September 12, 2018
RSS

Hurricane Florence On Track to Hit East Coast Nuclear Plants

Brunswick and Surry May Be Vulnerable to Flooding

WASHINGTON (September 12, 2018)—At least two nuclear power plants may be in harm's way when Hurricane Florence hits the East Coast later this week: Brunswick near Wilmington, North Carolina, and Surry near Williamsburg, Virginia. Both are vulnerable to hurricane-force winds and flooding, according to the Union of Concerned Scientists (UCS), but just how vulnerable is difficult to say.

There is not a clear picture of either plant's vulnerabilities because the Nuclear Regulatory Commission has withheld key flood protection preparedness reports it required in the wake of the 2011 Fukushima disaster, where flooding caused three reactor core meltdowns. However, both Brunswick and Surry have had potentially serious problems that their owners may or may not have fixed.

Brunswick owner Duke Energy reported to the Nuclear Regulatory Commission (NRC) in November 2012 that there were hundreds of missing or degraded flood barriers at the plant. The company's follow-up flood hazard reevaluation report, which it sent to the NRC in March 2015, is not publicly available, so there is no way to confirm that Duke replaced or repaired the barriers.

The NRC's March 2017 summary assessment of Duke's 2015 flood hazard reevaluation report states that the company underestimated the potential peak flood height from storm surge at the plant's safety related buildings, including the buildings housing the plant's two reactors, by nearly 8 feet.

Finally, a March 2018 NRC flood-related document states that Duke planned to install "cliff edge barriers" at targeted areas on the Brunswick site one to two days before a hurricane landfall. Given there is no other public information about these barriers, it is not assured they will adequately protect the plant.

Surry, meanwhile, was not designed to withstand flooding from heavy rainfall. The key document that is publicly available, plant owner Dominion's November 2015 flood hazard reevaluation report, indicates that heavy rainfall could cause flooding that overwhelms the plant's protection barriers.

Although Brunswick and Surry are the most threatened, other East Coast nuclear plants could be at risk from heavy rainfall and flash flooding that is expected even in inland areas.

Besides flooding, wind could be a major factor. Standard industry practices call for plant owners to shut down reactors if wind speeds are higher than 75 mph at the site or are forecast to exceed that speed. Shutting down a reactor does not make it safe, but it provides plant operators more time to deploy contingency measures if the storm disables emergency systems.

Regulations require nuclear plants to be designed to withstand likely hazards, such as hurricanes and earthquakes, without suffering reactor core damage. Based on past meteorological and geological history, plant designers take into account their estimates of the maximum credible hurricane force, earthquake magnitude and rainfall when constructing such protective features as flood walls and seals for doors and other wall openings.

"Nuclear plants are safe from flooding if plant operators properly install protective measures and designers accurately forecast flooding hazards," said Edwin Lyman, a senior scientist in the UCS Global Security Program and an expert in nuclear plant design. "Falling short on either requirement would make a nuclear plant more vulnerable to floods, which could lead to a meltdown."

Following the March 2011 Fukushima disaster, the NRC required US plant owners to analyze the effectiveness of their plant's flood protection features in what the agency called a "walkdown" report, and then reevaluate their facilities' vulnerabilities to more severe flooding events, including extreme precipitation and hurricanes. When hazards exceeded protections, owners were supposed to close the gap or convince the NRC that the potential hazard would not endanger the plant.

The NRC's post-Fukushima initiatives were intended to make US nuclear plants less vulnerable to flooding, and the walkdown reports did identify shortcomings in existing flood protection measures, Lochbaum said. But there is at least one instance where a walkdown report was grossly inaccurate. In 2012, Florida Power & Light told the NRC that flood protection measures at its St. Lucie plant were adequate. Two years later, heavy rainfall flooded St. Lucie's Unit 1 reactor auxiliary building with 50,000 gallons that flowed through flood barriers that had been missing since at least 1982.

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For more on the Brunswick plant: The NRC created a webpage for each nuclear plant listing the reports received from the owners and reviewed by the NRC. The NRC's webpage for Brunswick is here. Duke Energy's flooding walkdown report is here. Duke submitted its flood hazard reevaluation report on March 11, 2015, but the NRC has not yet made it publicly available. Most owner reports are publicly available, but the NRC has thus far withheld the one for Brunswick. The NRC's 2014 assessment of Duke's flooding walkdown report is here. The NRC's April 2018 assessment of Duke's withheld flood hazard reevaluation report is here. Duke's flooding walkdown report and the NRC's assessment reports indicate that missing or degraded flood barriers were identified at Brunswick. The reports do not indicate that all the known shortcomings have been remedied.

For more on the Surry plant: The NRC's webpage for Surry is here. Dominion submitted its flooding walkdown report for Surry to the NRC, but the agency has thus far withheld it from the public. Dominion's flood hazard reevaluation report is here. The NRC's assessment of Dominion's flood hazard reevaluation report is here.

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12 septembre 2018
RSS

L'ouragan Florence en passe de frapper les centrales nucléaires de la côte est

Brunswick et Surry pourraient être vulnérables aux inondations

WASHINGTON (12 septembre 2018) - Au moins deux centrales nucléaires pourraient être menacées par l'ouragan Florence qui frappera la côte est plus tard cette semaine: Brunswick près de Wilmington en Caroline du Nord et Surry près de Williamsburg en Virginie. Selon l'Union of Concerned Scientists (UCS), tous deux sont vulnérables aux vents de cyclone et aux inondations, mais il est difficile de dire à quel point ils sont vulnérables.

Les vulnérabilités de l'une ou l'autre centrale ne sont pas clairement définies, car la Commission de réglementation nucléaire a retenu les principaux rapports de préparation à la protection contre les inondations nécessaires à la suite de la catastrophe de Fukushima en 2011, où une inondation avait provoqué la fusion de trois réacteurs. Cependant, Brunswick et Surry ont tous deux eu des

problèmes potentiellement graves que leurs propriétaires pourraient avoir résolus ou non.

Le propriétaire de Brunswick, Duke Energy, a signalé à la Commission de réglementation nucléaire (CNRC) en novembre 2012 qu'il y avait des centaines de barrières anti-inondations manquantes ou dégradées à la centrale. Le rapport de réévaluation du risque d'inondation qui a été suivi par la société, qu'il a envoyé au CNRC en mars 2015, n'est pas accessible au public. Il n'y a donc aucun moyen de confirmer que Duke a remplacé ou réparé les barrières.

Le résumé de Mars 2017 CNRC évaluation du rapport risque d'inondation de Duke 2015 révaluation affirme que l'entreprise a sous - estimé la hauteur potentielle de pointe de crue de l' onde de tempête à la sécurité de l'usine de bâtiments liés, y compris les bâtiments abritant deux réacteurs, de près de 8 pieds de la plante.

Enfin, un Mars 2018 concernant les inondations du CNRC le document indique que Duke prévu d'installer des « barrières de bord de la falaise » dans des zones ciblées sur le site Brunswick un à deux jours avant une arrivée à terre d'ouragan. Étant donné qu'il n'y a aucune autre information publique sur ces barrières, il n'est pas assuré qu'elles protégeront correctement l'usine.

Surry, quant à lui, n'a pas été conçu pour résister aux inondations provoquées par de fortes précipitations. Le document clé accessible au public, le rapport de réévaluation des risques d'inondation de Dominion, daté de novembre 2015, du Dominion , indique que de fortes précipitations pourraient provoquer des inondations qui surchargeraient les barrières de protection de l'usine.

Bien que Brunswick et Surry soient les plus menacés, les autres centrales nucléaires de la côte Est pourraient être exposées aux fortes précipitations et aux inondations soudaines prévues même dans les régions intérieures.

Outre les inondations, le vent pourrait être un facteur majeur. Selon les pratiques standard de l'industrie, les propriétaires d'installations doivent arrêter les réacteurs si la vitesse du vent est supérieure à 75 mi / h sur le site ou s'il est prévu qu'elle dépasse cette vitesse. L'arrêt d'un réacteur ne le rend pas sûr, mais il laisse plus de temps aux

opérateurs pour déployer des mesures d'urgence si la tempête désactive les systèmes d'urgence.

La réglementation exige que les centrales nucléaires soient conçues pour résister aux dangers potentiels, tels que les ouragans et les tremblements de terre, sans subir de dommages au cœur du réacteur. En se basant sur l'histoire météorologique et géologique passée, les concepteurs d'installations tiennent compte de leurs estimations de la force maximale crédible de l'ouragan, de la magnitude des séismes et des précipitations lors de la construction de dispositifs de protection tels que murs anti-inondations et joints pour portes et autres ouvertures.

«Les centrales nucléaires sont protégées contre les inondations si les exploitants installent correctement les mesures de protection et les concepteurs prévoient avec précision les risques d'inondation», a déclaré Edwin Lyman, scientifique senior du programme UCS Global Security et expert en conception de centrales nucléaires. "Ne pas respecter l'une ou l'autre de ces exigences rendrait une centrale nucléaire plus vulnérable aux inondations, ce qui pourrait conduire à une fusion."

À la suite de la catastrophe de Fukushima en mars 2011, le CNRC a demandé aux propriétaires d'installations américains d'analyser l'efficacité des fonctions de protection contre les inondations de leur installation dans un rapport «de passage», puis de réévaluer la vulnérabilité de leurs installations à des inondations plus graves, notamment des précipitations extrêmes et les ouragans. Lorsque les risques excédaient les protections, les propriétaires étaient censés combler l'écart ou convaincre le CNRC que le danger potentiel ne mettrait pas l'usine en danger.

Les initiatives post-Fukushima du CNRC visaient à rendre les centrales nucléaires américaines moins vulnérables aux inondations, et les rapports de passage à l'acte ont révélé des lacunes dans les mesures de protection contre les inondations existantes, a déclaré Lochbaum. Mais il y a au moins un cas où un rapport de visite a été grossièrement inexact. En 2012, Florida Power & Light a déclaré au CNRC que les mesures de protection contre les inondations de son usine de Sainte-Lucie étaient adéquates. Deux ans plus tard, de fortes pluies ont inondé le

bâtiment auxiliaire du réacteur 1 de Sainte-Lucie avec 50 000 gallons qui ont traversé des barrières anti-inondation qui faisaient défaut depuis au moins 1982.

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Pour en savoir plus sur l'usine de Brunswick: Le CNRC a créé une page Web pour chaque centrale nucléaire, répertoriant les rapports reçus des propriétaires et examinés par le CNRC. La page Web du CNRC sur Brunswick est ici . Le rapport sur les inondations de Duke Energy est disponible . Duke a présenté son rapport de réévaluation des risques d'inondation le 11 mars 2015, mais le CNRC ne l'a pas encore rendu public. La plupart des rapports de propriétaires sont accessibles au public, mais le CNRC a jusqu'ici dissimulé celui pour Brunswick. L'évaluation 2014 du rapport de Duke sur les inondations par le CNRC est disponible . L'évaluation effectuée par le CNRC en avril 2018 du rapport de réévaluation des risques d'inondation retenu par Duke est disponible. Le rapport d'inondation de Duke et les rapports d'évaluation du CNRC indiquent que des barrages anti-inondations manquants ou dégradés ont été identifiés à Brunswick. Les rapports n'indiquent pas que toutes les lacunes connues ont été corrigées.

Pour en savoir plus sur l'usine Surry: La page Web du CNRC sur Surry est ici . Dominion a soumis au CNRC son rapport de clôture concernant les inondations pour Surry, mais l'agence ne l'a pas encore fait publier. Le rapport de réévaluation des risques d'inondation de Dominion est ici . L'évaluation par le CNRC du rapport de réévaluation du risque d'inondation du Dominion est ici .

L'Union of Concerned Scientists utilise une science rigoureuse et indépendante pour résoudre les problèmes les plus pressants de notre planète.En rejoignant des gens de partout au pays, nous combinons analyse technique et plaidoyer efficace pour créer des solutions novatrices et pratiques pour un avenir sain, sûr et durable.

