



UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION  
ATOMIC SAFETY AND LICENSING BOARD

In the Matter of  
NEXTERA ENERGY SEABROOK, LLC  
(Seabrook Station, Unit 1)

Docket No. 50-443-LA-2  
ASLBP No. 17-953-02-LA-BD01

Revised Hearing Exhibit

Revised Exhibit Number: NER005-R3

Exhibit Revision Date: September 22, 2019

Revised Exhibit Title: NextEra Exhibit List

NextEra Energy Seabrook, LLC, Docket No. 50-443-LA-2  
September 2019 Evidentiary Hearing Exhibits

<b>NextEra Exh. No.</b>	<b>Witness/ Panel</b>	<b>Exhibit Title/Description</b>	<b>ADAMS Accession No.</b>
NER001	MPR/NextEra	Testimony of NextEra Witnesses Michael Collins, John Simons, Christopher Bagley, Oguzhan Bayrak, and Edward Carley (“MPR Testimony”)	
NER002	MPR/NextEra	MPR Testimony – Attachment 1 – Glossary	
<b>NER003 [PROPRIETARY]</b>	<b>MPR/NextEra</b>	<b>MPR Testimony – Attachment 2 – Proprietary Appendix</b>	
NER004	MPR/NextEra	Testimony of NextEra Witnesses Said Bolourchi, Glenn Bell, and Matthew Sherman (“SGH Testimony”)	
NER005-R3	MPR/NextEra; SGH	NextEra Exhibit List	
NER006	MPR/NextEra	Michael Collins Biography	
<b>NER007 [PROPRIETARY]</b>	<b>MPR/NextEra</b>	<b>Seabrook Structures Monitoring Program Manual, Rev. 7</b>	
NER008	MPR/NextEra	John Simons <i>Curriculum Vitae</i>	
NER009	MPR/NextEra	Chris Bagley <i>Curriculum Vitae</i>	

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NER010	MPR/NextEra	Dr. Oguzhan Bayrak <i>Curriculum Vitae</i>	
NER011	MPR/NextEra	Edward Carley Resume	
<b>NER012 [Copyright]</b>	<b>MPR/NextEra; SGH</b>	<b>The Institution of Structural Engineers, “Structural Effects of Alkali-Silica Reaction” (July 1992)</b>	
NER013	MPR/NextEra; SGH	U.S. Department of Transportation, Federal Highway Administration, “Report on the Diagnosis, Prognosis, and Mitigation of Alkali-Silica Reaction (ASR) in Transportation Structures” (FHWA-HIF-09-004) (Jan. 2010)	
NER014	MPR/NextEra	NUREG-2191, “Generic Aging Lessons Learned for Subsequent License Renewal (GALL-SLR) Report,” Vol. 2 (July 2017) [Cover and Section X.M1]	ML17187A204
<b>NER015 [PROPRIETARY]</b>	<b>MPR/NextEra</b>	<b>MPR-3848, Rev. 0 “Seabrook Station, Approach for Shear and Reinforcement Anchorage Testing of Concrete Affected by Alkali-Silica Reaction” (Apr. 2013) (FP100818)</b>	
<b>NER016 [Copyright]</b>	<b>MPR/NextEra</b>	<b>Allford, M., “Expansion Behavior of Reinforced Concrete Elements Due to Alkali-Silica Reaction” (Aug. 2016)</b>	

NextEra Exh. No.	Witness/ Panel	Exhibit Title/Description	ADAMS Accession No.
NER017 [Copyright]	MPR/NextEra	EPRI Report 3002013192, “Evaluation of Laboratory Tests to Detect Up-to-Date Expansion and Remaining Expansion in Concrete Structures Affected by Alkali-Silica Reaction” (Oct. 15, 2018)	
NER018	MPR/NextEra	MPR-3727, Rev. 1, “Seabrook Station: Impact of Alkali-Silica Reaction on Concrete Structures and Attachments” (Jan. 2014) and NextEra Supplements I-V Thereto (FP100716, Rev. 4)	
NER019 [PROPRIETARY]	MPR/NextEra	Bayrak, O., “Structural Implications of ASR; State of the Art” (Feb. 2, 2012) (FP100697)	
NER020 [PROPRIETARY]	MPR/NextEra	MPR 0326-0062-88, Rev. 2, “Initial Expansion Assessment of ASR- Affected Reinforced Concrete Structures at Seabrook Station” (Mar. 2018) (FP101070, Rev. 1)	
NER021 [PROPRIETARY]	MPR/NextEra	MPR-4231, Rev. 0, “Instrumentation for Measuring Expansion in Concrete Affected by Alkali-Silica Reaction” (Oct. 2015) (FP100972)	
NER022 [PROPRIETARY]	MPR/NextEra	MPR-4262, “Shear and Reinforcement Anchorage Testing of Concrete Affected by Alkali- Silica Reaction,” Vol. I, Rev. 1 (July 2016) & Vol. II, Rev. 0 (Jan. 2016) (FP100994)	

