supplemental Direct Testimony, filed in response to the Council's Resolution, addressed the groundwater and air emissions issues by merely **discussing** the results of an analysis performed by C-K Associates, LLC and Losonsky & Associates, Inc. ("Report").[8] Mr. Long also states that his testimony **discusses** how the analysis in the Report supports the following conclusions:

1) Groundwater withdrawal at the Michoud plant is not the cause of observed damage to infrastructure in New Orleans East;

2) Groundwater withdrawal associated with NOPS will not exacerbate subsidence or cause damage to infrastructure in New Orleans East; and

3) Emissions from the proposed NOPS will not cause "air quality to exceed" regulatory standards.[9]

---

[6] Council Resolution R-16-506 at p. 9. (emphasis added).
[7] *Id.*
[8] Long Supplemental Direct Testimony at p. 2, lines 1-3.
[9] *Id.* at lines 3-18.

4) The potential flooding risk at the proposed NOPS site and the protective measures put in place by the U.S. Army Corps of Engineers ("USACE").[10]

ARGUMENT

The general rule governing the admissibility of expert testimony in Louisiana courts is found in La. Code of Evid. art. 702, which provides "[a] witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise." In *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), the United States Supreme Court set forth the criteria for determining the reliability of expert scientific testimony.[11] However, the Louisiana Supreme Court has found that the *Daubert* analysis addresses admissibility of the expert's opinion and not his qualifications as an expert in the area tendered.[12]

In *Cheairs v. State ex rel. Department of Transportation and Development*, 861 So.2d 536, 542 (2003), the Louisiana Supreme Court adopted the following three-part inquiry for determining whether it is proper to admit expert testimony under La. Code of Evid. art. 702: (1) if the expert is qualified to testify competently regarding the matters he intends to address; (2) if the methodology by which the expert reaches his conclusions is sufficiently reliable as determined by the sort of inquiry mandated in *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993) and (3) if the testimony assists the trier of fact, through the application of scientific, technical, or specialized expertise, to understand the evidence or to determine a fact in issue. However, a challenge to an expert's qualifications falls within the first prong of the

---

[10] Long Supplemental Direct Testimony at p. 2, lines 23-26, through p. 3, lines 1-7.
[11] The Louisiana Supreme Court adopted the *Daubert* analysis in *State v. Foret,* 628 So.2d 1116 (La.1993).
[12] The *Daubert* Court itself notes that Fed. Rule of Evid. 702, the counterpart of La.Code of Evid. art. 702, "is premised on an assumption that the expert's opinion will have a reliable basis in the knowledge and experience of his discipline." *Daubert*, 501 U.S. at 592.

Cheairs inquiry and does not involve a *Daubert* analysis. *See Robertson v. Doug Ashy Building Materials, Inc.*, 77 So.3d 339, 355 (La. 2014) ("*Daubert* concerns admissibility of the expert's opinion and not his qualifications as an expert in the area tendered.").

A Court should refuse to allow an expert witness to testify if it finds that the witness is not qualified to testify in a particular field or on a given subject. *Wilson v. Woods,* 163 F.3d 935 (5th Cir.1999). An expert witness may not give expert testimony beyond the scope of the field of expertise in which he is qualified. The test of competency of an expert is his knowledge of the subject about which he is called upon to express an opinion. *State v. Franklin* Cir., 956 So.2d 823, 839 (2007).

A review of Mr. Long's filed testimony and the deposition transcript demonstrates that he is not qualified to testify as an expert witness in the fields in which he offered testimony in his Supplemental Testimony. Specifically, it is clear that Mr. Long does not possess the qualifications, knowledge and expertise necessary to render an opinion or conclusions regarding (1) the health effects of the air emissions released by the proposed NOPS; (2) the effect of groundwater withdrawal at the Michoud site; or (3) the potential flooding risk at the proposed NOPS site and the protective measures put in place by USACE.

In his initial Direct Testimony, Mr. Long states that he has "significant experience with the development of cost estimates for power plant projects, the negotiation and administration of large contracts for the construction of power plants, and the procurement of services of major equipment vendors."[13] Mr. Long's educational background includes an undergraduate degree in electrical engineering and a Master's Degree in Business Administration.[14]

---

[13] Direct Testimony of Jonathan E. Long (June, 2016) at p. 2, lines 19-21.
[14] *Id.* at p. 1, lines 15-16. It should be noted that Mr. Long did not attach either a resume or *curriculum vitae* to his filed testimony.

With regard to his educational background, Mr. Long testified at deposition that he does not have a degree in health sciences, environmental health sciences, environmental studies, geology, biology or biochemistry.[15] Thus, Mr. Long clearly lacks the education to be qualified as an expert on the health effects of air emissions, the effects of groundwater withdrawal, or the risk of flooding at the Michoud site.

Mr. Long also testified at his deposition that he had only participated as a witness in two other proceedings. According to Mr. Long, his testimony in both previous proceedings involved discussing the development of the project and the cost estimates for the project.[16] Mr. Long also stated that he had filed written testimony in two other proceedings and that this written testimony also addressed issues of project planning and costs estimates.[17] None of these proceedings involved Mr. Long testifying regarding air emissions, groundwater, or flooding. Thus, Mr. Long has never been recognized as an expert on air emissions, groundwater withdrawal, or flooding risks.

With regard to his professional experience, Mr. Long testified that he has no professional experience addressing health issues, such as the effects on humans of the proposed NOPS' air emissions, admitting he is "not experienced in that area."[18] Similarly, Mr. Long expressly stated that subsidence in New Orleans was not within his area of expertise.[19] Mr. Long also testified that his only experience on environmental issues is obtaining the permits necessary to construct generating projects.[20]

---

[15] J. Long Deposition Transcript at 10, lines 10 through 20. Excerpts of the J. Long Deposition transcript are attached in the Appendix E.
[16] J. Long Deposition Transcript at 8, line 22 through 9, line 6.
[17] J. Long Deposition Transcript at 9, lines 11-25.
[18] J. Long Deposition Transcript at 12, lines 4-7.
[19] *Id.* at 48, line 22 through pg 49, line 1.
[20] *Id.* at 11, lines 7-22.

Mr. Long also was unable to demonstrate any working knowledge surrounding the air emissions, groundwater, or flooding issues. He did not know whether the RICE generating units were subject to different standards than the CT units.[21] Mr. Long also did not know what air pollutants the RICE units emit or the health impacts of those pollutants.[22] Mr. Long also could not correctly explain what is meant by the 100-year flood standard.[23] Mr. Long also could not state whether USACE applied the same standard in constructing the new levees as it applied when constructing the previous levees that failed during Hurricane Katrina.[24] Thus, Mr. Long lacked the professional experience necessary to be deemed an expert regarding air emissions, groundwater or flooding issues.

Mr. Long's opinion on the air emissions, groundwater, and flooding issues relies exclusively on the reports and opinions of other experts. As many courts have recognized, expert testimony based solely or primarily on the opinions of other experts is inherently unreliable. *Cholakyan v. Mercedes–Benz USA, LLC,* 281 F.R.D. 534, 544 (C.D.Cal.2012) ("An expert's sole or primary reliance on the opinions of other experts raises serious reliability questions."); *accord Am. Key Corp. v. Cole Nat'l Corp.,* 762 F.2d 1569, 1580 (11th Cir.1985) ("Expert opinions ordinarily cannot be based upon the opinions of others whether those opinions are in evidence or not."). It is only when the expert undertakes some independent investigation of the underlying opinions that his testimony may be considered reliable. *See Lightfoot v. Hartford Fire Ins. Co.,* No. 07–4833, 2011 WL 39010, at *4–5 (E.D. La. Jan. 4, 2011); *JRL Enters., Inc. v. Procorp Assocs., Inc.,* No. 01–2893, 2003 WL 21284020, at *7–8 (E.D. La. June 3, 2003). Mr. Long failed to undertake any independent investigation of the opinions underlying

[21] *Id.* at 41, line 18 through pg 42, line 3.
[22] *Id.* at 42, lines 4-25.
[23] *Id.* at 43, line 17-25.
[24] *Id.* at 44, lines 5-10.

the report he sponsors in his Supplemental Testimony. Accordingly, Mr. Long's November 2016 testimony must be stricken.

Several other ENO witnesses also discuss Mr. Long's Supplemental Testimony in their rebuttal testimonies. In conjunction with the striking of Mr. Long's testimony, those portions of the other witnesses testimonies which discuss Mr. Long's conclusions must also be stricken. Thus, the following portions of testimony also should be stricken:

4) Rebuttal Testimony of Mr. Charles W. Long, p. 30, lines 2-12.[25]

5) Rebuttal Testimony of Dr. George Losonsky, p. 17, fn 9.[26]

6) Rebuttal Testimony of Bliss M. Higgins, p. 12, lines 8–13 and p.13 lines 7-12.[27]

CONCLUSION

The threshold inquiry is whether the expert possesses the requisite qualifications to render opinion on a particular subject matter. Mr. Long lacks the sort of qualifications that would distinguish him as an expert specifically qualified to offer helpful testimony regarding air emissions, groundwater or flooding issues. Mr. Long's Supplemental Testimony contains opinions and conclusions that are outside of his qualifications and experience. For the reasons discussed in this Memorandum, the Motion to Strike should be granted.

CONTINUED FOR SIGNATURES

[25] See Appendix B.
[26] See Appendix C.
[27] See Appendix D.

Respectfully submitted,

Susan Stevens Miller
Earthjustice
1625 Massachusetts Ave., NW, Ste. 702
Washington, DC 20036
(202) 797-5246
smiller@earthjustice.org

Counsel for Alliance for Affordable Energy and 350-New Orleans

/s/ Michael L. Brown
Robert Wiygul, La. Bar No. 17411
Michael Brown, La. Bar No. 35444
Waltzer Wiygul & Garside LLC
1000 Behrman Highway
Gretna, LA 70056

Joshua Smith
Staff Attorney
Sierra Club Environmental Law Program
2101 Webster Street, Suite 1300
Oakland, CA 94612

Counsel for Sierra Club

/s/ Monique Harden
Monique Harden, La. Bar No. 24118
Deep South Center for Environmental Justice
3157 Gentilly Blvd., #145
New Orleans, LA 70122

Counsel for Deep South Center for Environmental Justice

CERTIFICATE OF SERVICE

I hereby certify that a copy of the foregoing pleading has been served upon "The Official Service List" via electronic mail and/or U.S. Mail, postage properly affixed this 12th day of December, 2017.

Susan Stevens Miller

Susan Stevens Miller.

APPENDIX A

BEFORE THE

COUNCIL OF 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

SUPPLEMENTAL DIRECT TESTIMONY

OF

JONATHAN E. LONG

ON BEHALF OF

ENTERGY NEW ORLEANS, INC.

NOVEMBER 2016

TABLE OF CONTENTS

EXHIBITS

I. INTRODUCTION AND PURPOSE

Q1. PLEASE STATE YOUR NAME AND CURRENT BUSINESS ADDRESS.

A. My name is Jonathan E. Long. My business address is Parkwood Two Building, 10055 Grogan's Mill Road, The Woodlands, Texas 77380.

Q2. WHAT IS THE PURPOSE OF YOUR SUPPLEMENTAL DIRECT TESTIMONY?

A. My Supplemental Direct Testimony provides additional support for the Application of Entergy New Orleans, Inc. ("ENO" or the "Company") to obtain approval from the Council of the City of New Orleans ("CNO" or the "Council") to construct the New Orleans Power Station ("NOPS" or the "Project").

On November 3, 2016, the Council issued Resolution R-16-506, which required ENO to make a supplemental filing, including supporting testimony, on or before November 18, 2016, related to several issues. These issues include, among other things, "groundwater withdrawal and subsidence at [ENO's] Michoud site and surrounding area(s), [and] air quality effects of the proposed NOPS."[1] In my Direct Testimony, filed in this Docket on June 20, 2016, I addressed the groundwater usage issue by noting that operating NOPS will require using between 1 to 10% of the amount of groundwater that was required to operate the deactivated Michoud Units, representing a reduction of between 90 to 99%. With regard to air emissions, I also noted that NOPS will produce significantly lower emissions levels as compared to the deactivated Units due to several factors, including the use of newer, more efficient technology, which translates to a net reduction in emissions.

[1] *See* Resolution R-16-506 at 9.

My Supplemental Direct Testimony addresses the groundwater and emissions issues in more detail by discussing the results of an independent analysis performed by C-K Associates, LLC and Losonsky & Associates, Inc.[2] As I discuss further herein, the analysis described in the C-K Technical Report supports the following conclusions:

1. Groundwater withdrawal at the Michoud Plant is not the cause of observed damage to infrastructure in New Orleans East including buildings, roads, and flood protection structures;

2. Groundwater withdrawal associated with NOPS will not exacerbate subsidence or cause damage to infrastructure in New Orleans East; and

3. The emissions from the proposed NOPS will result from combustion of clean burning natural gas; in no case, will the emissions cause air quality to exceed regulatory standards, which are protective of human health and the environment.[3]

Resolution R-16-506 also asks ENO "to address Intervenors' concerns raised to date."[4] To my knowledge, no Intervenors have submitted any testimony or other evidence in this proceeding to raise or support any such concerns.

I have been advised that concerns exist related to a potential risk for flooding at the proposed site of NOPS (described in my Direct Testimony and depicted in Exhibits JEL-1 and JEL-2) due to flooding that occurred during Hurricane Katrina. As such, my Supplemental Direct Testimony also discusses the analyses and design

[2] The analysis performed by C-K Associates, LLC and Losonsky & Associates, Inc. (collectively "C-K" or the "Authors") is detailed in a document entitled, "Technical Report – Evaluation of Groundwater Withdrawal and Air Quality," (the "C-K Technical Report" or the "Report"), which I reviewed in connection with providing my Supplemental Direct Testimony and have attached as Exhibit JEL-6.

[3] *See* C-K Technical Report at 1.

[4] *See* Resolution R-16-506 at 9.

measures undertaken by the Company and others involved in the Project to mitigate any risk of damage due to potential flooding at the proposed site. I also discuss protective measures put into place by the United States Army Corps of Engineers ("USACE") that address the issues believed to be causative of the flooding experienced at the site during Hurricane Katrina. My review of these items leads me to conclude that locating NOPS at the site identified in my Direct Testimony would not create any undue risk of damage to NOPS occurring due to flooding.

II. THE C-K TECHNICAL REPORT

Q3. PLEASE BRIEFLY DESCRIBE THE QUALIFICATIONS AND CREDENTIALS OF THE AUTHORS OF THE C-K TECHNICAL REPORT.

A. C-K Associates is an engineering firm that has been licensed in the state of Louisiana for over 30 years. The C-K Associates personnel who contributed to the Report are (i) Mr. Vinh Nguyen, a licensed professional engineer ("P.E.") with 32 years of experience in evaluating air emissions issues and performing air dispersion modeling; (ii) Mr. Alex Sheffield, a P.E. with over 30 years of experience in environmental consulting focused on water quality, compliance, and permitting issues; (iii) Ms. Beth Szwec, an environmental scientist with 29 years of experience in air dispersion modeling and air quality risk assessment; and (iv) Mr. David Hawley, a P.E. with 11 years of experience in environmental engineering focused on groundwater remediation and the design and operation of groundwater withdrawal systems. These individuals are familiar with environmental regulations, as well as the environmental, air quality, hydrological, and geotechnical subject matters discussed in the Report.

The principal of Losonsky & Associates, Inc., Dr. George Losonsky, holds a Ph.D. in Hydrology and Sedimentology and is a recognized expert in groundwater extraction. In addition, Dr. Losonsky served as a commissioner of the Southeast Louisiana Flood Protection Authority – East from 2007 to 2012 and has detailed understanding of hydrogeological and geotechnical processes that occur in the greater New Orleans area.

Q4. PLEASE GENERALLY DESCRIBE THE INFORMATION REVIEWED BY THE AUTHORS IN CONJUNCTION WITH PREPARING THE REPORT.

A. The Authors of the Report reviewed site specific information for the site of the deactivated Michoud Units and the proposed site of NOPS and conducted a field visit of the site. The Authors also reviewed specific information, described more fully below, related to the design and operation of NOPS. Additionally, the Authors evaluated peer-reviewed journal articles on subsidence in southeast Louisiana, including a report produced earlier this year by a team from Louisiana State University ("LSU") and the National Aeronautics and Space Administration ("NASA") (the "LSU/NASA Report").

III. GROUNDWATER WITHDRAWAL

A. Past Groundwater Withdrawals at the Michoud Site

Q5. DID THE C-K TECHNICAL REPORT DISCUSS THE POSSIBILITY OF A CAUSAL LINK BETWEEN PAST GROUNDWATER WITHDRAWALS AT THE MICHOUD SITE AND DAMAGE TO INFRASTRUCTURE IN NEW ORLEANS EAST?

A. Yes. First, it is important to recognize that the effects of past groundwater use by the deactivated Michoud Units are not indicative of the effects of groundwater use by NOPS because of NOPS' drastically reduced usage rate. Second, the C-K Technical Report concluded that groundwater withdrawal associated with the deactivated Michoud Units "is not the cause of observed damage to infrastructure in New Orleans East including buildings, roads, and flood protection structures."[5] The Report further states that "there is no cause-and-effect relationship between subsidence due to groundwater pumping and structural damage due to differential settlement in residential neighborhoods in New Orleans East." *Id.* at 2.