PARTAGER

Brunswick Nuclear Power Station Apparently Still Hasn't Addressed

Flooding Worst Case Scenario (Reevaluation); Targeted By Hurricane Florence

12 Wednesday SEP 2018

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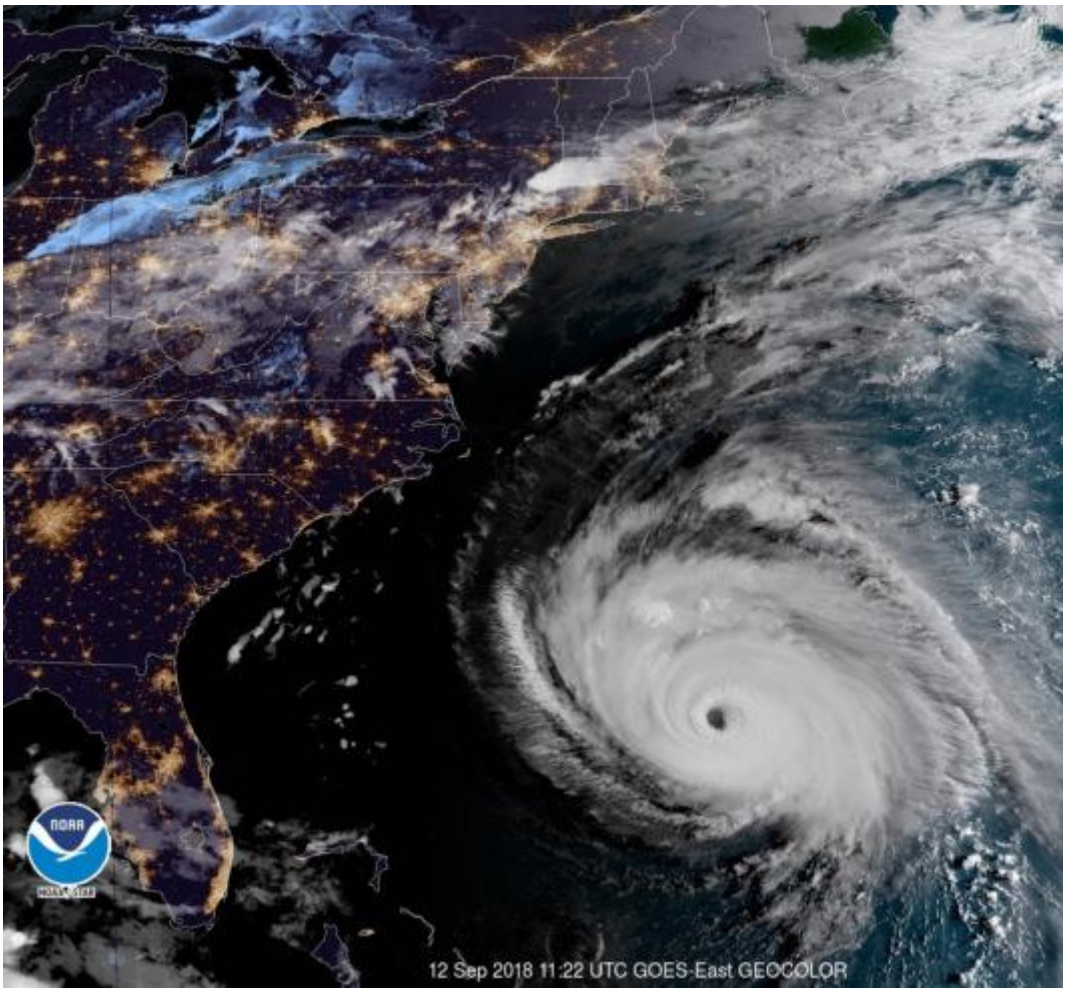
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Atlantic hurricanes, Atlantic Storms, Cape Fear, dangers of nuclear, environment, flooding, Flooding design basis, flooding reevaluation, Fukushima, Fukushima lessons learned, Hurricane Florence, loss of power, North Carolina, nuclear, nuclear accident, nuclear disaster, nuclear energy, nuclear meltdown, nuclear power, nuclear reactors, nuclear waste, radioactive waste, Rain, risk management, South Carolina, Spent Nuclear Fuel, Station Blackout, Storm Surge, US NRC, Virginia

As of April 2018, the US NRC hadn't received information about how Brunswick Nuclear Power Station was going to address the reevaluation of flooding hazard. As it is unclear how they would do it without building a flood wall and/or perhaps major water-proofing, they probably still haven't addressed it.

https://miningawareness.wordpress.com/2018/09/13/brunswick-nuclear-power-stations-cliff-edge-barriers-appear-to-fall-almost-8-feet-short-of-required-storm-surge-protection-level/



On April 16, 2018, the US NRC wrote Brunswick Nuclear Power Station in North Carolina: "*By letter dated March 16, 2017 (ADAMS Accession No. ML 17072A364), the NRC staff sent the licensee a summary of the staff's review of Brunswick's reevaluated flood-causing mechanisms… As stated in the letter, the reevaluated flood hazard results for the local intense precipitation, streams and rivers, failure of dams and onsite water control/storage structures, storm surge, and tsunami flood-causing mechanisms were not bounded by the current design basis. In order to complete its response to Enclosure 2 to the 50.54(f) letter, the licensee is expected to submit a focused evaluation or an integrated assessment in order to address these reevaluated flood hazards,…*"

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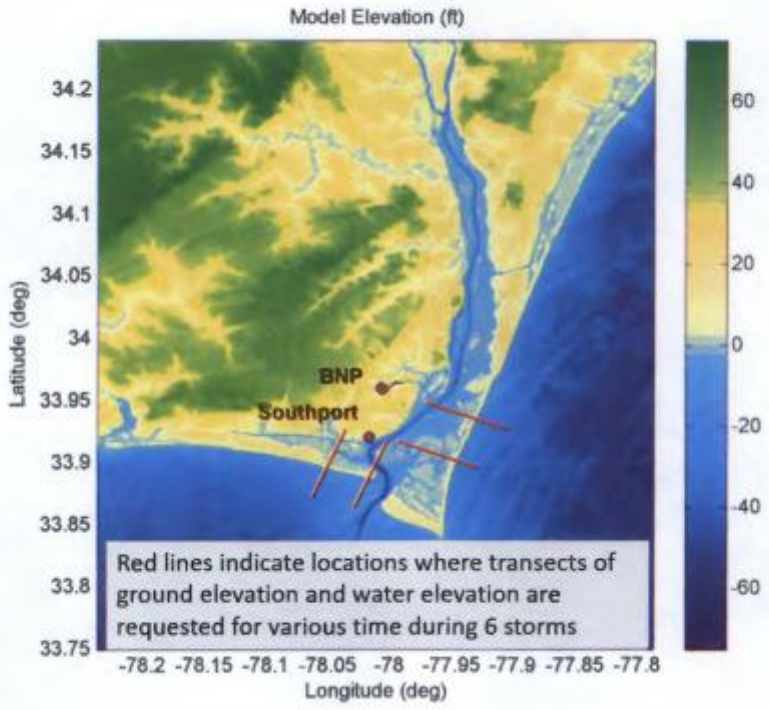


Figure 2: Area 1

Information Needs No. 22 – Figure of Transects

https://www.nrc.gov/docs/ML1727/ML17271A248.pdf

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 16, 2018

Mr. William R. Gideon
Site Vice President
Brunswick Steam Electric Plant
8470 River Rd. SE (M/C BNP001)
Southport, NC 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT UNITS 1 AND 2 – STAFF ASSESSMENT OF RESPONSE TO 10 CFR 50.54(f) INFORMATION REQUEST FLOOD-CAUSING MECHANISM REEVALUATION (EPID NOS. 000495/05000325/L-2015-JLD-0007 AND 000495/05000324/L-2015-JLD-0008)

Dear Mr. Gideon:

By letter dated March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued a request for information under Title 10 of the *Code of Federal Regulations*, Section 50.54(f) (hereafter referred to as the 50.54(f) letter). The request was issued as part of implementing lessons learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 2 to the 50.54(f) letter requested that licensees reevaluate flood-causing mechanisms using present-day methodologies and guidance. By letter dated March 11, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15079A385, non-public), Duke Energy Progress, LLC (Duke, the licensee) responded to this request for Brunswick Steam Electric Plant, Units 1 and 2 (Brunswick).

By letter dated March 16, 2017 (ADAMS Accession No. ML17072A364), the NRC staff sent the licensee a summary of the staff's review of Brunswick's reevaluated flood-causing mechanisms. The enclosed staff assessment provides the documentation supporting the NRC staff's conclusions summarized in the letter. As stated in the letter, the reevaluated flood hazard results for the local intense precipitation, streams and rivers, failure of dams and onsite water control/storage structures, storm surge, and tsunami flood-causing mechanisms were not bounded by the current design basis. In order to complete its response to Enclosure 2 to the 50.54(f) letter, the licensee is expected to submit a focused evaluation or an integrated assessment in order to address these reevaluated flood hazards, as discussed in COMSECY-15-0019, "Closure Plan for the Reevaluation of Flooding Hazard for Operating Nuclear Power Plants," and Japan Lessons-Learned Division (JLD) Interim Staff Guidance (ISG) JLD-ISG-2016-01, "Guidance for Activities Related to Near-Term Task Force Recommendation 2.1, Flooding Hazard Reevaluation; Focused Evaluation and Integrated Assessment." This letter closes out the NRC's efforts associated with CAC Nos. MF6104 and MF6105.

The Enclosure transmitted herewith contains Security-Related Information. When separated from the Enclosure, this document is decontrolled.

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If you have any questions, please contact me at (301) 415-3809 or by e-mail at Juan.Uribe@nrc.gov.

Sincerely,



Juan F. Uribe, Project Manager
Beyond-Design-Basis Management Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

Enclosure:
Staff Assessment of Flood Hazard
Reevaluation Report for Brunswick
(Non-public, Security Related)

cc w/o encl: Distribution via Listserv

https://www.nrc.gov/docs/ML1808/ML18089A055.pdf

Reuters reported that "*The NRC said in a 2004 report that all of the safety-related structures at Brunswick were waterproof up to 22 feet (6.7 meters) above sea level.*"

See: "***U.S. nuclear power plants prepare for Hurricane Florence***

Posted:Tue, 11 Sep 2018 17:13:16 -0400

Several nuclear power reactors in North and South Carolina and Virginia on Tuesday started to prepare for Hurricane Florence, which is expected to hit the coast as a major hurricane on

Friday. " http://feeds.reuters.com/~r/reuters/environment/~3/3NrUaH9iTcs/u-s-nuclear-power-plants-prepare-for-hurricane-florence-idUSKCN1LR2C8
However, the US NRC and the utility agreed that 22 ft was not high enough for the worst case scenario.

BELOW: CURRENT DESIGN BASIS CHARTS ARE FOLLOWED BY REEVALUATION CHARTS

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 16, 2017

Mr. William R. Gideon
Site Vice President
Brunswick Steam Electric Plant
8470 River Rd. SE (M/C BNP001)
Southport, NC 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 – INTERIM STAFF RESPONSE TO REEVALUATED FLOOD HAZARDS SUBMITTED IN RESPONSE TO 10 CFR 50.54(f) INFORMATION REQUEST – FLOOD-CAUSING MECHANISM REEVALUATION (CAC NOS. MF6104 AND MF6105)

Dear Mr. Gideon:

The purpose of this letter is to provide a summary of the U.S. Nuclear Regulatory Commission (NRC) staff's assessment of the reevaluated flood-causing mechanisms described in the March 11, 2015, flood hazard reevaluation report (FHRR) submitted by Duke Energy Progress, LLC (Duke, the licensee) for Brunswick Steam Electric Plant, Units 1 and 2 (Brunswick) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15079A385), as well as supplemental information resulting from audits.

By letter dated March 12, 2012, the NRC issued a request for information pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.54(f) (hereafter referred to as the 50.54(f) letter) (ADAMS Accession No. ML12053A340). The request was issued as part of implementing lessons learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 2 to the 50.54(f) letter requested licensees to reevaluate flood-causing mechanisms using present-day methodologies and guidance. Concurrent with the reevaluation of flooding hazards, licensees were required to develop and implement mitigating strategies in accordance with NRC Order EA-12-049, "Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12054A735). On March 30, 2015, the Commission provided staff requirements memorandum (SRM) (ADAMS Accession No. ML15089A236) to COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards," dated November 21, 2014 (ADAMS Accession No. ML14309A256), affirming that licensees need to address the reevaluated flooding hazards within their mitigating strategies for beyond-design-basis external events. Revision 2 of Nuclear Energy Institute (NEI) guidance document NEI 12-06, dated December 2015, includes a methodology for performing a mitigating strategies assessment (MSA) with respect to the reevaluated flood hazards.

Enclosure 2 transmitted herewith contains Security-Related Information. When separated from the Enclosure, this document is decontrolled.

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On February 29, 2016, the NRC staff published Japan Lessons-Learned Division (JLD) Interim Staff Guidance (ISG) JLD-ISG-2012-01, Revision 1, "Compliance with Order EA-12-049, 'Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events'" (ADAMS Accession No. ML15357A142), in the *Federal Register* (81 FR 10283). This ISG endorses Revision 2 of NEI 12-06 (ADAMS Accession No. ML16005A625). Based on the guidance provided in Revision 2 of NEI 12-06, any flood event duration parameters and applicable flood associated effects that were not provided in the FHRR should be considered as part of the Brunswick MSA. The NRC staff will evaluate the flood event duration parameters (including warning time and period of inundation) and flood-related associated effects developed by the licensee during the NRC staff's review of the MSA.

In addition to the MSA, in order to complete its response to the information requested by Enclosure 2 to the 50.54(f) letter, the licensee is expected to submit an integrated assessment or a focused evaluation, as appropriate, to address the reevaluated flood hazards that exceed the current design basis, as described in the NRC letter, "Coordination of Request for Information Regarding Flooding Hazard Reevaluation and Mitigating Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML15174A257). This letter describes the changes in the NRC's approach to the flood hazard reevaluations that were approved by the Commission in its SRM to COMSECY-15-0019, "Closure Plan for the Reevaluation of Flooding Hazards for Operating Nuclear Power Plants" (ADAMS Accession No. ML15209A682).

