

**RESPONSES TO COMMENTS**  
**Chemours Fayetteville Works**  
**Cape Fear River PFAS Mass Loading Model Scope of Work**

<b>Comments From</b>	<b>Comment ID</b>	<b>Comment</b>	<b>Responses</b>
CFRW	1	<i>With regards to Section 4.4.2, page 14, more information is needed about the long-term wells, or LTWs, being used to analyze groundwater discharge from the Black Creek Aquifer to the Cape Fear River. In particular, Chemours should provide all the borehole logs and monitoring well construction details to verify Geosyntec’s findings.</i>	Chemours has provided Geosyntec with the LTW borehole logs and past monitoring data. Geosyntec will integrate this information into its assessment of PFAS mass loading from the Site to the Cape Fear River.
CFRW	2	<i>Accurately analyzing PFAS mass loading into the Cape Fear River requires at least one wet weather sampling event taken during wet months, or during a period with higher precipitation.</i>	As discussed in section 4.7 page 16 of the Modeling Scope of Work document, wet weather samples will be collected at the mouths of tributaries, seeps and from locations in the Cape Fear River.
CFRW	3	<i>In Section 4.3 page 13, Chemours should be evaluating aerial deposition from the facility to the Cape Fear River, as well as to its tributaries—Georgia Branch and Willis Creek. It is not currently clear from the plan that the company is doing so.</i>	Aerial deposition potentially occurring from the facility to Cape Fear River tributaries will be incorporated into the model by directly measuring PFAS concentrations in surface water samples collected at the mouths of the tributaries. These water samples include potential PFAS in the tributaries from air deposition. Geosyntec will also estimate the direct aerial deposition component to the creeks using the same methods used for the Cape Fear River (deposition rate iso-contours, surface areas and tributary flow velocities).
CFRW	4	<i>With regard to Sections 4.3 (page 13) and 4.6 (page 15), it is not clear that the extent of aerial deposition from the facility has been fully evaluated, which is important to understanding these pathways. Geosyntec appears to be evaluating off-site groundwater using only residential well sampling. However, it is possible that the residential well sampling program assesses an area smaller than the aerial deposition from the facility, in which case the PFAS mass loading of aerial deposition off-site and to the Cape Fear River and its tributaries will not be fully evaluated.</i>	To capture potential upstream offsite groundwater contributions to Site-associated PFAS loadings, samples will be collected from the Cape Fear River directly upstream of the Site. These results in combination with private well data and samples collected adjacent to the drinking water intakes at Bladen Bluffs and Kings Bluff Canal will be used to assess upstream and downstream offsite groundwater contributions. Note that the sensitivity analysis discussed in section 5.2 will further evaluate the potential contribution from offsite groundwater.
CFRW	5	<i>It is not clear that this plan assesses surface water contamination from runoff that comes in contact with on- and off-site contaminated soil. This is a source of PFAS loading into the Cape Fear River and its tributaries, and should be assessed.</i>	Onsite stormwater runoff that is captured through the network of storm drains is accounted for in the model as transport pathway 4 (section 4.5). Further, onsite stormwater runoff that is not captured through the network of storm drains is anticipated to flow through the catchment areas of Willis Creek, Georgia Branch Creek, the seeps and Old Outfall 002, which are being assessed in the model (transport pathways 2, 5, 7 and 9). Contributions from offsite runoff will be assessed through a mass balance approach (section 4.6) and measured river concentrations adjacent to Bladen Bluffs and Kings Bluff Intake Canal. Initial modeling efforts demonstrate that onsite stormwater is a minor component of PFAS loading to the Cape Fear River. Additionally modeling efforts and HFPO-DA results reported by CFPWA both suggest storm events are correlated with reductions in HFPO-DA concentrations due to additional dilution from increased river flow.