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NER023 [PROPRIETARY]	MPR/NextEra	MPR-3722, Rev. 2, "Strength Testing of Anchors in Concrete Affected by Alkali-Silica Reaction" (Jan. 2016) (FP100718, Rev. 1) [Main Report & App. A]	
NER024 [PROPRIETARY]	MPR/NextEra	MPR-4247, Rev. 0 "Commercial Grade Dedication Report for Seabrook ASR Anchor Testing (Block Series and Girder Series Phase 2)" (Dec. 2015) (FP100986) [Main Report & Apps. A & B]	
NER025 [PROPRIETARY]	MPR/NextEra	MPR-4259, "Commercial Grade Dedication Report of Seabrook ASR Shear, Reinforcement Anchorage and Instrumentation Testing" (Jan. 2016) [Main Report, App. B, & Pages D-1745, D-2615 to 16, F-6129, F-9474, F-9596, G-14, and G-18 to 19]	
NER026 [PROPRIETARY]	MPR/NextEra	MPR-3757, Rev. 4, "Shear and Reinforcement Anchorage Test Specimen Technical Evaluation" (May 2014) (FP100760)	
NER027	MPR/NextEra	Saouma, V., "Benchmark Problems for AAR FEA Code Validation" (Aug. 4, 2017)	
NER028	MPR/NextEra; SGH	SG&H Report 110594-RPT-02, Rev. 1, "Damage Rating Index and ASR Rating" (Feb. 10, 2012) (FP100702)	

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NER029 [Copyright]	MPR/NextEra	EPRI Report 3002013190, “Modeling Concrete Structures Affected by Alkali Silica Reaction: Hydro-Quebec Approach for Hydraulic and Nuclear Power Plants” (Oct. 15, 2018)	
NER030 [Copyright]	MPR/NextEra	Giannini, E., “Evaluation of Concrete Structures Affected by Alkali-Silica Reaction and Delayed Ettringite Formation” (2012)	
NER031	SGH	Said Bolourchi <i>Curriculum Vitae</i>	
NER032	SGH	Glenn Bell <i>Curriculum Vitae</i>	
NER033	SGH	Matthew Sherman <i>Curriculum Vitae</i>	
NER034 [Copyright]	SGH	ASCE Standard ASCE/SEI 7-16, “Minimum Design Loads and Associated Criteria for Buildings and Other Structures” (2016) [Cover & Page 1]	
NER035	SGH	U.S. Department of Commerce, National Bureau of Standards, NBS Special Publication 577, “Development of a Probability Based Load Criterion for American National Standard A58” (1980)	

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NER036 [Copyright]	SGH	ASCE Standard ASCE/SEI 4-16, “Seismic Analysis of Safety-Related Nuclear Structures” (2016) [Cover & Pages 9-11, 23]	
NER037 [Copyright]	MPR/NextEra; SGH	Esposito, R., and Hendriks, M.A.N., “Literature Review of Modelling Approaches for ASR in Concrete: A New Perspective,” EUROPEAN JOURNAL OF ENVTL. & CIVIL ENG’G (2017)	
NER038	SGH	Gocevski, V., “Pathologies/Degradation Mechanisms Experienced by Hydro- Quebec During the Evaluation of Gentilly-2 NPP,” Report Submitted to ASCET, (June 2015)	
NER039 [Copyright]	SGH	Neville, A.M., “Properties of Concrete,’ 5th Edition, Pearson Education Limited; Harlow, Essex, England, 2012 [Cover Pages & Pages 426-27, 436-37, 444-45]	
NER040 [Copyright]	SGH	J.J. Brooks, <i>Accuracy of Estimating Long-Term Strains in Concrete</i> , 36 Magazine of Concrete Research 127, 131-45 (June 1984)	
NER041 [Copyright]	SGH	Mijnsbergen, J. and Reinhardt, H. W., “Long-Time Creep and Expansion Behavior of Concrete in a Marine Environment,” 109 American Concrete Institute Special Publication 599-624 (SP 109-27) (1994)	