The NRC staff has reviewed the information submitted by the licensee in its FHRR and the associated regulatory audit (ADAMS Accession No. ML15148A762), and has summarized the results of the review in the tables provided as an enclosure to this letter. Table 1 provides the current design-basis flood hazard mechanisms. Table 2 provides the reevaluated flood hazard mechanisms; however, the reevaluated flood hazard mechanisms bounded by the current design basis (Table 1) are not included.

The NRC staff performed a confirmatory analysis of the information provided in the FHRR to independently evaluate the sensitivity of the reevaluated hazards to input parameters. The confirmatory analysis indicated that the storm surge flood-causing mechanism is sensitive to the input parameters and methodology used. The sensitivities identified have been discussed with the licensee. As a measure of conservatism, the licensee agreed to provide margin above the FHRR stillwater elevations for storm surge for the subsequent flood evaluations addressing flooding due to storm surge. The water elevations summarized in Table 2 reflect this commitment.

Based on the information provided by the licensee and the staff's confirmatory analysis, the NRC staff has concluded that the reevaluated flood hazard information, as summarized in Table 2 of the enclosure, is suitable for the assessment of mitigating strategies developed in response to Order EA-12-049 (i.e., defines the mitigating strategies flood hazard information described in NEI guidance document NEI 12 06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide") for Brunswick. Further, the NRC staff has concluded that the enclosed reevaluated flood hazard information is suitable input for other flooding assessments associated with the 50.54(f) letter. The NRC staff plans to issue a staff assessment documenting the basis for these conclusions at a later time.

If you have any questions, please contact me at (301) 415-3809 or e-mail at Juan.Uribe@nrc.gov.

Sincerely,

Juan Uribe, Project Manager
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

Enclosures:
1. Summary of Results of Flooding Hazard Re-Evaluation Report (Redacted Version)
2. Summary of Results of Flooding Hazard Re-Evaluation Report (Non-Public Version)

cc w/encl: Distribution via Listserv

Table 1. Current Design Basis Flood Hazards for Use in the MSA

Mechanism	Stillwater Elevation	Waves/ Runup	Design Basis Hazard Elevation	Reference
Local Intense Precipitation	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.1 and Table 5-1
Streams and Rivers	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.2 & Table 5-1
Failure of Dams and Onsite Water Control/Storage Structures	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.3 and Table 5-1
Storm Surge				
At Site Safety Related Buildings	22.0 ft NGVD29	3.6 ft	25.6 ft NGVD29	FHRR Section 3b.4 and Table 5-1 FHRR Section 3b.7 and Table 5-1
At Site Safety Related Buildings with Margin Added	Not applicable	Not applicable	26.1 ft NGVD29	FHRR Section 3b.7
At Intake Structure	25.3 ft NGVD29	3.0 ft	28.3 ft NGVD29	FHRR Section 3b.7
Seiche	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.4 and Table 5-1
Tsunami	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.5 and Table 5-1

Table 1. Current Design Basis Flood Hazards for Use in the MSA

Mechanism	Stillwater Elevation	Waves/ Runup	Design Basis Hazard Elevation	Reference
Ice-Induced Flooding	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.6 and Table 5-1
Channel Migrations/Diversions	Not included in DB	Not included in DB	Not included in DB	FHRR Table 5-1

Note 1: Reported values are rounded to the nearest one-tenth of a foot.

Note 2: Storm Surge Flood-Causing Mechanism includes a combined analysis of both surge and seiche.

Table 2. Reevaluated Flood Hazards for Flood-Causing Mechanisms for Use in the MSA

Mechanism	Stillwater Elevation	Waves/ Runup	Reevaluated Hazard Elevation	Reference
Local Intense Precipitation				
Reactor Building (Door D-3)	21.1 ft NGVD29	Minimal	21.1 ft NGVD29	FHRR Section 4a and Tables 4-2 & 5-1
Turbine Building (Door D-24)	21.7 ft NGVD29	Minimal	21.7 ft NGVD29	FHRR Tables 4-3 & 5-1
Reactor Building (Door D-2)	20.8 ft NGVD29	Minimal	20.8 ft NGVD29	FHRR Section 4a and Tables 4-2 & 5-1
Streams and Rivers				
Cape Fear River	11.9 ft NGVD29	4.4 ft	16.3 ft NGVD29	FHRR Section 4b & Table 5-1 FHRR Section 4b, Table 4-18, & Table 5-1
Nancy's Creek	15.5 ft NGVD29	Minimal	15.5 ft NGVD29	FHRR Section 4b & Table 5-1
Failure of Dams and Onsite Water Control/Storage Structures				
REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Storm Surge				
Reactor Building	26.5 ft NGVD29	7.0 ft	33.5 ft NGVD29	See Note 5
Diesel Generator Building	26.5 ft NGVD29	7.1 ft	33.6 ft NGVD29	See Note 5

Table 2. Reevaluated Flood Hazards for Flood-Causing Mechanisms for Use in the MSA

Mechanism	Stillwater Elevation	Waves/ Runup	Reevaluated Hazard Elevation	Reference
Service Water Building/Intake Structure	26.4 ft NGVD29	7.1 ft	33.5 ft NGVD29	See Note 5
AOG Building	26.4 ft NGVD29	7.2 ft	33.6 ft NGVD29	See Note 5
Radwaste Building	26.5 ft NGVD29	7.2 ft	33.7 ft NGVD29	See Note 5
Turbine Building	26.7 ft NGVD29	7.1 ft	33.8 ft NGVD29	See Note 5
Tsunami				
At the Intake Canal	10.2 ft NGVD29	Not applicable	10.2 ft NGVD29	FHRR Section 4E & Table 5-1

Note 1: The licensee is expected to develop flood event duration parameters and applicable flood associated effects to conduct the MSA. The staff will evaluate the flood event duration parameters (including warning time and period of inundation) and flood associated effects during its review of the MSA.

Note 2: Reevaluated hazard mechanisms bounded by the current design basis (see Table 1) are not included in this table.

Note 3: Reported values are rounded to the nearest one-tenth of a foot.

Note 4: Wind/Wave effects for streams and rivers flood-causing mechanism were determined using combined effects PMH based wind/wave effects noted in Rev. 0 of the FHRR.

Note 5: For the storm surge hazard, the elevations presented in this table include adjustments (relative to results presented in the FHRR) to account for (1) sensitivity and uncertainty associated with the wind drag functions used in numerical storm surge models and (2) the calculation of the tidal component of the antecedent water level.

Note 6: Storm Surge Flood-Causing Mechanism includes a combined analysis of both surge and seiche.

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W. Gideon - 4 -

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2– INTERIM STAFF RESPONSE TO REEVALUATED FLOOD HAZARDS SUBMITTED IN RESPONSE TO 10 CFR 50.54(f) INFORMATION REQUEST – FLOOD-CAUSING MECHANISM REEVALUATION DATED MARCH 16, 2017

DISTRIBUTION:

PUBLIC	JLD R/F	RidsNRRJLD Resource
JUribe, NRR	LQuinn-Willingham, NRO	RidsNroDsea Resource
RidsNrrDorlLpl2 Resource	RidsNrrDorl Resource	RidsNrrPMBrunswick Resource
RidsRgn2MailCenter Resource	RidsNrrLASLent	RidsOgcMailCenter Resource
RidsOpaMail Resource	RidsAcrsAcnw_MailCtr Resource	CCook, NRO
ACampbell, NRO	RRivera-Lugo, NRO	LGibson, NRR
MWillingham, NRO	KSee, NRO	BHarvey, NRO
MShams, NRR		

ADAMS Accession Nos.: Pkg; ML17072A350; Non-Public Letter: ML17072A355; Public Letter: ML17072A364; Enclosure 1: ML17072A420; Enclosure 2: ML17072A452
***via email**

OFFICE	NRR/JLD/JHMB/PM*	NRR/JLD/LA	NRR/JLD/JHMB/BC(A)	NRR/JLD/JHMB/PM
NAME	JUribe	SLent	NSanfilippo	JUribe
DATE	3/15/2017	3/15/2017	3/16/2017	3/16/2017

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https://www.nrc.gov/docs/ML1707/ML17072A364.pdf

Below are excerpts from a November 2017 55 page US NRC document: https://www.nrc.gov/docs/ML1727/ML17271A248.pdf

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ATTACHMENT 5

Summary of Revised 10-Percent Exceedance High Tide Adjustment
(As developed by Duke in the Brunswick White Paper (See Attachment 6))

As part of the audit material reviewed for Brunswick (FHRR calculations and reports), and based on the staff's review of responses to Information Needs #2 (December 12, 2015; and supplemented in January 28, 2016), #3 (December 22, 2015), and licensee communications on June 2, 2016 ("10 Percent Monthly Max Tide Update – Preliminary Results"), the NRC determined that additional information was needed to close the 10-Percent Exceedance High Tide Adjustment analysis.

Request 1: Provide the finalized 10-percent exceedance high tide for the Brunswick site

Response:

Results of the 10-percent exceedance high tide (based on the monthly maximum per JLD-ISG-2012-06) for the Brunswick site are provided in Table 1, Enclosure 7 of the white paper discussed in Attachment 4 of this report. Below is a high level summary of Table 1 results:

- Highest still water level (containing SSC's) = 24.48 ft (NGVD29)
- Highest max wave run-up (containing SSC's) = 31.78 ft (NGVD29)

Requests 2, 3, 4:

Provide the methodology applied to develop the finalized 10-percent exceedance high tide. Discuss whether the value was determined using the ISG recommend method (JLD-ISG-2012-06: Guidance for Performing a Tsunami, Surge, or Seiche Hazard Assessment), or any other method. Provide the source and record length for the data applied to develop the finalized 10-percent exceedance high tide.

Response:

The updated 10-percent exceedance monthly maximum tide value was calculated by implementing the guidance from the JLD-ISG-2012-06 guidance document by the U.S. NRC (2013), which states that "*The 10% exceedance high tide is the high-tide level that is equaled or exceeded by 10 percent of the maximum monthly tides over the tidal epoch (a continuous 21-yr period in most locations). This tide can be determined from the recorded tide or from the predicted astronomical tide.*" Tidal water level measurements were obtained at Southport, NC (station 8659084). The Southport tide gauge dataset was selected as the nearest location to the BNP site with long-term water level records. The calculation proceeded in the following stages:

a) A harmonic tidal analysis of a recent full year of data (the year 2007 was selected) was conducted in order to extract the astronomical tidal constituents in a robust manner.

b) The tidal constituents were then used to generate a 21-year (2014-2034 inclusive) tidal water level prediction using the Matlab implementation of the UTide toolbox by Codiga (2011).

c) Monthly maxima were extracted over the 21-year period, amounting to 252 monthly maximum values.

d) The 10% exceedance value (3.56 ft above MSL) was taken as the 26th highest value among the monthly maximum values, equaled or exceeded by 10% of the monthly maxima (25 months).

The 10-percent exceedance monthly maximum tide value was used as the initial stillwater level throughout the Delft3D hydrodynamic and wave models in the combined effects scenario. Therefore the conservative assumption was applied that the maximum storm surge would coincide with the maximum tide level, consistent with the guidance provided in JLD-ISG-2012-06.

References

Codiga, D.L., 2011. Unified Tidal Analysis and Prediction Using the UTide Matlab Functions. Technical Report 2011-01. Graduate School of Oceanography, University of Rhode Island, Narragansett, RI. 59pp.

NOAA, 2016. Station ID 8659084, https://tidesandcurrents.noaa.gov/harcon.html?id=8659084. [accessed May 2016].

U.S. Nuclear Regulatory Commission, 2013. JLD-ISG-2012-06 Guidance for Performing a Tsunami, Surge, or Seiche Hazard Assessment, Interim Staff Guidance, Revision 0 (January 4, 2013).