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NCDEQ	6	<i>1. The document does not describe the spatial extent of the model or how the boundaries will be or were decided. Please clarify.</i>	The upstream spatial extent of the modeling effort will be the upstream river location where measured concentrations of Site-associated PFAS are non-detect. Over May 22 and 23, 2019 samples were collected from the river 8 and 20 miles upstream of the Site in support of this modeling work. Upon receipt of laboratory results, the results will be reviewed to assess if Site-associated compounds are non-detect. If there are detections, then an additional set of samples will be collected at further upstream to determine spatial extent. The downstream spatial extent of the modeling effort will be at the Kings Bluff Intake. Over May 22 and 23, 2019 samples were collected from these locations.
NCDEQ	7	<i>2. When the model is completed for baseflow conditions and during a storm event, DWR would like a complete copy of the model including supporting data for all calculations and assumptions.</i>	Geosyntec will provide DWR with the excel file used to prepare the modeling analysis.
NCDEQ	8	<i>3. It is unclear why the proposed model appears to require so few independent samples. Please explain. For example,</i>	The number of sampling events outlined in the modeling scope of work document were constrained by the time available to collect, analyze and then interpret the data before the consent order deliverable date of August 26, 2019 for the Paragraph 12 Reductions Plan. The Reductions Plan submission will outline a quarterly sampling and flow gauging schedule for the Seeps, Old Outfall 002, Outfall 002, Willis Creek, Georgia Branch Creek and the Cape Fear River upstream and downstream of the Site. This sampling will be implemented for a period of two years upon which time the scope and frequency of sampling will be re-evaluated in consultation with NCDEQ. The continued additional data collection will help assess potential variability over time, seasons, etc., The modeling analysis will be updated at minimum twice a year to account for newly collected data. Specific responses to NCDEQ comment number 3 (comment ID #8) sub-bullets are listed below.
NCDEQ	9	<i>a. How many samples will be used to estimate Cape Fear River concentration and flow data? Taken under what conditions? (p.12) Please also specify the number of samples that will be used to characterize Willis Creek, Georgia Branch Creek, and Old Outfall 002. (p. 13)</i>	a) Two sampling and flow gauging events of Georgia Branch Creek, Willis Creek, Old Outfall 002 and the Cape Fear River will be performed. Cape Fear River flow data will come from USGS river flow gauging locations. Samples will be collected during dry and wet weather conditions. Weekly Cape Fear River data published by CFPUA will also be considered in the Paragraph 12 submission.
NCDEQ	10	<i>b. Why are only two seep samples proposed? (p. 14)</i>	b) Please see response to NCDEQ comment 3, comment ID #8.
NCDEQ	11	<i>c. Samples will be taken from Outfall 002 every two weeks. How many samples in total will be used for model development? (p. 15)</i>	c) Two samples are collected per week from present Outfall 002 using a composite sampler. These data will be considered in the model development and Paragraph 12 submission.

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NCDEQ	12	<i>d. Page 17 seems to indicate that a total of two samples will be used for each location, at least for calibration purposes. Please explain.</i>	b) Please see response to NCDEQ comment 3, comment ID #8.
NCDEQ	13	<i>4. Does Outfall 002 have any groundwater contribution? (p. 9)</i>	On April 24th 2019 the Chemours contractor team conducted dry weather sampling at locations in the Site drainage network to assess the potential for groundwater contributions to PFAS detected in water sampled from Outfall 002. An additional set of samples was collected May 30 2019 from the Outfall channel between where DuPont area stormwater enter the channel and the Outfall 002 sump where the water enters the pipe to the river. The results of these sample analyses will be described in the Paragraph 12 Reductions Plan submission.
NCDEQ	14	<i>5. Onsite groundwater paths seem to miss the potential for the terracotta pipe to add to PFAS loading to Outfall 002. Has this possibility been analyzed? (p. 13)</i>	On April 24th the Chemours contractor team conducted dry weather sampling of the influent to the Wastewater Treatment Plant which includes contributions from Kuraray that flow through the Terracotta Pipe. The treated effluent of the Wastewater Treatment Plant discharges through Outfall 001 towards Outfall 002. The results of these sample analyses will be described and interpreted in the Paragraph 12 Reductions Plan submission.

**Notes**

CFPUA - Cape Fear Public Utility Authority

CFRW - Cape Fear River Watch

DWR - Division of Water Resources

HFPO-DA - hexafluoropropylene oxide dimer acid

LTW - long-term wells

NCDEQ - North Carolina Department of Environmental Quality

ORD - Office of Research and Development

PFAS - Per- and polyfluoroalkyl substances

USGS - United States Geological Survey