Q6. PLEASE SUMMARIZE THE ANALYSIS CONTAINED IN THE C-K TECHNICAL REPORT THAT SUPPORTS THIS CONCLUSION.

A. The C-K Technical Report's analysis centers on the "important distinction between subsidence, which acts regionally, and differential settlement, which acts locally and causes damage to structures (*e.g.*, buildings and infrastructure)." *Id.* at i.

[5] *See* C-K Technical Report at 1.

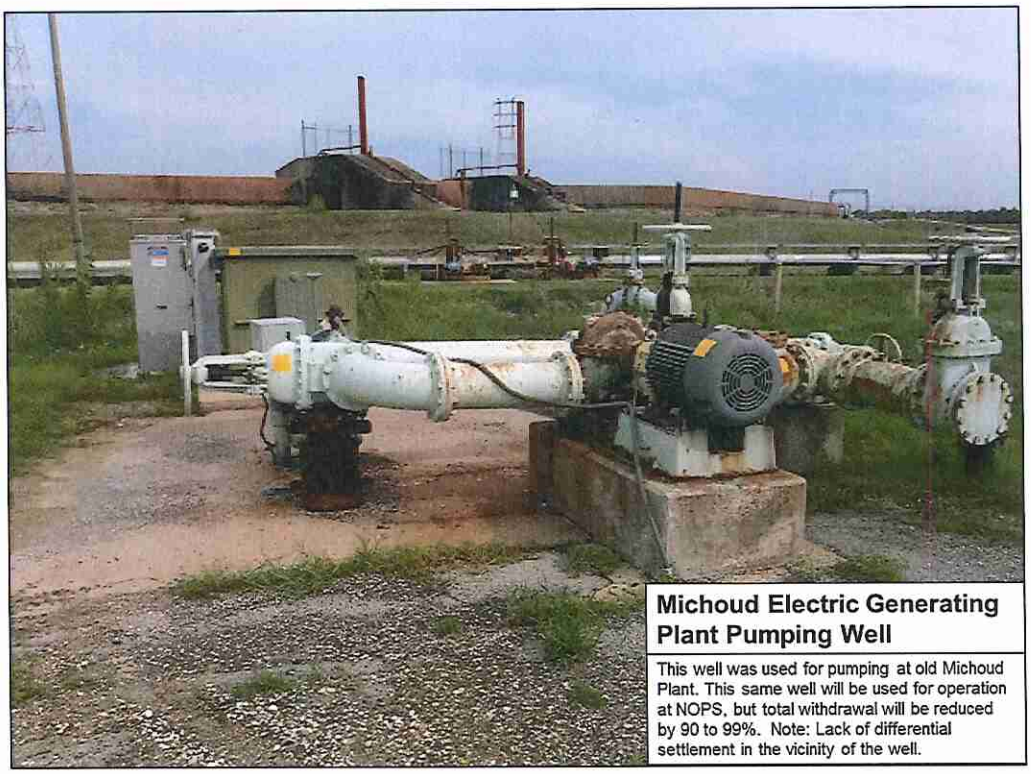
The Report explains that the occurrence commonly referred to as "subsidence" results from consolidation settlement of subsurface sediments that causes ground settlement to occur on a regional scale, which is distinct from "differential settlement." *Id.* at 3-4. The Report describes the phases in which consolidation settlement occurs (primary and secondary) and details the mechanics and causes of that process. *Id.* The causes include both natural, geological factors and industry and infrastructure activities, such as hydrocarbon extraction from oil and gas reservoirs in deep subsurface formations, groundwater pumping from aquifers, land reclamation through drainage of shallow sediments, and loading at the ground surface by buildings and other structures. *Id.*

Differential settlement, on the other hand, refers to "changes in the amount of settlement over sufficiently short distances to cause deformation and damages in man-made structures." *Id.* at 3. The damage to structures that can result from differential settlement occurs when the ground beneath the structure shifts by different amounts at different parts of the structure. The Report identifies a number of possible causes of differential settlement that are specific to the "silty, clayey marsh sediments [that] dominate the shallow subsurface throughout Orleans Parish." *Id.* at 6. These potential causes include water removal by tree roots and dewatering drains, both of which are prevalent in the reclaimed marsh land within Orleans Parish and New Orleans East. The Report describes how these factors lead to differential settlement and the structural damage associated with it. *Id.* at 6, 14.

The Report also identifies excessive groundwater pumping from improperly managed wells as a potential cause of differential settlement and provides a detailed

description of the mechanics of this cause-and-effect relationship. *Id.* at 4-6. The Report notes, however, that where differential settlement due to excessive groundwater pumping does occur, the signs of differential settlement, *i.e.*, visible damage to man-made structures, would be observable at or within several hundred feet of the well. *Id.* By contrast, a properly managed well would not cause differential settlement even within a close distance to the well and, therefore, could not cause differential settlement at greater distances. *Id.* at 6. Stated another way, a well that is not capable of causing damage to man-made structures within its immediate vicinity will not be capable of causing any of this kind of structural damage that may be observed at distances further away from the well.

In applying this concept to its analysis of the past groundwater pumping at the deactivated Michoud Units, the Report notes the absence of any evidence of differential settlement adjacent to the site of the Units, *i.e.*, "the absence of structural damage to buildings and infrastructure at the Michoud Plant." *Id.* at 6. Appendix A to the Report contains pictures, taken by the Authors during a site visit, that document the absence of such damage. Two such pictures are also included below:



Michoud Electric Generating Plant Pumping Well

This well was used for pumping at old Michoud Plant. This same well will be used for operation at NOPS, but total withdrawal will be reduced by 90 to 99%. Note: Lack of differential settlement in the vicinity of the well.

Building at Michoud Electric Generating Plant

Sidewalk, building foundation, and walls are not experiencing settlement. This building is within 50 feet of the groundwater pump (just to the right of the photo)

The Report reasons that since the groundwater extraction did not cause structural damage at or near the Units themselves, the extraction could not have caused structural damage observed at greater distances from the Units. *Id.* at 6, 13-14. As such, the Report concludes that any effect of past groundwater pumping at the deactivated Michoud Units "has been too small to develop differential settlement that could cause damage to buildings and other infrastructure." *Id.* at 14.

B. Groundwater Withdrawals Required to Operate NOPS

Q7. DID THE C-K TECHNICAL REPORT DISCUSS GROUNDWATER WITHDRAWAL REQUIRED FOR THE OPERATION OF NOPS?

A. Yes. The C-K Technical Report assessed the proposed groundwater usage rates for NOPS and any possible impact such activity could have on subsidence (*i.e.*, consolidation settlement) or differential settlement (*i.e.*, the process discussed above as causative of damage to infrastructure) in the New Orleans area and New Orleans East.

Q8. WHAT DID THE C-K TECHNICAL REPORT CONCLUDE WITH REGARD TO THE POSSIBILE IMPACT OF THE GROUNDWATER WITHDRAWAL REQUIRED FOR THE OPERATION OF NOPS ON SUBSIDENCE?

A. The C-K Technical Report concluded that "groundwater withdrawal associated with NOPS will not exacerbate subsidence or cause damage to infrastructure in New Orleans East." *Id.* at 1, 14.

Q9. PLEASE SUMMARIZE THE ANALYSIS DESCRIBED WITHIN THE C-K TECHNICAL REPORT THAT SUPPORTS THIS CONCLUSION.

A. The anticipated operation of NOPS includes plans to extract groundwater from the Gonzales-New Orleans aquifer via one of two wells currently located at the proposed site, *i.e.*, Deep Well No. 5 and Deep Well No. 6. C-K reviewed the specific capacity of these wells and the maximum flowrate required for the operation of NOPS. *Id.* at 11, 13. Based on this information, the Report found that the effects of NOPS' expected groundwater withdrawal on water levels in the Gonzales-New Orleans aquifer would be relatively low (as I noted above, operating NOPS will require between 1 to 10% of the groundwater used by the deactivated Michoud Units) and would fall "within the range of natural variation due to a number of natural causes including rainfall, river stage, or drought." *Id.* at 13. The Report also noted that long term rise in water levels in the Gonzales-New Orleans aquifer, which has been occurring since the late 1960s, will "slow down or eliminate the contribution of consolidation within that aquifer to subsidence in the New Orleans metropolitan area." *Id.* at 14. Based on this analysis, along with other factors discussed more specifically in the Report, the Authors reached the conclusion that "groundwater withdrawal associated with NOPS will not exacerbate subsidence or cause damage to infrastructure in New Orleans East." *Id.*

C. The LSU/NASA Report

Q10. PLEASE SUMMARIZE THE C-K TECHNICAL REPORT'S DISCUSSION OF THE LSU/NASA REPORT.

A. The C-K Technical Report provides a description of the methods utilized in creating the LSU/NASA Report and assesses what the LSU/NASA Report did, and did not, address or evaluate. *Id.* at 2-3, 9.

Q11. WHAT DOES THE C-K TECHNICAL REPORT CONCLUDE BASED ON THE AUTHORS' REVIEW OF THE LSU/NASA REPORT?

A. Among other things, the C-K Technical Report notes that the LSU/NASA Report did not present evidence of a correlation between subsidence and structural damage and did not conclude that any cause-effect relationship exists between subsidence and damages to structures, including residential homes and levees. *Id.* at 2-3. The C-K Technical Report also affirmatively states that – given the absence of structural damage at the Michoud site, the significance of which is summarized above and discussed more fully in the C-K Technical Report – the subsidence observed in the LSU/NASA Report would not have caused structural damage observed in New Orleans and in New Orleans East. *Id.* at 3, 14.

Q12. IS THERE ANYTHING ELSE OF WHICH THE COUNCIL SHOULD BE AWARE CONCERNING THE LSU/NASA REPORT?

A. Yes. In media interviews about the LSU/NASA Report, its authors confirmed that "additional research is needed to directly link groundwater pumping to the subsidence

rates."[6] The LSU/NASA Report's lead author, Ms. Cathleen Jones of NASA's Jet Propulsion Laboratory, also indicated that, with regard to the Michoud area, "We're not able to localize [subsidence] to a single industry." *Id.* Ms. Jones further stated, again with regard to the Michoud area, that it is "unclear whether the subsidence there results from groundwater withdrawal, compaction of soft soils and other soil processes, or because of geologic processes, such as a nearby 'Michoud fault.'" *Id.*

Q13. WHAT DO THE CONCLUSIONS FROM THE C-K TECHNICAL REPORT AND THE ABOVE STATEMENTS FROM THE LEAD AUTHOR OF THE LSU/NASA REPORT INDICATE WITH REGARD TO CONCERNS EXPRESSED BY INTERVENORS RELATED TO THE LSU/NASA REPORT?

A. As I noted above, I am not aware of any testimony or other evidence submitted by Intervenors in this proceeding to raise or support any such concerns. However, I have reviewed statements, made at Council meetings related to NOPS, which express concerns about NOPS due to a belief that the LSU/NASA Report demonstrates a link between groundwater withdrawal from the deactivated Michoud Units and damage to infrastructure (such as flood protection structures, buildings, houses, roads, driveways, sidewalks, *etc.*), as well as increased subsidence, in New Orleans East. The acknowledgement by the lead author of the LSU/NASA Report that the LSU/NASA Report was unable to tie subsidence in the Michoud area to a specific cause or industry, along with the conclusions from the C-K Technical Report stating that past groundwater use by the deactivated Michoud Units did not cause damage to

[6] *See*, http://www.nola.com/environment/index.ssf/2016/05/new_orleans_area_sinking_assis.html.

infrastructure in New Orleans East, indicate that these concerns are unfounded. To the extent such concerns extend to NOPS, the C-K Technical Report's conclusion that NOPS will not exacerbate subsidence or cause damage to infrastructure in New Orleans East also indicates that such concerns are unfounded with regard to NOPS.

IV. AIR QUALITY EFFECTS OF NOPS

Q14. DOES THE C-K TECHNICAL REPORT DISCUSS AN EVALUATION OF THE POTENTIAL AIR EMISSIONS ASSOCIATED WITH THE OPERAITON OF NOPS?

A. Yes. The Report discusses a screening level air dispersion modeling analysis that C-K performed for the purpose of evaluating potential effects of the emissions associated with NOPS on air quality. As the Report states, "C-K conducted a voluntary air dispersion model to understand ground-level concentration exposure to the public using conservative assumptions." *Id.* at 15.

Q15. HOW WAS THIS EVALUATION PERFORMED?

A. C-K utilized the AERSCREEN screening model, which utilizes a computer program to perform mathematical simulations of how air pollutants disperse in an ambient atmosphere. *Id.* AERSCREEN is one of the Environmental Protection Agency's ("EPA") approved, and preferred, models for environmental modeling simulations. *Id.* It is also the recommended screening model for producing conservative impact estimates, as it produces "worst-case" estimations of emission concentrations for a single source at 1-hour, 3-hour, 8-hour, 24-hour, and annual levels. *Id.*

Q16. HOW DID C-K UTILIZE THE AERSCREEN MODEL TO EVALUATE THE POTENTIAL EFFECTS OF EMISSIONS LEVELS RESULTING FROM THE OPERATION OF NOPS?

A. C-K used the AERSCREEN model to simulate emission concentrations and dispersals associated with operating NOPS and to compare those results against the EPA's National Ambient Air Quality Standards ("NAAQS"), which the EPA established under the Clean Air Act for the purpose of providing public health protection to sensitive populations, such as asthmatics, children, and the elderly, and to provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.[7] In addition to comparing the modeling results of emission concentration levels for NOPS to NAAQS, C-K also compared the simulated emission concentration levels from NOPS to simulated emission concentrations levels that would be experienced at a hypothetical outdoor gathering (such as a tailgate party) with a 2 kW generator located at least 30 feet from the nearest person. *Id.* at 16.

In developing the AERSCREEN model for these scenarios, C-K provided data for the following input requirements: Source Type (Point, Flare, Area or Volume); Physical Source and Emissions Characteristics (emission rate, stack height, stack diameter, stack gas exit velocity and temperature, and receptor height above ground); Meteorology (surface characteristics, ambient temperatures, minimum wind speed, and anemometer height); Building Downwash; and Terrain (flat, elevated and

[7] *See* https://www.epa.gov/criteria-air-pollutants/naaqs-table.

complex terrain).[8] When supplying the inputs for NOPS, C-K used the maximum possible emission rates for the equipment. *Id.* at 15.

Q17. WHAT DID THE MODELING INDICATE WITH REGARD TO EMISSION CONCENTRATION LEVELS RESULTING FROM THE OPERATION OF NOPS?

A. The modeling results, displayed in Table 3 of the Report, indicate that maximum emission concentration levels for NOPS are at least 96% below the EPA's primary NAAQS threshold, *i.e.*, the standards established by the EPA under the Clean Air Act for protecting human health and the environment. *Id.* at 16. The results also indicate that the hypothetical tailgate party included in the modeling would result in significantly higher levels of emission concentrations than the emission concentration levels that would result from the operation of NOPS. *Id.*

Q18. IS THERE ANYTHING ELSE OF WHICH THE COUNCIL SHOULD BE AWARE AS RELATED TO THE C-K TECHNICAL REPORT'S AIR EMISSIONS EVALUATION?

A. Yes. The Report also notes that the operation of NOPS will not cause the release of any new chemicals when compared to the operation of the deactivated Michoud Units and, in fact, NOPS will represent a significant reduction in emissions when compared to the operation of those deactivated Units. *Id.* This comparative reduction in emissions ranges from 50 to 97%, as depicted in Table 1 of the Report.

[8] *Id.* at 15-16. Table 2 of the Report includes the stack parameters and emission rates employed in the analysis and parameters used for developing the meteorological data set.

Q19. WHAT DO THE RESULTS OF THE C-K TECHNICAL REPORT'S MODELING AND ANALYSIS INDICATE WITH REGARD TO CONCERNS EXPRESSED BY INTERVENORS RELATED TO AIR EMISSIONS ASSOCIATED WITH NOPS AND PUBLIC HEALTH?

A. Once again, I am not aware of any testimony or other evidence submitted by Intervenors in this proceeding to raise or support any such concerns. However, I have reviewed statements, made at Council meetings related to NOPS, which expressed concerns over a myriad of hypothetical adverse health impacts potentially associated with emissions produced during the operation of NOPS. The results of the C-K Technical Report's AERSCREEN modeling indicate that the maximum ground-level emission concentration levels for NOPS will be 96% below the EPA's NAAQS limit, which was designed to protect the environment and public health – particularly the health of sensitive populations. As such, the findings evidenced in the C-K Technical Report indicate that concerns expressed with regard to negative health impacts due to emissions from NOPS are unfounded.

V. FLOOD RISK MITIGATION

Q20. YOU MENTIONED THAT THE PROPOSED SITE FOR NOPS EXPERIENCED FLOODING DURING HURRICANE KATRINA, DID THE COMPANY UNDERTAKE ANY EFFORTS TO MITIGATE THE RISK OF SIMILAR FLOODING IMPACTING NOPS?