Brunswick White Paper, Enclosure 7, Table 1:

"10-percent Exceedance High Tide Adjustment; Summary of PMH Results at buildings containing SSCs (Revision of Table 6-1 in BNP-14-009)"

Door ID	Building	Adjacent Ground Level	Finish Flood Level	Still water Level	Depth Above Ground	Max Wave Height	Max Wave Run Up	Flood Duration Above Adjacent Ground	Max Wave Height Instantaneous Water Surface Elevation	Max Wave Run Up Instantaneous Water Surface Elevation
		ft (NGVD29)			ft			hr	ft (NGVD29)	
D-2	Reactor Building	20.00	20	24.45	4.45	2.84	7.09	2.27	25.87	31.54
D-3		19.94	20	24.47	4.53	2.44	6.1	2.16	25.69	30.57
D-4	Diesel Generator Building	19.63	23	24.48	4.85	2.84	7.09	3.13	25.9	31.58
D-5		21.41	23	24.43	3.02	2.88	7.21	1.44	25.87	31.63
D-6		20.02	23	24.44	4.42	2.44	6.1	3.14	25.66	30.54
D-7		19.44	23	24.44	5	2.44	6.1	3.25	25.66	30.54
D-8		22.36	23	24.41	2.05	2.44	6.1	1.09	25.63	30.52
D-13	Service Water Intake Building	20.47	23	24.35	3.88	2.44	6.1	1.69	25.57	30.45
D-14		18.89	23	24.38	5.49	2.44	6.1	3.25	25.6	30.48

Brunswick White Paper, Enclosure 7, Table 2:

"10-percent Exceedance High Tide Adjustment; Summary of PMH Results at buildings not containing SSCs (Revision of Table 6-2 in BNP-14-009)"

Door ID	Building	Adjacent Ground Level	Finish Flood Level	Still water Level	Depth Above Ground	Max Wave Height	Max Wave Run Up	Flood Duration Above Adjacent Ground	Max Wave Height Instantaneous Water Surface Elevation	Max Wave Run Up Instantaneous Water Surface Elevation
		ft (NGVD29)			ft			hr	ft (NGVD29)	
D-1	Radwaste Building	19.01	23	24.5	5.49	2.88	7.21	3.15	25.94	31.7
D-9	AOG Building	19.54	22.33	24.41	4.87	2.88	7.21	3.12	25.85	31.62
D-10		19.81	22.33	24.36	4.55	2.88	7.21	3.12	25.8	31.57
D-11		19.81	22.33	24.38	4.57	2.44	6.1	3.12	25.6	30.49
D-12		19.67	22.33	24.42	4.75	2.88	7.21	3.13	25.86	31.62
D-15	Flex Storage Building	28.39	30.17	-	-.	-	-	-	-	-
D-16		28.54	30.17	-	-	-	-	-	-	-
D-17	Turbine Building	19.88	20	24.57	4.69	2.88	7.21	3.11	26.01	31.78
D-18		19.91	20	24.57	4.66	2.88	7.21	2.43	26.01	31.78
D-19		19.87	20	24.56	4.69	2.88	7.21	2.48	26	31.77
D-20		19.85	20	24.57	4.72	2.88	7.21	3.11	26.01	31.78
D-21		19.63	20	24.66	5.03	2.84	7.09	3.14	26.08	31.75
D-22		19.94	20	24.57	4.63	2.51	6.27	3.08	25.83	30.84
D-23		19.94	20	24.57	4.63	2.51	6.27	3.08	25.83	30.84
D-24		19.87	20	24.67	4.8	2.52	6.31	3.1	25.93	30.98
D-25		19.89	20	24.67	4.78	2.51	6.27	3.1	25.92	30.94
D-26		20.00	20	24.66	4.66	2.77	6.93	3.25	26.04	31.59

NUCLEAR REGULATORY COMMISSION REPORT FOR THE AUDIT OF DUKE ENERGY PROGRESS, LLC's FLOOD HAZARD REEVALUATION REPORT SUBMITTAL RELATED TO THE NEAR-TERM TASK FORCE RECOMMENDATION 2.1-FLOODING FOR BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 (CAC NOS. MF6104 AND MF6105)

BACKGROUND AND AUDIT BASIS

By letter dated March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued a request for information to all power reactor licensees and holders of construction permits in active or deferred status, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f), "Conditions of Licenses" (hereafter referred to as the "50.54(f) letter"). The request was issued in connection with implementing lessons learned from the 2011 accident at the Fukushima Dai-ichi nuclear power plant, as documented in the NRC's Near-Term Task Force report. Recommendation 2.1 in that document recommended that the NRC staff issue orders to all licensees to reevaluate seismic and flooding hazards for their sites using current NRC requirements and guidance. Subsequent staff requirements memoranda associated with SECY-11-0124 and SECY-11-0137 instructed the NRC staff address this recommendation through the issuance of requests for information to licensees pursuant to 10 CFR 50.54(f).

By letter dated March 11, 2015 (Agencywide Document Access and Management System (ADAMS) Accession No. ML15079A385, non-public), Duke Energy Progress, LLC (Duke, the licensee), submitted its Flood Hazard Reevaluation Report (FHRR) for Brunswick Steam Electric Plant, Units 1 and 2 (Brunswick). By letter dated June 11, 2015 (ADAMS Accession No. ML15148A762), the NRC informed the licensee of the staff's plan to conduct a regulatory audit of the Brunswick FHRR.

The audits performed provided the NRC staff with a better understanding of the analyses (and supporting documentation) of the flooding hazards presented in the Brunswick FHRR, and supported the completion of the staff's review of the FHRR, the issuance of the interim hazard letter (issued by letter dated March 16, 2017, ADAMS Accession No. ML17072A364), and will support the subsequent issuance of a staff assessment. The purpose of this report is to provide the results of the audit that was completed in accordance with the guidance set forth in NRC Office of Nuclear Reactor Regulation Office Instruction LIC-111, "Regulatory Audits," dated December 29, 2008 (ADAMS Accession No. ML082900195).

AUDIT LOCATION AND DATES

The audit was completed by document review via electronic reading room (ERR), remote webinar sessions, and ultimately a site visit. The details are as follow:

Webinar Sessions	10/28/2015; 11/16/2015; 1/26/2016; 3/10/2016; 4/28/2016; 6/23/2016; and 9/29/2016.
Site Visit	2/23/2017.

A closeout phone call was held on November 13, 2017.

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BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2– REPORT FOR THE AUDIT OF DUKE ENERGY PROGRESS FLOOD HAZARD REEVALUATION REPORT DATED November 15, 2017

DISTRIBUTION

PUBLIC	LQuinn, NRO	RidsNRRJLD Resource	
JLD R/F	RRiveraLugo, NRO	RidsNrrPMBrunswick Resource	RidsNrrLASLent
MShams, NRR	SDevlin, NRO	RidsNrrDorlLp2-2 Resource	LGibson, NRR
JUribe, NRR	JSebrosky, NRR	LQuinn-Willingham, NRO	CCook, NRO
ACampbell, NRO		RidsRgn2MailCenter Resource	

ADAMS Accession Nos. Pkg. ML17271A242 ; Audit Report (NON-PUBLIC) ML17271A026; Audit Report (PUBLIC) ML17271A248 *via email

OFFICE	NRR/DLP/PBMB/PM	NRR/JLD/LA	NRO/DSEA/RHM	NRR/DLP/PBMB/BC	NRR/DLP/PBMB/PM
NAME	JSebrosky	SLent	CCook*	MShams	JSebrosky
DATE	10/23/17	9/29/17	7/19/17	10/29/17	11/15/17

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https://www.nrc.gov/docs/ML1727/ML17271A248.pdf

Information from a Brunswick Relicensing document: "*The average daily freshwater flow into the Cape Fear estuary is around 10,000 cubic feet per second, but there is considerable variability. The distribution and quantity of rainfall in the watershed are the main determinants of annual and seasonal variation (CP&L 1980, pg. 4-5). Flows in the Cape Fear River are highest in late winter and lowest in late-summer and fall. During periods of average freshwater inflow (after the ebb tide) surface salinities range from 8 parts per thousand (Sunny Point) to 24 parts per thousand (Bald Head), while bottom*

salinities range from 15 parts per thousand (Sunny Point) to 29 parts per thousand (Bald Head) (CP&L 1980, pg. 4-20).
Tidal height (amplitude) decreases as the tidal pulse moves up-river. The average tidal amplitude in the lower river, (near its mouth) is approximately four feet (CP&L 1980, pg. 4-5). Tidal currents in the estuary average 3.4 feet per second, thus the movement of water in the channel during a six-hour ebb or flood tide is approximately 14 miles. This tidal excursion is large compared to the length of the estuary, and as a result water and associated organisms can be moved through the system in a few days.

The portion of the estuary seaward of Sunny Point, in which BSEP is located (essentially the first tidal reach), is characterized by complex water circulation patterns, vigorous tidal action, turbulence, fluctuating salinity levels, and high exchange ratios with the ocean. In many respects, this reach of the estuary acts as an extension of the nearby coastal zone. The distribution and abundance of aquatic organisms in the lower

*Brunswick Nuclear License Renewal App Environmental Report: Site and Environmental Interfaces Page 2-3*https://www.nrc.gov/reactors/operating/licensing/renewal/applications/brunswick/brunswick_er.pdf
Regarding the Spent Nuclear Fuel Facility, which is apparently NuHoms – Transnuclear-Areva/Orano. They claim that it can deal with a flood height of 50 feet, though the impacts of salt water on it cannot be good. Its elevation is apparently around 20 feet.
"*2.2.2 Water Level (Flood) Design*
The 32PTH DSC and HSM-H are designed for an enveloping design basis flood, postulated to result from natural phenomena such as tsunami, and seiches, as specified by IOCFR 72.122(b). For the purpose of this generic evaluation, a flood height of 50 feet with a water velocity of 15 fps is used. The 32PTH DSC is subjected to an external hydrostatic pressure equivalent to the 50 feet head of water or 21.7 psi. The HSM-H is evaluated for the effects of a water current of 15 fps impinging on the sides of a submerged HSM-H. For the flood case that submerges the HSM-H, the inside of the HSM-H will be rapidly filled with water through the HSM-H vents. Therefore, the HSM-H components are not evaluated for the resulting static head of water. The effects of flooding and submergence on the canister are addressed in Chapters 3, 4 and 11.

2.2.2.1 Flood Elevations
It is anticipated that the 32PTH DSC and HSM-H will be located on flood-dry sites. However, as stated above, the HSM-H and 32PTH DSC are designed for a flood elevation 50 ft. above the base of the HSM-H.

2.2.2.2 Phenomena Considered in Design Load Calculations

The HSM-H is designed to withstand loads from forces developed by the probable maximum flood including dynamic phenomena such as momentum and drag. The 32PTH DSC is designed for the hydrostatic head equal to 50 ft. water submergence." https://www.nrc.gov/docs/ML0415/ML041540170.pdf

Additional links-documents:

https://www.nrc.gov/reactors/operating/ops-experience/japan/plants/bru2.html

2015 Walkdown https://www.nrc.gov/docs/ML1427/ML14279A268.pdf

Closeout phone call November 2017: https://www.nrc.gov/docs/ML1727/ML17271A248.pdf

https://tidesandcurrents.noaa.gov/est/est_station.shtml?stnid=8658120

https://en.wikipedia.org/wiki/Hurricane_Hazel

https://tidesandcurrents.noaa.gov/waterlevels.html?id=8658120&units=metric&bdate=19541011&edate=19541019&datum=MHHW&interval=h

https://tidesandcurrents.noaa.gov/est/seasonal.shtml?stnid=8658120

5 AM Storm Surge Flooding Update for Sept 12, 2018 Hurricane Florence:

"*STORM SURGE: The combination of a dangerous storm surge and the tide will cause normally dry areas near the coast to be flooded by rising waters moving inland from the shoreline. The water has the potential to reach the following heights above ground if peak surge occurs at the time of high tide…*

Cape Fear to Cape Lookout, including the Neuse, Pamlico, Pungo, and Bay Rivers…9-13 ft

North Myrtle Beach to Cape Fear…6-9 ft

Cape Lookout to Ocracoke Inlet…6-9 ft

South Santee River to North Myrtle Beach…4-6 ft

Ocracoke Inlet to North Carolina/Virginia Border…4-6 ft

Edisto Beach to South Santee River…2-4 ft

The deepest water will occur along the immediate coast in areas of onshore winds, where the surge will be accompanied by large and destructive waves. Surge-related flooding depends on the relative timing of the surge and the tidal cycle, and can vary greatly over short distances. For information specific to your area, please see products issued by your local National Weather Service forecast office.