NextEra Exh. No.	Witness/ Panel	Exhibit Title/Description	ADAMS Accession No.
NER042 [Copyright]	SGH	G.E. Troxell, et al., <i>Long-Time Creep and Shrinkage Tests of Plain and Reinforced Concrete,</i> 1958 Proceeding of the American Society for Testing and Materials 1101-20	
NER043	SGH	NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants: LWR Edition," Chapter 3 – Design of Structures and Components, Equipment, and Systems § 3.7.2, Rev. 4 (Sept. 2013)	ML13198A223
NER044	SGH	Seabrook Station Unit 1, Updated Final Safety Analysis Report (UFSAR) (Rev. 19) [§ 2.5.2.5 only]	
NER045 [PROPRIETARY]	MPR/NextEra	MPR-4286, Rev. 0, "Supplemental Commercial Grade Dedication Report for Seabrook ASR Test Programs" (Mar. 2016) (FP101003)	
NER046	MPR/NextEra	Seabrook Mechanical Maintenance Procedure MS0517.51, "Installation of Geokon Snap-Ring Borehole Extensometers," Rev. 0 (Feb. 2016) [Cover & Pages 13-19]	
NER047	MPR/NextEra	N. Ezell et al., "Experimental Collaboration for Thick Concrete Structures with Alkali-Silica Reaction" (2018)	



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NER048	MPR/NextEra	L. Phan, "Structural Performance of NPP Concrete Structures Affected by Alkali-Silica Reaction (ASR)," Slides for NRC Regulatory Information Conference Session TH27 (2018)	
<b>NER049</b> [Copyright]	<b>MPR/NextEra;</b> <b>SGH</b>	<b>EPRI Report 3002007777,</b> <b>"Modeling Existing Concrete</b> <b>Containment Structures" (Aug.</b> <b>2017)</b>	
NER050	MPR/NextEra	Reineck et al., "Research Report: Extended Databases with Shear Tests on Structural Concrete Beams without and with Stirrups for the Assessment of Shear Design Procedures"(Mar. 2010)	
<b>NER051</b> [Copyright]	<b>MPR/NextEra</b>	<b>Reineck et al., "ACI-DAfStb</b> <b>Database of Shear Tests on Slender</b> <b>Reinforced Concrete Beams</b> <b>without Stirrups," 110-5 ACI</b> <b>Structural Journal 867 (Sept.-Oct.</b> <b>2013)</b>	
NER052	MPR/NextEra	Clayton et al., "The Effects of Alkali-Silica Reaction on the Strength of Prestressed Concrete Beams," 68-15 The Structural Engineer 287 (Aug. 1990)	
NER053	MPR/NextEra	Richart et al., "The Failure of Plain and Spirally Reinforced Concrete in Compression," University of Illinois Engineering Experiment Station, Bulletin No. 190 (Apr. 1929)	

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NER054 [Copyright]	MPR/NextEra	Chana and Korobokis, "Structural Performance of Reinforced Concrete Affected by Alkali Silica Reaction: Phase 1" (Oct. 1990) [Cover Pages & § 7.2]	
NER055 [PROPRIETARY]	MPR/NextEra	MPR Document 0326-0058-157, "Overview of Anchor Testing Program in Concrete Affected by Alkali-Silica Reaction," (Feb. 26, 2013)	
NER056	MPR/NextEra	NUREG-1800, Rev. 2, "Standard Review Plan for Review of License Renewal Applications for Nuclear Power Plants" (Dec. 2010) [Cover Pages & App. A § A.1]	ML103490036
NER057	MPR/NextEra	Oak Ridge National Laboratory, "In-Service Inspection Guidelines for Concrete Structures in Nuclear Power Plants" (Dec. 1995)	
NER058 [Copyright]	MPR/NextEra; SGH	D. Wald, "ASR Expansion Behavior in Reinforced Concrete – Experimentation and Nuclear Modeling for Practical Application" (Aug. 2017)	
NER059	MPR/NextEra	RILEM Technical Committee 259-ISR, "Benchmark Problems for AAR FEA Code Validation" (Aug. 4, 2017)	
NER060 [Copyright]	MPR/NextEra	Manabe et al., "Maintenance Management of Turbine Generator Foundation Affected by Alkali-Silica Reaction," 14 Journal of Advanced Concrete Technology 590 (Sept. 2016)	