A. Yes. The project team that I led worked with the engineering, procurement, and construction ("EPC") contractor I identified in my Direct Testimony (Chicago Bridge & Iron, Inc. or "CB&I"), the project owner's engineer (Sargent & Lundy or "S&L"), and the Company's Risk & Insurance Management ("RIM") group to determine the proper elevation required for the Project to mitigate the risk of NOPS being impacted by the type of flooding that was experienced during Hurricane Katrina.

Q21. PLEASE DESCRIBE THE WORK AND ANALYSIS PERFORMED TO DETERMINE THE PROPER ELEVATION REQUIRED FOR MITIGATING THIS RISK.

A. ENO commissioned a site survey for the Michoud site in October of 2015. Using data from that survey, along with the Federal Emergency Management Agency's ("FEMA") flood protection guidelines, and input from employees who worked at the Michoud site during Hurricane Katrina, the Company, CB&I and S&L worked to determine a recommended Top of Concrete ("TOC") elevation for NOPS.

Two cases were considered when determining the TOC elevation. For the first case, the team evaluated FEMA's "Hurricane Katrina Surge Inundation and Advisory Base Flood Elevation Map," which depicts the Base Flood Elevation ("BFE") for the site. FEMA's BFE for the proposed location of the Combustion Turbine ("CT") is the Highest Existing Adjacent Grade ("HEAG"), plus 3 feet. The October 2015 survey indicates that the elevation at the proposed location of the CT is 2.0 feet below sea level. Using this elevation as the HEAG indicates that the FEMA

Advisory recommendation would be to set the TOC for NOPS at an elevation of 1.0 foot above sea level.

The second case focused on the highest point of elevation identified in the October 2015 site survey, the TOC for the Administration Building, which the survey indicates is 1.5 feet above sea level. The team also took into account the Hurricane Katrina flood depth at the Administration Building, which was between 6 to 8 inches, but for purposes of the team's analysis was rounded up to a flood depth of 1 foot. The team then used a height of 1 foot above this flood depth to calculate the appropriate elevation for the TOC for the proposed site of the CT. This resulted in a TOC elevation for NOPS at 3.5 feet above sea level, which is 2.5 feet higher than the FEMA Advisory recommendation for the TOC at the site. Ultimately, the project team opted to use the second case and incorporated a TOC level of 3.5 feet above sea level into the design plans for NOPS.

Q22. YOU MENTIONED THAT THE COMPANY'S RIM GROUP WAS ALSO INVOLVED IN THIS PROCESS; PLEASE DESCRIBE THE ROLE OF THAT GROUP.

A. During the process of planning for the possible construction of NOPS, the RIM group began the process of soliciting input from the Company's insurance underwriters for the Project. As part of this process, the RIM group arranged a tour of the proposed site, as well as the USACE's Hurricane & Storm Damage Risk Reduction System ("HSDRRS"), for a group of insurance underwriters and underwriters' engineers. The purpose of the tour was to allow the underwriters and engineers to evaluate the risk of issuing insurance for NOPS and to demonstrate to the group that hurricane and

storm damage risk associated with ENO's portfolio of assets had been greatly reduced by the installation of the USACE's HSDRRS system. During the tour, special emphasis was placed on the improvements to the levees, floodwalls, gated structures, and pump stations that form the 133–mile Greater New Orleans perimeter system, in addition to the improvements to the approximately 70 miles of interior risk reduction structures.

Upon completion of the site visit and tour of the HSDRRS, the insurance underwriters conveyed to the Company's RIM group that not only were they much more comfortable with insuring the ENO's portfolio of assets, which at the time included the now-deactivated Michoud Units that had not yet been deactivated and were still in service, but that they also felt any flood risks to the proposed NOPS were minimal given the HSDRRS and the fact that TOC elevation would be 3.5 feet above sea level. After consideration of the information received from the NOPS project team and feedback from this panel of insurance underwriters and underwriters' engineers, the Company's RIM group concurred with the recommendation to set TOC for NOPS at 3.5 feet above sea level.

Q23. DO ANY OF THE COMPONENTS OF THE USACE'S HSDRRS ADDRESS ISSUES THAT CONTRIBUTED TO FLOODING EXPERIENCED AT THE MICHOUD SITE DURING HURRICANE KATRINA?

A. Yes. As has been well documented, the storm surge that impacted the majority of New Orleans East during Hurricane Katrina resulted from the storm coming through the Gulf of Mexico, creating a record storm surge from the east off of Lake Borgne,

and pushing water up the Mississippi River Gulf Outlet ("MRGO") and into the Gulf Intracoastal Waterway ("GIWW"). A storm surge from Lake Pontchartrain also caused water to enter the GIWW from the north, via the Inner Harbor Navigational Canal ("IHNC"). The Michoud site is located along the GIWW, just west of where the MRGO meets the GIWW. The flooding at the Michoud site occurred due to the increased water level in the GIWW, which caused water to overtop the levees protecting the plant. It is important to note that, although the levees and floodwalls protecting the Michoud site were overtopped, they were not breached.

Since Hurricane Katrina, the MRGO has been decommissioned and was closed off with a rock dam near the mouth of the Mississippi River. The USACE has also since completed the world's largest surge barrier of its kind, the IHNC-Lake Borgne Surge Barrier, which did not exist during Hurricane Katrina and was designed to block off a surge similar to the record-setting surge experienced during that storm. The USACE has also constructed the St. Bernard Parish levee floodwalls, which cover approximately 23 miles along both sides of the Lake Borgne Surge Barrier and range from 26.5 to 30.5 feet in height. On Lake Pontchartrain, the USACE completed the Seabrook Floodgate, which is designed to keep storm surges from the Lake from entering the IHNC from the north.

The USACE also made improvements to the levees and floodwalls that protect the proposed NOPS site, which were consistent with the improvements the USACE made to levees and floodwalls throughout greater New Orleans as a part of the HSDRRS. The proposed NOPS site will benefit from the protection afforded by

these improvements, which include: 1) splash pads[9] being added to the backside (land facing side) of concrete levee walls to prevent scour caused by water overtopping the levee walls; 2) reinforced earthen levees being required to have specific types of clay properly applied and compacted in addition to having a reinforced grass-mat system overlaid on top of the earthen levees, which provides added protection against erosion if flood waters were to overtop the earthen levee; 3) concrete armoring[10] being added to both the concrete levee walls and earthen levees to help prevent erosion of the underlying foundation of soil, sand and/or clay.

As is the case with the entire HSDRRS, the measures described above were designed and constructed to withstand a 100-year storm. Part of the criteria used to achieve this level of risk reduction for the HSDRRS included factoring "expected sea level rise, settlement and subsidence of structures, and possible increases in storm severity or frequencies" in to the "final design of the HSDRRS structures."[11]

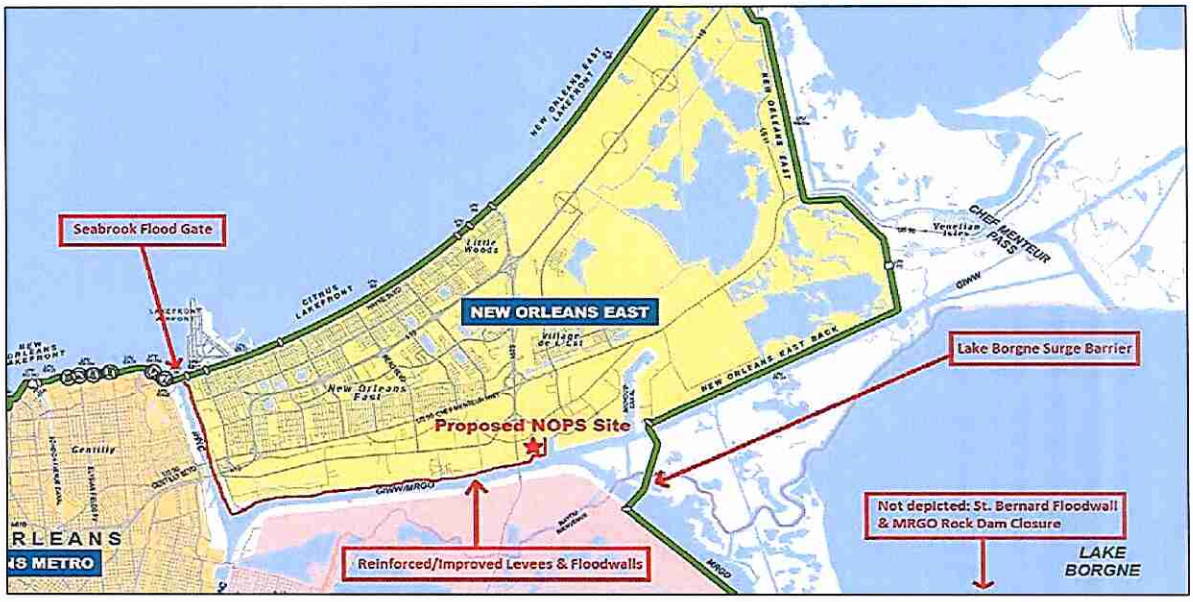
I attach documents from the USACE discussing and depicting these improvements to this Supplemental Direct Testimony as Exhibit JEL-7 (HSDRRS Map) and JEL-8 (New Orleans East HSDRRS Fact Sheet). Additionally, I have provided illustrative graphics that depict the geographic relationship of certain of the HSDRRS measures to the proposed NOPS site, which are attached, collectively, as Exhibit JEL-9. One such depiction is included below:

---

[9] A splash pad is concrete pad poured adjacent to the concrete levee wall that prevents erosion of the underlying foundation of soil, sand and/or clay if flood waters were to overtop the levee wall.

[10] Concrete armoring is a concrete covering of a portion of levee adjacent to the levee, which provides added protection against erosion if flood waters were to overtop the levee.

[11] *See* http://www.mvn.usace.army.mil/Missions/HSDRRS/Risk-Reduction-Plan/100-Year-Level-Protection/.



Q24. BASED ON YOUR KNOWLEDGE OF THE PROJECT AND THE MATTERS DISCUSSED IN YOUR ABOVE TESTIMONY, IS IT YOUR OPINION THAT LOCATING NOPS AT THE PROPOSED SITE WOULD NOT CREATE ANY UNDUE RISK OF DAMAGE TO NOPS OCCURRING DUE TO FLOODING?

A. Yes. I do not believe that locating NOPS at the proposed site will create any undue risk of flooding for the Project. However, the Council should be aware that, although ENO has taken reasonably prudent steps to minimize the risk of NOPS being impacted by flooding, it is not possible to entirely exclude or prevent the possibility of flooding at the proposed NOPS site, or at any site within Orleans Parish. As such, ENO has taken the steps required to purchase insurance to help protect ENO's customers from significant financial impacts related to such risk.

Q25. DOES THIS CONCLUDE YOUR SUPPLEMENTAL TESTIMONY?

A. Yes.

AFFIDAVIT

STATE OF TEXAS

COUNTY OF Montgomery

NOW BEFORE ME, the undersigned authority, personally came and appeared, **JONATHAN E. LONG,** who after being duly sworn by me, did depose and say:

That the above and foregoing is his sworn testimony in this proceeding and that he knows the contents thereof, that the same are true as stated, except as to matters and things, if any, stated on information and belief, and that as to those matters and things, he verily believes them to be true.

Jonathan E. Long

SWORN TO AND SUBSCRIBED BEFORE ME
THIS 15th DAY OF NOVEMBER, 2016

NOTARY PUBLIC

My commission expires: January 27, 2019

TARA SCHWEGLER
Notary Public, State of Texas
My Commission Expires
January 27, 2019

TECHNICAL REPORT - EVALUATION OF GROUNDWATER WITHDRAWAL AND AIR QUALITY

New Orleans Power Station
Entergy New Orleans, Inc.
3601 Paris Road
New Orleans, Louisiana 70129

November 16, 2016

Prepared by:

CK Associates
Environmental Consultants

17170 Perkins Road
Baton Rouge, LA 70810
225-755-1000
CK Project Number: 14005

EXECUTIVE SUMMARY

Entergy New Orleans, Inc. (ENO) has proposed to construct a combustion gas turbine (CT) electric generation facility, referred to as New Orleans Power Station (NOPS), which will be located at the site of the deactivated Michoud Electric Generating Plant (Michoud plant). The proposed NOPS project will produce substantially fewer emissions and utilize substantially less groundwater than the previously active Michoud plant at the same site. Some members of the community have raised concerns regarding environmental impacts of NOPS, especially regarding air quality impacts and subsidence due to groundwater withdrawals.

C-K Associates, LLC and Losonsky & Associates, Inc. conducted an evaluation to address concerns raised and to understand how the proposed NOPS might impact subsidence and air quality in New Orleans East. The evaluation included a review of site-specific information at the Michoud plant as well as available peer reviewed journal articles on subsidence in southeast Louisiana. In particular, a review was conducted of the report released earlier this year by a team from Louisiana State University (LSU) and National Aeronautics and Space Administration (NASA) which used airborne radar to measure subsidence rates from 2009 to 2012.

Subsidence has occurred in New Orleans East and was caused by multiple mechanisms that occur both deep and shallow and act both locally and regionally. This report makes an important distinction between *subsidence* which acts regionally and *differential settlement* which acts locally and causes damage to structures (e.g. buildings and infrastructure). It is possible that groundwater withdrawal has contributed to subsidence adjacent to the Michoud plant, within less than a mile, but it has not contributed to differential settlement (i.e. structural damage) in New Orleans East. Structural damage in New Orleans East is caused by differential settlement likely due to consolidation in shallow sediments due to local dewatering.

The proposed pumping at NOPS will have limited influence on groundwater elevations both regionally and at the Michoud plant and will not cause structural damage.

The following conclusions were drawn based on the evaluation:

1.) **Groundwater withdrawal at the Michoud Plant is not the cause of observed damage to infrastructure in New Orleans East including buildings, roads, and flood protection structures;**

2.) **Groundwater withdrawal associated with NOPS will not exacerbate subsidence or cause damage to infrastructure in New Orleans East; and**

3.) **The emissions from the proposed NOPS will result from combustion of clean burning natural gas; in no case, will the emissions cause air quality to exceed regulatory standards, which are protective of human health and the environment.**

This report was prepared by engineers and scientists familiar with local, regional, and statewide environmental conditions and regulations, who are qualified to discuss the subject matter.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

Entergy New Orleans, Inc. (ENO) has proposed to construct a combustion gas turbine (CT) electric generation facility, referred to as New Orleans Power Station (NOPS), which will be located at the site of the deactivated Michoud Electric Generating Plant (Michoud plant). The proposed NOPS project will produce substantially fewer emissions and utilize substantially less groundwater than the previously active Michoud plant at the same site. Some members of the community have raised concerns regarding environmental impacts of NOPS, especially regarding air quality impacts and subsidence due to groundwater withdrawals.

This technical report was prepared for ENO to address the public concerns regarding the subsidence and air quality associated with NOPS. This report presents analysis, calculations, and references that support the following conclusions:

1. **Groundwater withdrawal at the Michoud Plant is not the cause of observed damage to infrastructure in New Orleans East including buildings, roads, and flood protection structures;**
2. **Groundwater withdrawal associated with NOPS will not exacerbate subsidence or cause damage to infrastructure in New Orleans East; and**
3. **The emissions from the proposed NOPS will result from combustion of clean burning natural gas; in no case, will the emissions cause air quality to exceed regulatory standards, which are protective of human health and the environment.**

The report was prepared by environmental engineers and scientists at C-K Associates, LLC, an engineering firm licensed in the state of Louisiana with support from George Losonsky, Ph.D., P.G. of Losonsky & Associates Inc. The engineer and scientists who prepared this report are familiar with environmental regulations and relevant environmental, air quality, hydrogeologic, and geotechnical subjects and are qualified to prepare this report. In addition, Dr. Losonsky served as a commissioner of the Southeast Louisiana Flood Protection Authority - East from 2007 to 2012 and has detailed understanding of hydrogeologic and geotechnical processes that occur in the greater New Orleans area.

The evaluation in this Technical Report included a review of site specific information at the Michoud plant as well as available peer reviewed journal articles on subsidence in southeast Louisiana. In particular, a review was conducted of the report released earlier this year by a team from Louisiana State University (LSU) and National Aeronautics and Space Administration (NASA) which used remote sensing to measure subsidence rates from 2009 to 2012. A field visit of the Michoud plant was conducted in support of this evaluation.

2.0 SUBSURFACE STABILITY EVALUATION

In recent public meetings, some members of the community have raised concerns that groundwater withdrawals in the vicinity of the Michoud plant have caused problems with subsidence in local residences. Some of these community members have often cited the recent journal article published by a team from Louisiana State University (LSU) and the National Aeronautical Space Administration (NASA) that measured subsidence in the New Orleans area from 2009 to 2012 (i.e. NASA Report). The NASA Report concludes that there is a correlation between subsidence and historic industrial pumping of groundwater in New Orleans East. CK agrees that there is evidence of subsidence in the vicinity of pumping wells on the Michoud Plant property, but this technical report concludes that there is no cause-and-effect relationship between subsidence due to groundwater pumping and structural damage due to differential settlement in residential neighborhoods in New Orleans East. In addition, the NASA report does not present a correlation between structural damage and subsidence. This report will also present evidence that the relatively low groundwater withdrawal rate proposed at NOPS (e.g. 96 gallons per minute) will not contribute to subsidence in New Orleans East.