RAINFALL: Florence is expected to produce heavy and excessive rainfall in the following areas…

Coastal North Carolina…20 to 30 inches, isolated 40 inches
South Carolina, western and northern North Carolina…5 to 10 inches, isolated 20 inches
Elsewhere in the Appalachians and Mid-Atlantic states…3 to 6 inches, isolated 12 inches

This rainfall would produce catastrophic flash flooding and significant river flooding."
https://www.nhc.noaa.gov/text/refresh/MIATCPAT1+shtml/120852.shtml?
This post was published on Sept. 12, 2018 at 8.13 am EDT (12.13 UTC)

La centrale nucléaire de Brunswick n'a apparemment toujours pas réglé le problème des pires scénarios d'inondation (réévaluation); Ciblé par l'ouragan Florence

12 mercredi SEPT. 2018

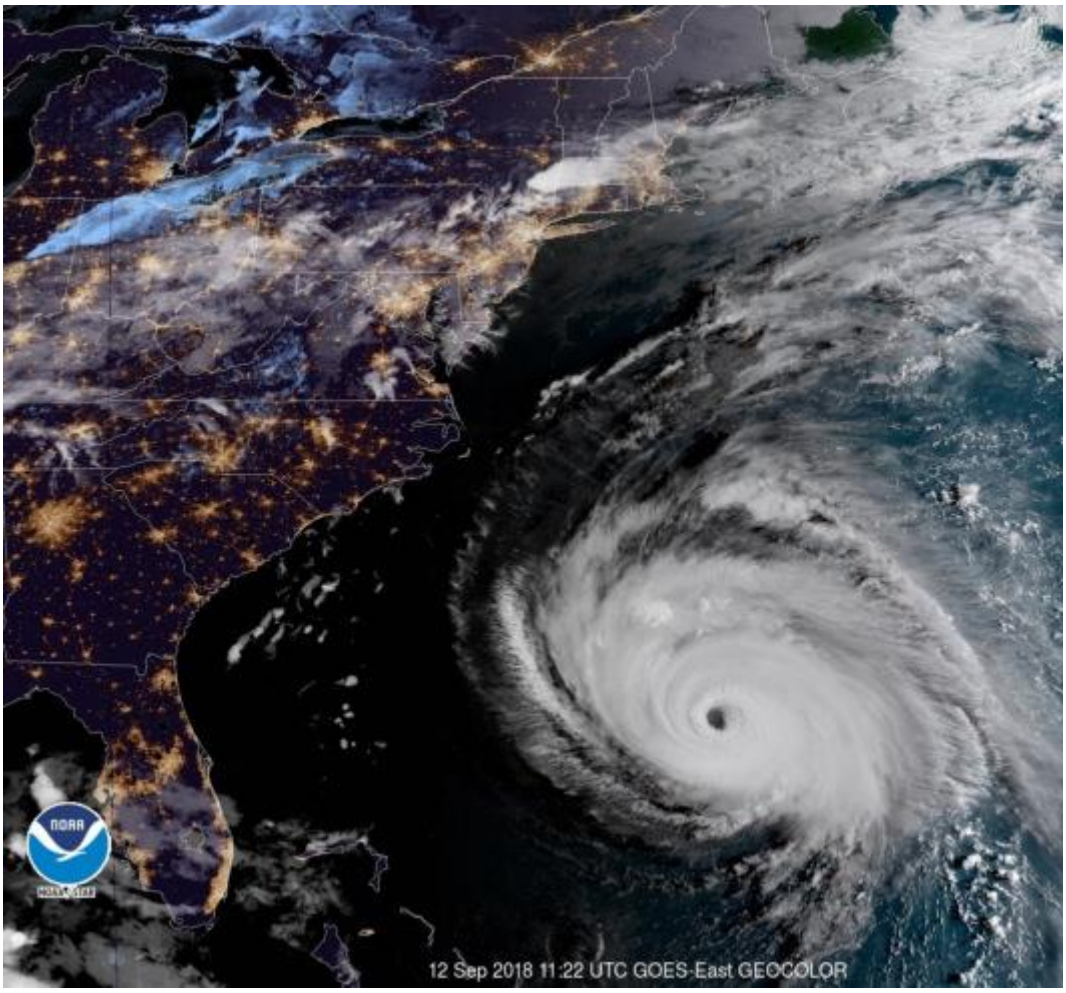
PUBLIE PAR MININGAWARENESS IN NON CLASSE

≈ LAISSER UN COMMENTAIRE

Mots clés

Les ouragans de l' Atlantique , les tempêtes de l' Atlantique , Cape Fear , dangers du nucléaire , l' environnement , les inondations , la base de la conception des inondations , révaluation inondations , Fukushima, les leçons de Fukushima ont appris , l' ouragan Florence , perte de puissance , Caroline du Nord , nucléaire , accident nucléaire , catastrophe nucléaire , l' énergie nucléaire , fusion nucléaire , l' énergie nucléaire , les réacteurs nucléaires ,déchets nucléaires , déchets radioactifs , la pluie , la gestion des risques , Caroline du Sud , combustible nucléaire usé , station Blackout , des ondes de tempête , NRC , Virginie

En avril 2018, le NRC américain n'avait pas reçu d'informations sur la manière dont la centrale nucléaire de Brunswick allait s'attaquer à la réévaluation du risque d'inondation. Comme on ne sait pas comment ils le feraient sans la construction d'un mur anti-inondation et / ou peut-être une importante imperméabilisation de l'eau, ils ne l'ont probablement toujours pas abordée.
https://miningawareness.wordpress.com/2018/09/13/brunswick-nuclear-power-stations-cliff-edge-barriers-appear-to-fall-almost-8-feet-short-of-required-storm- protection contre les surtensions / Le 16 avril 2018, le NRC américain a écrit à la centrale nucléaire de Brunswick en Caroline du Nord: «



Dans une lettre datée du 16 mars 2017 (numéro d'accession ADAMS ML 17072A364), le personnel du CNRC a envoyé à la titulaire un résumé de l'examen par son personnel des mécanismes réévaluant les mécanismes responsables des inondations de Brunswick… Comme indiqué dans la lettre, les résultats des Les précipitations intenses, les ruisseaux et les rivières, la défaillance des barrages et des structures de contrôle / stockage de l'eau sur le site, les ondes de tempête et les mécanismes provoquant les tsunamis n'étaient pas limités par le dimensionnement actuel. Afin de compléter sa réponse à la pièce jointe 2 de la lettre 50.54 (f), le titulaire de licence doit soumettre une évaluation ciblée ou une évaluation intégrée afin de faire face à ces risques d'inondation réévalués,… "

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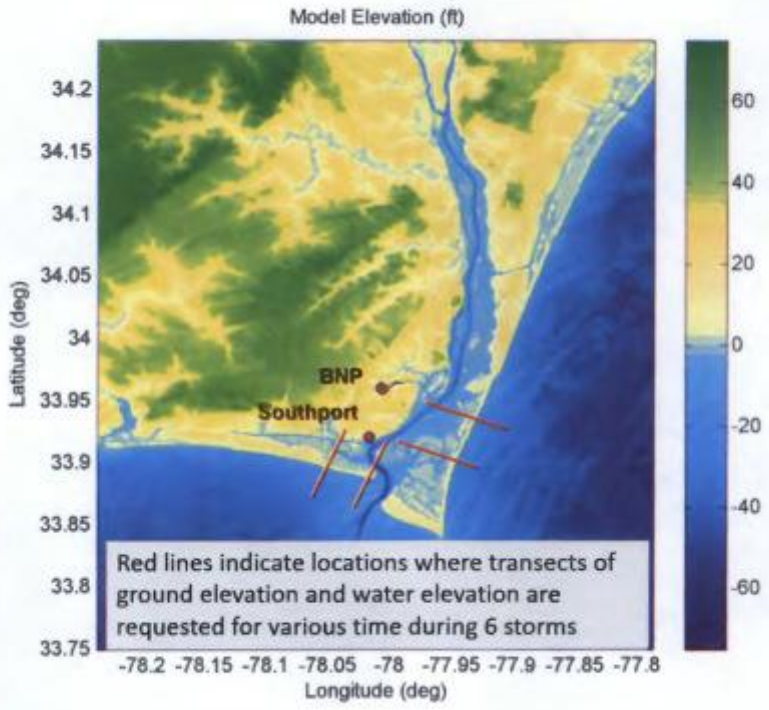


Figure 2: Area 1

Information Needs No. 22 – Figure of Transects

https://www.nrc.gov/docs/ML1727/ML17271A248.pdf

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 16, 2018

Mr. William R. Gideon
Site Vice President
Brunswick Steam Electric Plant
8470 River Rd. SE (M/C BNP001)
Southport, NC 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT UNITS 1 AND 2 – STAFF ASSESSMENT OF RESPONSE TO 10 CFR 50.54(f) INFORMATION REQUEST FLOOD-CAUSING MECHANISM REEVALUATION (EPID NOS. 000495/05000325/L-2015-JLD-0007 AND 000495/05000324/L-2015-JLD-0008)

Dear Mr. Gideon:

By letter dated March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued a request for information under Title 10 of the *Code of Federal Regulations*, Section 50.54(f) (hereafter referred to as the 50.54(f) letter). The request was issued as part of implementing lessons learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 2 to the 50.54(f) letter requested that licensees reevaluate flood-causing mechanisms using present-day methodologies and guidance. By letter dated March 11, 2015 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15079A385, non-public), Duke Energy Progress, LLC (Duke, the licensee) responded to this request for Brunswick Steam Electric Plant, Units 1 and 2 (Brunswick).

By letter dated March 16, 2017 (ADAMS Accession No. ML17072A364), the NRC staff sent the licensee a summary of the staff's review of Brunswick's reevaluated flood-causing mechanisms. The enclosed staff assessment provides the documentation supporting the NRC staff's conclusions summarized in the letter. As stated in the letter, the reevaluated flood hazard results for the local intense precipitation, streams and rivers, failure of dams and onsite water control/storage structures, storm surge, and tsunami flood-causing mechanisms were not bounded by the current design basis. In order to complete its response to Enclosure 2 to the 50.54(f) letter, the licensee is expected to submit a focused evaluation or an integrated assessment in order to address these reevaluated flood hazards, as discussed in COMSECY-15-0019, "Closure Plan for the Reevaluation of Flooding Hazard for Operating Nuclear Power Plants," and Japan Lessons-Learned Division (JLD) Interim Staff Guidance (ISG) JLD-ISG-2016-01, "Guidance for Activities Related to Near-Term Task Force Recommendation 2.1, Flooding Hazard Reevaluation; Focused Evaluation and Integrated Assessment." This letter closes out the NRC's efforts associated with CAC Nos. MF6104 and MF6105.

The Enclosure transmitted herewith contains Security-Related Information. When separated from the Enclosure, this document is decontrolled.

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W. Gideon - 2 -

If you have any questions, please contact me at (301) 415-3809 or by e-mail at Juan.Uribe@nrc.gov.

Sincerely,



Juan F. Uribe, Project Manager
Beyond-Design-Basis Management Branch
Division of Licensing Projects
Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

Enclosure:
Staff Assessment of Flood Hazard
Reevaluation Report for Brunswick
(Non-public, Security Related)

cc w/o encl: Distribution via Listserv

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https://www.nrc.gov/docs/ML1808/ML18089A055.pdf

Reuters a déclaré que « *le CNRC a déclaré dans un rapport de 2004 que toutes les structures liées à la sécurité à Brunswick étaient étanches jusqu'à 6,7 mètres au-dessus du niveau de la mer. "*

Voir:" ***Les centrales nucléaires américaines se préparent à l'ouragan Florence***

Publié: mardi, 11 septembre 2018 17:13:16 -0400

Plusieurs réacteurs nucléaires en Caroline du Nord et du Sud et en Virginie ont commencé mardi à se préparer à l'ouragan Florence, qui devrait frappé la côte comme un ouragan majeur

vendredi. " Http://feeds.reuters.com/~r/reuters/environment/~3/3NrUaH9iTcs/us-nuclear-power-plants-prepare-for-hurricane-florence-idUSKCN1LR2C8

Cependant, le US NRC et le service public ont convenu que 22 pieds n'était pas assez élevé pour le pire des cas.

CI-DESSOUS: LES TABLEAUX DE RÉÉVALUATION SUIVENT LES TABLEAUX DE BASE DE LA CONCEPTION

ACTUELS https://www.nrc.gov/docs/ML1707/ML17072A364.pdf

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 16, 2017

Mr. William R. Gideon
Site Vice President
Brunswick Steam Electric Plant
8470 River Rd. SE (M/C BNP001)
Southport, NC 28461

SUBJECT: BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 – INTERIM STAFF RESPONSE TO REEVALUATED FLOOD HAZARDS SUBMITTED IN RESPONSE TO 10 CFR 50.54(f) INFORMATION REQUEST – FLOOD-CAUSING MECHANISM REEVALUATION (CAC NOS. MF6104 AND MF6105)

Dear Mr. Gideon:

The purpose of this letter is to provide a summary of the U.S. Nuclear Regulatory Commission (NRC) staff's assessment of the reevaluated flood-causing mechanisms described in the March 11, 2015, flood hazard reevaluation report (FHRR) submitted by Duke Energy Progress, LLC (Duke, the licensee) for Brunswick Steam Electric Plant, Units 1 and 2 (Brunswick) (Agencywide Documents Access and Management System (ADAMS) Accession No. ML15079A385), as well as supplemental information resulting from audits.

By letter dated March 12, 2012, the NRC issued a request for information pursuant to Title 10 of the *Code of Federal Regulations*, Section 50.54(f) (hereafter referred to as the 50.54(f) letter) (ADAMS Accession No. ML12053A340). The request was issued as part of implementing lessons learned from the accident at the Fukushima Dai-ichi nuclear power plant. Enclosure 2 to the 50.54(f) letter requested licensees to reevaluate flood-causing mechanisms using present-day methodologies and guidance. Concurrent with the reevaluation of flooding hazards, licensees were required to develop and implement mitigating strategies in accordance with NRC Order EA-12-049, "Requirements for Mitigation Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML12054A735). On March 30, 2015, the Commission provided staff requirements memorandum (SRM) (ADAMS Accession No. ML15089A236) to COMSECY-14-0037, "Integration of Mitigating Strategies for Beyond-Design-Basis External Events and the Reevaluation of Flooding Hazards," dated November 21, 2014 (ADAMS Accession No. ML14309A256), affirming that licensees need to address the reevaluated flooding hazards within their mitigating strategies for beyond-design-basis external events. Revision 2 of Nuclear Energy Institute (NEI) guidance document NEI 12-06, dated December 2015, includes a methodology for performing a mitigating strategies assessment (MSA) with respect to the reevaluated flood hazards.