NextEra Exh. No.	Witness/ Panel	Exhibit Title/Description	ADAMS Accession No.
NER061 [Copyright]	SGH	Somerville, Management of Deteriorating Concrete Structures (2008) [Cover & Pages 111, 155-164, 206-208]	
NER062	SGH	Transcript, Advisory Committee on Reactor Safeguards, License Renewal Subcommittee (Oct. 31, 2018) [Cover & Pages 101-102]	ML18348B117
NER063 [Copyright]	SGH	Mohammed et al., "Alkali-Silica Reaction-Induced Strains over Concrete Surface and Steel Bars in Concrete," 100 ACI Materials Journal 133 (Mar.-Apr. 2003)	
NER064	SGH	Mohammed et al., "ASR Expansion of Concrete Beams with Various Restrained Conditions—612 Days of Accelerated Marine Exposure," Proceedings of the 12th International Conference on Alkali-Aggregate Reaction in Concrete 1169 (2004)	
NER065 [Copyright]	SGH	Bažant and Steffens, "Mathematical Model for Kinetics of Alkali-Silica Reaction in Concrete," 30 Cement and Concrete Research 419 (2000)	
NER066	SGH	Dunant and Scrivener, "Micro-Mechanical Modelling of Alkali-Silica-Reaction-Induced Degradation Using The AMIE Framework," 40 Cement and Concrete Research 4, 517-25 (2010)	

<b>NextEra Exh. No.</b>	<b>Witness/ Panel</b>	<b>Exhibit Title/Description</b>	<b>ADAMS Accession No.</b>
NER067	SGH	Charlwood, "A Review of Alkali Aggregate Reaction in Hydro Plants and Dams," 1 Int'l Journal on Hydropower & Dams 3, 73-80 (May 1994)	
<b>NER068</b> [Copyright]	<b>SGH</b>	<b>Cope et al., "Prediction of Stress Distributions in Reinforced Concrete Members Affected by Alkali Aggregate Reaction" (1994)</b>	
<b>NER069</b> [Copyright]	<b>SGH</b>	<b>Fairbarin et al., "Modeling the Structural Behavior of a Dam Affected by Alkali-Silica Reaction," 22 Communications in Numerical Methods of Eng'g 1 (July 14, 2005)</b>	
<b>NER070</b> [Copyright]	<b>SGH</b>	<b>Grimal et al., "Creep, Shrinkage, and Anisotropic Damage in Alkali-Aggregate Reaction Swelling Mechanism Part I: A Constitutive Model," 105-3 ACI Materials Journal 227 (May-June 2008)</b>	
<b>NER071</b> [Copyright]	<b>SGH</b>	<b>Comi and Perego, "Anisotropic Damage Model for Concrete Affected by Alkali-Aggregate Reaction," 20 Int'l Journal of Damage Mechanics 598 (May 2011)</b>	
<b>NER072</b> [Copyright]	<b>SGH</b>	<b>Saouma and Perotti, "Constitutive Model for Alkali-Aggregate Reactions," 103 ACI Materials Journal 194 (May-June 2006)</b>	
<b>NER073</b> [Copyright]	<b>SGH</b>	<b>Pan et al., "Modeling of alkali-silica reaction in concrete: a review," 6 Frontiers of Structural and Civil Eng'g 1 (2012)</b>	

NextEra Exh. No.	Witness/ Panel	Exhibit Title/Description	ADAMS Accession No.
NER074 [Copyright]	SGH	Jurcut, "Modelling of Alkali-Aggregate Reaction Effects in Reinforced Concrete Structures" (2015)	
NER075	MPR/NextEra; SGH	Swiss Committee on Dams, "Concrete Swelling of Dams in Switzerland" (May 8, 2017)	
NER076 [PROPRIETARY]	MPR/NextEra	Testimony of NextEra Witnesses John Simons, Christopher Bagley, Oguzhan Bayrak, and Edward Carley in Response to Exhibit INT030	

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