2.1 Overview of NASA Report

There have been multiple studies in the past several decades focusing on subsidence in the New Orleans area, and of these, the recent NASA Report has attracted significant media and public attention and is worth discussing here. The study included the use of a radar that was mounted to the underside of an aircraft and flown over the study area at an altitude of 12.5 kilometers. The radar equipment used in the study sends and receives radio waves and is able to detect fractional changes in wavelength, which is used to provide information about the earth's surface. For this study two images were created, on 16 June 2009 and 2 July 2012 (1112-day separation). These two images were then used to determine the land surface change during the study period to determine subsidence (Jones, et al 2016).

The result of the study is an image (differential interferogram) that provides information about the vertical velocity (i.e. subsidence) during the study period. In addition, the authors of the study included a discussion and conclusions which considered anthropogenic and geologic factors that may affect the subsidence in the study area. The discussion sections included interpretation of the data, trends from previous studies, and possible causes of the observed subsidence. The conclusions of the report included the following:

- The effects of groundwater withdrawals: *"...groundwater withdrawal is the primary subsidence driver in areas with major industry around the New Orleans(sic), particularly in Norco and Michoud."*
- The effect of shallow surface dewatering: *"dewatering and drainage appears to affect surface elevation...results from InSAR[radar] give an indication of the spatial extent of this phenomenon, which can be mitigated by policy change."*

- The degree and duration of subsidence under new structures: *"...subsidence halts relatively rapidly following surface loading, in < 5 years, with significant declines in rates after 0.5–3 years"*

It is important to note the study did not conclude there is a cause-effect relationship between subsidence and damage to structures including residential homes and levees. The remainder of this section includes a discussion of the subsidence observed in the study, and how it would not have caused structural damage.

2.2 Description of Consolidation Process

Ground settlement on a regional scale is caused by consolidation of subsurface sediments. Ground settlement caused by sediment consolidation is referred to as *consolidation settlement*. Consolidation settlement is distinct from *differential settlement*, which typically refers to changes in the amount of settlement over sufficiently short distances to cause deformation and damage in man-made structures. Various mechanisms cause consolidation settlement over time, as illustrated in **Figure 1**. Consolidation settlement in the New Orleans area began with natural mechanisms soon after sediments were deposited and continued through the present time with a combination of natural and man-made mechanisms.

Water wells at the Michoud plant withdraw groundwater from sediments originating during the most recent ice age, called the Quaternary Ice Age, which began 1.6 million years ago. Over 1,000 vertical feet of sand, silt and clay sediments accumulated through the end of the Quaternary Ice Age 11,000 years ago. (**Figure 1**) (Rogers, J.D., Boutwell, G.P., et al., 2008). A period of sea level rise followed the Ice Age and lasted for about 5,000 years, until approximately 6,000 years before the present. Distributary channels of rivers carrying sediments from the melting glaciers deposited additional sediments during the period of sea level rise. These sediments are currently just below the land surface and they are primarily fine grained deltaic clay and marsh sediments.

The present belongs to the Holocene Interglacial Age, which began with the end of the Quaternary Ice Age 11,000 years before present. During most of the Holocene Age, which continues at the present time, the ground surface has dropped, or subsided, in response to the weight of rapidly deposited sediments, and this subsidence is called *isostatic sag*. Isostatic sag is a broad regional response of the earth's crust to pressure. The crust can also rebound depending on pressure changes, as is the case north of southeast Louisiana, in Mississippi, in response to subsurface changes caused by isostatic sag in southeast Louisiana. Isostatic sag continues in southeast Louisiana today.

Consolidation settlement began while sediment thickness was still building up during the Quaternary Ice Age and continued through the Holocene Age. This mechanism began at depth even as sediments continued to accumulate during the Quaternary Ice Age and has continued throughout the Holocene Age. Consolidation settlement develops in two phases: primary and secondary consolidation. Primary consolidation is the earliest phase of consolidation, attributed wholly to loss of water from the sediments. Subsequent consolidation involves permanent physical changes to the sediment grain structure

caused by various mechanisms collectively referred to as secondary consolidation (Guezo, Y.J.A. et al., 2007; Chen, B.S., and Mayne, P.W., 1994; Olson, R.E., 1989 and references contained within; Barden, L., 1968). During primary consolidation, recently deposited sediments lose water from the pore spaces, which initially represent a large fraction of the total volume of sediment. As the void-to-solid ratio decreases, so does the water pressure. With declining water pressure (hydrostatic stress) inside the pore spaces of the sediment, an increasingly larger fraction of the overburden weight (total stress) has to be supported at the contact points and surfaces between the sand or silt grains comprising the sediment (effective stress). This process continues as newly deposited sediment adds more overburden weight. The grain pack becomes successively stronger as the void-to-solid ratio decreases, which in turn makes the sediment mechanically more stable and diminishes the rate of settlement, as seen in **Figure 1** (Winters, W.J., Dugan, B., and Collett, T.S., 2008).

The onset of secondary consolidation coincides with a rapid decrease in the rate of natural dewatering of the sediments. As the grain pack becomes compact, the rate at which the void-to-solid ratio decreases also diminishes. Eventually the grains can undergo other physical changes that further shorten the thickness of sediment overburden. Large-scale tectonic processes can contribute to secondary consolidation by geologic faulting, which is an ongoing process in the Louisiana Gulf Coast.

Additional causes of secondary consolidation of subsurface sediments are caused by industry and infrastructure in the last 100 years (**Figure 1**). These include hydrocarbon extraction from oil and gas reservoirs in deep subsurface formations, groundwater pumping from aquifers typically hundreds to a few thousand feet deep, land reclamation drainage of shallow sediments mostly no more than 10 feet deep, and loading at the ground surface by buildings.

2.3 Subsidence and Differential Settlement in New Orleans East

It is important to differentiate between subsidence and differential settlement. For purposes of this technical report, subsidence refers to regional consolidation of sediment. Differential settlement is localized consolidation affecting a small area which is often due to local causes. This concept is important when establishing causes of structural damage.

2.3.1 Causes of Differential Settlement in New Orleans East

Extraction of groundwater from subsurface sediments can cause differential settlement if the rate of extraction is sufficiently high to cause a steep deflection of the water table or of the hydraulic pressure (potentiometric) surface of the water-bearing zone or aquifer from which water is extracted. This can occur in the vicinity of water wells, trees, and drain pipes, as shown in **Figure 2.** A water well installed 600 feet deep in a sandy, gravelly aquifer overlain by a layer of clay can create a steep cone of depression of the water table or water pressure surface if pumped at excessive rates of water extraction. This steep cone of depression of the water level near the well can remove enough water from the clay above the aquifer to cause the clay to consolidate, or shrink, becoming less thick. That shrinkage can be large enough to extend upward to the ground surface where it can

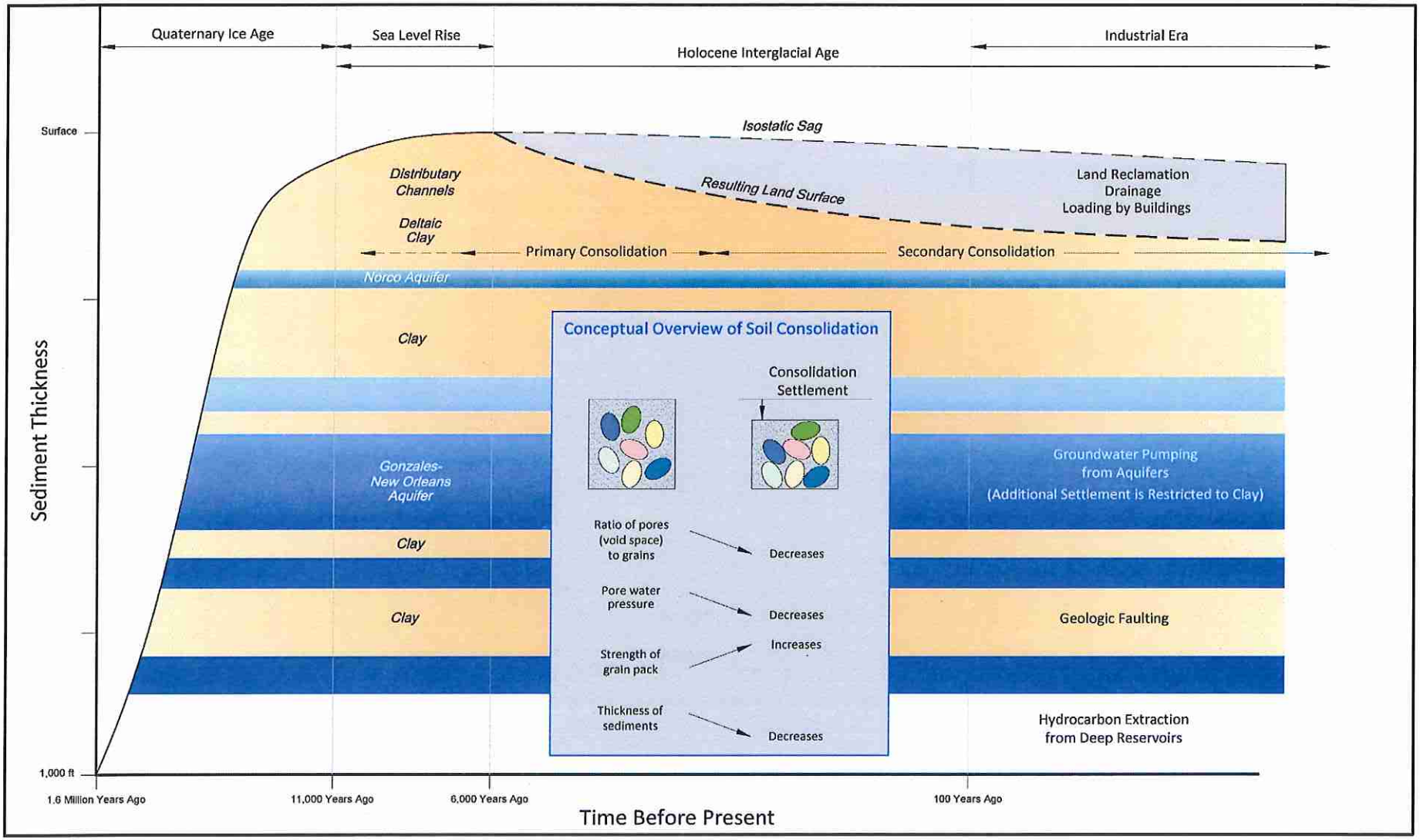


Figure 1 - Soil Subsidence Overview

cause differential settlement affecting buildings, pipe racks, roads and highway overpasses located within several hundred feet of the well. Differential settlement develops when the ground shifts by different amounts between different parts of a structure. Differences in the amount of settlement are caused by changes in the water pressure with distance from the water well within the steep portion of the cone of depression. Beyond several hundred feet of the water well, the water level assumes its natural, basically flat position, which prevents differential settlement.

By contrast, a properly managed well develops only a limited cone of depression by limiting the groundwater extraction rate (**Figure 3**). The water level is kept sufficiently high in the well to limit the gradient within the cone of depression of the water pressure surface around the well. The change in water level at different distances from the well is less pronounced and insufficient to cause differential settlement at the ground surface.

Buildings and other structures at the ground surface adjacent to the well remain undamaged, even within the several hundred-foot radius of the cone of depression. The water level beyond several hundred feet from the well remains in its natural, flat position and cannot damage any structures above. Since the well is unable to cause damage to structures above the steepest part of its cone of depression within several hundred feet of the well, the well cannot cause damage at greater distances.

The effects of water removal from the shallow marsh sediments by tree roots and drains, discussed below, continue unabated regardless of the pumping rate at the deep water well. Damage to homes, sidewalks and roads will continue to be seen as long as shallow dewatering infrastructure (e.g. drains, roots, etc.) remains in place. **Appendix A** includes photographs documenting the absence of structural damage to buildings and infrastructure at the Michoud Plant.

Silty, clayey marsh sediments dominate the shallow subsurface throughout Orleans Parish. Infrastructure related groundwater extraction from these shallow sediments can cause damage throughout the developed metropolitan area, irrespective of the flat water level in the deep aquifer (**Figure 2**). Tree roots within the silty, clayey marsh sediments are known to cause cracks in walls and foundations of homes, besides damaging sidewalks. The damage to homes is not usually caused by tree roots physically uplifting the building foundations just as they lift sidewalks. Instead, groundwater removal by tree roots adjacent to a home creates a cone of depression that extends beneath the house foundation, causing differential settlement and cracking of the foundation and walls of the house.

Drains are common in the reclaimed marsh and much of the Orleans Parish infrastructure cannot exist without continuous dewatering of shallow sediments. Dewatering drains also depress the shallow water table and create changes in water level that can extend under roads running along or over the drains (**Figure 2**). Water level gradients under roads and other infrastructure can cause differential settlement, which is a common problem in developed areas with shallow water, and especially in reclaimed marsh land.