Enclosure 2 transmitted herewith contains Security-Related Information. When separated from the Enclosure, this document is decontrolled.

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On February 29, 2016, the NRC staff published Japan Lessons-Learned Division (JLD) Interim Staff Guidance (ISG) JLD-ISG-2012-01, Revision 1, "Compliance with Order EA-12-049, 'Order Modifying Licenses with Regard to Requirements for Mitigation Strategies for Beyond-Design-Basis External Events'" (ADAMS Accession No. ML15357A142), in the *Federal Register* (81 FR 10283). This ISG endorses Revision 2 of NEI 12-06 (ADAMS Accession No. ML16005A625). Based on the guidance provided in Revision 2 of NEI 12-06, any flood event duration parameters and applicable flood associated effects that were not provided in the FHRR should be considered as part of the Brunswick MSA. The NRC staff will evaluate the flood event duration parameters (including warning time and period of inundation) and flood-related associated effects developed by the licensee during the NRC staff's review of the MSA.

In addition to the MSA, in order to complete its response to the information requested by Enclosure 2 to the 50.54(f) letter, the licensee is expected to submit an integrated assessment or a focused evaluation, as appropriate, to address the reevaluated flood hazards that exceed the current design basis, as described in the NRC letter, "Coordination of Request for Information Regarding Flooding Hazard Reevaluation and Mitigating Strategies for Beyond-Design-Basis External Events" (ADAMS Accession No. ML15174A257). This letter describes the changes in the NRC's approach to the flood hazard reevaluations that were approved by the Commission in its SRM to COMSECY-15-0019, "Closure Plan for the Reevaluation of Flooding Hazards for Operating Nuclear Power Plants" (ADAMS Accession No. ML15209A682).

The NRC staff has reviewed the information submitted by the licensee in its FHRR and the associated regulatory audit (ADAMS Accession No. ML15148A762), and has summarized the results of the review in the tables provided as an enclosure to this letter. Table 1 provides the current design-basis flood hazard mechanisms. Table 2 provides the reevaluated flood hazard mechanisms; however, the reevaluated flood hazard mechanisms bounded by the current design basis (Table 1) are not included.

The NRC staff performed a confirmatory analysis of the information provided in the FHRR to independently evaluate the sensitivity of the reevaluated hazards to input parameters. The confirmatory analysis indicated that the storm surge flood-causing mechanism is sensitive to the input parameters and methodology used. The sensitivities identified have been discussed with the licensee. As a measure of conservatism, the licensee agreed to provide margin above the FHRR stillwater elevations for storm surge for the subsequent flood evaluations addressing flooding due to storm surge. The water elevations summarized in Table 2 reflect this commitment.

Based on the information provided by the licensee and the staff's confirmatory analysis, the NRC staff has concluded that the reevaluated flood hazard information, as summarized in Table 2 of the enclosure, is suitable for the assessment of mitigating strategies developed in response to Order EA-12-049 (i.e., defines the mitigating strategies flood hazard information described in NEI guidance document NEI 12 06, "Diverse and Flexible Coping Strategies (FLEX) Implementation Guide") for Brunswick. Further, the NRC staff has concluded that the enclosed reevaluated flood hazard information is suitable input for other flooding assessments associated with the 50.54(f) letter. The NRC staff plans to issue a staff assessment documenting the basis for these conclusions at a later time.

If you have any questions, please contact me at (301) 415-3809 or e-mail at Juan.Uribe@nrc.gov.

Sincerely,

Juan Uribe, Project Manager
Hazards Management Branch
Japan Lessons-Learned Division
Office of Nuclear Reactor Regulation

Docket Nos. 50-325 and 50-324

Enclosures:
1. Summary of Results of Flooding Hazard Re-Evaluation Report (Redacted Version)
2. Summary of Results of Flooding Hazard Re-Evaluation Report (Non-Public Version)

cc w/encl: Distribution via Listserv

Table 1. Current Design Basis Flood Hazards for Use in the MSA

Mechanism	Stillwater Elevation	Waves/ Runup	Design Basis Hazard Elevation	Reference
Local Intense Precipitation	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.1 and Table 5-1
Streams and Rivers	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.2 & Table 5-1
Failure of Dams and Onsite Water Control/Storage Structures	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.3 and Table 5-1
Storm Surge				
At Site Safety Related Buildings	22.0 ft NGVD29	3.6 ft	25.6 ft NGVD29	FHRR Section 3b.4 and Table 5-1 FHRR Section 3b.7 and Table 5-1
At Site Safety Related Buildings with Margin Added	Not applicable	Not applicable	26.1 ft NGVD29	FHRR Section 3b.7
At Intake Structure	25.3 ft NGVD29	3.0 ft	28.3 ft NGVD29	FHRR Section 3b.7
Seiche	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.4 and Table 5-1
Tsunami	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.5 and Table 5-1

Table 1. Current Design Basis Flood Hazards for Use in the MSA

Mechanism	Stillwater Elevation	Waves/ Runup	Design Basis Hazard Elevation	Reference
Ice-Induced Flooding	Not included in DB	Not included in DB	Not included in DB	FHRR Section 3b.6 and Table 5-1
Channel Migrations/Diversions	Not included in DB	Not included in DB	Not included in DB	FHRR Table 5-1

Note 1: Reported values are rounded to the nearest one-tenth of a foot.

Note 2: Storm Surge Flood-Causing Mechanism includes a combined analysis of both surge and seiche.

Table 2. Reevaluated Flood Hazards for Flood-Causing Mechanisms for Use in the MSA

Mechanism	Stillwater Elevation	Waves/ Runup	Reevaluated Hazard Elevation	Reference
Local Intense Precipitation				
Reactor Building (Door D-3)	21.1 ft NGVD29	Minimal	21.1 ft NGVD29	FHRR Section 4a and Tables 4-2 & 5-1
Turbine Building (Door D-24)	21.7 ft NGVD29	Minimal	21.7 ft NGVD29	FHRR Tables 4-3 & 5-1
Reactor Building (Door D-2)	20.8 ft NGVD29	Minimal	20.8 ft NGVD29	FHRR Section 4a and Tables 4-2 & 5-1
Streams and Rivers				
Cape Fear River	11.9 ft NGVD29	4.4 ft	16.3 ft NGVD29	FHRR Section 4b & Table 5-1 FHRR Section 4b, Table 4-18, & Table 5-1
Nancy's Creek	15.5 ft NGVD29	Minimal	15.5 ft NGVD29	FHRR Section 4b & Table 5-1
Failure of Dams and Onsite Water Control/Storage Structures				
REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
REDACTED	REDACTED	REDACTED	REDACTED	REDACTED
Storm Surge				
Reactor Building	26.5 ft NGVD29	7.0 ft	33.5 ft NGVD29	See Note 5
Diesel Generator Building	26.5 ft NGVD29	7.1 ft	33.6 ft NGVD29	See Note 5

Table 2. Reevaluated Flood Hazards for Flood-Causing Mechanisms for Use in the MSA

Mechanism	Stillwater Elevation	Waves/ Runup	Reevaluated Hazard Elevation	Reference
Service Water Building/Intake Structure	26.4 ft NGVD29	7.1 ft	33.5 ft NGVD29	See Note 5
AOG Building	26.4 ft NGVD29	7.2 ft	33.6 ft NGVD29	See Note 5
Radwaste Building	26.5 ft NGVD29	7.2 ft	33.7 ft NGVD29	See Note 5
Turbine Building	26.7 ft NGVD29	7.1 ft	33.8 ft NGVD29	See Note 5
Tsunami				
At the Intake Canal	10.2 ft NGVD29	Not applicable	10.2 ft NGVD29	FHRR Section 4E & Table 5-1

Note 1: The licensee is expected to develop flood event duration parameters and applicable flood associated effects to conduct the MSA. The staff will evaluate the flood event duration parameters (including warning time and period of inundation) and flood associated effects during its review of the MSA.

Note 2: Reevaluated hazard mechanisms bounded by the current design basis (see Table 1) are not included in this table.

Note 3: Reported values are rounded to the nearest one-tenth of a foot.

Note 4: Wind/Wave effects for streams and rivers flood-causing mechanism were determined using combined effects PMH based wind/wave effects noted in Rev. 0 of the FHRR.

Note 5: For the storm surge hazard, the elevations presented in this table include adjustments (relative to results presented in the FHRR) to account for (1) sensitivity and uncertainty associated with the wind drag functions used in numerical storm surge models and (2) the calculation of the tidal component of the antecedent water level.

Note 6: Storm Surge Flood-Causing Mechanism includes a combined analysis of both surge and seiche.

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W. Gideon - 4 -

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2– INTERIM STAFF RESPONSE TO REEVALUATED FLOOD HAZARDS SUBMITTED IN RESPONSE TO 10 CFR 50.54(f) INFORMATION REQUEST – FLOOD-CAUSING MECHANISM REEVALUATION DATED MARCH 16, 2017

DISTRIBUTION:

PUBLIC	JLD R/F	RidsNRRJLD Resource
JUribe, NRR	LQuinn-Willingham, NRO	RidsNroDsea Resource
RidsNrrDorlLpl2 Resource	RidsNrrDorl Resource	RidsNrrPMBrunswick Resource
RidsRgn2MailCenter Resource	RidsNrrLASLent	RidsOgcMailCenter Resource
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ACampbell, NRO	RRivera-Lugo, NRO	LGibson, NRR
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MShams, NRR		

ADAMS Accession Nos.: Pkg; ML17072A350; Non-Public Letter: ML17072A355; Public Letter: ML17072A364; Enclosure 1: ML17072A420; Enclosure 2: ML17072A452
***via email**

OFFICE	NRR/JLD/JHMB/PM*	NRR/JLD/LA	NRR/JLD/JHMB/BC(A)	NRR/JLD/JHMB/PM
NAME	JUribe	SLent	NSanfilippo	JUribe
DATE	3/15/2017	3/15/2017	3/16/2017	3/16/2017

OFFICIAL AGENCY RECORD

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Vous trouverez ci-dessous des extraits d'un document du US NRC de 55 pages publié en novembre
2017: https://www.nrc.gov/docs/ML1727/ML17271A248.pdf https://www.nrc.gov/docs/ML1727/ML17271A248.pdf

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ATTACHMENT 5

Summary of Revised 10-Percent Exceedance High Tide Adjustment
(As developed by Duke in the Brunswick White Paper (See Attachment 6))

As part of the audit material reviewed for Brunswick (FHRR calculations and reports), and based on the staff's review of responses to Information Needs #2 (December 12, 2015; and supplemented in January 28, 2016), #3 (December 22, 2015), and licensee communications on June 2, 2016 ("10 Percent Monthly Max Tide Update – Preliminary Results"), the NRC determined that additional information was needed to close the 10-Percent Exceedance High Tide Adjustment analysis.

Request 1: Provide the finalized 10-percent exceedance high tide for the Brunswick site

Response:

Results of the 10-percent exceedance high tide (based on the monthly maximum per JLD-ISG-2012-06) for the Brunswick site are provided in Table 1, Enclosure 7 of the white paper discussed in Attachment 4 of this report. Below is a high level summary of Table 1 results:

- Highest still water level (containing SSC's) = 24.48 ft (NGVD29)
- Highest max wave run-up (containing SSC's) = 31.78 ft (NGVD29)

Requests 2, 3, 4:

Provide the methodology applied to develop the finalized 10-percent exceedance high tide. Discuss whether the value was determined using the ISG recommend method (JLD-ISG-2012-06: Guidance for Performing a Tsunami, Surge, or Seiche Hazard Assessment), or any other method. Provide the source and record length for the data applied to develop the finalized 10-percent exceedance high tide.

Response:

The updated 10-percent exceedance monthly maximum tide value was calculated by implementing the guidance from the JLD-ISG-2012-06 guidance document by the U.S. NRC (2013), which states that "*The 10% exceedance high tide is the high-tide level that is equaled or exceeded by 10 percent of the maximum monthly tides over the tidal epoch (a continuous 21-yr period in most locations). This tide can be determined from the recorded tide or from the predicted astronomical tide.*" Tidal water level measurements were obtained at Southport, NC (station 8659084). The Southport tide gauge dataset was selected as the nearest location to the BNP site with long-term water level records. The calculation proceeded in the following stages:

a) A harmonic tidal analysis of a recent full year of data (the year 2007 was selected) was conducted in order to extract the astronomical tidal constituents in a robust manner.

b) The tidal constituents were then used to generate a 21-year (2014-2034 inclusive) tidal water level prediction using the Matlab implementation of the UTide toolbox by Codiga (2011).

c) Monthly maxima were extracted over the 21-year period, amounting to 252 monthly maximum values.

d) The 10% exceedance value (3.56 ft above MSL) was taken as the 26th highest value among the monthly maximum values, equaled or exceeded by 10% of the monthly maxima (25 months).

The 10-percent exceedance monthly maximum tide value was used as the initial stillwater level throughout the Delft3D hydrodynamic and wave models in the combined effects scenario. Therefore the conservative assumption was applied that the maximum storm surge would coincide with the maximum tide level, consistent with the guidance provided in JLD-ISG-2012-06.

References

Codiga, D.L., 2011. Unified Tidal Analysis and Prediction Using the UTide Matlab Functions. Technical Report 2011-01. Graduate School of Oceanography, University of Rhode Island, Narragansett, RI. 59pp.

NOAA, 2016. Station ID 8659084, https://tidesandcurrents.noaa.gov/harcon.html?id=8659084. [accessed May 2016].

U.S. Nuclear Regulatory Commission, 2013. JLD-ISG-2012-06 Guidance for Performing a Tsunami, Surge, or Seiche Hazard Assessment, Interim Staff Guidance, Revision 0 (January 4, 2013).

Brunswick White Paper, Enclosure 7, Table 1:

"10-percent Exceedance High Tide Adjustment; Summary of PMH Results at buildings containing SSCs (Revision of Table 6-1 in BNP-14-009)"

Door ID	Building	Adjacent Ground Level	Finish Flood Level	Still water Level	Depth Above Ground	Max Wave Height	Max Wave Run Up	Flood Duration Above Adjacent Ground	Max Wave Height Instantaneous Water Surface Elevation	Max Wave Run Up Instantaneous Water Surface Elevation
		ft (NGVD29)			ft			hr	ft (NGVD29)	
D-2	Reactor Building	20.00	20	24.45	4.45	2.84	7.09	2.27	25.87	31.54
D-3		19.94	20	24.47	4.53	2.44	6.1	2.16	25.69	30.57
D-4	Diesel Generator Building	19.63	23	24.48	4.85	2.84	7.09	3.13	25.9	31.58
D-5		21.41	23	24.43	3.02	2.88	7.21	1.44	25.87	31.63
D-6		20.02	23	24.44	4.42	2.44	6.1	3.14	25.66	30.54
D-7		19.44	23	24.44	5	2.44	6.1	3.25	25.66	30.54
D-8		22.36	23	24.41	2.05	2.44	6.1	1.09	25.63	30.52
D-13	Service Water Intake Building	20.47	23	24.35	3.88	2.44	6.1	1.69	25.57	30.45
D-14		18.89	23	24.38	5.49	2.44	6.1	3.25	25.6	30.48

Brunswick White Paper, Enclosure 7, Table 2:

"10-percent Exceedance High Tide Adjustment; Summary of PMH Results at buildings not containing SSCs (Revision of Table 6-2 in BNP-14-009)"

Door ID	Building	Adjacent Ground Level	Finish Flood Level	Still water Level	Depth Above Ground	Max Wave Height	Max Wave Run Up	Flood Duration Above Adjacent Ground	Max Wave Height Instantaneous Water Surface Elevation	Max Wave Run Up Instantaneous Water Surface Elevation
		ft (NGVD29)			ft			hr	ft (NGVD29)	
D-1	Radwaste Building	19.01	23	24.5	5.49	2.88	7.21	3.15	25.94	31.7
D-9	AOG Building	19.54	22.33	24.41	4.87	2.88	7.21	3.12	25.85	31.62
D-10		19.81	22.33	24.36	4.55	2.88	7.21	3.12	25.8	31.57
D-11		19.81	22.33	24.38	4.57	2.44	6.1	3.12	25.6	30.49
D-12		19.67	22.33	24.42	4.75	2.88	7.21	3.13	25.86	31.62
D-15	Flex Storage Building	28.39	30.17	-	-.	-	-	-	-	-
D-16		28.54	30.17	-	-	-	-	-	-	-
D-17	Turbine Building	19.88	20	24.57	4.69	2.88	7.21	3.11	26.01	31.78
D-18		19.91	20	24.57	4.66	2.88	7.21	2.43	26.01	31.78
D-19		19.87	20	24.56	4.69	2.88	7.21	2.48	26	31.77
D-20		19.85	20	24.57	4.72	2.88	7.21	3.11	26.01	31.78
D-21		19.63	20	24.66	5.03	2.84	7.09	3.14	26.08	31.75
D-22		19.94	20	24.57	4.63	2.51	6.27	3.08	25.83	30.84
D-23		19.94	20	24.57	4.63	2.51	6.27	3.08	25.83	30.84
D-24		19.87	20	24.67	4.8	2.52	6.31	3.1	25.93	30.98
D-25		19.89	20	24.67	4.78	2.51	6.27	3.1	25.92	30.94
D-26		20.00	20	24.66	4.66	2.77	6.93	3.25	26.04	31.59

NUCLEAR REGULATORY COMMISSION REPORT FOR THE AUDIT OF DUKE ENERGY PROGRESS, LLC's FLOOD HAZARD REEVALUATION REPORT SUBMITTAL RELATED TO THE NEAR-TERM TASK FORCE RECOMMENDATION 2.1-FLOODING FOR BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2 (CAC NOS. MF6104 AND MF6105)

BACKGROUND AND AUDIT BASIS

By letter dated March 12, 2012, the U.S. Nuclear Regulatory Commission (NRC) issued a request for information to all power reactor licensees and holders of construction permits in active or deferred status, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Section 50.54(f), "Conditions of Licenses" (hereafter referred to as the "50.54(f) letter"). The request was issued in connection with implementing lessons learned from the 2011 accident at the Fukushima Dai-ichi nuclear power plant, as documented in the NRC's Near-Term Task Force report. Recommendation 2.1 in that document recommended that the NRC staff issue orders to all licensees to reevaluate seismic and flooding hazards for their sites using current NRC requirements and guidance. Subsequent staff requirements memoranda associated with SECY-11-0124 and SECY-11-0137 instructed the NRC staff address this recommendation through the issuance of requests for information to licensees pursuant to 10 CFR 50.54(f).

By letter dated March 11, 2015 (Agencywide Document Access and Management System (ADAMS) Accession No. ML15079A385, non-public), Duke Energy Progress, LLC (Duke, the licensee), submitted its Flood Hazard Reevaluation Report (FHRR) for Brunswick Steam Electric Plant, Units 1 and 2 (Brunswick). By letter dated June 11, 2015 (ADAMS Accession No. ML15148A762), the NRC informed the licensee of the staff's plan to conduct a regulatory audit of the Brunswick FHRR.

The audits performed provided the NRC staff with a better understanding of the analyses (and supporting documentation) of the flooding hazards presented in the Brunswick FHRR, and supported the completion of the staff's review of the FHRR, the issuance of the interim hazard letter (issued by letter dated March 16, 2017, ADAMS Accession No. ML17072A364), and will support the subsequent issuance of a staff assessment. The purpose of this report is to provide the results of the audit that was completed in accordance with the guidance set forth in NRC Office of Nuclear Reactor Regulation Office Instruction LIC-111, "Regulatory Audits," dated December 29, 2008 (ADAMS Accession No. ML082900195).

AUDIT LOCATION AND DATES

The audit was completed by document review via electronic reading room (ERR), remote webinar sessions, and ultimately a site visit. The details are as follow:

Webinar Sessions	10/28/2015; 11/16/2015; 1/26/2016; 3/10/2016; 4/28/2016; 6/23/2016; and 9/29/2016.
Site Visit	2/23/2017.

A closeout phone call was held on November 13, 2017.

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BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2– REPORT FOR THE AUDIT OF DUKE ENERGY PROGRESS FLOOD HAZARD REEVALUATION REPORT DATED November 15, 2017

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OFFICE	NRR/DLP/PBMB/PM	NRR/JLD/LA	NRO/DSEA/RHM	NRR/DLP/PBMB/BC	NRR/DLP/PBMB/PM
NAME	JSebrosky	SLent	CCook*	MShams	JSebrosky
DATE	10/23/17	9/29/17	7/19/17	10/29/17	11/15/17

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Information tirée d'un document de Brunswick Relicensing: « *Le débit quotidien moyen d'eau douce dans l'estuaire du Cape Fear est d'environ 10 000 pieds cubes par seconde, mais la variabilité est considérable. La distribution et la quantité des précipitations dans le bassin hydrographique sont les principaux déterminants de la variation annuelle et saisonnière (CP & L 1980, p. 4-5). Les débits dans la rivière Cape Fear sont les plus élevés en fin d'hiver et les plus bas en fin d'été et en automne. Pendant les périodes d'afflux moyen d'eau douce (après la marée basse), la salinité de surface varie de 8 parties par millier (Sunny Point) à 24 parties par millier (Bald Head), tandis que la*

salinité de fond varie de 15 parties par millier (Sunny Point) à 29 parties. pour mille (tête chauve) (CP & L 1980, p. 4-20).
La hauteur des marées (amplitude) diminue à mesure que le pouls des marées monte. L'amplitude moyenne des marées dans le bas fleuve (près de son embouchure) est d'environ quatre pieds (CP & L 1980, p. 4-5). Les courants de marée dans l'estuaire sont en moyenne de 3,4 pieds par seconde. Le mouvement de l'eau dans le chenal lors d'une marée haute ou d'une marée haute de six heures est d'environ 14 milles. Cette excursion par les marées est importante par rapport à la longueur de l'estuaire et permet ainsi à l'eau et aux organismes associés de circuler dans le système en quelques jours. La partie de l'estuaire située au large de Sunny Point, dans laquelle se trouve le BSEP (essentiellement le premier marée), se caractérise par des schémas complexes de circulation de l'eau, une action vigoureuse des marées, une turbulence, des niveaux de salinité fluctuants et des rapports d'échange élevés avec l'océan. À bien des égards, cette étendue de l'estuaire sert de prolongement de la zone côtière voisine. La distribution et l'abondance des organismes aquatiques dans le bas
Application de renouvellement du permis nucléaire Brunswick Rapport environnemental: Interfaces site et environnement Page 2-
3 https://www.nrc.gov/reactors/operating/licensing/renewal/applications/brunswick/brunswick_er.pdf
En ce qui concerne l'installation de combustible nucléaire usé, qui est apparemment NuHoms - Transnuclear-Areva / Orano. Ils prétendent que cela peut traiter avec une hauteur d'inondation de 50 pieds, bien que les effets de l'eau salée sur elle ne peuvent pas être bons. Son altitude est apparemment d'environ 20 pieds.
« 2.2.2 Conception du niveau d'eau (inondation)
Les 32PTH DSC et HSM-H sont conçus pour une inondation de dimensionnement enveloppante, supposée résulter de phénomènes naturels tels que les tsunamis et les seiches, tels que spécifiés par IOCFR 72.122 (b). Aux fins de cette évaluation générique, une hauteur d'inondation de 50 pieds avec une vitesse de l'eau de 15 ips est utilisée. Le 32PTH DSC est soumis à une pression hydrostatique externe équivalente à la pression de la tête de 50 pieds d'eau ou 21,7 psi. Le HSM-H est évalué pour les effets d'un courant d'eau de 15 ips frappant les côtés d'un HSM-H immergé. Pour le cas d'inondation qui submerge le HSM-H, l'intérieur du HSM-H sera rapidement rempli d'eau à travers les orifices de ventilation du HSM-H. Par conséquent, les composants HSM-H ne sont pas évalués pour la quantité d'eau statique résultante. Les effets des inondations et de la submersion sur le canister sont traités aux chapitres 3, 4 et 11.
2.2.2.1 Élévations des inondations
Il est prévu que les ASN 32PTH et HSM-H seront situés sur des sites non inondables. Toutefois, comme indiqué ci-dessus, les ASN HSM-H et 32PTH sont conçus pour une crue d'altitude de 50 pieds au-dessus de la base du HSM-H.