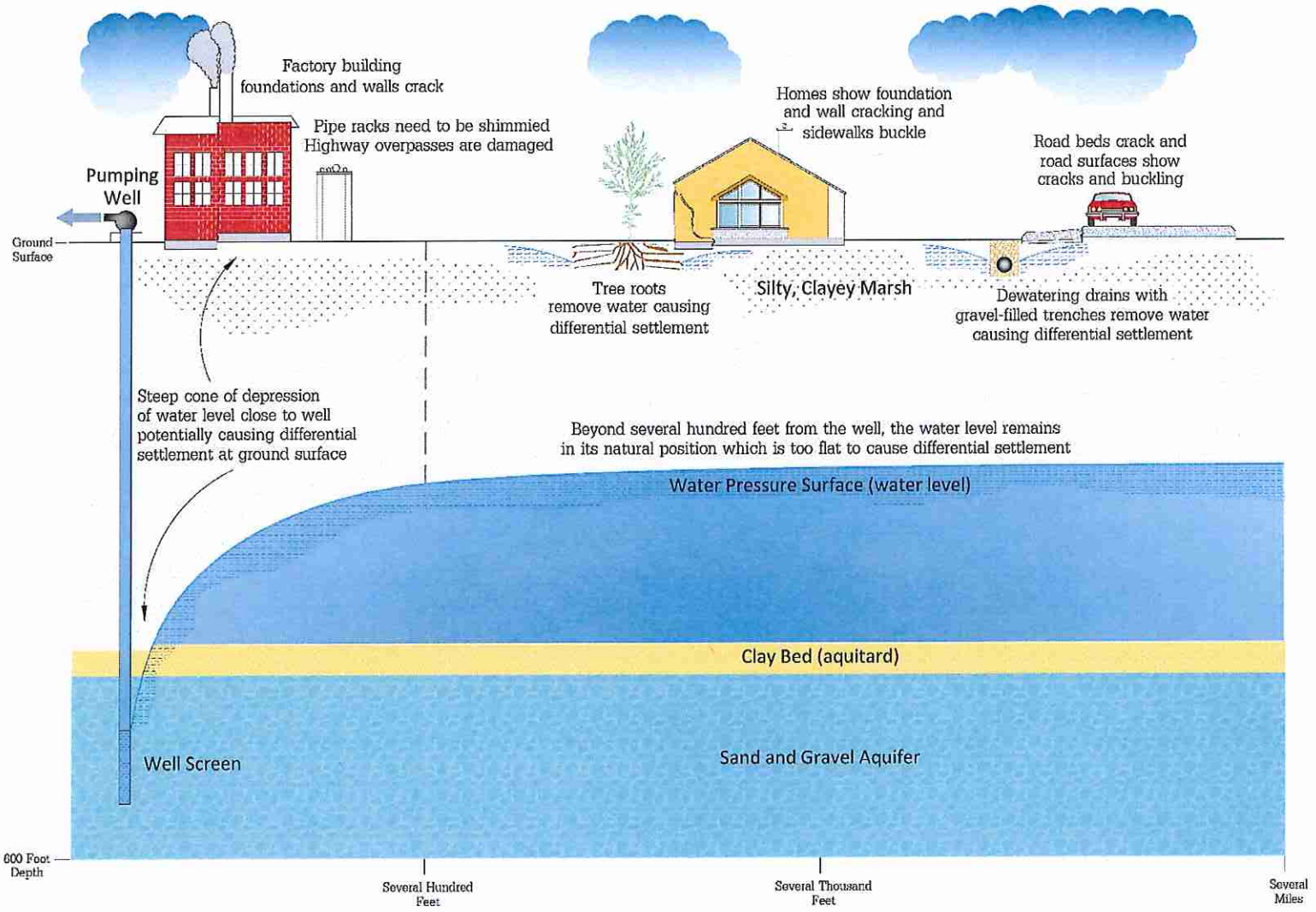


Figure 2 – Deep and Shallow Causes of Differential Settlement

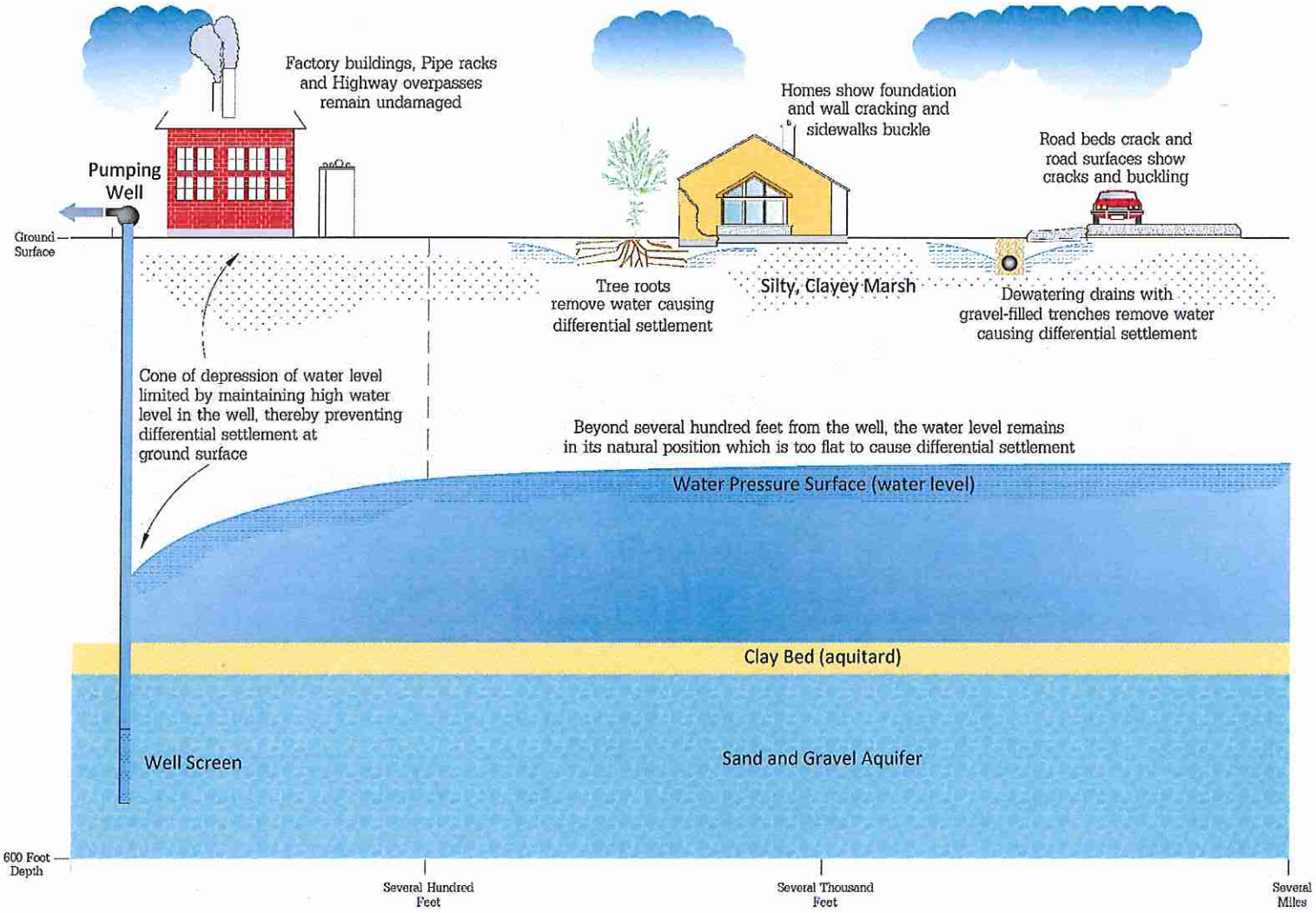


Figure 3 -Differential Settlement in New Orleans East

2.3.2 The Role of Industrial Pumping in New Orleans East on Subsidence and Differential Settlement.

The NASA report concluded there is a connection between subsidence in New Orleans East and groundwater withdrawal. The NASA report included a map of subsidence of the New Orleans area, extending into parts of Jefferson and St. Bernard Parishes, which is included in **Figure 4**. NASA measured subsidence over a 3-year period using remote sensing technology. The map ranks subsidence on a scale of 9 levels from low to high, and it allows comparison of subsidence at the Michoud plant and the surrounding infrastructure and communities with the New Orleans metropolitan area. Subsidence varies throughout the New Orleans area as shown on **Figure 4** from fractions of an inch per year (purple and blue) to more than half an inch per year (green) to an inch or more (yellow and orange). The amount of subsidence varies over short distances on a local scale, creating a pattern of juxtaposed low to medium to high subsidence that pervades the New Orleans area. Three areas that typify this variegated pattern are enclosed by three dashed circles on **Figure 4**. One of the circles is in a residential neighborhood approximately 1.5 miles north of the Michoud plant. The plant shows high subsidence according to the map's scale (shown as a small yellow area). Other (yellow) high subsidence areas are located northeast of the Michoud plant, at the neighboring NASA Michoud Facility. Lower subsidence (denoted by blue and green) define a saddle of lower subsidence between the Michoud plant and its neighboring NASA Michoud Facility. This indicates the limited aerial extent of the high subsidence associated with the Michoud plant. Likewise, the (yellow) area of high subsidence at the Michoud plant is separated from the residential areas to the north by a belt of low subsidence (denoted mainly by blue).

The rate of regional subsidence over a three-year period displayed in **Figure 4** reflects the rate of subsidence from 2009 and 2012. As water levels continue to rise in the Gonzales – New Orleans aquifer the rate of subsidence will diminish over time. A similar map produced in future decades may show lower subsidence than the current map. The increase in water pressure caused by rising water levels will cause a negative rate of change of subsidence.

An evaluation of land subsidence by Dial and Tomaszewski (1988) states (on page 31) that "The drainage of swamps and marshy areas for development of suburban areas in Jefferson Parish has caused the most dramatic short-term problem of land subsidence. Differential subsidence of up to 3.3 ft was reported in some areas by Snowden and others (1977, p. 173)" Dial and Tomaszewski (1988) further report that most of the 1.7 feet of subsidence measured in downtown New Orleans between 1938 and 1964 (Kazmann and Heath, 1968, p. 111) was attributed by Kazmann and Heath (1968) to water level decline in the Gonzalez-New Orleans aquifer. According to Dial and Tomaszewski (1988), "They [Kazmann and Heath, 1968] concluded that the ratio of land subsidence to water-level decline was 1 ft of subsidence for every 50 ft of water-level decline...Since the early 1970's, pumpage in the New Orleans area has declined and water levels have been recovering."

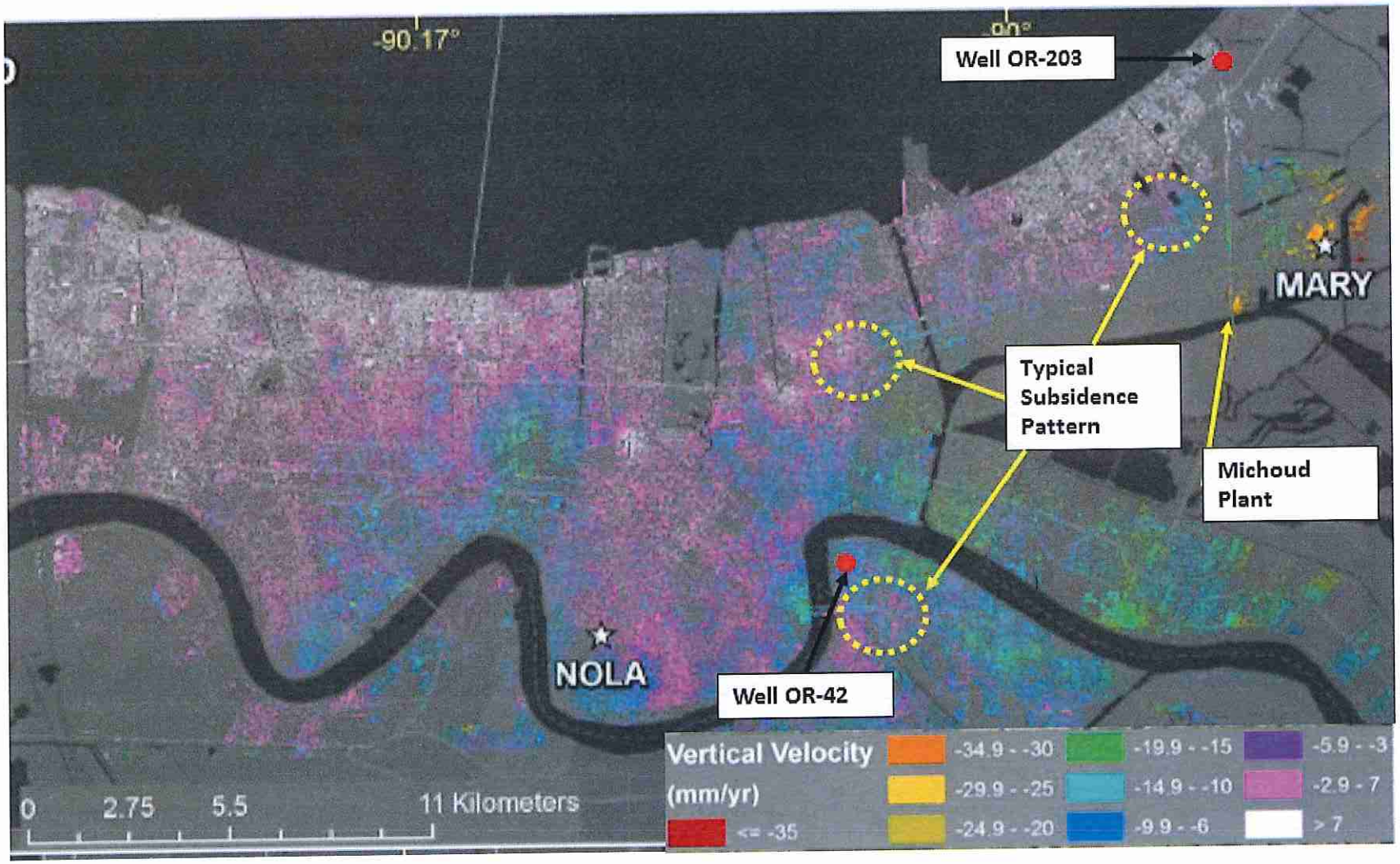


Figure 4 -Subsidence Rates in Greater New Orleans (adapted from Jones et al, 2016 and Prakken, 2008)

2.4 Water Levels and Groundwater Use Trends in Orleans Parish

Industry has been extracting groundwater from the Gonzales-New Orleans aquifer for many decades since the early part of the 20th century. Average annual groundwater extraction rates by industry are compared to changes in water level in the chart shown in **Figure 5**. Groundwater extraction by industry in Orleans Parish has been on the decline since the mid-1980s, and water levels in the Gonzales–New Orleans aquifer have been increasing since the late 1960s as demonstrated by wells OR-42, OR-203, and OR-175 (USGS 2016). Groundwater use in Orleans Parish remained steady throughout the 1960s and 1970s, during which time the water level in the Gonzales-New Orleans aquifer changed markedly, first declining and then abruptly changing to a steady increase in water level in the late 1960s. Water levels have continued to rise at a fairly steady rate since then, yet groundwater extraction began to decline abruptly after 1985. The change in trend in one parameter while the other remains constant indicates the absence of a direct connection between water well operation and water levels in the Gonzales-New Orleans aquifer.

The return to pre-1950's water levels in the last three decades (**Figure 5**) has stabilized the Gonzales-New Orleans aquifer and overlying clay aquitard layers, making them less prone to consolidation. Higher hydrostatic stress resulting from rising water levels stabilizes the grain structure of the sediments by decreasing effective stress between adjacent grains. The absence of significant new sediment deposition, which is prevented by the engineering control of the Mississippi River, ensures that total stress remains essentially unchanged, so an increase in hydrostatic stress is accompanied by a decrease in effective stress.

Figure 5 demonstrates the regional nature of the Gonzales–New Orleans Aquifer. The aerial extent of the aquifer is very large and covers several parishes which contain other industries that extract groundwater from the Gonzales-New Orleans aquifer. Long-term changes in water level will be influenced not only by Orleans Parish industries, but other industrial centers as well. Global influences on sea level rise and precipitation patterns will likewise influence long-term water level trends.

2.5 Impact of Proposed Pumping Rates

In 1983, there were approximately 200 wells in the Gonzalez-New Orleans aquifer along the Mississippi River stretching from St. Charles to St. Bernard parishes. About half of these wells had flow rates in the range of 1,000 to 2,000 gallons per minute (gpm) (Dial, 1983). The proposed pumping rate at NOPS is significantly below that range (about 100 gpm).

The proposed NOPS will include plans to extract groundwater from one of two wells currently located at the facility (i.e. Well # 5 and Well #6). As part of routine facility maintenance, pumping tests were conducted on the groundwater wells in 2013 and 2015. Four tests were conducted on each well and the specific capacity of each well was calculated. The specific capacity has units of gpm per foot (gpm/ft) and provides an

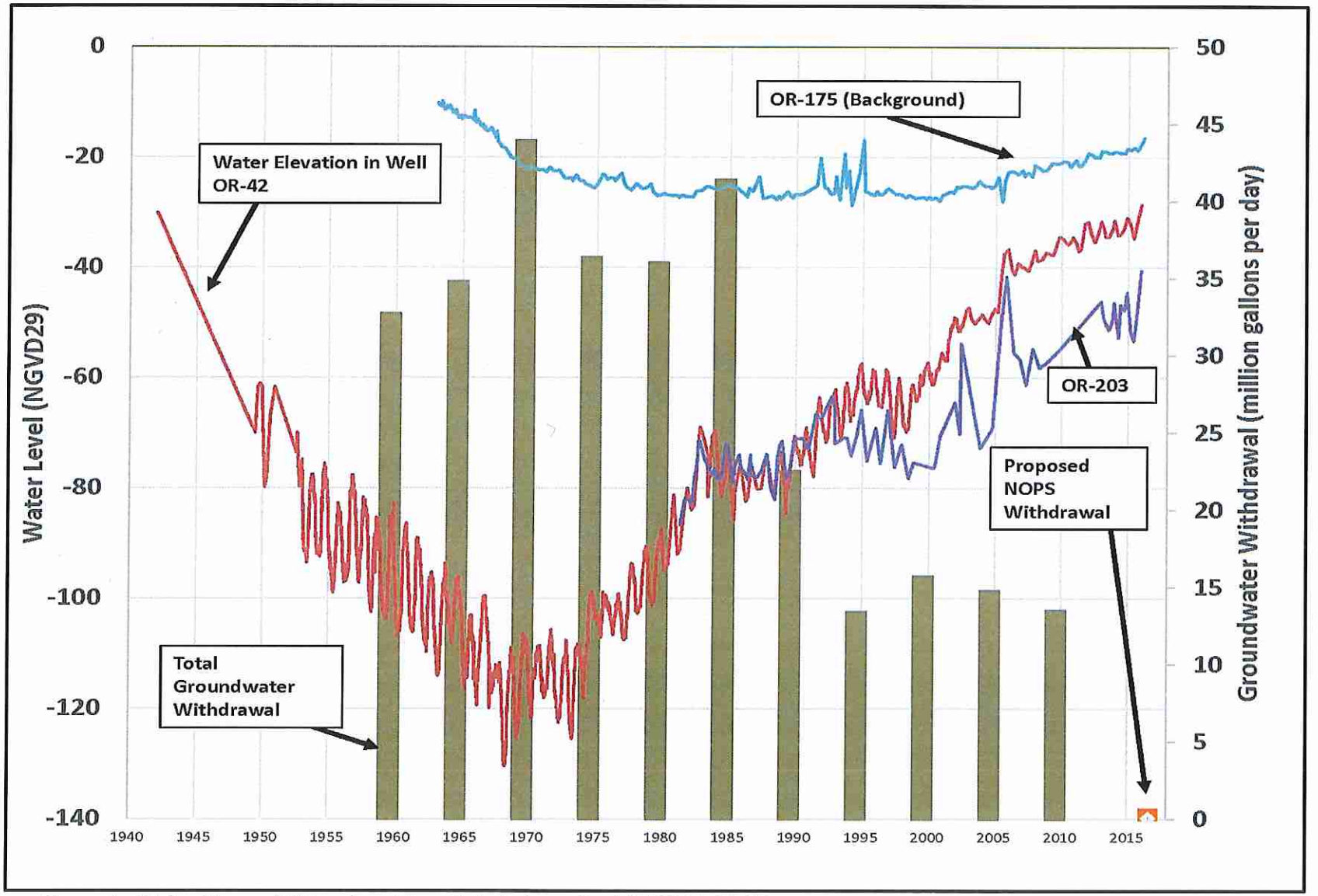


Figure 5 - Water Use and Water Level Trends in Orleans Parish (USGS, 2016)

estimate of drawdown in a well at a given flow rate. The specific capacity of Well # 5 ranged from 36.4 to 38.6 gpm/ft and from 41.8 to 49.7 gpm/ft for Well #6. Based on specific capacity, drawdown in the pumping well is expected to be between 1.9 and 2.6 ft at the planned flow rate of 96 gpm.

The anticipated drawdown is relatively low and is within the range of natural variation of water level due to a number of natural causes including rainfall, river stage, or drought. As noted above, the water level in the New Orleans area has been on the rise since the 1970s and a rise in water level will reduce the rate of subsidence.