2.2.2.2 Phénomènes pris en compte dans les calculs de charge de calcul
Le HSM-H est conçu pour résister aux charges résultant des forces générées par la crue maximale probable, y compris des phénomènes dynamiques tels que la quantité de mouvement et la traînée. Le 32PTH DSC est conçu pour une charge hydrostatique égale à une immersion de 50 pieds dans
l'eau. " Https://www.nrc.gov/docs/ML0415/ML041540170.pdf
Liens-documents complémentaires:
https://www.nrc.gov/reactors/operating/ops-experience/japan/plants/bru2.html
2015 Walkdown https://www.nrc.gov/docs/ML1427/ML14279A268.pdf
Closeout appel téléphonique en novembre
2017: https://www.nrc.gov/docs/ML1727/ML17271A248.pdf
https://tidesandcurrents.noaa.gov/est/station_shtml?stnid=8658120
https://en.wikipedia.org/wiki/Hurricane_Hazel
https://tidesandcurrents.noaa.gov/waterlevels.html?id=8658120&units= métrique &
bdate = 19541011 & edate = 19541019 & datum = MHHW & interval = h
https://tidesandcurrents.noaa.gov/est/seasonal.shtml?stnid=8658120
Mise à jour sur les inondations dues aux ondes de tempête le 12 septembre 2018 à propos de l'ouragan Florence :
« *PLUIE STORM: La combinaison d'une onde de tempête dangereuse et de la marée provoquera l'inondation des zones normalement sèches près de la côte par la montée des eaux qui remontent du rivage. L'eau peut*
potentiellement atteindre les hauteurs suivantes au-dessus du sol si le pic de surtension se produit au moment de la marée haute…
Cape Fear à Cape Lookout, y compris les
rivières Neuse, Pamlico, Pungo et Bay… 9-13 ft
North Myrtle Beach à Cape Fear… 6 à 9 m
Cape Lookout à Ocracoke Inlet… 6 à 9 ft
South Santee River jusqu'à North Myrtle Beach … 4-6 ft
Ocracoke Inlet jusqu'à la frontière Caroline du Nord / Virginie… 4-6 ft
Edisto Beach jusqu'à South Santee River… 2-4 ft
L'eau la plus profonde se produira le long de la côte immédiate dans les zones de vents soufflant du large , où la vague sera accompagnée de grosses
vagues destructrices. Les inondations liées aux surtensions dépendent du moment relatif de la surtension et du cycle des marées et peuvent varier considérablement sur de
courtes distances. Pour des informations spécifiques à votre région, veuillez consulter les produits publiés par votre
bureau de prévisions local du service météorologique national.

PLUIE: Florence devrait produire des
précipitations abondantes et excessives dans les régions suivantes…
Caroline du Nord côtière… 20 à 30 pouces, isolée 40 pouces
Caroline du Sud, ouest et nord de la Caroline du Nord… 5 à
10 pouces, isolée 20 pouces
Ailleurs dans les États des Appalaches et du centre du littoral de l'Atlantique… 3 à
6 pouces, isolée 12 pouces
Ces précipitations produiraient des crues éclair catastrophiques et des inondations importantes du fleuve. "
Https://www.nhc.noaa.gov/text/refresh/MIATCPAT1+shtml/120852.shtml ?
Cet article a été publié le 12 septembre 2018 à 8h13 HAE (12h13 UTC).

Accès à la centrale nucléaire Brunswick limitée en raison de l'inondation des routes; Travailleurs dormant sur des lits de camp

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18 mardi SEPT. 2018

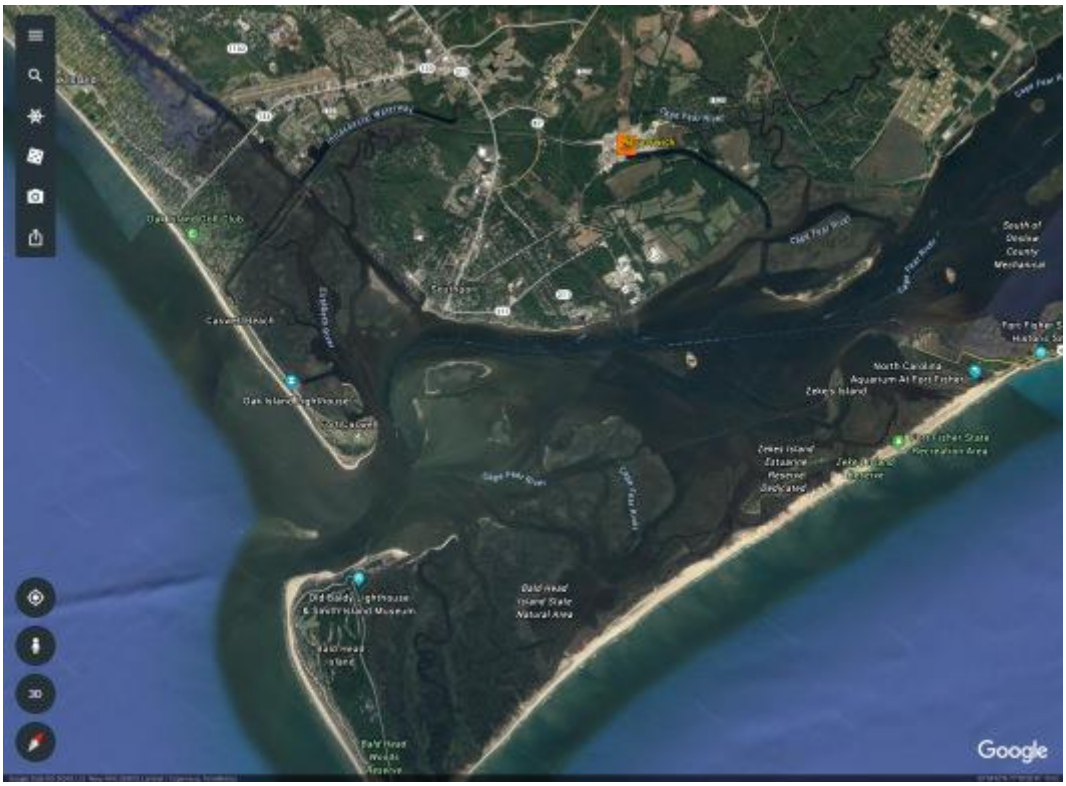
PUBLIE PAR MININGAWARENESS IN NON CLASSE

≈ LAISSER UN COMMENTAIRE

Mots clés

Les ouragans de l' Atlantique , les tempêtes de l' Atlantique , Cape Fear , dangers du nucléaire , l' environnement , les inondations , l' ouragan Florence , perte de puissance , Caroline du Nord , nucléaire , énergie nucléaire , l' énergie nucléaire , les réacteurs nucléaires , les déchets nucléaires , les déchets radioactifs , la pluie , la gestion des risques , Spent Combustible nucléaire , onde de tempête , US NRC

Entre le jeudi matin et le vendredi matin, les réacteurs nucléaires Brunswick ont été mis hors tension: https://www.nrc.gov/reading-rm/doc-collections/event-status/reactor-status/2018/2018PowerStatus.txt le samedi après-midi un rapport a été envoyé au US NRC, apparemment en raison de l'inaccessibilité du site de la centrale nucléaire de Brunswick à compter de minuit vendredi / samedi, en raison de l'inondation de routes locales. L'inondation des routes de la région ne devrait pas être une surprise. Comme on peut le voir sur la carte du haut, la centrale nucléaire est entourée d'eau: « *ÉVÉNEMENT INHABITUEL DUS AUX CONDITIONS DU SITE PRÉVENANT L'ACCÈS AUX PLANTES*



«Un événement dangereux a entraîné sur le site des conditions suffisantes pour interdire au personnel de l'usine d'accéder au site par des véhicules personnels en raison de l'inondation de routes locales par la tempête tropicale Florence.»
DHS notifié SWO, FEMA OPS et DHS NICC. Notifié FEMA NWC, NuclearSSA et FEMA NRCC par courrier électronique. "
Date de notification: 15/09/2018
Heure de notification: 15:45 [HE]
Date de l'événement: 09/15/2018
Heure de l'événement: 00:00 [HAE]
Date de la dernière mise à jour: 09/15/2018 " https: // www .nrc.gov / reading-rm / doc-collections / event-status / event / 2018 / 20180917fr.html
https://www.nhc.noaa.gov/archive/2018/al06/al062018.public.063.shtml ?
Sur la base des informations disponibles, il n'y a aucune raison de croire que le site lui-même a été inondé - bien que si l'ouragan avait été plus puissant et vint plus au sud, il aurait pu être inondé. Il existe toujours un risque de défaillance de la pompe de puisard, entraînant des inondations dues aux précipitations. De plus, les travailleurs ont été coincés dans des lits de camp et sont probablement privés de sommeil. Nous ne savons pas non plus ce que manque d'eau pour chasser les toilettes. Ou signifiaient-ils vraiment le manque d'égouts sanitaires? Pour le refroidissement du réacteur, l'admission provient de la rivière Cape Fear et l'émissaire vers l'océan. Y a-t-il un problème de prise d'eau en raison d'une inondation? Si oui, comment refroidissent-ils les réacteurs et le combustible

irradié? Le site Web du gouvernement du CNRC devrait contenir des documents traitant de la conception, etc., de Brunswick. Mais, https://miningawareness.wordpress.com/2018/09/13/brunswick-nuclear-power-stations-cliff-edge-barriers-appear-to-fall-almost-8-feet-short-of-required-storm- niveau de protection contre les surtensions /

« ***Les inondations limitent l'accès à la centrale nucléaire de Duke à Brunswick; les équipages utilisent des porta-pots, des berceaux*** »PAR JOHN MURAWSKI, NewsObserver / The Herald Sun, http://archive.is/y4pUM

Ce qui suit est un extrait d'un document sur les problèmes et les leçons prétendument tirés de l'ouragan Andrew:*Caractère adéquat du moment de la fermeture d'une usine en prévision d'un ouragan: les procédures de Turkey Point pour le calendrier de fermeture d'une centrale en prévision d'un ouragan exigent que la centrale soit au moins en mode 4 (arrêt à chaud) 2 heures avant le début de l'ouragan. force des vents sur le site. Estimant 8 heures pour effectuer un arrêt ordonné, le titulaire de permis a commencé à fermer une usine environ 12 heures avant l'atterrissage prévu de l'ouragan. En conséquence, les deux unités étaient en mode 4 lorsque l'ouragan Andrew a frappé. Toutefois, les engagements pris par les titulaires de licence en réponse à la règle de la panne de la station imposent seulement à la titulaire de licence de commencer l'arrêt au moins 2 heures avant le début des vents de force ouragan. Donc, le fait de démarrer une centrale strictement en conformité avec les engagements pris par le titulaire de la licence aurait pu avoir pour conséquence que la centrale est en train de fermer deux unités en cas de coupure de courant. De plus, à Turkey Point (et dans d'autres réacteurs commerciaux susceptibles d'être endommagés par un ouragan), un équipement important (par exemple, une eau d'alimentation auxiliaire) est situé à l'extérieur et ne sera probablement pas accessible pendant un ouragan.. "* Https://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/1993/in93053.html

«L' ***inondation de Florence limite l'accès routier à la centrale nucléaire de Duke*** *Publié: Lun, 17 septembre 2018 17:23:28 -0400 Duke Energy Corp a déclaré lundi que sa centrale nucléaire de Brunswick en Caroline du Nord restait fermée en toute sécurité malgré l'accès limité par la route au site à cause des inondations causées par la tempête Florence* ". http://feeds.reuters.com/~r/reuters/environment/~3/6ZjhBDn5jfs/florence-flooding-limits-road-access-to-duke-nuclear-plant-idUSKCN1LX25N Grande explication sur minuit: http: // www.npl.co.uk/reference/faqs/is-midnight-12-am-or-12-pm-faq-time

~~OFFICIAL USE ONLY – SECURITY RELATED INFORMATION~~

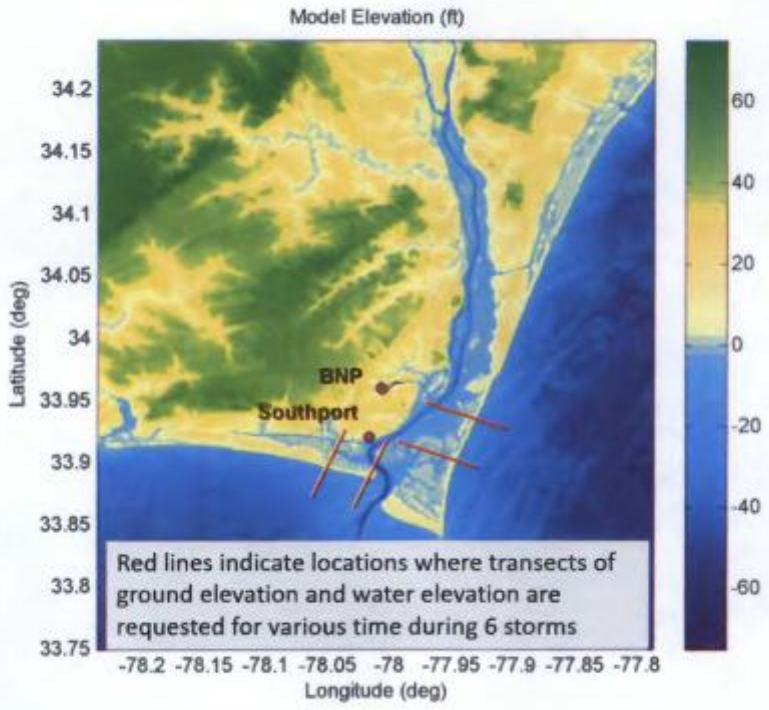


Figure 2: Area 1

Information Needs No. 22 – Figure of Transects

https://www.nrc.gov/reading-rm/doc-collections/cfr/part050/part050-0002.html
https://www.npr.org/2018/09/13/647358237/hurricane-florence-weakens comme un peu comme il se ferme dans la côte nord de la Caroline