2.6 Summary and Conclusions

Subsidence has been measured on a regional scale throughout the parishes comprising the New Orleans metropolitan area. Geologist and earth scientist have long been known that groundwater extraction can cause subsidence in the vicinity of water wells producing at a high rate. This subsidence is largely restricted to the vicinity of the water well or well field. Geological and hydrological study of the southeastern Louisiana Gulf Coast has led to consensus in at least the last 30 years that natural processes after the last Ice Age have caused the earth's crust to adjust by subsidence due to isostatic sag in the last 6,000 years, and the sea level to begin rising immediately after the end of the Quaternary Ice Age 11,000 years before present. These natural processes have caused and will continue to cause widespread subsidence throughout the New Orleans metropolitan area.

The rate of subsidence and changes in the rate of subsidence are influenced by a combination of global, regional and local conditions. As a result, the magnitude of subsidence exhibits a high degree of localized variability on the scale of the New Orleans metropolitan area.

The fundamental mechanism for subsidence is the same for both natural and infrastructure-related causes. Total stress on subsurface sediments, created by the weight of overburden, is supported by the combination of water pressure, which creates hydrostatic stress, and pressure at grain-to-grain contacts, which represents effective stress. After deposition, sediments naturally expel some of the pore water, which reduces the hydrostatic stress that helps support the sediment grain pack. Since total stress remains essentially constant during the dewatering, the effective stress must increase to balance the loss of hydrostatic stress. Sediment grains rotate and rearrange to form a more compact grain pack in response to these pressure changes. As the grain pack becomes more compact, the effective stress between grains increases and the whole grain pack becomes stronger. A stronger grain pack will exhibit less strain in response to additional consolidation, and therefore the rate of subsidence decreases steadily with time as consolidation advances from primary to secondary stages. Once new sediment accumulation at the ground surface or on the sea floor stops, geotechnical models for predicting the degree of subsidence that can be expected in response to sediment dewatering may be generally useful but typically use simplifying assumptions that lead to overly conservative conclusions. For example, many models assume that water leaves clay aquitard layers between sand aquifers by moving strictly in the vertical direction, which leads to maximum efficiency of removal of all water from the aquitard system.

Instead, water is known to move within clay aquitards through fracture networks and therefore it has horizontal components of flow which allows some water to redistribute within the clay rather than moving straight down into the underlying aquifer.

The total amount of subsidence at the Michoud plant includes regional subsidence caused by ongoing natural, global and regional mechanisms, and any marginal increase in subsidence caused by groundwater extraction at the Michoud plant has been too small to develop differential settlement that could cause damage to buildings and other infrastructure. Furthermore, long term rise in water levels in the Gonzales-New Orleans aquifer will slow down or eliminate any contribution of consolidation settlement within that aquifer to subsidence in the New Orleans metropolitan area.

Of greater importance in affecting the structural stability of buildings and infrastructure than deep aquifer pumping is shallow water extraction from silty, clayey marsh sediments near the ground surface that are dewatered for the purpose of land reclamation and maintenance by drainage. Tree roots and underground drain pipes cause damage due to differential settlement of buildings, homes, sidewalks, roads and other infrastructure by differential settlement resulting from a variety of shallow infrastructure features throughout the New Orleans metropolitan area.

Based on the evaluation presented herein the following conclusions are made:

1.) **Groundwater withdrawal at the Michoud Plant is not the cause of observed damage to infrastructure in New Orleans East including buildings, roads, and flood protection structures; and**

2.) **Groundwater withdrawal associated with NOPS will not exacerbate subsidence or cause damage to infrastructure in New Orleans East.**

3.0 Air Emissions Evaluation

Under the Clean Air Act, the Environmental Protection Agency (EPA) is required to regulate emission of pollutants to protect public health and welfare. State and local governments also monitor and enforce Clean Air Act regulations, with oversight by the EPA. The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The EPA has set NAAQS (limits) for six principal pollutants, which are called "criteria" air pollutants. They are particle pollution (often referred to as particulate matter, PM_{10} and $PM_{2.5}$), photochemical oxidants and ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead.

The NOPS air emissions from combustion equipment must comply with NAAQS. The CT plant equipment will include a natural gas combustion turbine and supporting equipment (e.g. an emergency generator and a firewater pump). The CT plant will also require a permit issued by the Louisiana Department of Environmental Quality (LDEQ). The air permit will set emission limit controls and requirements for testing.

3.1 Proposed Air Emissions

The CT plant total annual air emissions will be significantly lower for all criteria air pollutants than the previous Michoud Electric Generating Plant due to lower electrical generation power (e.g. 246 MW versus 913 MW when all three Michoud units were operating), lower operating hours (e.g. 4,000 hours/year) as a gas-fired peaking unit, and newer technology resulting in lower emission factors. **Table 1** compares the air emissions of the previous versus the new CT plants for all criteria pollutants. This table shows the reduction in air emissions range from 50% for Volatile Organic Compounds (VOC) to 97% for Nitrogen Oxides (NOx).

3.2 Screening Level Air Modeling

The LDEQ has emission thresholds that require permit applicants to perform environmental modeling during the permitting process. Because NOPS is below the LDEQ air standards threshold, LDEQ does not require air dispersion modeling for NOPS. Nevertheless, CK conducted a voluntary screening level air dispersion model to understand ground-level concentration exposure to the public using conservative assumptions. In order to compare with the NAAQS, ground level concentrations are estimated based on the maximum emission rates of the equipment. The air dispersion models can be used effectively to estimate the downwind ambient concentration of air pollutants emitted from the CT plant equipment sources. The atmospheric dispersion modeling is the mathematical simulation of how air pollutants disperse in the ambient atmosphere. It is performed with computer programs that solve the mathematical equations and algorithms which simulate the pollutant dispersion.

EPA preferred models include AERSCREEN for screening analysis and AERMOD for refined model simulations. AERSCREEN is the recommended screening model that will produce conservative impact estimates without the need for actual hourly meteorological or detailed terrain data. If air quality evaluated using AERSCREEN passes the appropriate standards (e.g. NAAQS) there is no need for additional modeling (e.g. Refined AERMOD). AERSCREEN model will produce estimates of "worst-case" 1-hour concentrations for a single source, based on a matrix of meteorological conditions and also includes conversion factors to estimate "worst-case" 3-hour, 8-hour, 24-hour, and annual concentrations. AERSCREEN is intended to produce concentration estimates that are equal to or greater than the estimates produced by AERMOD with a fully developed set of actual meteorological and terrain data, but the degree of conservatism will vary depending on the application.

The AERSCREEN model was developed to provide an easy-to-use method of obtaining pollutant concentration estimates. To perform a modeling study using AERSCREEN, data for the following input requirements must be supplied:

- Source Type (Point, Flare, Area or Volume);

- Physical Source and Emissions Characteristics (emission rate, stack height, stack diameter, stack gas exit velocity and temperature, and receptor height above ground);
- Meteorology (surface characteristics, ambient temperatures, minimum wind speed, and anemometer height);
- Building downwash; and
- Terrain (flat, elevated and complex terrain).

The stack parameters and emission rates employed in the modeling analysis are included in **Table 2.** Also, the parameters used for the development of the meteorological data set is included in **Table 2**.

The AERSCREEN model is an EPA-approved model that includes very conservative modeling assumptions. For comparison, two situations were considered: 1) the proposed NOPS, and 2) a hypothetical outdoor gathering with a 2 KW home generator. It is assumed the generator is gasoline powered and placed 30 feet from the nearest person.

Table 3 shows the AERSCREEN modeling outputs of NOPS maximum ground-level concentrations compared to the NAAQS. Several averaging periods are considered based on the form of the NAAQS standard. NOPS is at least 96% below the NAAQS for all modeled chemicals. The modeling included conservative assumptions, but in general demonstrates the personal ground-level exposure due to the NOPS emissions will be well below the applicable air standards.

The second situation modeled was meant to provide a perspective of the exposure levels in everyday life (i.e. a home generator, or vehicle exhaust). **Table 3** shows the AERSCREEN model results of a small home generator compared to NOPS. The results demonstrate that in some cases the exposure from other "everyday" sources are much higher than the exposure due to NOPS' emissions and could exceed the NAAQS.

3.3 Summary and Conclusions

The following conclusions were made based on the analysis presented herein:

- No new chemicals will be released due to NOPS when compared to the historical operations of the Michoud plant;
- Chemicals emitted are consistent with natural gas combustion;
- Emissions are dissipated before they reach the fence line to concentrations much below the limits for public breathing level air (NAAQS); and
- The new NOPS CT plant will represent a significant reduction in emissions when compared to the previous operations.

In summary; **the emissions from the proposed NOPS will result from combustion of clean burning natural gas; in no case, will the emissions cause air quality to exceed regulatory standards, which are protective of human health and the environment.**

4.0 CLOSURE

Based on the information presented in this technical report, it has been demonstrated that differential settlement, which has caused structural damage observed on buildings and infrastructure throughout New Orleans East, is not causally related to subsidence due to groundwater pumping at the Michoud plant, and is instead more likely influenced by shallow subsurface factors related to dewatering and vegetation.

The NOPS air emissions will have significantly lower emissions in all criteria air pollutants than the previous Michoud Electric Generating Plant due to lower electrical generation power, lower operating hours as a gas fired peaking unit, and newer technology resulting in lower emission factors. Based on the AERSCREEN model approved by the EPA using very conservative assumptions, the results demonstrate that the personal ground-level exposure due to the CT Plant's emissions will be well below the applicable air standards.

While this technical report addresses many technical concepts, the conclusions of the evaluation can be summarized as follows:

1.) **Groundwater withdrawal at the Michoud Plant is not the cause of observed damage to infrastructure in New Orleans East including buildings, roads, and flood protection structures;**

2.) **Groundwater withdrawal associated with NOPS will not exacerbate subsidence in New Orleans East; and**

3.) **The emissions from the proposed NOPS will result from combustion of clean burning natural gas; in no case, will the emissions cause air quality to exceed regulatory standards, which are protective of human health and the environment.**

5.0 WORKS CITED

Barden, L., 1968, *Primary and Secondary Consolidation of Clay and Peat*, Geotechnique, Vol. 18, pp. 1-24.

Chen, B.S., and Mayne, P.W., 1994, *Profiling the Overconsolidation of Clays by Piezocone Tests*, National Science Foundation Report No. GIT-CEEGEO-94-1, Georgia Institute of Technology School of Civil and Environmental Engineering, 280 pp.

Dial, D.C., and Sumner, D.M., 1989. Geohydrology and Simulated Effects of Pumpage on the New Orleans Aquifer System at New Orleans, Louisiana, State of Louisiana Department of Transportation and Development in cooperation with the

Department of the Interior, U.S. Geological Survey, Water Resources Technical Report No. 46, Baton Rouge, 1989, 54 pp.

Dial, D.C., 1983. Ground-Water Data for the Mississippi River Parishes in the Greater New Orleans Area, Louisiana, Department of the Interior, U.S. Geologic Survey in cooperation with the Louisiana Department of Transportation and Development, Office of Public Works, Water Resources Basic Records Report No. 11, 1983, 47 pp.

Dial, D.C., and Tomaszewski, D.J., 1988. Geohydrology, Water Quality, and Effects of Pumpage on the New Orleans Aquifer System, Northern Jefferson Parish, Louisiana, U.S. Geological Survey in cooperation with the Jefferson Parish Department of Water, Water-Resources Investigations Report 88-4097, Baton Rouge, 1988, 34 pp.

Guezo, Y.J.A., et al., 2007, *Stress and Stress Path Dependence of the Recompression Index (Cr) for an Over Consolidated Clay Soil*, Proceedings of CIGMAT-2007 Conference & Exhibition, Houston, TX, pp. 1-2

Jones, C. E., K. An, R. G. Blom, J. D. Kent, E. R. Ivins, and D. Bekaert (2016), Anthropogenic and geologic influences on subsidence in the vicinity of New Orleans, Louisiana, J. Geophys. Res. Solid Earth, 121, 3867–3887, doi:10.1002/ 2015JB012636.

Olson, Roy. E., 1989, *Secondary Consolidation, Unit 7 in:* Advanced Soil Mechanics, Department of Construction Engineering, Chaoyang University of Technology, pp. 99-119.

Prakken, L. B. Groundwater Resources in the New Orleans Area, Water Resources Technical Report No. 80; Louisiana Department of Transportation and Development in cooperation with U.S. Geological Survey., 2008

Rogers, J.D., Boutwell, G.P., Schmitz, D.W., Karadeniz, D., Watkins, C.M., Athanasopoulos-Zekkos, A.G., and Cobos-Roa, D., 2008. *Geologic Conditions Underlying the 2005 17th Street Canal Levee Failure in New Orleans*, Journal of Geotechnical and Geoenvironmental Engineering, Vol. 134, No. 5, pp. 583-601.

United States Geological Survey, Louisiana Water Science Center, online data for water use and groundwater well elevations. http://la.water.usgs.gov/ Accessed August 2016.

Winters, W.J., Dugan, B., and Collett, T.S., 2008. *Physical properties of sediments from Keathley Canyon and Atwater Valley, JIP Gulf of Mexico gas hydrate drilling program*, Marine and Petroleum Geology, Vol. 25, pp. 896-905.

TABLE 1

Table 1
Air Emissions Summary
New Orleans Power Station

Constituent	Constituent Identifier	Emissions Allowed Under Current Permit (Ton/Year)	Proposed NOPS Permit Limits[1] (Ton/Year)	Difference Between Existing Permit and Proposed NOPS Limits (Tons/Year)	Percent Reduction
Particulate Matter Less than 10 microns	PM_{10}	283.55	13.97	-269.58	**95%**
Particulate Matter Less than 2.5 microns	$PM_{2.5}$	283.55	13.97	-269.58	**95%**
Sulfur Dioxide	SO_2	22.55	7.40	-15.15	**67%**
Nitrogen Oxides -	NO_X	8596.89	275.28	-8321.61	**97%**
Carbon Monoxide	CO	3132.22	657.48	-2474.74	**79%**
Volatile Organic Compounds	VOC	205.35	102.99	-102.36	**50%**
Particulate Lead	LEAD	0.02	0	-0.02	**100%**

[1] Proposed permit limits based on information included in July 22, 2016 submittal to Louisiana Department of Environmental Quality

TABLE 2

Table 2
Screening Model Inputs Summary
New Orleans Power Station

Source ID	Stack Height (ft)	Exit Temperature (°F)	Exit Velocity (fps)	Stack Diameter (ft)	NOx (lb/hr)	CO (lb/hr)	$PM_{10/2.5}$ (lb/hr)	SO_2 (lb/hr)	Benzene (lb/hr)	Formaldehyde (lb/hr)
Turbine	135	1197	187.3	21	145.41	328.18	6.89	3.86	0.038	2.231
Firewater Pump	9	1056	51	0.67	0.02	1.65	0.10	0.003	0.002	0.002
Emergency Generator	13	1015	293.7	0.83	0.203	11.53	0.67	0.02	0.011	0.001
2 kW Home Generator	3	900	0.138	3.28	0.04	2.69	0.0019	0.0016	<0.001	<0.001

[1]24-Hour averaging period for $PM_{2.5}$ modeled using the total emitted from the emergency units for testing in a 24-hour period.

Minimum Wind Speed (m/s)	Anemometer Height (m)	Surface Albedo	Bowen Ratio	Surface Roughness Length (m)
0.5	10	0.15	0.21	0.088

TABLE 3

Table 3
Screening Model Results
New Orleans Power Station

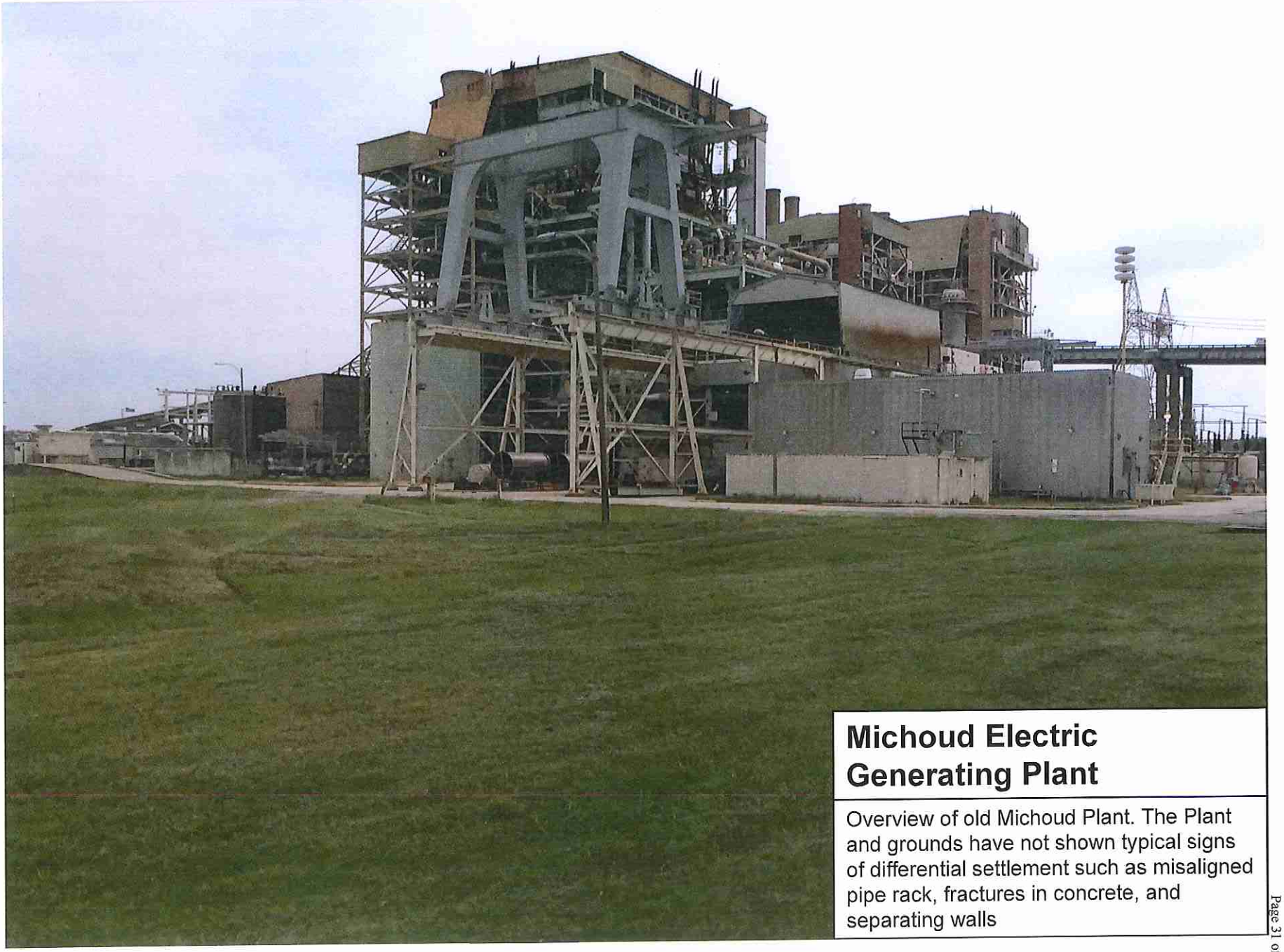
Constituent	Constituent Identifier	Averaging Period	Model Predicted Concentration		NAAQS (ug/m^3)
			Situation 1 – Proposed NOPS (ug/m^3)	Situation 2 – Home Gathering with Generator (ug/m^3)	
Particulate Matter Less than 10 microns	PM_{10}	24 – Hour	0.58	6.52	150
Particulate Matter Less than 2.5 microns	$PM_{2.5}$	24- Hour	0.58	6.52	35
		Annual	0.04	1.09	12
Sulfur Dioxide	SO_2	1-Hour	0.23	9.14	196
		3-Hour	0.41	9.14	1,300
		24-Hour	0.25	5.49	365
		Annual	0.02	0.91	80
Nitrogen Oxides -	NO_X	1 Hour	6.74	182.88	188
		Annual	0.63	17.15	100
Carbon Monoxide	CO	1-Hour	151	15,373	40,000
		8-Hour	136	**13,836**	10,000
Benzene		Annual	0.014	0.011	12
Formaldehyde		Annual	0.015	0.011	7.69

NOTES:
NAAQS = National Ambient Air Quality Standard
1 – values bolded exceed the NAAQS

APPENDIX A

Michoud Electric Generating Plant Pumping Well

This well was used for pumping at old Michoud Plant. This same well will be used for operation at NOPS, but total withdrawal will be reduced by 90 to 99%. Note: Lack of differential settlement in the vicinity of the well and in following pictures.



Michoud Electric Generating Plant

Overview of old Michoud Plant. The Plant and grounds have not shown typical signs of differential settlement such as misaligned pipe rack, fractures in concrete, and separating walls

Building at Michoud Electric Generating Plant

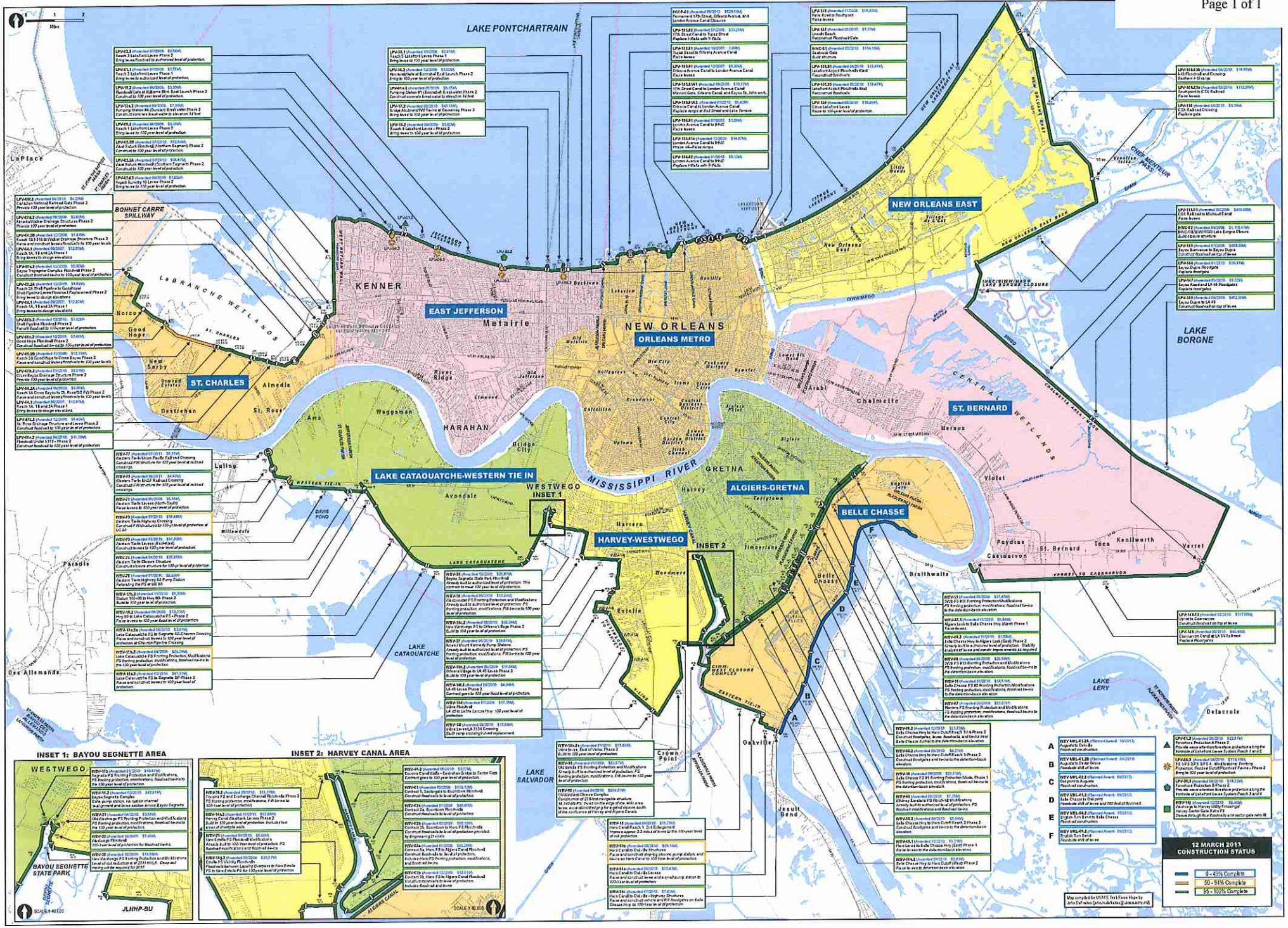
Sidewalk, building foundation, and walls are not experiencing settlement. This building is within 50 feet of the groundwater pump (just to the right of the photo)

Building at Michoud Electric Generating Plant

Sidewalk, parking lot, and building foundation are not experiencing settlement

GREATER NEW ORLEANS HURRICANE AND STORM DAMAGE RISK REDUCTION SYSTEM (HSDRRS)

Lake Pontchartrain and Vicinity (LPV)/Westbank and Vicinity (WBV) Construction Status: 12 March 2013

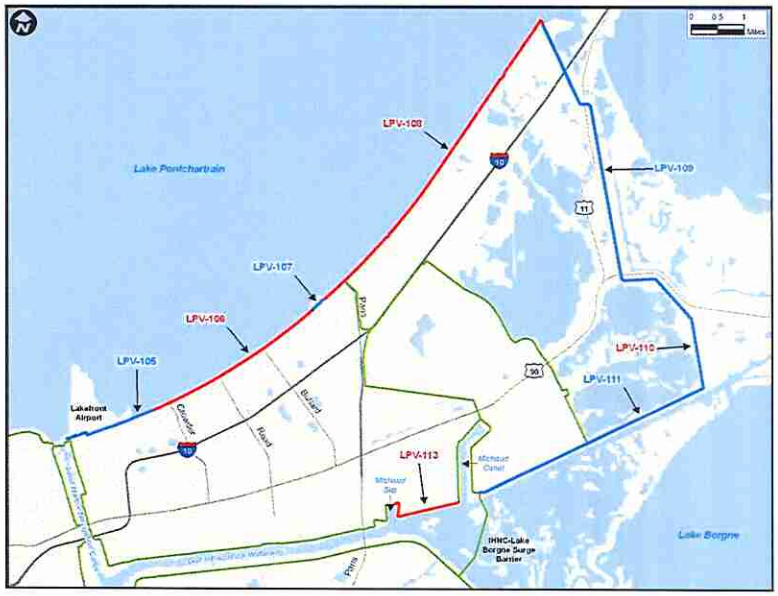


NEW ORLEANS EAST

Updated May 2015

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**

Public safety is the Corps of Engineers' top priority. Congress has fully authorized and funded the Hurricane and Storm Damage Risk Reduction System (HSDRRS) for southeast Louisiana. The $14.45 billion HSDRRS includes five parishes and consists of 350 miles of levees and floodwalls; 73 non-Federal pumping stations; 3 canal closure structures with pumps; and 4 gated outlets.



Project Summary

The perimeter system in New Orleans East stretches from the eastern end of the Inner Harbor Navigation Canal (IHNC) along Lake Pontchartrain to the northeast, continues southeast to the Gulf Intracoastal Waterway, southwest to the Michoud Slip and then ties in to the IHNC Surge Barrier. The structural features reduce the risk associated with a storm surge event that has a one percent chance of occurring in any given year, or a 100-year storm surge. The total construction value for the New Orleans East perimeter system is an estimated $1 billion.

Project Features

Approximately 25 miles of levee have been raised and approximately 2 miles of floodwall have been constructed around the perimeter of New Orleans East. Along the New Orleans East lakefront near the Lakefront Airport, a new concrete T-wall and a vehicle gate at Downman Road (LPV 105) were constructed. Between the Lakefront Airport and Paris Road, the existing embankment was raised with a 2 to 4 foot high floodwall (LPV 106) and a new T-wall and access gate were constructed at Lincoln Beach (LPV 107). Between Paris Road and Southpoint, the existing levee was raised and T-walls were constructed at the Collins Pipeline Crossing. All features along the New Orleans East lakefront are at an elevation of between 15 and 18 feet above sea level.

On the eastern edge of New Orleans East between Southpoint and the CSX Railroad, the existing levee was raised and vehicle gates (LPV 109.02a&c) were constructed. In order to raise the levee expeditiously, innovative construction techniques - wick drains and a sand drainage blanket - were used to strengthen and consolidate the underlying soil. Vehicle gates were also built at Highway 90 and Highway 11, and Interstate 10 was raised where it crosses the levee (LPV 109.02b). The entire LPV 109 stretch was raised to an elevation between 16.5 and 25 feet above sea level.

At the CSX Railroad crossing, a 27.5 foot high gate (LPV 110) was constructed. Between the CSX Railroad and the Michoud Canal, the existing levee and T-wall around Drainage Pump Station 15 were raised and a floodwall to tie into the Inner Harbor Navigation Canal-Lake Borgne Surge Barrier (LPV 111) was constructed. In order to strengthen the underlying soil, deep soil mixing (a process that involves injecting a cement-water mixture deep into the native soil and mixing it with the soil) was used to strengthen the levee's foundation. The levee and floodwalls in this location were raised to an elevation of between 25 and 32 feet above sea level. Further west, between the Michoud Canal and the Michoud Slip, the existing levee was raised to 19.5 feet above sea level (LPV 113).

-Over-

U.S. ARMY CORPS OF ENGINEERS – TEAM NEW ORLEANS
7400 Leake Avenue, New Orleans, LA 70118 | www.mvn.usace.army.mil
Visit the following links to follow us on Facebook, Twitter and Flickr:
www.facebook.com/usacenola
www.twitter.com/teamneworleans
www.flickr.com/teamneworleans

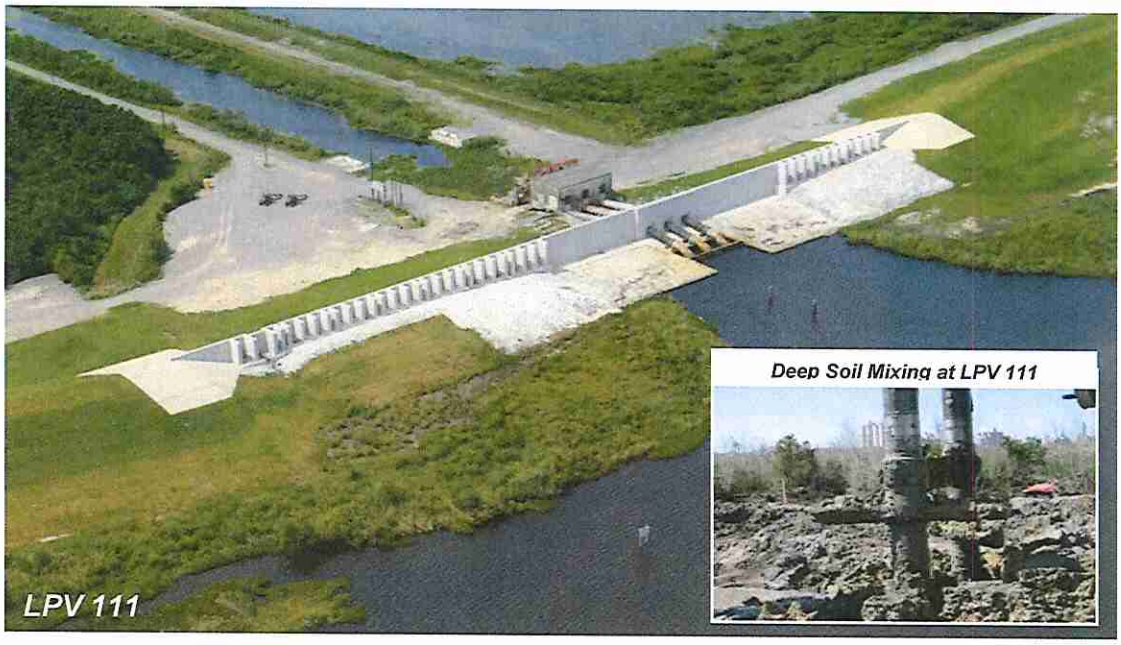
NEW ORLEANS EAST

Updated May 2015

U.S. ARMY CORPS OF ENGINEERS **BUILDING STRONG®**

Project Status
All 100-year level risk reduction features in the New Orleans East perimeter system were completed in June 2011.


Interstate 10 Crossing at LPV 109



U.S. ARMY CORPS OF ENGINEERS – TEAM NEW ORLEANS
7400 Leake Avenue, New Orleans, LA 70118 | www.mvn.usace.army.mil
Visit the following links to follow us on Facebook, Twitter and Flickr:
www.facebook.com/usacenola
www.twitter.com/teamneworleans
www.flickr.com/teamneworleans


Lake Borgne Surge Barrier
Not depicted: St. Bernard Floodwall & MRGO Rock Dam Closure
LAKE BORGNE
CHEF MENTEUR PASS
Venetian Isles
GIWW
NEW ORLEANS EAST
NEW ORLEANS EAST BACK
MRGO
NEW ORLEANS EAST LAKEFRONT
NEW ORLEANS EAST
Village de L'Est
Little Woods
Proposed NOPS Site
Reinforced/Improved Levees & Floodwalls
GIWW/MRGO
IHNC
Seabrook Flood Gate
LAKEFRONT AIRPORT
Gentilly
ELYSIAN FIELDS AV
LONDON AVENUE CANAL

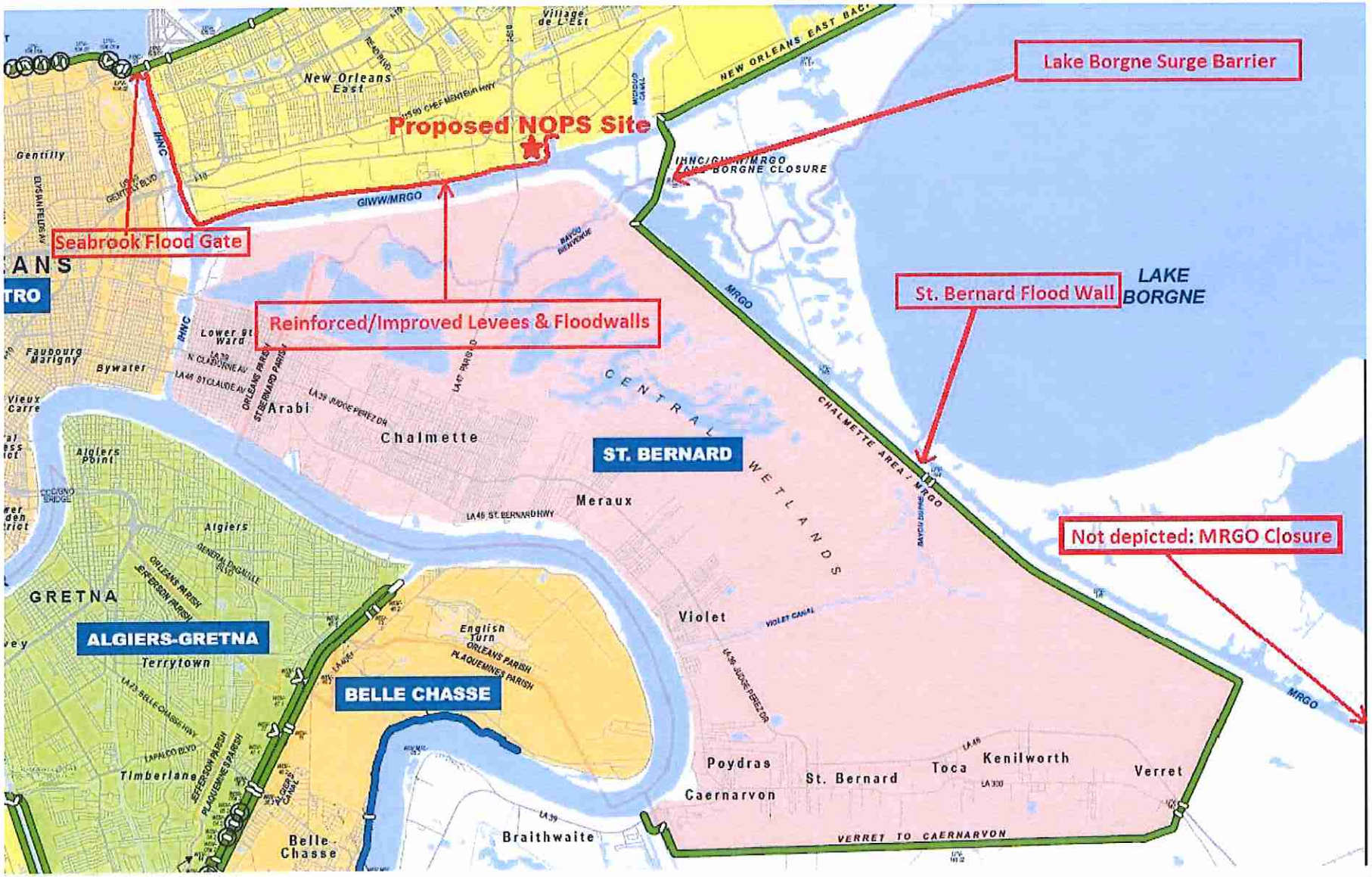


Exhibit JEL-9
CNO Docket No. UD-16-02
Page 2 of 2

APPENDIX B

Army Corp of Engineers has taken to reduce the risk of flooding due to storm surge in the New Orleans East area. The Supplemental Testimony of Company witness Jonathan E. Long, on pages 16-22, details these efforts, which include constructing the world's largest flood barrier, closing the Mississippi River Gulf Outlet, and improving the flood protection system in New Orleans East.

These efforts, coupled with the fact that these improvements were tested by Hurricane Isaac, and the fact that the elevation of the proposed unit is 3.5 ft. higher than sea level (2.5 ft. higher than FEMA's recommended elevation), creates a much lower risk profile for operating a unit located at the Michoud site during a storm. As is also discussed by Mr. Jonathan E. Long, this much lower risk profile was also concurred with by the group of insurance companies that evaluated the site when deciding whether they would provide insurance to a new unit at the Michoud location.

Q23. ON PAGES 9-10 OF HIS DIRECT TESTIMONY, MR. LANZALOTTA SUGGESTS THAT ENO COULD UNDERGROUND ITS TRANSMISSION SYSTEM IN LIEU OF BUILDING LOCAL GENERATION TO RECEIVE STORM HARDENING BENEFITS. PLEASE RESPOND.

A. Mr. Lanzalotta fails to recognize that if his strategy were to be implemented, then any transmission line that is not buried underground quickly becomes the weakest link in the electric grid and the most vulnerable element of the electric grid that is susceptible to storm damage. This means that even if every single line in the Company's transmission grid were to be buried underground (even though the costs would be astronomical), all transmission lines that lie upstream of the City of New Orleans

APPENDIX C

that system to be resilient to such effects. As such, I believe Dr. Kolker's concerns to be invalid, on the basis of both my hydrogeological analyses and my involvement in the design and building of the HSDRRS.

Q19. IN YOUR DIRECT TESTIMONY, YOU DEVOTED SIGNIFICANT DISCUSSION TO BOTH YOUR EXPERIENCE AS AN SLFPA-E COMMISSIONER AND TO INVALIDATING DR. KOLKER'S CONCERNS REGARDING FLOOD RISKS AT THE PROPOSED NOPS SITE. HAS DR. KOLKER'S MOST RECENT TESTIMONY ADDRESSED THESE ISSUES?

A. No. Dr. Kolker's most recent testimony fails to address the flaws and errors I pointed out in his prior testimony regarding his opinions about flood risks at the proposed NOPS site and the reasons he identified in an attempt to validate his opinions. One of the many facts cited in my Direct Testimony that Dr. Kolker fails to address is that the CPRA's 2017 Master Plan predicts no flooding at the proposed NOPS site under the worst-case storm scenario considered under the Master Plan (the "high scenario" over a 50-year time frame). This finding by the CPRA results from many factors, including the components of the HSDRRS infrastructure that surround the NOPS site and mitigate each factor that contributed to overtopping of the levees at the site of the deactivated Michoud plant during Hurricane Katrina.[9] These measures and their geographic relationship to the proposed NOPS site are depicted in **Figure 3**, below.

[9] The Supplemental Direct Testimony of Jonathan E. Long, at pgs.19-20, provides more specific details on the causes of the overtopping of levees at the Michoud site during Hurricane Katrina and how the HSDRRS mitigates each one of those contributing factors.

APPENDIX D

Q14. IN SEVERAL PLACES IN HER DIRECT TESTIMONY, DR. WRIGHT STATES THAT ENO HAS NOT CONSIDERED POTENTIAL ADVERSE IMPACTS OF NOPS. HOW DO YOU RESPOND TO THAT TESTIMONY?

A. Dr. Wright's conclusory statements are inconsistent with the information and analysis that ENO has provided in support of its application. In particular, ENO has provided evaluations of the effects NOPS would have in the areas of air quality, public health, and groundwater withdrawal. In their Supplemental Direct Testimonies, Mr. Jonathan Long and Dr. George Losonsky discuss groundwater withdrawal at length by presenting the findings of the "Technical Report – Evaluation of Groundwater Withdrawal and Air Quality," prepared by C-K Associates, LLC and Losonsky & Associates, Inc. ("C-K Technical Report").[18] Mr. Jonathan Long and the C-K Technical Report also discuss air quality.[19] And I discussed in my Direct Testimony how the EPA sets standards for air quality that are protective of human health and the environment and explained how the proposed NOPS resources would not be expected to cause or contribute to an exceedance

tract has a population of 836, made up of 62% African American and 4% Asian American, and has 341 occupied homes. Thus, the Michoud census tract actually has a lower percentage of African American and Asian American residents than New Orleans East as a whole and is closer to the demographic profile of the City of New Orleans as a whole. I attach as Exhibit BMH-2, which contains census data for Census Tract 17.51.

[18] *See* Jonathan Long Supplemental Direct; and Losonsky Supplemental and Amending Direct; *see also* Exhibit JEL-6, "Technical Report – Evaluation of Groundwater Withdrawal and Air Quality, New Orleans Power Station (2016)" (the "C-K Technical Report").

[19] *See* Jonathan Long Supplemental Direct at 14–17.

of air standards or to have an adverse impact on the air quality of the area.[20] These evaluations show not only that ENO has considered potential adverse impacts on health and the environment, but also that NOPS will not have such adverse impacts.

Q15. PLEASE SUMMARIZE THE STUDY THAT ENO HAS PRESENTED CONCERNING AIR QUALITY.

A. C-K Associates, LLC prepared the C-K Technical Report to determine "how the proposed NOPS might impact . . . air quality in New Orleans East."[21] The study used AERSCREEN, an EPA-preferred air dispersion model, to produce conservative estimates of the impact that the combustion turbine ("CT") option for NOPS would have on air quality.[22] In particular, the C-K Technical Report compared potential emissions from the CT option to the NAAQS set by the EPA.[23] As detailed in my Direct Testimony, the NAAQS establish limits for carbon monoxide, lead, nitrogen dioxide, ozone, particle pollution, and sulfur dioxide, referred to as "criteria" air pollutants.[24] The EPA has determined that the NAAQS protect public health, "including protecting the health of 'sensitive' populations such as asthmatics, children, and the elderly,"[25] and the public

[20] *See* Higgins Direct Testimony at 26.

[21] JEL-6, at 1.

[22] *Id.* at 15. AERSCREEN is the EPA's recommended screening model to produce "worst case" estimates of air quality. Screening Models, United States Environmental Protection Agency, https://www3.epa.gov/scram001/dispersion_screening.htm.

[23] JEL-6, at 14. I explained in my Direct Testimony how the NAAQS are set. *See* Higgins Direct at 30–38.

[24] *Id.*; *see also* NAAQS Table, United States Environmental Protection Agency, https://www.epa.gov/criteria-air-pollutants/naaqs-table.

[25] NAAQS Table, United States Environmental Protection Agency, https://www.epa.gov/criteria-air-pollutants/naaqs-table.

APPENDIX E

Transcript of the Testimony of
Jonathan E. Long

Date taken: December 8, 2017

Application of Entergy New Orleans, Inc., et al

All electronic deposition & exhibit files
are available at **<<<www.psrdocs.com>>>**.
Please call or e-mail reporters@psrdocs.com if you need a
Username and **Password**.

Professional Shorthand Reporters, Inc.
Phone:504-529-5255
Fax:504-529-5257
Email:reporters@psrdocs.com
Internet: http://www.psrdocs.com

Public Service Commission case. Was a deposition taken in that case?

A There was a deposition taken in the case I commonly refer to the "Little Gypsy case."

Q That's what that case was, Little Gypsy?

A Yes.

Q Did you offer live testimony during a hearing as well as the filed testimony?

A Yes.

Q What year did that case occur?

A My recollection about the exact year is not clear.

Q I know those cases can go on forever, so do you have kind of a general sense?

A 2007, 2008.

Q Okay.

A I also gave testimony last year in the proceedings related to the St. Charles Power Station Project.

Q For the Little Gypsy case, you said you provided testimony. What was your testimony about?

A Very similar. I was responsible for

developing the project and providing the cost estimate for that project.

Q And for the St. Charles Power that you just did, what was your testimony about in that?

A The same.

Q Are those the only two proceedings that you have provided testimony in that you can recall?

A Live testimony.

Q Okay. You filed testimony in others?

A Yes.

Q Approximately how many have you filed testimony in?

A There are two others in addition to the ones we mentioned that I recall.

Q Okay.

A I believe that's right.

Q Do you recall the names of the cases?

A Well, there's the Lake Charles Power Station case in Louisiana, and then there's the Montgomery County Power Station case in Texas.

Q And was essentially your testimony about the same thing?

A Yes.

Q Okay. You didn't file a resume or a similar docket with your testimony in this case; is that correct?

A I don't remember providing a resume.

Q Okay. On Page 1 of your direct testimony, you state you have a Bachelor's Degree in electrical engineering and a Master's in business administration, correct?

A That's correct.

Q Do you have a degree in health sciences?

A I do not.

Q Environmental health sciences?

A I do not.

Q Environmental studies?

A No.

Q Geology?

A No.

Q Biology or biochemistry?

A No.

Q Okay. Essentially, on Page 2, you have described your experience as the development of cost estimates for power plant projects, the negotiation and administration of large contracts for the construction of these

power plants and the procurement of services of major equipment vendors; is that correct? I will let you go ahead and look at it if you want to just to check.

A I believe you characterized that correctly.

Q Okay. What professional experience do you have addressing environmental issues?

A Could you be a little clearer, more clearer about what you mean by "environmental issues"?

Q Air emissions, flooding, things of that nature.

A My expertise lies in the development of power generation facilities and the management of projects to engineer, procure and construct those facilities.

In all of those projects, we seek to obtain the necessary environmental permits to allow those projects to be constructed and operated, and that's my expertise, is obtaining the permits.

Q Okay. And would your answer be similar with regard to your professional experience regarding health issues?

pending approval by the LDEQ and the EPA. What permits are you seeking from the EPA?

A The reason it's stated that way is that the laws that we are complying with are Federal laws as implemented by the State, and so they're one and the same regulations administered by the State. So the EPA has, I believe in my experience, the right to come in and take a look at what the State is doing, and that's why it's listed here.

Q Okay. But you didn't actually make any filings to the EPA?

A No.

Q Are RICE units subject to different national emission standards than the CT units?

A Please ask me that again, to make sure I get the question correctly.

Q Are the RICE generating units subject to different EPA, which would have been adopted by the LDEQ, national emission standards than a CT unit?

A I'm not certain of the answer to that question. We have employed an expert, Ms. Higgins, who would know that, and the consultants that we utilize to obtain these

permits would know the answer to that. I sitting here today do not know, if there's a difference, what the difference would be.

Q Okay. And do you know what hazardous air pollutants the RICE units emit?

A There's information in my testimony about what the emissions are and in Ms. Higgins' testimony about what those emissions are, and there are several. If I tried to sit here and name them today, I might get that wrong, so I'm not going to do that.

Q Okay. Do you know what the health impacts from pollution from electricity power plant sources are?

A That's not an area of expertise for me, so I wouldn't try to describe that.

Q So I assume your answer to what the long-term effects are would be the same?

A That's right.

Q Has the EPA determined if there is a safe level of emissions from generating stations?

A There again, I would probably refer you to Ms. Higgins about what the EPA has determined.

Q Now I'm going to ask you some questions about the levee issues and the flooding issues.

If you could, go back to Page 41 of your direct. Okay. The elevation at the proposed location of the CT is two feet below sea level; is that correct?

A That's my recollection, yes.

Q Okay. Now, the RICE unit is not expected to be put in the exact same location as the CT unit on the property; is that correct?

A It's very similar. They're in the same proximity.

Q So you would expect that the elevation would be the same, correct?

A That's correct.

Q Okay. Can you explain what's meant by a 100-year storm standard?

A That description is pretty well explained in documentation provided by the U.S. Army Corps of Engineers, which I have read. I would be a little reluctant to try to regurgitate what it means. But I think you can take that on face value that it is what they would expect to see over a 100-year period.

Q Okay. On Page 17 of your direct testimony -- No. I'm sorry. It's not direct. On Page 17 of your supplemental direct that was submitted in November, 2016, you discussed surveying the site of the CT location to determine what the recommended elevation should be for the CT generators; is that correct?

A Yes.

Q Did ENO commission a second site survey for the RICE unit location?

A The RICE location has been surveyed. I couldn't tell you today what the exact results of that survey were.

Q So the CT unit, after the survey, it was determined it should be built three and a half feet above sea level, correct?

A Yes.

Q And do you know what the survey determined as to what level the RICE unit should be?

A The same.

Q Okay. During Hurricane Katrina, this location was subject to six-foot storm surges, correct?

A I'm not aware of a determination that

A I believe that it isn't in the most flood prone area, but I'm not sure I could provide all the facts that would support that sitting here today.

Q Are you aware that it's the Army Corps of Engineers' position that levees alone will never provide adequate protection to the communities in New Orleans?

A I live in New Orleans. I'm well aware of that.

Q Did the former plant have flood insurance?

A I'm not an expert on what sort of insurance we would have carried at the time of the flood.

Q What is subsidence?

A I have read Mr. Losonsky's reports and technical evaluations of subsidence, and, you know, it's my understanding what happens when there's settlement and there's reduction in the elevation of the top of the ground.

Q Do you know what the largest contributors to subsidence are in New Orleans?

A That's not an area of expertise. No, I couldn't tell you that with, you know, any

confidence.

Q Okay. Did the report attached to your November testimony discuss the history of subsidence and subsidence problems in the region?

A I'm aware that there were elements of that in there.

Q Okay. Are you familiar with Interferometric Synthetic Aperture Radar that is used to determine subsidence rates?

A You must be referring to the technology that was used in the NASA/LSU study. I wouldn't have known what the exact technical term is, but I would guess that that's what you're referring to.

Q Did the authors of the study that you sponsored use that technology?

A No.

Q Is the only evidence provided in the report you sponsored a few ground level photographs?

MR. ALFORD:

Object to the form.

EXAMINATION BY MS. MILLER:

Q What evidence was provided in the